**Science Data Literacy**

An Authentic Learning Experience

**Goals**

To create a Scientific Data Literacy (SDL) course for undergraduate students in science and technology that gives them an understanding of the fundamental concepts in scientific data preservation, management, access, and use to facilitate scientific inquiry. As one of the outcomes, the SDL course will suggest and help prepare students majoring in science and technology to choose a career in science data management.

**Pre-course Survey**

- Assess students’ perceived competence for technology
- Assess students’ perceived competence for data

**Post-course Survey**

- Assess the outcomes students gained
- Assess the instructional content and methods

**Module One: Overview**

Students built a fundamental understanding of scientific data and their technical aspects involving collecting, processing, transformation, management, and use. The Theory of Multiple Intelligence (MI) provided a framework in profiling the characteristics of students’ learning styles, which helped us identify motivational factors and incorporate them into the design of learning materials.

**Module Two: Step by Step Guide**

This module focused on inquiry-based learning by using real-world cases. We created a number of step-by-step guides for students to learn how to identify the needs for organizing, reporting, and managing scientific data and how to design databases and systems based on these needs. The guides covered technical terminology and walked them through typical data management processes, in which students worked in groups to analyze and evaluate the soundness of solutions they designed.

Students were coached in communication skills to prepare them for interviews with researchers, thus raising their confidence and helping them to isolate the data management issues in the elaborate work practices of scientists.

**Module Three: Authentic Team Projects**

Team projects provided the students an opportunity to work in groups on a real-world project that included:

- interviewing science faculty to understand their data management problems and requirements
- analyzing interview results as well as following up with further questions, and then
- designing a solution for managing and using data, and implementing the solution.

The project-based learning gave students a means to apply the knowledge about science data fundamentals they gained from completing the first two modules. They demonstrated a sense of ownership when completing their projects based on interactions with researchers, who were well-established domain experts in physical biology, paleoclimatology, and environmental science.

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**Credit:**

Jian Qin (PI), John D’Ignazio, Ruth Small (Co-PI)

Contact:

jqin@syr.edu

http://sdl.syr.edu