Jacalyn E. Bryan and Elana Karshmer

Using IL threshold concepts for biology

Bees, butterflies, and beetles

Fresh from the 2014 ALA Annual Conference in Las Vegas, our minds filled with new ideas for library instruction, we settled into preparing our instruction program for the upcoming fall semester. In addition to a major revision of our first-year information literacy program at Saint Leo University and developing a session for our provisionally admitted students, we were asked to devise a 30-minute (yes, 30 minute) library instruction session for freshmen biology majors who were attending a "Biology Boot Camp" prior to the start of the fall semester. But where to begin? Having been inspired by the ACRL Instruction and Distance Learning Sections' session on threshold concepts at ALA, we decided to use that as a basis for our instructional plan.

Threshold concepts and the Framework for Information Literacy

The term *threshold concepts* has received a good deal of discussion among academic librarians since this paradigm shift forms the basis of the new Framework for Information Literacy for Higher Education. *Threshold concepts* are defined as "those ideas in any discipline that are passageways or portals to enlarged understanding or ways of thinking and practicing within that discipline."[1]

During the learning process, students exist in a *liminal* or transitional space that may be exciting but also intimidating.[2] Jan Meyer and Ray Land are credited with introducing threshold concepts as applied to university learning environments and delineated five characteristics of these concepts: transformative, irreversible, integrative, bounded, and potentially troublesome.[3]

As Lori Townsend, Korey Brunetti, and Amy R. Hofer explain in a *portal* article, threshold concepts are similar to learning outcomes, which are used in designing curriculum; however, the difference is that once a threshold concept is acquired, students' perspectives are altered, leading them to see things through a different lens.[4] The new Framework for Information Literacy for Higher Education is built on six frames focusing on one of the following threshold concepts: authority is constructed and contextual, information creation as a process, information has value, research as inquiry, scholarship as conversation, and searching as strategic exploration.[5] There is also a Delphi study in progress that is attempting to identify threshold concepts for information literacy and these are separate from those used in the new framework.[6]

Megan Oakleaf suggests that librarians may want to identify "big ideas" or concepts, develop learning outcomes from those ideas,

Jacalyn E. Bryan is reference and instructional services librarian, email: jacalyn.bryan@saintleo.edu, and Elana Karshmer is instruction program and information literacy librarian, email: elana.karshmer@saintleo.edu, at Saint Leo University's Cannon Memorial Library

come to a consensus on the learning outcomes, and then design their pedagogical methods, assessment tools, and curriculum maps.[7]

The threshold concept theory is also linked to critical thinking as it "deepens our understanding of critical learning experiences."[8] Time constraints, especially in the one-shot session, often lead us to teach in a "tools-based" or skills-based mode rather than guiding students to think critically about information and conceptualize the research process.[9]

One-shots: Here to stay

Although most librarians find the use of one-shot library instruction sessions frustrating and challenging in terms of delivering the requisite content in an engaging manner, research suggests that despite the perceived shortcomings of this type of instruction, students do learn from such lessons. While Marcie Jacklin and Karen Bordonaro note that one-shots are often not offered at the most useful times, and may not be tied to specific assignments, causing them to be overly general, the majority of research available focuses on how librarians might adapt and/or reconfigure the one-shot to make it a more effective teaching tool.[10] Gayla Byerly, Annie Downey, and Lilly Ramin, for example, found that despite the fact that one-shot sessions place increased emphasis on the importance of certain skills, thereby minimizing the importance of others, students at the University of North Texas performed well enough on the Library Instruction Software for Assessment (LISA) to indicate that one-shot sessions had a positive effect on their acquisition of information literacy skills.[11]

Further, Elizabeth Spievak and Pamela Hayes-Bohanon's study of student responses to one-shot sessions suggests that even a single information literacy-themed session was likely to increase the probability that students would use library databases, check out library materials, ask librarians for help, and return for help at a later date.[12] These positive findings and the breadth of research out there on this particular teaching strategy suggest that while the one-shot may have its limitations, it is not going anywhere. Thus, as a staple strategy within the library instruction repertoire, it is imperative that librarians and collaborators continue to find new ways to use the one-shot within particular disciplines and in ways that highlight specific skills and/or knowledge.

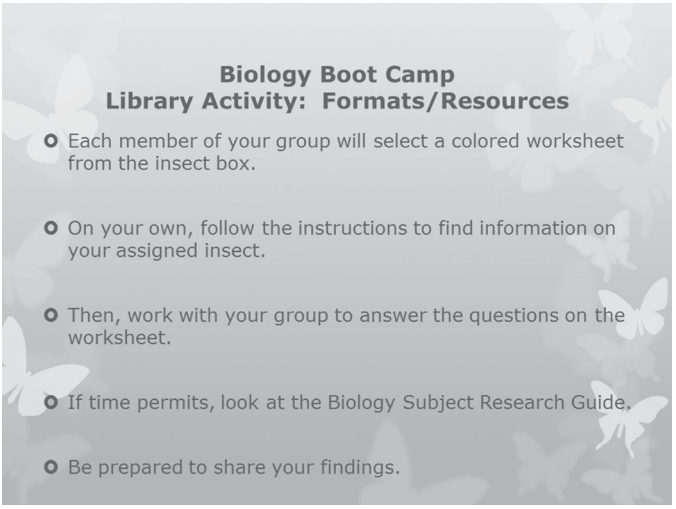
Biology information literacy kits. View this article online for detailed image.

The blueprint: Format as a process

With threshold concepts in mind, we examined the second draft of the framework and thought that format as a process might be a good foundation from which to build our lesson. In particular the knowledge practice of "identify[ing] which formats best meet particular information needs" seemed appropriate. (Since that time, the final framework document has been filed and approved with the items above revised to information creation as a process and "assess[ing] the fit between an information product's creation process and a particular information need," respectively.)

Next we brainstormed about biology, which brought to mind things like labs, experiments, stations, and science kits. We decided to focus on the science kits idea because it

allowed us to concentrate on concepts instead of searching techniques and could be completed in a short amount of time. The kits were comprised of pencil boxes labeled with the common and scientific names of different insects. Inside each box was a corresponding plastic insect, directions for obtaining information on that insect in three different resources, including our library catalog (e-book), *Science Direct* (journal article), and *Access Science* (encyclopedia entry), and a worksheet with questions asking students to evaluate the information they found. In the event that the number of students in the class could not be evenly divided into groups of three, we set aside several kits that contained directions for four different resources, which included the three listed above plus *ProQuest* (journal article).



Biology Boot Camp—directions for activity

At the beginning of the session, we divided the class of 24 students into groups of three and each group received one insect kit. We then explained the directions for the activity. Each member of the group was to select a colored worksheet from their assigned insect box and follow the instructions to find information on the assigned insect. Using the worksheet, the members of the group then worked together to answer the questions on the usefulness and limitations of the resources they used. The questions included: 1) Which resource provided an overview of your insect? 2) Which resource provided the most current, up-to-date information on your insect? 3) Which resource provided the most in-depth information on your insect? and 4) Which resource had the narrowest focus in terms of information on your insect? (If students finished the activity early, they were directed to examine the Biology Subject Research Guide.)

Several groups then volunteered to share their findings with the rest of the class. The discussion revealed that different resources (e.g., e-books, journal articles, and encyclopedia entries) contain different types of information that could be useful in meeting a variety of information needs. However, some of the students' responses to the questions posed indicated that they needed more help understanding and interpreting the types of information they located in the various resources. Their analyses of what they discovered showed that they needed more time and practice in considering how different information formats provide various kinds of information that can be used for a wide array of purposes.

At the same time, other students seemed to understand the differences between the formats and how these formats might best be used to meet their information needs. These findings may be the result of the quality of previous information literacy instruction and the degree to which such instruction was part of the students' K–12 education, as well as the students' individual information literacy aptitude.

This activity required students to take part in cooperative and active learning. Overall

students seemed to be engaged by the use of the insect kits. This might be attributed in part to the subject-specific nature of the activity, the pre-chosen topics that allowed students to dive right in, the use of plastic specimens, and the "fun factor." These observations, however, are anecdotal, since we did not have time to formally assess the session within the 30 minutes allotted.

Future directions

Following the biology sessions, we reviewed our lesson plan and instructional methods and made some minor revisions on the directions and the worksheet in the insect kit to provide better clarity. In the future we would like to institute several substantive changes. First, we have determined that 30 minutes is simply not enough time for this activity because it does not allow every group to share their results. We will consult with the faculty members who organized the Biology Boot Camp and request a minimum of 45 minutes. Second, we would like to incorporate a follow-up assessment of the library session that students could complete online to save time. This would give us some real data to assess the effectiveness of this activity. The survey questions could include a combination of quantitative and qualitative questions, which would allow for the collection of data while providing a glimpse into the students' critical thinking processes. In addition, the results would provide a picture of whether the lesson design and execution is effective in achieving the learning outcomes. Third, we will create a brochure on biology resources that includes the link to our Biology Subject Research Guide, which will be distributed to students at the end of the session.

Adaptability, creativity, and other frameworks

While our project incorporated the use of kits to teach students about resources in biology, this approach could be easily adapted to other subjects.

For example, kits could be created for a literature course exploring different authors and various literature resources. A Shakespeare kit could contain the name of one of his plays and a specific historical event mentioned in that play, as well as visual images and/or physical objects. Students would then be

Biology Boot Camp Assessment

1. Which resource best provides a brief overview of information?
   - Encyclopedia
   - Journal Article
   - E-Book
   - Database

   Explain the reason for the answer you chose.

2. Which resource provides the most current, up-to-date information?
   - Database
   - Journal Article
   - E-Book
   - Encyclopedia

   Explain the reason for the answer you chose.

3. Which resource provides the most in-depth information?
   - E-Book
   - Encyclopedia
   - Journal Article
   - Database

   Explain the reason for the answer you chose.

4. This library session helped me to understand the different types of resources available for research:
   - Strongly agree
   - Agree
   - Neither agree or disagree
   - Disagree
   - Strongly disagree

asked to find information that discusses the relevance of that historical event to the play itself using different resources.

The idea of using kits does not have to be limited to the particular framework or threshold concept described above. It's important to be creative and think outside the box in developing new and engaging activities for information literacy. The Framework for Information Literacy for Higher Education should be viewed as an opportunity for exploration and innovation in information literacy instruction.

Notes

1. "Framework for Information Literacy for Higher Education (January 2015)," ACRL, accessed February 25, 2015, www.ala.org/acrl/standards/ilframework.

2. Korey Brunetti, Amy R. Hofer, Silvia Lu, and Lori Townsend, "Can We Get There from Here?: Threshold Concepts from Theory to Practice" (presentation from ALA Annual Conference, Las Vegas, Nevada, June 29, 2014).

3. Jan Meyer and Ray Land, "Threshold Concepts and Troublesome Knowledge: Linkages to Ways of Thinking and Practising within the Disciplines," (Occasional Report 4), Enhancing Teaching-Learning Environments in Undergraduate Courses Project, Edinburgh (2003): 4-5, accessed November 12, 2014, www.colorado.edu/ftep/documents/ETLreport4-1.pdf.

4. Lori Townsend, Korey Brunetti, and Amy R. Hofer, "Threshold Concepts and Information Literacy," *portal: Libraries and the Academy* 11, no. 3 (2011): 855.

5. "Framework for Information Literacy for Higher Education."

6. Korey Brunetti, Amy R. Hofer, Silvia Lu, and Lori Townsend, "Threshold Concepts and Information Literacy: The Delphi Study," accessed November 13, 2014, www.ilthresholdconcepts.com/.

7. Megan Oakleaf, "A Roadmap for Assessing Student Learning Using the New Framework for Information Literacy for Higher Education," *The Journal of Academic Librarianship* 40, no. 5 (2014): 511–13.

8. Virginia Tucker, Judith Weedman, Christine Bruce, and Sylvia Edwards, "Learning Portals: Analyzing Threshold Concept Theory for LIS Education," *Journal of Education for Library and Information Science* 55, no. 2 (2014): 150.

9. Robert Detmering and Anna Johnson, "Focusing on the Thinking, Not the Tools: Incorporating Critical Thinking Into an Information Literacy Module for an Introduction to Business Course," *Journal of Business & Finance Librarianship* 16 (2014): 105.

10. Marcie Jacklin and Karen Bordonaro, "Innovations in Practice: Drop-In Clinics for Environmental Studies Students," *Partnership: The Canadian Journal of Library and Information Practices and Research* 3, no. 2 (2008), https://journal.lib.uoguelph.ca/index.php/perj/article/view/482/1334#.VH39rMl5XFI.

11. Gayla Byerly, Annie Downey, and Lilly Ramin, "Footholds and Foundations: Setting Freshmen on the Path to Lifelong Learning," *Reference Services Review* 34, no. 4 (2006): 589–98.

12. Elizabeth Spievak and Pamela Hayes-Bohanon, "Just Enough of a Good Thing: Indications of Long-Term Efficacy in One-Shot Library Instruction," *Journal of Academic Librarianship* 39, no. 6 (2013): 488–99.

New Framework for Information Literacy discussion list, website

Connect with colleagues interested in Framework for Information Literacy for Higher Education through a new discussion list. The list will serve as an open forum for asking questions, posting professional development opportunities, and sharing examples of the framework in practice. To subscribe, visit http://lists.ala.org/sympa/info/acrlframe.

More information on the framework, including a recording of the March 11, 2015, ACRL Presents webinar Putting the Framework for Information Literacy into Action: Next Steps, is now available on a new website dedicated to the framework. The website is available at http://acrl.ala.org/framework/.