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Information Literacy Stipend (2012): Enhancing Student Research Skills

FINAL REPORT

Course Name & Number: BIOL 382, Development of a Research Project: Measuring Bone Calcium

Expected student learning outcomes and assessment related to information literacy:

1) Students determine the nature and extent of information needed.

Students conferred with instructor and participated in discussions to determine information needed for measuring bone calcium content from bones that were from normal and diseased individuals. A goal of this exercise was to become familiar with relevant literature resources and information retrieval systems that would aid in development of hypotheses and laboratory methods to test questions generated by a hypothesis (bones from diseased animals have less calcium content than bones from normal animals).

Students worked in a group to address a question (topic) regarding what is present in literature data bases by searching the topic (measuring bone calcium) with key words. The students accessed needed information effectively and efficiently using appropriate online databases. The group kept individual logs and individual bibliographies, but they also utilized Mendeley, a reference manager and PDF organizer. This portion of the experience was assisted by Kristen Yarmey, Digital Services Librarian, Weinberg Memorial Library. The students critically evaluated the literature learning to identify original research and distinguish between various designs and their level of control/rigor.

2) Students will select the most appropriate investigative methods of information retrieval for accessing problem solving information.

Students conferred with instructor and participated in discussions to determine information needed. Students developed a hypothesis and formulated questions. They explored general background information and their source, become familiar with the topic, defined specific information needed, identified key concepts and terms, and recognized information that could be combined to produce new information. They revised, as needed, to fine tune their hypothesis and testable questions. Students also identified the value and differences of potential resources, the audience, and purpose of resources, recognized primary from secondary sources of information, and recognized that information needs to be reconstructed from primary sources towards accomplishing their goals.

The exercises experienced allowed the students to select the most appropriate investigative methods of information retrieval for accessing problem solving information. They identified the scope, content, and organization of information retrieval systems available and the most appropriate method for efficient and effective access to needed information.

3) Students design, construct, and implement information search strategies.

The students developed a research plan by developing search strategies with keywords, synonyms or related terms with controlled vocabulary. They implemented a search strategy using different interfaces/search engines and used library sources, email, or Inter-Library Loan services to locate and retrieve information. Students received information on line or in person.

4) Students extract, records, and manage information and its sources.

Students extracted, recorded, and managed retrieved information and its sources. They created a personal retrieval, storage, and management system, and a group storage and management system (Mendeley). For this they copied, cut and pasted, scanned, etc.

5) Students evaluate information and sources critically and incorporate selected information.

Students were able to read and select main ideas and restate those ideas in their own words as they compared and analyzed information from varied sources. In this light, they were able to recognize prejudices of authors, manipulation of information, and contextual differences in information/sources. They were able to synthesize main ideas and create new concepts, recognizing interrelationships among concepts and combining them into potentially useful supporting evidence or whether the information satisfies the research information in need. They compared prior knowledge to determine if it satisfies the research question, drew conclusions based on the gathered information, and then designed and tested questions with appropriately retrieved/learned techniques (laboratory component).

6) Students use information to effectively accomplish a specific purpose.

Students individually and independently organized information retrieved into an outline, a research proposal, and a final report. They integrated new and prior knowledge and transferred information by incorporation, e.g., by paraphrasing. Besides weekly discussions, a primary communication medium was by individual written reports that supported the intended purpose of original biological research. Students were able to understand ethical, legal, and sociological issues surrounding information technology and allowed them to follow laws, regulations, institutional policies, and etiquette related to information retrieval and use.