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AC 2007-2735: ENCOURAGING LIFELONG LEARNING FOR ENGINEERING MANAGEMENT UNDERGRADUATES

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Encouraging Life Long Learning for Engineering Management Undergraduates

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Abstract

The current ABET guidelines place an emphasis on life-long learning for our undergraduate students. What is life-long learning? How can we encourage students to consider global issues, current events, or even anything "that isn't going to be on the next test"? In this paper we present survey results evaluating habits of undergraduate students entering an engineering management program and seniors related to life-long learning including attending professional society meetings, reading trade publications, reading business related books, and other learning outside of the classroom activities.

This paper also presents a two semester effort to increase life-long learning activities among undergraduate engineering management students. Changes were made to an introductory sophomore level EM class. Students were required to participate in life-long learning activities including reading business books and interviewing managers. These activities were graded as part of the required course. Additionally, the students were asked to identify learning activities they would complete the semester following the course – which would not be reflected in their grades. Recommendations for incorporating life-long learning initiatives in the engineering management undergraduate curriculum are also presented.

Introduction

The current ABET guidelines place an emphasis on life-long learning for our undergraduate students. In the report "Engineering Change: A Study of the Impact of EC2000" (Lattuca, et. al.) reviewing the new ABET guidelines 31% of employers reported that lifelong learning skills were *moderately important* in new hires and 60% reported that lifelong learning skills were *highly important* or *essential.* The same report showed that 2004 graduates self-report learning outcomes were higher for the life-long learning criteria when compared to 1994 graduates.

Our students often spend only four or five years being formally trained as engineers. This is compared to thirty or forty years working and developing as engineers. It is clear that lifelong learning is important, particularly as the world becomes seemingly faster paced. Faculty, however, continue to struggle with how do we measure life-long learning and how do we encourage life-long learning.

UC Santa Cruz (http://www.cse.ucsc.edu/programs/abet/outcomei.html) developed the following list of items that can be measured to evaluate lifelong learning.

1. Membership in professional societies (such as IEEE or ACM)
2. Enrollment in graduate school (either immediately or after a few years)
3. Certification (such as Microsoft or independent testing agency)
4. Courses taken (without certification or matriculation in a graduate program)
5. Survey questions about technical books and articles read recently

Research

A survey was conducted to establish a baseline of the current level of lifelong learning activity. Seniors from variety of engineering disciplines participated in a voluntary survey about lifelong learning. We received 26 usable responses. When asked "How important do you think it is to know what is going on in the world?" we received positive feedback as shown in Figure 1.
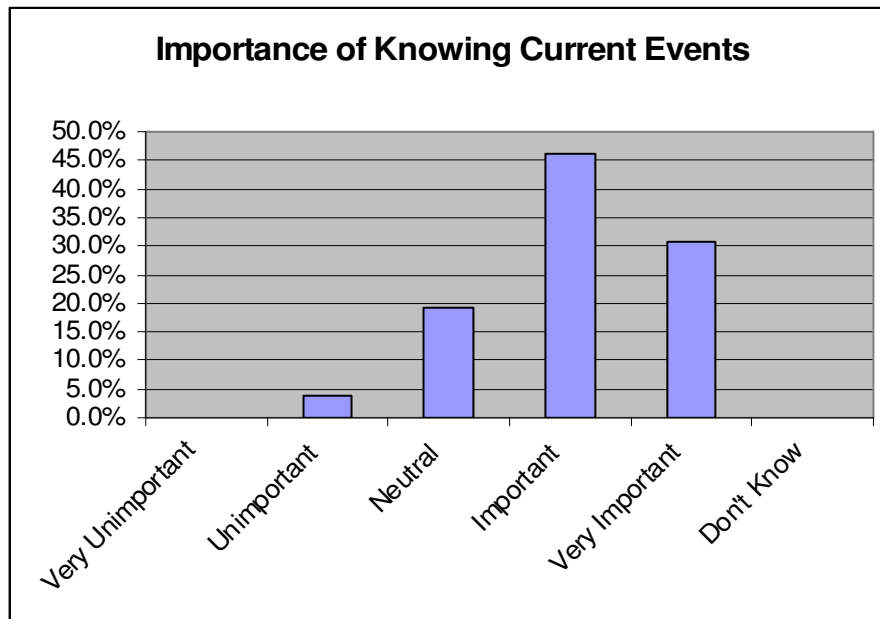
Importance of Knowing Current Events

Figure 1 – Importance of Knowing What Is Going on in the World Reported by Seniors

The students were then asked to select their source(s) of current events from: Television, Websites, Radio, Magazines/Newspapers, and Others. They were allowed to select as many as applied and asked to specific examples of each.
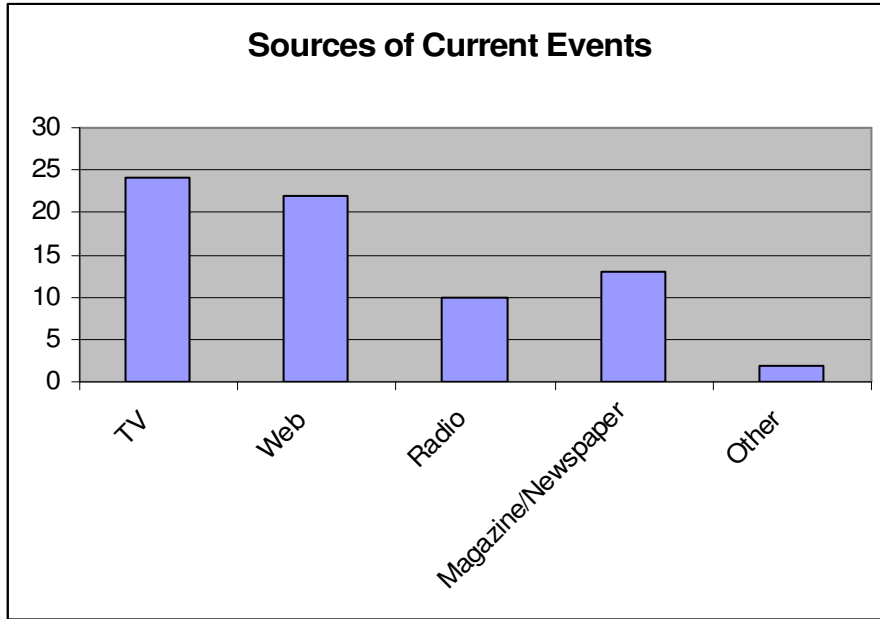
Sources of Current Events

Figure 2 – Seniors Sources of Current Events

Television was the most frequently cited sources of current events. The majority of students listed CNN and various network news programs. Three students listed "The Daily Show" on Comedy Central. Frequently cited websites included Google, YahooNews and MSN. The examples listed under "Other" were word-of-mouth interactions with others. The students were asked how many business-related books on topics such as leadership they had read in the past year. Figure 3 shows their responses.

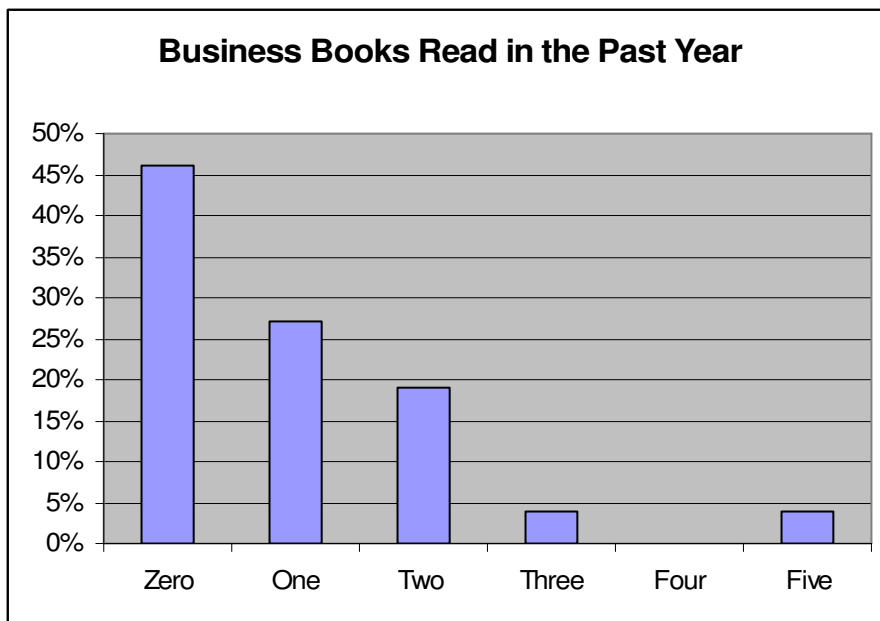**Business Books Read in the Past Year**

Figure 3 – Number of Business-Related Books Read by Seniors

The self-report number of business related books read was low, as can be seen in figure 3. A follow-up question asked the students to list the book titles they could remember. The vast majority were well recognized best sellers such as "Good to Great" and "Built to Last."

Emphasized Life Long Learning

In an effort to emphasis the importance of lifelong learning for undergraduate engineering students, the authors revised an introductory sophomore engineering management course to encourage lifelong learning. Students were given assignments to read a variety of articles related to professionalism and required to attend relevant speakers during the semester. Students were required to read books on topics such as leadership and management. The books were selected by the students and included "The Toyota Way", "The World is Flat", "Good to Great" and many others. Each student then presented a brief three to five minute summary and analysis of the book he or she read.

The instructors got some surprised comments from students related to the exercise. One student that was always reading a paperback book before class stated that this was the first non-fiction book he had read. Others commented on encouraging others to read the particular book. To determine if the reading assignment and oral reports had inspired the students to read more we conduct a life long learning survey at the end of the semester in this introductory class.
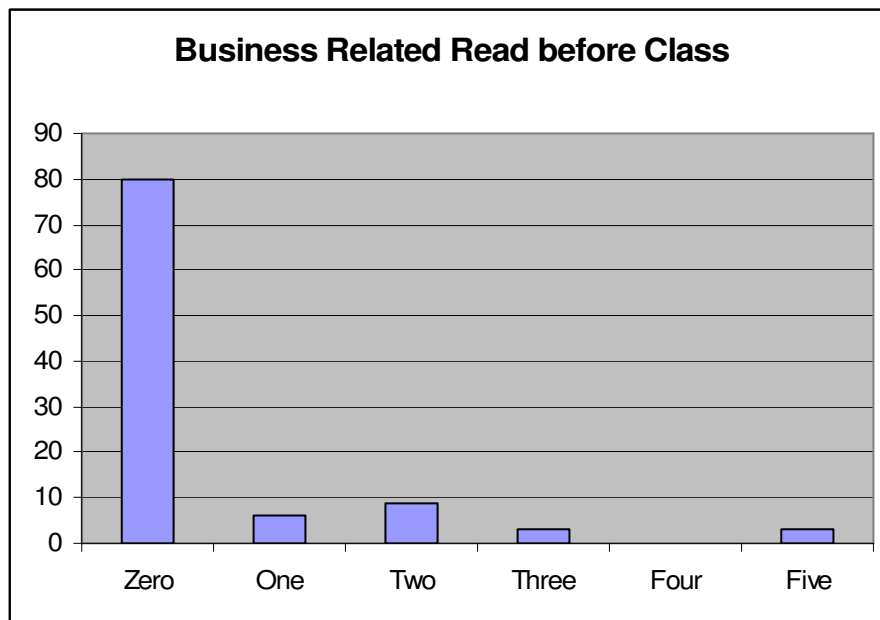

Figure 4 - Number of Business-Related Books Read by Sophomores before the Class

As can be seen in Figure 4, the underclass students are less likely to be doing supplemental reading when compared to the seniors. We asked the 35 students in the sophomore class the following question, "Based on the books discussed in class, are there any you plan on reading in the next few months?" 40% replied "yes" and another 40% replied "no". The remaining 20% answered "maybe." The students were asked to list specifics books they plan to read. 13 of the 35 students listed specific titles they plan to read based on the book reports in the class.

Conclusion

While the self-reported improvement in outside reading by the underclass students was significant it represents less than half showing an interested in self directed life-long learning while still students. The percentage of seniors reading without any specific effort at encourage lifelong learning was higher at 55%. This was a surprising result for the authors. It is not clear whether the seniors are more incline to read due to their exposure to more advanced courses in their fields, experiences they have had outside the classroom such as internships, or the general maturing that comes with two or three more years of college. The authors plan to continue our efforts to encourage students to learn outside of the classroom and are open to suggestions from other instructors facing this issue.