Abstract

21st century engineers need skills not just to develop technologies but also to assess broad implications of those technologies. We present a faculty-librarian collaborative project designed to enable students to acquire both technical knowledge and information literacy skills to assess needs, research and evaluate emerging technologies, identify social, economic, and environmental issues, synthesize findings, and make sound decisions in a global economy.

Background

Academic inquiry requires critical thinking and is based on the ability to determine the information you need, locate, evaluate, synthesize, and utilize that information. This ability is known as information literacy. As many students arrive at college without such a skill set, equipping them with the ability to utilize diverse sources of information properly has become an important part of higher education and provides a basis for lifelong learning. This collaboration was designed for undergraduate industrial technology students to bridge the information literacy gap between high school and university and gain the skills necessary for the future.

Introduction

The collaboration between the instructor and librarian was primarily focused on teaching the students how to utilize library and online resources to collect and evaluate information, analyze and synthesize data, and determine the feasibility of deploying a particular technology.

Course Learning Objectives

Industrial Technology 150: Industrial Power Systems

Course learning outcomes were mapped to Industrial Technology Learning Goals:

• Map student assignment/critical thinking development
• Administer information literacy post-test and evaluate individual student progress
• Examine student team progress
• Provide 3 milestones during the course of the project appears to retain students' interest and support.

Preliminary Findings

The pre-post result revealed that students' information retrieval and evaluation skills ranged from adequate to poor. Students' initial feedback on the Library training session was positive, especially regarding the instruction of citation management software. This finding is interesting, as most instructors often couple instruction on information retrieval and evaluation with citation management skills. However, specific instruction on the various aspects of the library's acquisition service was provided after the students' initial feedback. It appears that yes, the students need to organize information via a search engine, but for informed decision-making. The specific instruction given to the students after the initial feedback was key because the students were not informed about the existing resources at their disposal.

Research Guide Screenshots

Fig. 1. IT150 Research Guide Home Page

Fig. 2. Finding Articles Tab

Research Assignment Components

- Research Project: Teams of two students were required to determine the feasibility of energy-related technology deployment in a foreign country by considering not just the technical complexity of the project but also the country's current needs, resources, infrastructure, educational systems, and so on.
- Assignments were designed to help students progress in stepwise fashion and build on what was discovered.

Research Proposal Essay and Presentation

- Rationale for selecting the country of interest and justification for selecting the power system technology for potential adoption.

Background Essay and Presentation

- Rationale for selecting a particular technology application and comparison with current technology for the same application.

Research on topics, works consulted, initial analysis of information collected, and analysis of what issues still need to be explored.

Technology Deployment Essay and Final Presentation

- Overview of the research project: country (location, population, economics, culture, education), technology (operation principles, cost of ownership), and application.

- Proposed solution. Note whether or not the technology has the potential to be adopted, propose a plan for implementing it or finding an alternative solution.

Deployment of Fuel-cell Based Electrical Transit Buses in Argentina

Background information: A transit company in Buenos Aires is considering bringing fuel-cell electric transit buses to service. In order to evaluate the situation carefully, and identify potential benefits and problems, the following types of questions need to be asked:

- What is the initial cost? What is the operational cost? What is the total cost compared with the current solution (e.g. buses using gas)?
- What sort of infrastructure or utility is needed in order to operate the electrical bus? For example, where and how can the buses be fueled?
- Who can drive the electrical bus? Is special training needed? How about bus maintenance? Can existing staff handle that, or will someone else need to be hired? If so, does the surrounding area provide such a workforce (education and skill level)?
- What will benefit from such an action? Will the government partially sponsor the purchase or operation? Is there any impact toward the company's revenue?
- Does the consumer care? Will a clean bus attract more riders? Will the driver come from a union?
- What is the carbon footprint of electrical buses?
- Which route should be used as a pilot?

Example Research Project and Information Needs

Further Reading

- The Internet and Information Technology: Critical Perspectives, Possible Futures. Lexington Books, Lanham, MD.
- The Internet and Information Technology: Critical Perspectives, Possible Futures. Lexington Books, Lanham, MD.
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