

On the Development of a Scientific Communications Course

South East Science Boot Camp 2019

Data Blitz

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Talk Outline

- Background and development process
- Student learning outcomes
- Information literacy topics and framework mapping
- Key course assignment

Course Description from APSU Bulletin

Overview of written, visual, and oral methods of science communication; major sources of scientific information and procedures for their efficient use. Focus will be on writing papers, proposals and presentations targeting both scientific and non-scientific audiences.

Setting the Background for the Course

- Chemistry or biology majors; M.A.T. and M.Ed. students with a focus in secondary science
- Support for STEM educators
- Cross-listed for graduate and undergraduate students
- Team teaching opportunity for the Chemistry Department and the Library
- Online format, 8 weeks

ACS Curriculum Standards and Learning Objectives for Accreditation

- 4.4 Chemical Information Resources. A broad range of the peer-reviewed chemical literature must be readily accessible to both faculty and students.

<https://www.acs.org/content/dam/acsorg/about/governance/committees/training/2015-acg-guidelines-for-bachelors-degree-programs.pdf>

ACS Curriculum Standards

- 7.2 Chemical Literature and Information Management Skills. Essential student skills include the ability to retrieve information efficiently and effectively by searching the chemical literature, evaluate technical articles critically, and manage many types of chemical information. Students must be instructed in effective methods for performing and assessing the quality of searches using keywords, authors, abstracts, citations, patents, and structures/substructures.

<https://www.acs.org/content/dam/acsorg/about/governance/committees/training/2015-acg-guidelines-for-bachelors-degree-programs.pdf>

ACS Curriculum Standards

7.4 Communication Skills. Effective communication is vital to all professional chemists. Speech and English composition courses alone rarely give students sufficient experience in oral and written communication of technical information. The chemistry curriculum should include critically evaluated writing and speaking opportunities so students learn to present information in a clear and organized manner, write well-organized and concise reports in a scientifically appropriate style, and use relevant technology in their communications.

<https://www.acs.org/content/dam/acsorg/about/governance/committees/training/2015-acg-guidelines-for-bachelors-degree-programs.pdf>

Student Learning Outcomes

Students will be able to utilize advanced research tools to **locate** and **identify** information sources.

Students will be able to **question** and **evaluate** information sources to determine the quality, authority, and purpose of both formal and informal scientific communications.

Students will be able to **recognize** the peer review process and **critically appraise** scholarly publishing practices.

Students will be able to **synthesize** and **ethically communicate** scientific information in multiple formats in a concise and well-organized manner.

Course Topics

- Information ethics
- Evaluating and understanding information sources
- Peer review, scholarly publishing, and authority
- Searching literature & structure/reaction searching
- Understanding and presenting scientific information

Mapping to the Information Literacy Framework

- Module 1: Information ethics, plagiarism, and word usage in scientific communication. Evaluating information sources. Types of information sources & citation formatting.

Information Has Value

- Module 2: Peer review, scholarly publishing, open access, fair use, and copyright.

Authority is Constructed and Contextual

Scholarship as Conversation

Mapping to the Framework

- Module 3: Information seeking strategies and research tools. SciFinder – research topics, structure & reaction searching, and patents. Google, PubMed, and other databases.

Searching as Strategic Exploration

- Module 4: Reading & understanding different modes of scientific communication. Organization of concepts and mechanics of technical writing.

Research as Inquiry

Mapping to the Framework

- Module 5: Communicating scientific information through a variety of formats.

Information Creation as a Process

Key Course Assignment

Understanding Scientific Communication by Summarizing Articles and Presenting Information.

- Use a structure search in SciFinder to locate an original research article.
- Identify three similar scientific journal articles that either 1) help you better understand the primary article or 2) further elaborate on the research that is presented in the primary article.

Key Course Assignment Continued

- **Write a detailed outline presenting the information from the four articles you identified in a concise and well-organized manner.**
- **From the outline, write a five-page paper presenting the research articles in a concise and well-organized manner. Focus on word usage that is appropriate for scientific and technical communication.**
- **Using the paper, develop a 15-minute oral presentation on your findings.**

Key Questions for Students

- What are the central findings of the scientific article?
- What evidence is present to support the conclusions of the paper?
- How is the article relevant to the field or discipline?
- What concepts are developed within the introduction section that help you understand the background for the research?
- What points from the paper were difficult to understand?
- What topics were straightforward for you to understand?
- What additional information would help you to better understand the article?

Key Questions Continued

- How are the research articles related?
- Is there overlap?
- How are the methods similar or different?
- Look at the references. Include a consideration of the topics discussed, as well as the authority of each paper.

Conclusions

- Create assignments that help students practice communicating scientific information
- Focus on the process
- Repetition

Thank you.

Questions?

References

American College of Research Libraries, 2015. ACRL Information Literacy Framework.

http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/Framework_ILHE.pdf

American Chemical Society Committee on Professional Training, Spring 2015. Undergraduate Professional Education in Chemistry: ACS Guidelines and Evaluation Procedures for Bachelor's Degree Programs. American Chemical Society: Washington, DC.

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