

Using Case Studies to Incorporate Entrepreneurship in Technical Courses

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Abstract

Undergraduates are increasingly interested in entrepreneurial and intellectual property (IP) topics. To meet that demand in crowded curricula is difficult. One approach is to use relevant discipline specific case studies which have a “story” that raises student awareness and interest in entrepreneurial and IP. Short discipline specific cases are being developed and used in Mechanical Engineering Technology courses at RIT. These cases are a portion of a larger effort to create a readily accessible digital media library of these cases. The results of the impact of case studies on undergraduate student interest and awareness of IP and entrepreneurship are encouraging.

Introduction

Career paths for college graduates are different than for their parents, long stable careers with a single employer are increasingly unlikely. Many recent graduates in fact plan to advance their careers with strategic changes in their employment. A second element of the change in career expectations is a growing acknowledgement that in a global economy, innovation and invention is the key to distinguishing products, companies and individuals¹. Surveys of graduates of the Mechanical Engineering Technology (MET) program at RIT² indicate the majority of alumni migrate toward management. This is not unique, Fisher, et al at Penn State Behrend recently reported³ on the results of alumni and businesses surveyed for “business knowledge attributes” necessary for engineering technology graduates.

Incorporating business and management skills has been accomplished with specific courses such as engineering economics, and project management, available as electives or as required courses in many if not most engineering and engineering technology degree programs. At RIT students elect to participate in a wide range of College of Business minors. More difficult is linking technical course material to careers that will require a significant focus on innovation, invention and entrepreneurial activities. While courses in entrepreneurship, product development and product realization are popular technical electives, enrollment is restricted to those self selected students with experiences and interests directed toward invention, innovation and entrepreneurship.

With content filled technical courses, adding material to encourage students to consider entrepreneurial activities is difficult. Furthermore, few students have a vision of themselves becoming economic engines generating new products and services. A solution is being created at

RIT using short case studies with course specific relationships to engage students in the prospect of being entrepreneurial. Case studies are widely used in some disciplines, such as business and health sciences, but more rarely in science and engineering. Clyde Herreid⁴ argues that by engaging students in a case study's topical material, students assume ownership of the material beyond the facts.

A portion of the goal to expose students to entrepreneurial career possibilities is to create a library of discipline related short cases with associated learning/teaching guides. The initial cases were designed and used in RIT MET courses. As developed, cases will be available for a wider range of disciplines. Ultimately the cases will be housed in a digital media library and accessible to both internal and external users.

Objectives and Cases Employed

During fall quarter 2006-07 academic year two short entrepreneurial topical cases were employed in multiple sections of a fluid mechanics course. The cases were discussed in student team groups during recitation and with the larger class during the same recitation period. The first case focused on two successful alumni who dared to start an energy consulting business immediately upon graduation. The goal of this case was to stimulate students to consider their own entrepreneurial possibilities. The second case involved the creation of an innovative product and addressed the issues of intellectual property (IP) ownership and creativity. The goal of the second case was to increase the awareness of students of IP issues at the university, on coop employment and later in permanent employment.

Assessment of Effectiveness

A total of 86 students, mostly first quarter 3rd year students with a smaller number of 4th year students (RIT's ET programs are 5 year cooperative education required). Students were mechanical engineering technology (80) or electrical/mechanical engineering technology (6). Most (53) had not yet had a coop block, but would be on coop spring quarter. On a voluntary basis students completed a survey after completion of the course, 64 of 86 students participated completely with another 12 surveys partially completed.

For the first case, with the objective being to raise the awareness of the students entrepreneurial possibilities, before the case about 53% thought they had a possibility of becoming entrepreneurs while after the case exercise 54% felt that becoming an entrepreneur was at least a possibility for their careers with 42% declaring it was a "certainty". In addition only 24% indicated that they expected to be a "valued employee" rather than "self employed" or "manager" 15 years after graduation. These are interesting preliminary results, encouraging technical students to envision themselves as creating new goods and services through innovation, invention and entrepreneurship.

The second case used was titled "It's my Idea, Don't I Own It?" and the objective was to stimulate student's awareness about IP ownership. While the case addressed a single individual's experience (positive and negative) with developing a novel technology while in the employ of a company in a

closely related field, the class discussion quickly turned to “what students own of their school projects”, “what happens on coop and when they return from coop” and “permanent employment IP”.

Going into the second case most (81%) of the students considered them selves “imagineers” (creative, innovative, etc). After the case no students felt discouraged from endeavoring to strive to innovate and invent, however 72% felt their perspective had changed, especially with respect to ownership of creative products. On similar questions the students indicated their perceptions had been changed about “protecting IP” (93%) and “IP and work” (85%). These results indicate the case effectively stimulated students to consider innovation and invention ideas carefully.

Summary and Conclusions

The first use of these cases was a great experience. Without considering the results more than anecdotal, they are encouraging. The students in applied fluid mechanics visited topics in entrepreneurship, innovation and invention in an interesting an engaging fashion and appear to have raised awareness and stimulated the possibilities of more entrepreneurial careers. As these students progress academically into quarters with free slots for entrepreneurial or product development courses, a test of success will be measured by enrollment. Several of the students in the first group to use the cases have enrolled in the entrepreneurship minor and one student has formed a business that is moving into the student portion of RIT’s incubator. Ultimate success will be measured by future careers.

The second use of the cases is occurring in early October 2007 and those results will be presented also.

Use of entrepreneurial cases in a technical course was accomplished with out displacing course content and in a manner that did not add to the course work load of the students (cases were short enough to read and discuss during class). Additional cases need to be developed with a flavor relevant to other technical courses and disciplines. The first cases will be available in the RIT Digital Media Library spring 2008.

References

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Professor Lundgren primarily teaches energy related courses in mechanical engineering technology. His current research area is in bio-fuels. He is a member of the advisory group for the Program for Innovation and Entrepreneurship at RIT and was a member of the interdisciplinary team that created the RIT minor in entrepreneurship. He serves on the board of a student founded consumer products company and also on the board of a bio-fuels startup company.

