

Nina Clements and Laura Guertin

Science literacy meets information literacy

Using Zotero as a teaching tool

At Penn State-Brandywine, a small campus in The Pennsylvania State University system located just outside of Philadelphia, librarians and scientists don't often have the opportunity to work together, mostly due to the nature of science assignments. Lower-division science classes don't often require a nonlaboratory research component, meaning that introductory science students spend time doing research in the laboratory instead of the library. That changed when Earth Sciences Professor Laura Guertin contacted Reference and Instruction Librarian Nina Clements to brainstorm strategies for imparting science literacy and news literacy to her students. This collaboration resulted in a semester-long assignment that measured science literacies as well as information literacy.

Two existing courses at Penn State-Brandywine, Environment Earth (EARTH 100) and The Sea Around Us (GEOSC 040), satisfy a general education science requirement for nonscience majors. Both courses were redesigned to focus student learning beyond science content and discipline skill sets. The overarching course goal for both courses was rewritten to allow students to understand, communicate examples, and make informed decisions relating to big ideas and fundamental concepts of Earth/ocean science. One of the subgoals of both courses was for students to be able to assess news with respect to geologic (or ocean) events or Earth science (or oceanography) in general and to read and interpret articles in the news.

To develop the scientific literacy of students and their ability to read, interpret, and evaluate sources of scientific news, we designed a semester-long literacy project involving a weekly search and evaluation of current science news articles, learning and using a digital citation management tool, creating an annotated bibliography, and connecting the content of the science news stories with discipline-specific literacy principles. Ultimately, students used the annotated bibliography and science literacy principles as a resource for the students' take-home final exam.

For this literacy assignment, students had two instructional sessions in the library's computer lab. In the first session, we gauged students' facility with credible news sources by asking them to introduce themselves and share their favorite news source. This enabled us to learn their names as well as gain a sense of the types of sources with which they were familiar. Most sources the students identified were not appropriate for this type of project (such as Yahoo News), so it was helpful to know that from the beginning.

We also evaluated a hoax website¹ together using the CRAP test (currency, reliability, authority, purpose/point of view). In addition to the CRAP test, we encouraged

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students to rely on class knowledge and common sense. The students in the oceanography course were studying octopus, so Clements showed them a website on the Pacific Northwest tree octopus.² While the site looked credible, students used their common sense and the knowledge they had gained from their class assignments to conclude that the site was a hoax, even though it met more than one of the CRAP test requirements.

Clements gave students a worksheet³ that guided them through the CRAP test and asked them to analyze an article from a list of trusted online sources of Earth/ocean science news on the course's class page, which Guertin designed. Using this list of reliable and recommended websites for the first annotation was key; it gave students a benchmark for how to evaluate other articles they found on their own.

The CRAP worksheet was helpful because it forced students to slow down and articulate their source analysis instead of making a knee-jerk assessment. We divided students in pairs to complete the worksheet and then asked them to present their evaluation to the rest of the class. The threat of public speaking helped to engage students with the assignment and keep them on task. We reviewed the worksheet in the second session as well, though we did not require students to complete it.

The first computer laboratory session also introduced students to the citation management tool Zotero, a free citation management system created by the Center for History and New Media at George Mason University. In the first session, students created Zotero accounts as well as a group library, which they shared with Guertin, so she could check the frequency and pace of the students' annotations. Creating the Zotero accounts took longer than anticipated and ate up much of the session, because Zotero does not automatically accept new accounts, and students needed their own accounts in order to save their articles. In future semesters, we will remedy this by devoting a few

minutes in an earlier class period to account creation, so that everyone will walk into the first library session with an activated Zotero account. We've also established a naming convention for students' use to name their group libraries, so that Guertin will be able to easily identify to which student each shared library belongs.

For their semester-long literacy assignment, students were required to add articles to Zotero weekly for a total of 15 articles, not all at once at the end of the semester. Thus, students were able to add at least one article and annotation to their Zotero libraries during the first session while we were there to help them. The students were required to write their article annotation in the Zotero Notes field and follow specific guidelines.⁴

They summarized the article's argument and assessed the quality of the source based on the CRAP test we reviewed during the first library session. At the end of each annotation in the Zotero Notes field, students also were required to list the Earth Science/Ocean Science Literacy Principles associated with the article. These scientific literacy principles have been defined by the discipline to state the big ideas and supporting concepts all Americans should know about Earth/ocean sciences. By writing an annotation and connecting the article content with these literacy principles, this activity reinforced the relevance of the course content and emphasis on scientific literacy while familiarizing students with Zotero.

The second library lab session was devoted to answering questions about Zotero. For example, several students had forgotten how to add sources to their shared group libraries rather than their individual libraries. Before the second session, Guertin examined each student's group library (she had 60 students overall, so this was a time commitment) and provided sample assignment grades reflecting their progress with the literacy project. Based on her feedback, students were able to ask specific questions about Zotero and specific news sources, as students were discouraged from including

too many articles from the same publication or on the same science topic. The idea behind this was to establish breadth rather than depth on a particular subtopic, since breadth would help them more with their cumulative final exam at the end of the semester. Many students, however, found topics of interest that they wanted to pursue, the assignment (and the final exam) has been revised to allow students to choose a topic of interest.

During the second session, Clements also showed students how to create a bibliography from their Zotero libraries, which they needed to do in order to complete the annotated bibliography component of the project. We also engaged in an additional review with the CRAP test and introduced students to library databases as well as Google News filters and alerts. Again, while in the computer laboratory, students were able to add at least one source to their Zotero libraries, with annotations. This helped ensure student buy-in, since they were essentially completing their weekly assignment by attending the library session and following directions.

At the end of the semester, Guertin required students to complete a reflection of the entire literacy project, and Clements was able to contribute a few general questions about Zotero and the library sessions. Student responses to the literacy project were overwhelmingly positive. Several students reported that they used Zotero for other classes in addition to GEOSC 040 or EARTH 100.

Students often approached librarians to express their enthusiasm for Zotero, and librarians encountered Guertin's Zotero enthusiasts in instruction sessions for other courses. If librarians didn't discuss Zotero as part of the instruction session for another course (such as Rhetoric and Composition), students raised their hands to sing the praises of Zotero to their classmates.

Students also reported an increased comfort level with and use of the campus library and librarians. Their least favorite aspect of the project was the introduction of library databases in the second instruction ses-

sion. Students commented that they found the databases difficult to use and preferred using the preselected news sources on the class website.

We're currently reevaluating the inclusion of library databases in future iterations of the course, because students really were able to find the types of articles they needed through Google and instructor-recommended sources. This required some adjustment, as it was initially difficult for Clements to imagine a library session without library resources, but libraries are much more than simple gatekeepers of information. We can also teach students how to understand and evaluate information from a variety of sources.

Guertin was largely satisfied with the sources and annotations in the student Zotero libraries, as well as their annotated bibliographies and final projects. One key to this project's success was our excellent collaborative relationship. We met over the summer to design the assignment/s and sessions together, which made Clements (and our other librarians) more effective at helping students to meet project requirements. Overall, this project reinforced science literacy principles and helped Guertin reach her overarching and secondary course goals, while also helping students to find, assess, and analyze current news information.

Notes

1. "Save The Pacific Northwest Tree Octopus," accessed August 26, 2015, <http://zapatopi.net/treeoctopus/>.

2. Ibid.

3. kscinfolit, "Handout and Worksheet: C.R.A.P. Test Map," Keene Info Lit Bank, accessed August 26, 2015, <http://infolit.keene.edu/2011/07/12/c-r-a-p-test-map-worksheet-and-handout/>.

4. Diana Hacker, "Hacker-Haddad-APA-AnnBib-2009.qxd-Hacker-Haddad-Apa-Annbib.pdf," *APA Annotated Bibliography (Haddad)*, accessed August 26, 2015, <http://dianahacker.com/pdfs/hacker-haddad-apa-annbib.pdf>. *rh*