

# Infusing Actual Management Experiences into Construction Education

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The intent of the class, Special Topics in Construction revolves around the concept of students utilizing previous coursework to plan, research and solve real live construction industry problems. Construction students at a Northern University have demonstrated they can successfully handle undergraduate research projects and work closely with representatives of the construction industry to solve problems pertinent to the field.

**Key Words:** Management Skills, Undergraduate Research, Industry Relations, ACCE Topics

## Introduction

In an effort to prepare better construction management graduates, actual management experiences have been incorporated into a construction course called Special Topics in Construction at this university (UNIX Offered to students in their final semester, the course encourages students to operate in a real industry setting while still in college. Within the structure of the course, students work independently to solve a real industry problem or concern.

The Special Topics course was designed partially on the concept of cooperative education. The intent of cooperative education is to integrate "classroom study with planned and supervised work experience and would involve a position such as a superintendent, assistant project management, etc. and related responsibilities. This educational pattern allows students to acquire practical skills as well as to be exposed to the reality of the world beyond the boundaries of the campus, enhancing the self-awareness and direction of the individuals" (National Commission for Cooperative Education [NCCE], 1993).

## Course Rationale

The rationale behind the special topics course is to involve students (in teams of two or three) with a construction company to solve a management-related problem. The team has the opportunity to conduct a planned research project, function in a management capacity, and become directly involved with representatives of the construction industry.

Objectives for the course, center on developing the students' management skills. These major objectives include:

- The ability to plan, implement, and carry out an efficient and effective research project.

- The ability to work with an entity in the construction industry to solve an industry or company problem or concern.
- The ability to function in a middle-level management capacity with an emphasis on time management communication skills, goal setting, problem identification, development of team problem solving and presentation skills.

Additionally, students are encouraged to address topics identified in the standards and criteria of the American Council for Construction Education (ACCE) (American Council for Construction Education [ACCE], 1994). Some of the major areas student have addressed include:

- To communicate, both orally and in writing, and to understand human behavior.
- Industrial Relations-personnel management, labor relations, supervision, productivity.
- Management-business, industrial management, organizational behavior.
- Estimating and bidding-quality surveying, pricing, manpower estimates, bid compilation, bidding strategies.
- Project execution-construction methods, equipment selection, work analysis, safety, field records, quality control and assurance, job supervision.

### **Course Overview and Requirements**

The course gives students the opportunity to interact with industry representatives and combine this experience with their academic preparation in the field of construction management. Throughout the course students must clearly and professionally present themselves over the telephone, in face-to-face contacts, and in writing. Additionally, students are provided the opportunity to enhance their management skills with direct and indirect contact with an array of company personnel from the president down to craftspeople. In essence the team that represents the university becomes the resource center for the construction company.

The faculty member's responsibility is to monitor a teams' (students') progress and maintain high professional standards. Also, the instructor assists in supplying expertise primarily in areas of problem identification, contacts with industry, problem solving strategies, and identification of resources. A primary requirement to make the course successful is the establishment of deadlines when specific items of course work must be accomplished. Throughout the course the teams of students are required to update the instructor in writing (weekly), attend weekly sessions, and keep an ongoing written log of activities. These logs include information gained from sources such as personal contacts, magazines, and books. On a weekly basis each team meets for 15 minutes with the instructor to discuss progress. The teams are brought together as a class twice every month to update and share experiences about their projects.

The course is broken down into several discrete areas each with its own deadline. The deadlines for completion of specific segments of the courses help undergraduates pace their progress. The main areas are listed in Figure 1.

During the semester, the students consult with the staff at the library and utilize various print and electronic information resources. At the beginning of the term, a reference librarian gives a one-

hour presentation on these resources. The librarian reviews more sophisticated aspects of searching the local online library catalog. Students are also shown how to connect through the Internet to other, larger online library catalogs in Iowa, as well as to the online catalogs of other institutions around the country known for their strong collections in construction management. Through such searches, students can identify sources not available locally but which might be available through "interlibrary loan."

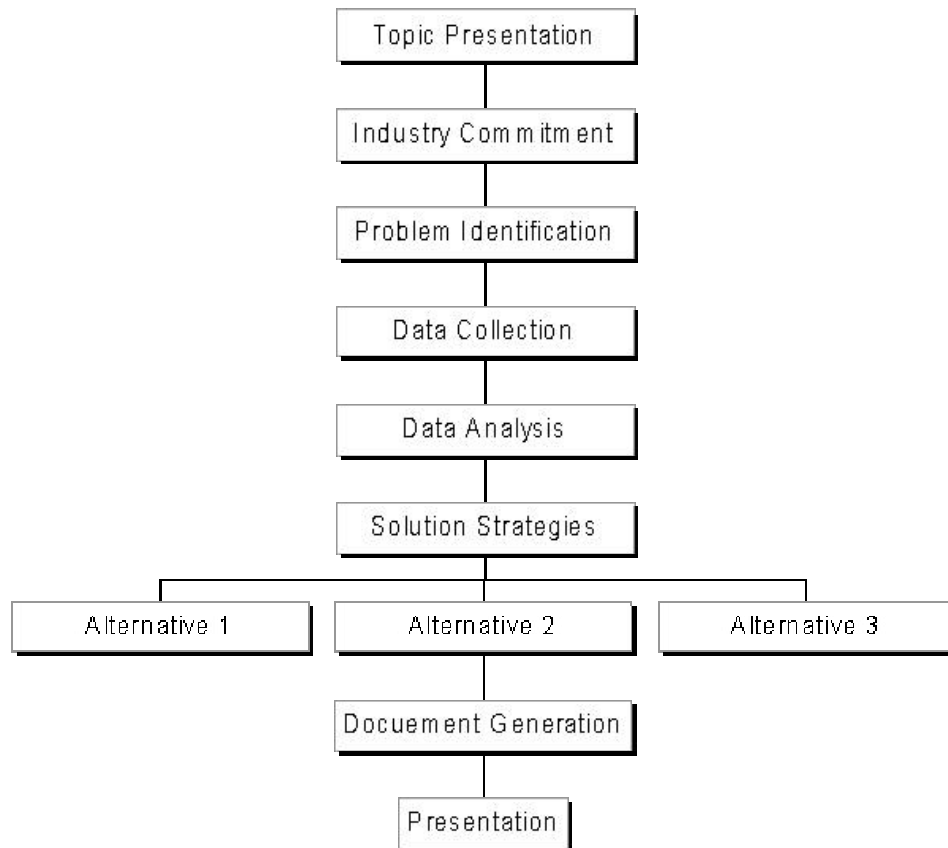


Figure 1: Special topics flow chart.

The library session also covers tools for locating trade and scholarly journal article citations. Specific sources covered include Applied Science and Technology Index (1995), Engineering Index (1995), and ABII INFORM (1995), (an electronic index which focuses on management and related topics as reported in trade, practitioner, and scholarly journals). Also covered is LEXIS-NEXIS (1995), an online information service that includes the complete text of various business and construction journals; state and federal statutes, regulations, and court cases; and various company reports. (Education license requirements place restrictions on how students may use this service.)

Students also learn how to use local, state, and national directories and other tools to identify experts on various topics. For example every geographic region in which future graduates may be working is likely to have its own directory of associations and a few such sources for Iowa are covered to illustrate the types of tools likely to be available for most states and metropolitan regions. Students also are exposed to important sources with a national scope, such as the

Encyclopedia of Associations (1993), which are likely to list organizations whose staffs may include experts on various topics likely to arise in construction management.

In addition to academic research, students are encouraged to contact professors in related departments on campus as well as professionals in the construction industry. The support from professors in departments such as English and Business/Management has been instrumental to the success of various projects. Students also have worked with individuals from the Iowa Well Drilling Association, Department of Labor (OSHA), Scaffolding Association, and Lawyers representing ADA. In almost all cases these industry contacts have been extremely helpful for our students. The concept of involvement with an industry-related project has generated excitement, because students have opportunities to be directly involved in the "real world."

### **Actual Student Projects**

The following listings demonstrate the type of projects recently completed by construction management students at UNI.

#### *Safety analysis/planning of a well drilling company*

Students worked on the assessment of field safety practices as utilized by a large well drilling firm. The team worked closely with field and office personnel in the development of a company-wide safety manual. In addition student utilized OSHA consultants in assessing the firm's existing conditions and proposed improvements. The manual discusses strategies for incorporation of motivational and human developmental theories. During the semester students became very familiar with OSHA manuals specifically 1910 and 1926.

#### *American Disability Act (ADA)*

This project involved developing an ADA plan for a mechanical/electrical firm with 63 employees. Students collected facts and information pertaining to the new law mandating the implementation of ADA. The primary emphasis of the project was development of a company policy and manual for ADA. Specific attention was directed toward analyzing job hiring techniques, identifying appropriate job titles, and related tasks. Students had the opportunity to work with professional associations and state entities in interpreting the ADA mandate and its repercussions. Students also attended various ADA conferences.

#### *Management Information Systems (MIS)*

Two students had the opportunity to work with the upper management of an international construction firm in the area of the analysis of data flow pertaining to fiber systems network technologies. The bulk of the project involved research on better ways to handle information, faster reporting and the usage of such information to allow for more sound decision making, increased communication, and decision making. The team critiqued the company's information and data collection systems. In the process, alternate software and bar coding were examined.

Additionally, throughout the semester the faculty of the construction management program and Business School worked together with the team.

### *Total Quality Management for Field Personnel*

This team concentrated on the concept of TQM with primary attention on the training and education of field personnel (superintendent, foreman, craftspeople). With the aid of office and field management, the team focused on identifying the concepts/techniques/methods related to TQM that could be incorporated in every day construction operations. Concepts such as developing better rapport between management and employees, better supervision, quality, and preplanning strategies were researched. The company has implemented many of the ideas recommended by the team.

### **Conclusion**

The Special Topics course is designed to give students management experience in a real live construction industry setting. With appropriate guidance and direction, students can gain a professional experience pertaining to current problems in the construction industry. Viable topics such as Management Information Systems (MIS), Total Quality Management (TQM), and American Disability Act (ADA) can be adequately researched from an academic and industry setting. The interaction of students, faculty, and industry representatives in such a problem solving arrangement is in essence a form of an outreach program that encourages a sharing of information and ideas. In summary, students gain a more realistic outlook on putting research into practice.

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