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Information Literacy in Science & Technology Disciplines

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Information Literacy in Science & Technology Disciplines

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ACRL Conference
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Overview

- **Information Literacy Standards for Science & Technology**
- **Library instruction for engineering students at University of Nebraska-Lincoln**
- **Addressing the S&T IL Standards in LI and assessment**
- **Collaborative development of online assessment**

Early History

- **ACRL/Science & Technology Section (STS) Task Force formed in January 2002**
- **Task Force Charge**
- **Standards, PI's and Outcomes**
- **Based on ACRL ILC Standards**
- **Relate to Science & Technology disciplines**
- **Determine organization**
- **Collaborative input**
- **Report and solicit STS member and other input**

Information Literacy Standards for Science & Technology

Synopsis of the Standards

- **Standard One: Identifying the need for information**
- **Standard Two: Procuring the information**
- **Standard Three: Evaluating the information, revising search strategy, obtaining more information**
- **Standard Four: Using the Information and using it in an ethical and legal manner**
- **Standard Five: Engage in lifelong learning**

Information Literacy Standards for Science and Technology

- **Approved by STS Council, June 2004**
- **Submitted to *College & Research Libraries News***
- **Submit to ACRL Standards and Accreditation Committee (SAC) for approval June 2005**
- **Available from ACRL Standards Web site:**
http://www.ala.org/ala/acrl/acrlstandards/infolitscitech.htm
- **Annotated version from Task Force Web site:**
http://sciencelibrarian.tripod.com/ILTaskForce/ILIndex.htm

Documents and Resources Cited

- **Regional Accreditation Standards**
- **Discipline Specific documents**
- **National Environmental Health Science and Protection Accreditation Council**
- **American Chemical Society, Committee on Professional Training**
- **Accreditation Board for Engineering and Technology Inc. (ABET)**
- **Engineering Libraries Division "Information Competencies for Engineering"**
- **Web site: CAL POLY: Introductory Competencies in Specific Disciplines**

Monographs

- ***Engineering Libraries: Building Collections and Delivering Services*, Conklin and Musser, eds., Haworth Press, Inc, NY 2001**
- ***Information and the Professional Scientist and Engineer*, Baldwin and Hallmark, eds. Haworth Press, Inc, NY 2001**
- ***Online Ecological and Environmental Data*, Baldwin, Virginia A., ed., Haworth Press, Inc, NY 2004**
- ***Communication Patterns of Engineers*. Tenopir, Carol, and Donald W. King, IEEE Press (Wiley-Interscience), Piscataway, NJ 2004**

References in the Standards

- **Annotated sources**
- **Key to References**
- **Regional Standards documents – disciplinary related, interrelatedness, work with others, ethical use of information, continued learning**
- **Discipline documents – professional ethics, group or team work, multi-disciplinary teams, life-long learning, effective communication, critical evaluation**
- **Monographs – synthesis/summary of findings, current awareness, archiving/preservation, literature of professional associations, external vs. internal sources**

Unique characteristics – Standard 1

- **Performance Indicator 2 "Identifies a variety of types and formats of potential sources for information"**
- **Outcome "Understands sources that are specific to the field …"**
- **Handbooks**
- **Patent literature**
- **Standards**
- **Specifications**
- **Product literature**

Unique characteristics – Standard 1

- **Performance Indicator 2 "Identifies a variety of types and formats of potential sources for information"**
- **Outcome "Knows how <u>scientific, technical, and related</u> information is formally and informally produced, organized, and disseminated. <u>Understands the flow of</u>**

<u>scientific information and the scientific information life cycle.</u> EL p. 168-169, NEASC p. 6: 4.18, NEASC p. 6: 4.22, Flaxbart (Chemistry) p. 21, CPE p.12-19."

Unique characteristics – Standard 1
■Performance Indicator 2 "Identifies a variety of types and formats of potential sources for information"
■Outcome "Recognizes that knowledge can be organized into disciplines <u>and combinations of disciplines (multidisciplinary)</u> that influence the way information is accessed <u>and considers the possibility that the literature of other disciplines may be relevant to the information need.</u> ABET 3.d, CHEM p.14, NEASC p. 6: 4.18, Pinelli p. 158, Caracuzzo p. 168 and 169"

Unique characteristics – Standard 2
■Performance Indicator 2 "Constructs and implements effectively designed search strategies."
■Search term input options such as structure searching, image searching
■Using citations and cited reference searching
■Similar features in a variety of interfaces (such as e-mail and save options)

Unique characteristics
■Online Data
■Access, time limitations
■Competitive advantage
■Research Data as intellectual property
■Archival information, preservation
■Works effectively in small groups or teams
■Researcher, funding source acknowledgement

Unique characteristics - Standard 5
■"The information literate student recognizes the need to keep current regarding new developments in his or her field and understands that information literacy is an ongoing process and an important component of lifelong learning. NCA-HLC Criterion Four, 4a, and 4b, SACS 5.1.2, NEASC 4.19, ABET TC2K Criterion 2.h, ABET 3.i, 3.j"
■Keeping up with new developments in field
■Current awareness services
■Scholarly publishing changes

Information Literacy in Engineering at UNL

■Established Library Instruction in 5 Engineering Disciplines
■Mechanical Engineering
■Civil Engineering
■Construction Management
■Industrial & Management Systems Engineering
■Engineering Mechanics

Information Literacy in Engineering at UNL

■Faculty concerns
■Students would rather find an article to read online – ignored reading assignments on reserve
■Students found articles strictly by doing an Internet Search Engine search –faculty wanted them exposed to the journal literature
■Students will copy tables off the Internet, modify them for inclusion in their research papers, and not cite them

Information Literacy in Engineering at UNL

■Background
■UNL Libraries' 1-hour credit course LI110 – declined by CET
■Approach
■CET - identify a candidate class that all engineering students take 2000
■By Department - Identify a candidate class that all engineering students take 2000-2004
■Freshman Orientation 2005

Strategy
■Talk to the Department Chair or visit during a department faculty meeting
■Before faculty are planning for the Fall semester
■Do you have a class that all students in your department take?
■Outline of my Library Instruction – flow of scientific information
■Two library instruction sessions, the first short (20 minutes), with a graded library assignment in between

Reasons for success
■Each Department has an "overview" class
■Each class has a "loose structure" no textbook, usually a variety of speakers
■Only one or a few non-library assignments determine course grade
■Faculty welcome library assignment as a contribution to the class grade
■Library assignments are graded, sometimes in part by graduate assistants in the department

Reasons for success
■Library assignment is useful in conjunction with student research project
■Collaborate with faculty to develop sets of research topics from which the students develop their own research questions for the library assignment
■Assignments are completed by students working in pairs or groups

Problems Encountered
■Class is dropped from the curriculum (Mechanical Engineering)
■Course material gets too full for library instruction sessions

■Drop back to one session – much of the library instruction occurs in the assignment

Addressing the S&T IL Standards in LI and Assessment - Instruction
■Importance of Information Resources – in the Profession
■Lifelong Learning
■During your career in Construction Management you will want to continue your learning experience so that you can keep up to date with the progress of your profession.
■Critical thinking, research, and problem solving skills will be important assets on the job.

Addressing the S&T IL Standards in LI and Assessment - Instruction
■Lifelong Learning Opportunities
■By belonging to appropriate societies
■By attending conferences
■By subscribing to magazines and journals relevant to your areas of interest and setting up alerting services
■By using a number of information seeking techniques to obtain recent or needed information
■By taking continuing education courses

Addressing the S&T IL Standards in LI and Assessment - Evaluation
■What is your perception of the value of this instruction in your professional career?
■It is valuable to my professional career as a way to broaden my knowledge 2.28/24
■I don't see where it helps but maybe I will eventually 18.09/24
■…Might not have access to index databases 21.78/24
■I think this instruction is very good at testing our information searching abilities top score 23.88/24

Addressing the S&T IL Standards in LI and Assessment - Written
■Follows library instruction regarding the Flow of Scientific Information
■Introduces students to the idea that the database *Compendex* will retrieve information from several levels in the Flow of Scientific Information
■Use of expert search requires designation of field to search in. Question requires use of Boolean Logic, phrase, field searching
■Easy to grade

Addressing the S&T IL Standards in LI and Assessment - Online
■Example of four questions that introduce online patent searching, patent classification, and "prior art" searching:
■Two fill in the blank – doing a patent number search on the USPTO Web site
■Third question, multiple choice, – determine the class/subclasses the two patents have in common

■Question four, inline question type – class/subclass definitions, patent search for prior art

Online Assessment using EDU

■Variety of question types
■Select questions for each assignment
■Gradebook
■Test bank can be administered with a separate URL for each course with no login restrictions
■URL for each discipline

Questions?

Potential for Collaboration

Collaborative Development of Assessment Tools
Collaborative development of library instruction test banks that address specific aspects of the standards

Collaborative Development of Assessment Tools
■Add questions relevant to a variety of engineering and science disciplines to the test bank
■Pilot
■Grant proposal
■
Collaborative Development of Assessment Tools
Interest in participation?