Challenges: Higher Order Thinking Skills online!

- Online environment
- Working engineers
- Unfamiliarity with libraries
- Proving value of secondary research
Mechanical engineer needs to learn about electric drives. Choice of motors. What will fit?
Engineer is moved to a new department. Needs to understand U.S. regulations concerning x-ray machines.
Manager is required by Dept of Energy to write a Cost Risk Analysis for construction of new laboratory.
Student needs to work closely with German companies
Story: Management issues

Employee Training, Knowledge Management, Employee Retention
About 15 years of cooperation....

Technical Communication Program

College of Engineering

Kurt F Wendt
Engineering Library

The University of Wisconsin Madison
### MEPP: Masters of Engineering in Professional Practice

<table>
<thead>
<tr>
<th>Year 1 - Summer</th>
<th>Year 1 – Fall</th>
<th>Year 1 – Spring</th>
<th>Year 2 – Summer</th>
<th>Year 2 – Fall</th>
<th>Year 2 – Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 credit</td>
<td>3 credits</td>
<td>3 credits</td>
<td>1 credit</td>
<td>3 credits</td>
<td>3 credits</td>
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<tr>
<td><strong>First Summer Residency on the UW-Madison Campus</strong></td>
<td>Technical Project Management</td>
<td>Communicating Technical Information</td>
<td>Second Summer Residency on the UW-Madison Campus</td>
<td>International Engineering Strategies and Operations</td>
<td>Engineering and Business Data Communication and the Virtual Office</td>
</tr>
<tr>
<td></td>
<td>3 credits</td>
<td>3 credits</td>
<td>3 credits</td>
<td>3 credits</td>
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</table>
Engineering programs must demonstrate that their students attain:
(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multi-disciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
### Using Bloom’s Taxonomy to assess IRRAE work…

<table>
<thead>
<tr>
<th>01 IRRAE Project Proposal</th>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include facts about a problem to be solved</td>
<td>Discuss and describe the problem</td>
<td>Demonstrate or illustrate the expected use of the proposed solution.</td>
<td>Categorize and review possible implications of the proposed solution.</td>
<td>Plan a unified approach to solution (timeline, budget, personnel).</td>
<td>Assess likely level of success; predict value of proposed solution.</td>
<td></td>
</tr>
</tbody>
</table>

| 02 IRRAE Literature Review | Use research to discover the facts of the state-of-the-art. | Discuss related research, show relationships, and review the relative completeness of the information. | Apply the research to the problem; indicate what is useful and what is not. | Interpret and arrange your discussion to effectively deal with the topic. | Combine different ideas and research information to provide a clear and coherent summary | Draw conclusions as to what parts of the problems have or have not been solved. Recommend next steps. |

**Expectations and assessment – first two assignments**
<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Comprehension</th>
<th>Application</th>
<th>Analysis</th>
<th>Synthesis</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish an effective factual basis for project (good research completed). Include facts about a problem to be solved.</td>
<td>Discuss and relate the research, explain connections between elements of research and the problem. Discuss and describe the problem.</td>
<td>Apply facts and research to the identified problem; show effective problem solving for the project. Demonstrate or illustrate the expected use of the proposed solution.</td>
<td>Identify and relate components of the problems and elements of the research; establish relevance. Categorize and review possible implications of the proposed solution.</td>
<td>Assemble, organize, and present elements of the problem and details of research to demonstrate a coherent and complete solution.</td>
<td>Assess significance of your work, likely impact, recommend next steps, note any prospective problems or future issues.</td>
</tr>
</tbody>
</table>

Using Bloom’s Taxonomy to assess IRRAE work…

Expectations and assessment – final assignments
Motorcycle engineer needs to study motorcycle windshields in wind tunnels.
Advice to other librarians

• Win them over with a mini literature search
  – Show them this is an effective way to get things done.
  – Not used to reading how someone else solved a problem

• Document Delivery
  – Unfamiliar with a free service. Too good to be true.

• Support them
  – Any problem you have – come to me.
  – Convince them that you like to get lots of questions.

• Repeat yourself. Re-explain
  – Some people don’t hear you until they are in the middle of a problem.
Why it’s worth the extra effort...

• Distance students ask questions that help improve services for everyone.

• Working engineers are solving real and difficult problems.
  – Tests the library resources and librarians’ skills.

• Proven success of program
  – Students develop information literacy skills
  – Students want to use library resources after graduation.
**Evaluation**

- Overall – continued increase in perceived “value”
- Specific comment from summer 2007 (survey results):

<table>
<thead>
<tr>
<th>Question</th>
<th>Agree 50%</th>
<th>Strongly Agree 50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>...improved research skills considerably</td>
<td></td>
<td></td>
</tr>
<tr>
<td>...improved communication skills</td>
<td></td>
<td></td>
</tr>
<tr>
<td>...what I learned will be useful...now:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>...in the future:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>...library databases were valuable</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Here’s what we heard
Motorcycle Engineer

QUESTIONS?

In Memory of Brian Mowrey who went down the open road before us.

THANKS TO:
Patrick Fagan & Paul Ross - IRRAE Instructors
Amy Kindelchi & Jennifer Nowalk-Velasco - Library Queens
Pradeep Rohatgi & Ryoichi Amano - Faculty Reviewers
MEPP Class of 2007 – Best Cohort on Earth