

Assessment of Information Literacy and Critical Thinking Skills in UH 290, "Science as a Way of Knowing"



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Course Objectives: UH 290

In the Honors College new curriculum, UH 290, "Science as a Way of Knowing," engages freshmen in scientific modes of inquiry and scholarly literature research. Course objectives target **Information Literacy** and **Critical Thinking**.

Information Literacy: Access, evaluate and utilize scholarly literature

UH 290 activities, assignments, and exams are aligned for students to:

- Engage the current scientific literature (conduct searches; evaluate sources, methods, data representation & interpretation)
- Gain awareness of probabilistic and statistical reasoning; correlation vs. causation; estimation and uncertainty in science
- Apply these tools and critical thinking skills to selected major topics.

Critical Thinking: Comprehension and evaluation of primary scientific literature

To build students' abilities to procure, comprehend, and evaluate scientific articles, two weeks of the semester are devoted to these activities. Class lectures and in-class activities model these "scientific habits of mind," reinforced by homework assignments utilizing primary articles. Students use critical thinking skills to scrutinize sources for assumptions and biases, generate questions and hypotheses, comprehend empirical results and observations, and draw valid inferences and conclusions.

Pre-course data: Fall '08 and Spring '09

During week 1 of both semesters, a survey was given (Fall '08, 16 students; Spring '09, 18 students):

- 50% of students agreed that they felt comfortable conducting a search of primary scientific articles (Table 1).
- Nearly 90% of students said that they would like to develop the needed skills and knowledge to critically analyze a scientific paper (Table 1).

Table 1. Student responses (week 1 of semester) to pre-course survey prompts on information literacy and critical thinking.

Prompt	Strongly agree (%)	Agree (%)	Neutral (%)	Disagree (%)	Strongly disagree (%)	Semester	Response count (%)
I am comfortable conducting a literature search of primary scientific articles.	0	50.0	18.8	25	0	Fall 08	93.8
	0	38.9	38.9	16.6	5.6	Spring 09	100
I would like to develop the needed skills and knowledge to comprehend and critically analyze a scientific paper.	31.2	56.2	6.3	0	0	Fall 08	93.7
	5.6	83.3	11.1	0	0	Spring 09	100

Initial Approach to Information Literacy

Fall 08: In week 3 of fall semester, two librarians gave the class one 50-minute session on information literacy, targeting these skills:

- Identifying types of information sources available
- Accessing each type
- Evaluating the quality of books/articles found
- Choosing and effectively searching appropriate science databases
- Locating resources from bibliography entry

Assessment of Information Literacy Skills After Initial Session

Fall 08: The initial session should have been review for this class, as 50% of students reported being "comfortable conducting a literature search." However, post-session analysis indicated that the single 50-minute library session was inadequate:

- 60% of student teams (groups of 4 students) could not locate scholarly articles using library resources after the library session
- Students were searching with Google because they did not know how to locate resources through the library (as indicated by online threaded group discussions)

Mid-semester Adjustment: Closing the Assessment Loop on Information Literacy

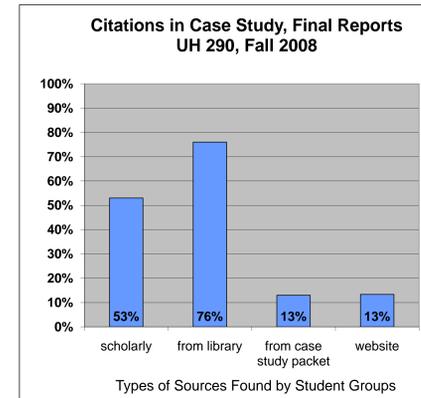
Fall 08: Based on assessment of the students' group work and threaded discussions, librarians Galbraith and Johnson provided three additional, in-person library sessions in week 14.

Changes in the session design included:

- Students had time to work with each research tool after instruction.
- Students searched for information needed in the next assignment-- a case study
- Librarians and instructor were available to answer questions and give assistance.

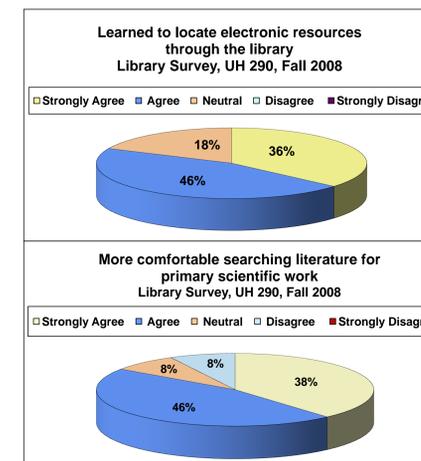
Fall 08: Conclusions

Students' information literacy and critical thinking skills improved when they were given additional days in the library to practice research skills in the presence of support librarians. Analysis of student performance was based on their case study final reports, library instruction evaluations, post-course survey data, and course evaluations (data given below).



Students Improved Performance in Case Study Final Reports: Fall 08

- 76% of resources cited in the students' final case study derived from library sources.
- 53% of their citations were to scholarly sources and only 13% from websites.
- 29% of the bibliographic references were noted as **excellent** by the instructor (data not depicted).



Students Gained Confidence (Post-course survey: Fall 08)

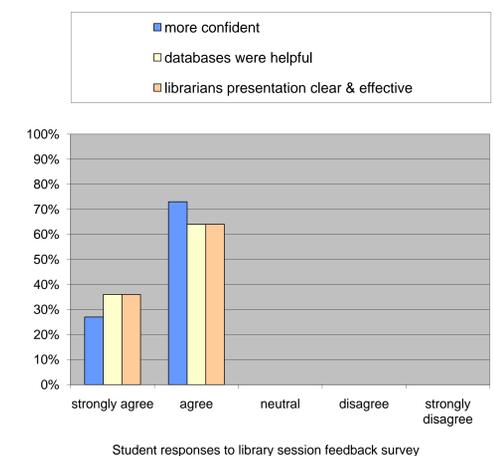
- 82% of students reported that they could retrieve electronic resources through the library.
- 84% of students reported that they felt comfortable searching for primary scientific literature (up 35% from pre-course survey).
- 100% of students reported that they could locate related scholarly information (data not depicted).
- 68% of students reported that the library sessions helped them learn (data not depicted).

Students Reported Additional Improvements

On the library exit survey after the four library sessions in 12/08, 100% of students reported they:

- Felt more confident doing research.
- Understood how to use library sources.
- Thought the library instructors were clear and effective.

Student-Reported Gains from Library Sessions UH 290, Fall 2008



Spring 09 Lessons Learned: Adjustments Based on Assessment Data

In light of assessment data and student feedback from Fall 08, the course syllabus for Spring 09 was revised to include two (rather than one) initial 50-minute library sessions using the new design. In the subsequent survey:

- 67% of students thought the library sessions were worthwhile (comments such as "very helpful," "great," "good"); only one student indicated the sessions were "fairly helpful."
- 22% stated that although they had had a library tutorial in another course, the UH 290 sessions served as a useful refresher.