Strengthening Students' Information Literacy Skills as They Develop Original Research Proposals for a Scientific Process Course

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ISC 3120: Scientific Process

This Scholarly-Enriched Course has been designed to teach specific course content, which will include the production of scholarly work that utilizes writing, critical thinking, and information literacy.

Scientific Process is required by all natural science majors at FGCU. It has been identified as a scholarly-enriched gateway/research methods course per the University's Quality Enhancement Plan, FGCUScholars. In this course students learn to carefully read and evaluate scientific papers; develop original scientific research proposals on topics of their interest which integrate current knowledge while asking new questions; and evaluate each other's proposals through a peer review assignment formatted as an NSF funding panel.

Information Literacy Enhancements

Information Literacy is defined by the American Library Association as "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." These abilities are an important part of undergraduate research, as students must be able to find, access and use multiple sources of information to inform the development of their own proposals. Information literacy instruction and collaboration with faculty in support of undergraduate research is a current topic of interest among academic librarians (Hensley 2015). At FGCU, Biology and library faculty have collaborated to add the following course enhancements to the Scientific Process course:

- **Librarian instruction sessions** for the class increased from one to two. The first session focused on generating keywords and finding background information. The second focused on in-depth literature searching in conjunction with the use of RefWorks for citation management.
- Students were required to complete a **Search Strategy Worksheet** identifying keywords from their research questions and as synonyms or related terms for each.
- A **Research Log** in which students wrote down the different databases and search terms they used, their usefulness, and notes, was also required.
- An **Information Literacy Self-Efficacy Survey** was administered at the beginning of the course and then again after the course enhancements.

Preliminary Assessment Results

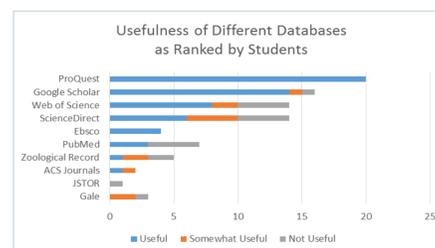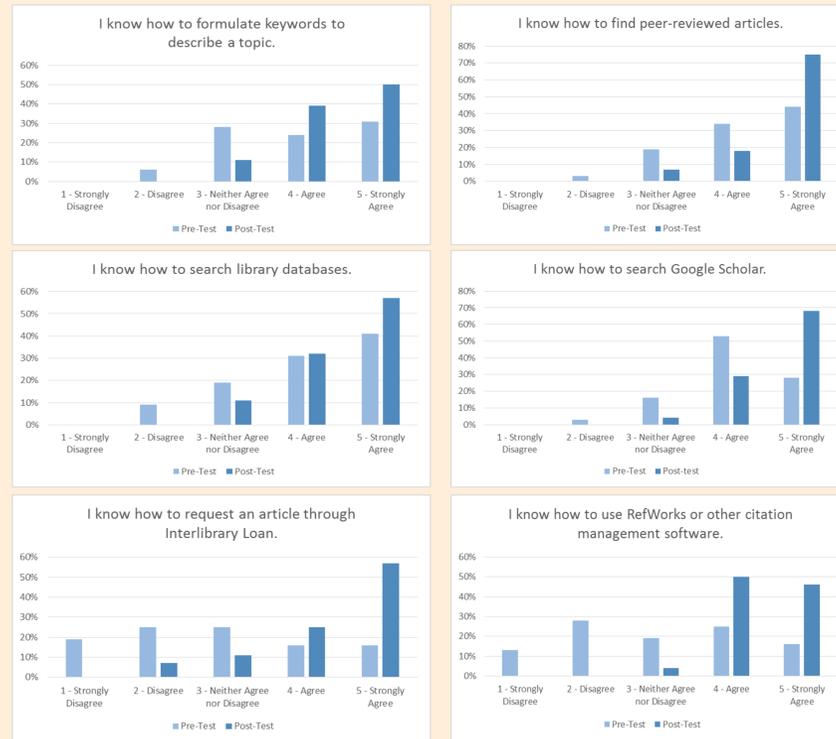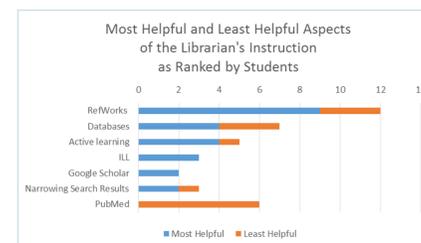**Figure 1**: Information Literacy Self-Efficacy Survey Results

Figure 2: Usefulness of different databases/search engines as ranked by students using their Research Logs.

Figure 3: Most and least helpful aspects of the librarians' instruction sessions per student responses to open ended questions at the end of the Information Literacy Self-Efficacy Survey.

Search Strategy Worksheets: The vast majority of students identified **three keywords** to describe their topics, as was required by the worksheet. The lowest number of synonyms or related terms identified for a keyword was **zero** and the highest number was **nine**. The average number of synonyms identified was **three,** and the most common number (mode) was **two**.

Emerging Conclusions

The first information literacy instruction session and the Search Strategy Worksheet helped prepare students for a thoughtful and deliberate search of the scientific literature. Most students completed the worksheet satisfactorily, with an average of three synonyms or related terms identified for each keyword. The Research Log, introduced during the second instruction session along with advanced database searching techniques, emerged as a powerful tool, as it forced students to use multiple databases and evaluate them. Many students provided surprisingly detailed reflections on their search processes in the Notes column. Sharma (2007) found similar value in having students complete search strategy worksheets and research logs as a part of information literacy instruction.

A moderate level of librarian involvement in course design and information literacy instruction has been found to result in the greatest improvement in students' research skills (Junisbai, Lowe, & Tagge, 2016). Our collaboration appears to have had a positive impact on students' skills as measured by the Information Literacy Self-Efficacy Survey. The strongest gains were seen in using RefWorks and Interlibrary Loan. While students' confidence in their ability to search library databases, search Google Scholar, and find peer-reviewed articles was fairly high to begin with, it improved even more after the course enhancements, with a majority of students indicating they strongly agreed. Students identified ProQuest and Google Scholar as their preferred search tools, while the RefWorks component was deemed the most helpful aspect of the instruction. It should be noted that few students chose biomedical topics (an unlikely turn of events for this course), which resulted in PubMed being deemed less helpful.

References

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