Teaching Information Literacy Through Senior Projects

Presented at the 7th Annual Georgia Conference on Information Literacy, Savannah, GA

Lisha Li
Library and Information Center
Georgia Institute of Technology
Oct. 1, 2010
Outlines

• Background
• Initial collaboration
• Information literacy workshop
  – Design – ACRL IL Standards
  – Implementation
  – Feedback and Improvements
  – Assessment/Evaluation
• Workshop outcomes
• Discussions and conclusions
CEE Background

- CEE: School of Civil and Environmental Engineering (1896)
- Civil and environmental engineering deals with the design, construction and maintenance of the physical and naturally built environment, including structures and materials, transportation of people and goods, air and water quality, natural materials in engineered systems, sustainable resource management, and environmental biotechnology, etc.
CEE Background

- Total Full Time Faculty: 81
- Total Students (Fall 2009): 1,190
  - Undergraduate: 857
  - Graduate: 333
Course Background

• Course - CEE 3000: Civil engineering systems
• Introduced in 1999.
• Description: “…introduces students to a sustainable engineering approach for planning, design, implementation, operation and renewal of civil engineering systems.”
• Required senior course (3 credit hours)
• 2 classes offered each semester with 60 - 65 students in each class (- mostly CEE, some Arch, IE, ME, BMED)
Course Background (cont’d)

- Multidisciplinary perspective (technical, economic, environmental and socio-political)
- Group project based (~3-5 students in each group)
- Bibliography of information and data sources
- Project report and team presentation
- Course evaluation for Project Report: 20%
ASCE* Vision for Civil Engineering in 2025

(*ASCE: American Society for Civil Engineers)
Course Objectives

- 4 Modules:
  - Sustainable engineering and the system approach
  - Mathematical tools and systems performance analysis
  - Economic decision-making tools and projects evaluation
  - Project presentations

- 2 Objectives
  - Engineering communication
  - Library information skills
Projects Examples

- Sears Tower vs. Petronas Towers
- Dallas Fort Worth Airport vs. Atlanta Hartsfield-Jackson Airport
- Itapu Dam vs. Hoover Dam
- Atlanta area vs. Chicago area transportation systems
- Port of Rotterdam vs. Port of Singapore
- Georgia Dome vs. Roman Coliseum
- Japan’s Shinkansen vs. France’s TGV
Comparative Systems Analysis

- Characterizing the systems
  - Purpose, background, functional characteristics, linkages (environmental, economic, social, political)

- Comparing the systems
  - Performance, environmental impacts, benefit/cost, social/political analysis

- Evaluating the systems
  - Identification of better system with justification, recommendations for improvement, limitation of analysis
Workshop Development Time Line

Fall 2005: Initial collaboration
Summer 06: Student project report reviews
Fall 07 – Spring 08: IL workshop expansion
Fall 08: IL Workshop assessment ; standardization

Spring 06 : 1st Library IL Workshop offered
Fall 06 – Spring 07: Feedback & Improvement
Summer 08: Paper submission
Spring 09- : IL Workshop offered to every class
Initial Collaboration with Faculty

- It all started with...
  - *Journey to Planet Earth (DVDs)*

Rivers of Destiny
The Urban Explosion
Land of Plenty, Land of Want
On the Brink
Seas of Grass
Hot Zones
Future Conditional
The State of the Planet
State of the Planet's Wildlife
State of the Ocean's Animals
State of the Planet's Oceans
ACRL IL Standards for Sci-Tech

- Information Literate students:
  - determines the nature and extent of the information needed;
  - acquires needed information effectively and efficiently;
  - critically evaluates the procured information and its sources, and as a result, decides whether or not to modify the initial query and/or seek additional sources and whether to develop a new research process;
  - Understands the economic, ethical, legal, and social issues surrounding the use of information and its technologies and either as an individual or as a member of a group, uses information effectively, ethically, and legally to accomplish a specific purpose;
  - understands that information literacy is an ongoing process and an important component of lifelong learning and recognizes the need to keep current regarding new developments in his or her field.
# IL Workshop Focus

<table>
<thead>
<tr>
<th>Focus</th>
<th>Information Knowledge and Skill Sets</th>
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<tbody>
<tr>
<td><strong>Information Structure</strong></td>
<td>Understand how information is created, disseminated and organized</td>
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<tr>
<td></td>
<td>- Know the scholarly publication process</td>
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<td>- Know the concepts of database, indexes, thesaurus and classification systems</td>
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<td><strong>Information Access</strong></td>
<td>Effectively apply information retrieval skills and know where and how to obtain useful information</td>
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<td></td>
<td>- Be familiar with resources available and their features</td>
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<td>- Form effective search strategies and apply useful search tips</td>
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<td>- Access full text and obtain materials through interlibrary loan services</td>
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<td><strong>Information Integration</strong></td>
<td>Critically evaluate information and its sources and incorporate information effectively into their projects</td>
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<td>- Apply information evaluation criteria</td>
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<td>- Use styles and citation management tools</td>
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<td>- Be aware of copyright and fair use issues</td>
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IL Workshop Setting

- Held at Homer Rice Center – a library classroom with 32 student computers, and 1 instructor computer with data projector
- Offered as an one time session outside the course meeting time
- Provided two identical sessions on different day/time for student to choose from through registration
- Opened follow-up consultations sessions/hours
IL Workshop Layout & Follow up Session

- Information resources:
  - 30 min.

- Information access and integration demo:
  - 30 min.

- Hands-on exercises:
  - 30 min.
Information Structure/Resources

- Overview of scholarly publishing process, databases, indexes, thesaurus
- Major databases for civil and environmental engineering
- Databases in broader scope: social, economic, and public policy aspects
# Resources by Type of Project

<table>
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<th>Project Type</th>
<th>Major Resources</th>
<th>Additional Resources</th>
<th>Government Sponsored Research</th>
<th>News</th>
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Information Structure/Resources (cont’d)

- CrossSearch features
- Customization features
- Advanced databases search features
  - Advanced search
  - Save search
  - Export records
Information Access

- Brainstorm keywords and forming search strategies - using examples from previous classes
- Refine search results using facet feature
- Review, select, and export results
- Full text article access
  - Through SFX;
  - print;
  - ILLiad
Information Integration

- Information evaluation criteria
- Annotated bibliographies
- Citation styles (ASCE, APA, MLA, Chicago)
- Citation management tools (EndNote)
- Copyright and fair use issues
Hands-on Exercises

- Locate books
  - GIL/GIL Universal catalogs
  - WorldCat
- Search and access journal articles
  - Database searches for project topics
  - Electronic journals and SFX
- Locate Technical Reports
  - Print reports
  - Reports on microform
  - Environmental Impact Statements (EIS) documents
Follow-up

- E-mail questions and answers
- Consultation sessions by request (held at consultation area for 1-3 students, or a library class room for more than 3 students)
  - Project specific issues
  - Resource specific questions
  - Search strategies and search terms
  - Obtaining specific items
  - Bibliographies
Evaluation and Assessment

- Short surveys after classes
- Informal feedback from students and faculty
- Formal assessment through CETL*
- Email responses
- Observation through follow-up consultation

* CETL: Center for the Enhancement of Teaching and Learning, GA Tech
After Class Survey

- This workshop provides me with enough resources to start my search of information for my project.
  - Strongly agree 64%
  - Agree 36%

- This workshop teaches me necessary information skills to conduct my research using library resources.
  - Strongly agree 91%
  - Agree 9%
Suggestions and Improvement Made

- For future improvement of the similar workshop, I would recommend:
  - Add more international resources (-added)
  - Use a microphone
  - Offer more sessions * (- two sessions offered for each class)

(* 39 students showed up in class one time)
1. Please indicate your preferences for the CEE 3000 Library Workshop.

2. Please enter your project name:

3. Please enter your email address:

4. Please enter your group number:

5. Which session are you able to attend?
   - [ ] Tue., Sept. 22 at 4 p.m. only
   - [ ] Wed., Sept. 23 at 4 p.m. only
   - [ ] Either Tue., Sept. 22 at 4 p.m. or Wed., Sept. 23 at 4 p.m.
   - [ ] Neither date/time works with my schedule. I will request a make-up session for another time.

6. Please list one thing you would like to get out from this workshop:
Formal Assessment Through CETL*

- 2008 Class of 1969 Teaching Fellowship
- Class Observation by the Fellowship Program Director and her assistant
- After workshop dialogue/discussion with students
- Feedback collected

* CETL: Center for the Enhancement of Teaching and Learning
Feedbacks from CEE 3000 Students

What helps you learn in this library workshop?
- The students unanimously agreed that the following techniques/tools help them learn:
  - 1) the research guide web site;
  - 2) the hands-on time for learning;
- Many students agreed that the following help them learn:
  - 3) PowerPoint slides;
  - 4) the handouts

What changes in this library workshop would improve your learning?
- Speak louder* (All students agreed with this except the ones in the front row.)
- Provide more information about citations (styles)
- Explain about preparing bibliography
Feedbacks from CEE 3000 Students (cont’d)

- What is the most important feedback you want your instructor to hear?
  - “Thank you! We appreciate you taking us through this information.”
  - “This was a good workshop because now we know what resources we have.”
  - “Integrating practice time and coaching into the PowerPoint presentation would be very helpful.”
Informal Responses

- “It was very helpful.” – students
- “It was worth it” - students
- “Your slides were very informative and helpful.” – students
- “Glad to see more quality references used by students.” - faculty
- “Overall quality improvement (of project reports).” – teaching faculty
Q: Where do you go to meet your academic information needs? (Please rank your 1st, 2nd, 3rd... choices) – (Graduate)
Q: Where do you go to meet your academic information needs? (Please rank your 1st, 2nd, 3rd... choices) – (Undergraduate)
Student Project Report
Reference Review

Works Cited (Spring 05)

- Books: 56.3%
- Conf. Paper: 2.1%
- Gov. Doc.: 8.3%
- Magazines: 15.1%
- Journals: 0.0%
- Reports: 0.0%
- News/Media: 1.6%
- Booklet: 6.3%
- Web: 0.5%
- Wikipedia: 0.0%
- Interviews: 4.7%
- Others*: 0.0%
Student Project Report
Reference Review

Works Cited (Spring 06)

- Books: 44.8%
- Journals: 12.0%
- Publications: 10.4%
- Web: 6.4%
- Interviews: 6.4%
- Others*: 6.4%
- Conference Papers: 2.4%
- Reports: 0.4%
- Magazines: 5.6%
- Government Documents: 0.0%
- News/Media: 0.8%
Student Project Report Reference Review

▪ Percentage of scholarly journal articles cited among all references*:
  • Spring 2005: 4.7%
  • Spring 2006: 10.4%
  • Spring 2007: 20%
  • Fall 2007: 18%
  • Fall 2010: N/A

(* Not including articles from trade journals and magazines)
Student Project Report Reference Review (cont’d)

• Use of scholarly journals, technical reports and government documents
  ▪ Before the workshop offered: 16%
  ▪ After the workshop offered: 31%
    (through 2007)
Workshop Outcomes

- Students gained knowledge of value-added resources and were able to select appropriate search tools for their projects
- Students learned how to conduct effective searches and evaluate results
- Students learned how to effectively manage, and incorporate info. into their reports
- Students were aware of rights issues and asked related questions
Workshop Outcomes (cont’d)

- Workshop expansion:
  - offering two sessions for each class
  - including all classes for the same course
- Workshop are offered every semester including summer.
- Workshop standardized in course syllabus
- Librarian has more opportunities working with different professors each semester.
## CEE 3000 Course Syllabus

**Benchmarking Sustainability Engineering Education: Final Report:** EPA Grant X3-83235101-0

**Appendix D: Course Syllabi**

### Course Outline

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<th>Class</th>
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<th>Topics</th>
<th>Assignments</th>
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<td>Course overview; Introduction to sustainability: trends, definitions, measurement; Systems</td>
<td>Project description out</td>
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<td>Aug 23</td>
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<td>3</td>
<td>Aug 28</td>
<td>representation and analysis; Planning from a systems perspective; Performance-based planning; Context sensitive solutions, Asset Management; Environmental and Social Impact Assessment</td>
<td>HW1 out</td>
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<td>3</td>
<td>5</td>
<td>Sept 4</td>
<td>Mathematical models, Optimization by Calculus</td>
<td>HW1 due</td>
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<td></td>
<td>6</td>
<td>Sept 6</td>
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<td>Library Workshop*</td>
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<td>Sept 11</td>
<td>Engineering Communication I: Written</td>
<td>COM1 out</td>
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<td>Sept 13</td>
<td>QUIZ #1</td>
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<td>Engineering Communication II: Visual</td>
<td>COM1 due/COM2 out</td>
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<td>Sept 20</td>
<td>Optimization by Linear and Integer programming; Queuing Analysis, Incorporating uncertainty in</td>
<td>Project Bibliography due COM2 due</td>
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<td>6</td>
<td>11</td>
<td>Sept 25</td>
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### Library Information Skills

Another important objective of this course is to develop basic library information and research skills (manual and electronic). Again, the project is designed to develop and assess these skills. In particular, the quality, range and balance of information sources used in the project will be evaluated. Ms. Lisha Li, the Civil Engineering Librarian for the Institute, will participate in the course by presenting a workshop on the basics of Library Information and Research Skills and should be considered an important resource as you develop your written reports. She can be reached at lisha.li@library.gatech.edu or 404-385-7185.
Center for Sustainable Engineering (CSE) Benchmark Assessment

Benchmark Assessment

The Center has recently completed an EPA-funded project to determine the status of sustainable engineering education at four-year colleges and universities in the U.S. As part of this project, the Center has collected information on courses and curricula, sustainability centers and institutes, conferences related to sustainability, and other activities related to Sustainable Engineering. In addition, the Center has collected information on the content of courses, such as the key concepts, types of educational activities, and written materials.

Based on the project results, the Center is developing a roadmap for achieving excellence in Sustainable Engineering education, and will summarize the data and the roadmap in journal articles and on the Center website.

The final report for the EPA project is available by clicking below:

- Final Report, all text except Course Syllabi
  - Course Syllabi Part 1
  - Course Syllabi Part 2
  - Course Syllabi Part 3
  - Course Syllabi Part 4

http://www.csengin.org/
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<td>construction, Towns of Le Ray and Pamella, Jefferson County; Final</td>
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<td>Section 4(f) Evaluation</td>
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<td>Environmental impact statements for transportation facilities</td>
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<td>Doyle Drive: south access to the Golden Gate Bridge: final environmental impact statement/report and final section 4(f) evaluation. / 3 VOLUMES</td>
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<td>Forest Highway 52 (County State-Aid Highway 22) Chippewa National</td>
<td>Highway Div; FOREST SERVICE, WASHINGTON, DC.</td>
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<td>Forest, Beltrami County, Minnesota.</td>
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Distance Learning Session for GT Savannah Students (Wimba)
Resources Page Via T-Square (Sakai)

CEE3000
Civil Engineering Systems
Spring 2009
Library Resources Page

This page is an introduction to information resources, both at the Georgia Tech Library and on the Internet, which will help you with your research projects.

- Finding Background Information
- Locating Books
- Locating Articles/Papers
- Accessing Electronic Journals
- Finding Technical Reports
- Finding Government Documents
- Finding EIS Information
- Finding Statistics
- Locating Company Information
- Finding Newspapers
- International Resources
- Locating Maps/GIS
- Obtaining Materials
- Evaluating Internet Sites
- Citation Tools
- Further Info & Contact
Course Guide (LibGuide)

CEE 3000: Civil Engineering Systems

Welcome

This page is prepared to guide you through resources in the library as well as on the internet that are useful for your CEE 3000 projects. Depending on your project, you may use it by either looking at document types such as books, articles, reports, or focusing on specific topics such as social, economic, or environmental aspects.

I am available for individual appointment if you would need further assistance with your specific topic.

Video

New Hoover Dam

Feedback

Let us know how useful this guide is for you. Was this information helpful?

- Yes
- No
- Don't know

Submit Vote
## Course Guide Use Statistics

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*Library Workshop*
Lessons Learned

- Students were enthusiastic about participating
- Students were interested in when relevant example was used
- Uneven student information skill level (suggest introductory class for transfer students)
Lessons Learned (cont’d)

- Learn from teaching
  - Individual teaching -> classroom lecturing -> project based teaching -> learner-centered teaching

- Show them the “tricks” (e.g. EndNote, annotated bibliography, LibX GT)

- Learn from the students (e.g. invited to student project presentations)
Discussions

▪ Students pay series attention to IL classes if it is emphasized especially by teaching faculty.

▪ Students are curious to learn how to search databases effectively, though some of them may not have enough patience.

▪ Reference analysis and other assessment measures. (quality, quantity)
Conclusion

- Teaching information literacy through senior projects can be an effective way to engage students in learning.
- Collaborating with teaching faculty, librarians can win trust and embrace new opportunities.
- Be flexible and willing to learn and implement new methods in teaching information literacy.
Bibliographies

Questions?
Thanks!