EDUCATING FOR EVIDENCE BASED DECISIONS IN ENGINEERING

THE VIEW AS LIBRARIAN AND INSTRUCTOR

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FIRST-YEAR ENGINEERING

Purdue University

- All incoming intended engineering majors
  - First year students, transfer students
- Approximately 1,600 students each fall
  - 14 sections
  - 120 students per section
- 2 classrooms
  - Studio classroom – 60 laptops supplied
  - Design lab – 120 laptops supplied
9 OVERALL OBJECTIVES

• 2 specific to information literacy skills

  • Collect, analyze, and represent data to make informative explanations and persuasive arguments

  • Implement iterative processes, rich information gathering, and multiple modes of modeling when solving complex design problems
SPECIFIC OBJECTIVES

OBJECTIVES FOR THE TOPIC OF THE DAY

• Compiled from Week 2 and Week 9
  • Explain why information gathering is an important part of the engineering design process
  • List and apply three criteria for evaluating the trustworthiness of information resources
  • Identify and gather necessary elements of a citation
  • Include complete and correct in-text citations in written documents (including citations for image sources)
  • Include a complete reference list in written documents
  • Explain how research and information sources are related to making evidence-based engineering decisions
STUDENT TASKS

CONTEXT SETTING – WEEK 2, HOMEWORK

• Use and document (with proper citations) at least two high quality external resources to learn three things about judging design competitions in general that are relevant to this problem context.
STUDENT TASKS

EVALUATING SOURCES – WEEK 9, IN-CLASS ACTIVITY

• Go to a given URL, evaluate if the information is logical
  • Empire state building is 12,500 ft tall

• Compare two sites related to the Engineering Grand Challenges (URLs provided)
  • Credibility of each

• Information required for writing a webpage citation
POPULATION

CULTURAL DIVERSITY

39.5% - IN
15.1% - IL
26.1% - USA

19.3% - International
56.5% - China
DATA ANALYSIS

CONTEXT SETTING – WEEK 2

• 97 of 119 students completed the assignment

• 96 of the 97 responses included references
  • 23% got most elements included in the citations
  • 63% got at least one references mostly correct
  • 14% misidentified type of resource found

• Only 20 of the 96 (~20%) included in-text citations
DATA ANALYSIS

EVALUATING SOURCES—WEEK 9

• Quality of data (Empire State Building)
  • 98% correct

• Evaluating websites (Engineering Grand Challenges)
  • Website1 – 97% correct
  • Website 2 – 90% correct

• Information for a website citation
  • 61% correct
Discussion

Similarity of Results

- Common abilities
  - Construct references for websites
  - Identify complete references
  - Explain why a source could be used
  - Explain why a source is trustworthy

- Inert knowledge
  - Can be recalled as taught, unable to be applied
MISSING SKILLS

• Inability to determine what has been found
  • E.g. journal article → citation is written as a webpage

• Inability to recognized when they have stated a claim
  • Can’t tell when information needs a reference
FUTURE CONSIDERATIONS

CULTURAL STEREOTYPES

- Additional data analysis divided by demographics → citation practices based on cultural background
  - Inappropriate citation practices much broader than oft assumed cultural misunderstandings
CONCLUSIONS

“CALL TO ACTION”

- Students have the basic skills
- Move our instruction opportunities into teaching that helps students activate this knowledge