Faculty Information Literacy Stipend

Final Report

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Course: CEE 5/7308 Smart Infrastructure and Environment

Semester: Spring 2024

Introduction

The cornerstone of CEE 5/7308 is a semester project in which students write and present a National Science Foundation (NSF) mock research proposal. One of two major components in the proposal is the comprehensive literature review (the other is a presentation of preliminary results using technical tools developed in class). The literature review the critical step in determining if a student's research idea is appropriate, novel, and properly motivated. In past semesters, I have found the literature review to be the weakest part of student proposals. Upon consultation with Sylvia Jones, we created assignments, presentations, and rubrics designed to improve student understanding of appropriate source research, attribution, and ultimately, literature review. The improvements to the course supported by this award were successful and impacted student learning; I will continue to work with Sylvia in future semesters.

Description of the information literacy assignment or activities

The primary information literacy addressed in this award was technical source identification, evaluation, attribution, and synthesis (e.g. annotated bibliography and narrative literature review). The first formal activity associated with this award was a presentation given by Sylvia Jones on 1/31/2024 in class. Sylvia covered a basic introduction to the library and transitioned to a very detailed overview of the tools available to SMU students seeking to identify technical courses. She included several detailed examples and even incorporated some of the students' topics as examples (e.g. bridge condition monitoring). The interactive nature of this discussion ensured the students were confident in the tools (e.g. Compendex, Web of Science) beyond a simple Google search. The first formal assignment comprised two information literacy components: (1) an annotated bibliography of 20 sources and (2) a preliminary presentation of the bibliography including a systematic presentation of how the sources were obtained. Sylvia created an assessment rubric and we both assessed the written annotated bibliographies as a mid-semester grade and feedback loop for students. Additionally, Sylvia attended the mid-semester presentations and give informal feedback on the processes and contents of the students' presentations. The last assignment was the integration of the annotated bibliography into a coherent, narrative literature review serving as a major component of the final project.

Method of assessment

Students were asked to provide more information literacy-specific assignments and deliverables this semester; these activities greatly aided the final result of their individual narrative literature reviews in their final proposal projects. Students demonstrated learning with a written annotated bibliography, a portion of their mid-semester preliminary presentation dedicated to source acquisition (process and findings), and finally, a cohesive narrative blending source themes into a convincing literature review.

Results and impact on student learning

Informal discussions indicated a strong benefit of Sylvia's presentation and feedback on the literature review process. Additionally, rubric results are as follows:

Table 1: Composite Annotated Bibliography Results

Metric	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6	Student 7	Student 8	Average
Recency and Quality of Sources	3.3	1.7	3.3	5.5	3.3	1.7	3.3	3.2	**63%**
Accurate Citation Style (ASCE)	1.1	3.3	5.5	4.4	3.9	5.5	3.9	4.0	**79%**
Annotations Content (what did they do; conclusion; etc.)	1.1	3.3	3.3	4.4	5.5	4.4	4.4	3.8	**76%**
Annotations Structure	1.1	2.2	5.5	5.5	5.5	5.5	5.5	4.4	**89%**
Overall Quality	1.1	3.3	3.9	5.0	5.5	5.0	5.0	4.1	**82%**
Total	**7.7**	**13.8**	**21.6**	**24.9**	**23.8**	**22.1**	**22.1**	**19.4**	**78%**

Individual metric averages are given in Table 1. Students struggled most with finding quality sources for this initial assignment. Overall, averages of individual student performance (composite between faculty and library liaison) were between 32% and 94% with an average of 78% for the initial annotated bibliography. For the final project, literature review portion, the scores ranged from 60%-100% with an average of 78%. The narrative is significantly more difficult to compose than the annotative bibliography.

Summary and next steps

After discussion with Sylvia, I would like to continue to involve the library in a presentation each semster the course is offered and have a library member join presentations when available. Students valued connecting personally with Sylvia. Additionally, I would like to assess the final project at a more granular level (similar to the mid-semester project – Table 1). I would also like to include one more assignment to help students transition from the annotated bibliography to the narrative more successfully.

Appendix – Rubric, Mid-Semester Assignment, Final Project Assignment, Student Examples

Evaluation Form for Annotated Bibliography

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Evaluation Criteria Min:1 Max: 5	PAPER (Student)						
Recency and Quality of Sources							
Accurate Citation Style (ASCE)							
Annotations Content (what did they do; conclusion; etc.)							
Annotations Structure							
Overall Quality							
Total							

<u>**Project**</u>
Preliminary Proposal Report and Presentations Due 6:30 pm, Wednesday, March 6, 2024
Final Proposal Presentation Due in class April 24, 2024
Final Proposal Due 6:30 pm, Wednesday April 24, 2024

The project in this course will comprise developing a National Science Foundation (NSF) style grant proposal for funding a smart infrastructure project of your choosing. You will select a call for proposals posted on the NSF website that you wish to respond to. You will then formulate a project plan and provide a proof of concept with preliminary results. Each project must encompass two of the main areas detailed in the infrastructure report card. Students must work on this project individually.

The project will be divided into two main submissions: a preliminary proposal, which will be due partway through the semester, and a final comprehensive proposal, which will be due at the final.

<u>Preliminary Proposal [Report – 10%, Presentation – 5%]</u>
The preliminary proposal will comprise a report containing the following:

Identification of an NSF Call for Proposals
The NSF puts out calls for proposals for areas of research that they are looking to fund. It is the responsibility of you, the researcher, to identify appropriate calls that are in line with your project goals. A full A-Z index of current NSF funding opportunities can be found here: https://nsf.gov/funding/azindex.jsp. The opportunities are sorted by topic; topics such as "Civil", "Cyber-Physical", and "Engineering" may be helpful.

Each project will contain a synopsis that describes the research that the NSF is looking to fund. This will guide how you develop the rest of your project, so it is crucial to select a proposal call that aligns with your research interests. For any hope of receiving funding, it is critical that you propose a project that conforms to what the NSF is looking for; make note of any keywords used in the synopsis, as it is useful to include these in your proposal as well.

Describe how your project fits the NSF program you have chosen.

Project Summary
Provide a summary of your proposed project discussing the following:

- What is your infrastructure/area focus and to what NSF call are you responding? Include motivation and a literature review.
- What is the goal of your project and the outcome of your system?
- Identify the primary challenges of the project.
- What are the preliminary sources of data that you will use? How will you collect and analyze them?

Literature Review

When performing research, it is important to understand what research has already been done in the area you are focusing on. This is important because (1) it allows you to ensure that the work you are doing is novel (the NSF will not fund you to reinvent the wheel), and (2) research performed by other researchers in your area may provide insight into better ways to solve the problems within your own project (or you may identify gaps in the existing research that your research can fill). Specifically, you will be able to: (1) Discern legitimacy and context of sources, (2) balance broad vs. focused inquiries, and (3) identify appropriate research gaps.

Identify 20 sources that discuss research findings applicable to your chosen area of focus or characterize the problem. Focus on articles that have been published recently (2020-present). One helpful tool is https://scholar.google.com/, which functions just like normal Google (keyword searches) but returns only links to journal articles. We will have a guest speaker, Sylvia Jones, from the library on 1/31/2024. She will provide and overview of tools from the library along with some tips on literature reviews and sources in general.

From your pool of 20 sources, choose 10 and perform a detailed annotated bibliography. Provide a summary of each journal article (what did they do, what were there conclusions, etc.) as well as how the research contained within pertains to your project of choice. A guide for constructing an annotated bibliography can be found here: https://guides.library.cornell.edu/annotatedbibliography Use the ASCE citation style guide for citing your selected journal articles. A description of the ASCE style guide can be found here: https://www.canterbury.ac.nz/library/support/citations-and-referencing/asce-citation-style/.

CEE5308 Students may identify 16 initial sources and choose 8 for the detailed bibliography.

Preliminary Proposal Formatting Requirements:
Preliminary reports must follow NSF formatting Guidelines and should include a (1) Detailed Cover Page (NSF, call, duration, budget, due date, etc.), (2) Project Summary, and (3) literature review.

Preliminary Proposal Presentations:
Preliminary proposal presentations will comprise 5 minute presentations with a 1-2 minute Q&A.

Specific Requirements (e.g. formatting, etc) will be made available prior to the submission deadline; exact details on the deliverables are subject to change prior to submission.