

Work-in-Progress: Embedding Entrepreneurship in the Computing Curricula

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Abstract - Two projects at Arizona State University at the Polytechnic campus blend a range of student engagement activities to promote entrepreneurship. The first, “from .EDU to .COM”, engages students with industry entrepreneurs through on-campus events (colloquia and a Polytechnic showcase event), student engagement projects with SMEs, and internships. The second, “Agile Methods for Entrepreneurship” proposes curricular modifications, cohort programs with the Polytechnic’s business school, lab-oriented practice with ASU’s University Technology Office, and an off-campus 2-day workshop with students and real-world entrepreneurs, among other activities. Besides being housed in the same academic unit, these projects also share a common, differentiating approach. First, both emphasize a “learn by doing” approach consistent with the Polytechnic mission. Second, both engage students in entrepreneurship through a variety of activities. We believe the latter point is especially important; in our view entrepreneurship is often promoted through a single highly visible activity. Our approach embeds entrepreneurship across the spectrum of student engagement. This reflects our belief that students must *engage repeatedly* with entrepreneurs to understand and adopt this cultural norm. In this paper we describe our entrepreneurial engagement activities and discuss preliminary results from the first year of our experience.

Index Terms – entrepreneurship, polytechnic

INTRODUCTION

In a metropolis of almost 4 million people (the greater Phoenix metropolitan area) there is only one true research university and that is Arizona State University (ASU). Yet, there is hardly any collaboration between industry and ASU. Industry participation accounted for less than 10% of ASU research budget in 2005. The Entrepreneurship at ASU effort, supported by the Ewing Marion Kauffman Foundation, promotes a culture of entrepreneurship across all of ASU. Two projects at ASU’s Polytechnic campus supported internally from the grant, “from .EDU to .COM” and “Agile Methods for Entrepreneurship” (AME) adopt an approach consistent with the mission of a polytechnic: hands-on, integrated learning that engages the entire campus community in several types of activities promoting an entrepreneurial culture. To understand how to “do” entrepreneurship, students and faculty must first *experience* entrepreneurship. Therefore, these projects bring a full

spectrum of resources to bear to promote entrepreneurial activities throughout the academic experience.

This paper will describe these two projects and their various activities. But first we present the motivation for these projects and the objectives they share.

MOTIVATION

Large research universities such as ASU are often so caught up in the competition for federal research dollars that they do not focus sufficient resources on the transfer of knowledge and technology to society. A grant proposal is successful, research conducted, papers published, and the cycle repeats. ASU Poly’s mission is more direct; to conduct leading-edge teaching and research, *and apply it* to today’s problems. ASU Poly is charged with connecting to the needs of industry to support this mission. One important area of industry connection is with small and medium-sized enterprise (SMEs). This class of company is often responsible for high-risk, high-reward entrepreneurial activities, but is also often excluded from engaging research universities for several real and perceived reasons such as intellectual property (IP) issues, dealing with a large bureaucratic state agency (ASU), not knowing who to engage with for their specialized needs, large overhead, etc. This has held back ASU entrepreneurs (both student and faculty) to break through and engage in creative enterprises.

A second motivating factor is the need to create a culture of entrepreneurship. Much like being trained to be an engineer or a mathematician, entrepreneurship is an approach to problem solving that encourages a way to think about the problem and its solution. Problems are seen as *opportunities* and solutions as a *process* resulting in perhaps further sustainable opportunity. A final motivating factor is “a need for speed.” Entrepreneurial activities differ from traditional research activities in that once the knowledge transfer process is initiated, the process speeds up. Academic research is a trial of patience, a grind. Entrepreneurship has a significant temporal dimension that makes patience more vice than virtue. An important element of our projects is the blending of grounded science with the need to identify and capitalize on opportunity before it is lost.

PROJECT OBJECTIVES

The objectives for the “from .EDU to .COM” and AME projects include the following.

1. Transfer student projects from the classroom to commercial ventures.
2. Create lecture and learner-centered educational modules including support for distance learning.
3. Promote partnerships with SMEs to allow them access to the university's knowledge capital, while the university gains access to the fast-paced entrepreneurial projects.
4. Forge a sustainable multidisciplinary infrastructure between for promoting entrepreneurship.
5. Enhance the social embeddedness mission of ASU by connecting students with the emerging, vibrant technology sector in the greater Phoenix area.

PROJECT 1: FROM .EDU TO .COM

From .EDU to .COM increases student entrepreneurship through collaboration with Small/Medium Enterprises (SME's). Activities for this project are coordinated by the Advanced Technology Innovation Center (ATIC, <http://atic.asu.edu>), established in fall 2006 at ASU Poly with a foremost mission of creating collaborations between industry and ASU faculty and students. ATIC's activities are designed to increase student entrepreneurship and the utilization of ASU's knowledge capital through collaboration with SMEs. SMEs are open to external innovation and partnering with others to develop new products so involving them helps potential ASU entrepreneurs to break through and engage in creative enterprises. This project is midway through its one-year implementation window. The following activities are being implemented as part of the project.

- Monthly colloquia with CXX's executives of SMEs or large corporations.
- Organized PolyTech Day (<http://polytechday.asu.edu>) as a showcase event for demonstrating ASU applied student and faculty research projects to the industry community.
- ATIC has created a pipeline of 74 SME opportunities, of which 12 projects have already been completed, with 8 more going to contract.
- ATIC projects represent multidisciplinary innovation; computing, engineering, nutrition, manufacturing technology, electronic systems, and law all have projects.
- ATIC projects have engaged at least a dozen faculty and over three dozen students.
- A new SME-friendly internship programs has begun.

PROJECT 2: AGILE METHODS FOR ENTREPRENEURSHIP

The "Agile Methods for Entrepreneurship" (AME) project is an experiential learning and venture creation program that uses agility to create, evolve, and engrain student ventures. The AME program leverages connections to entrepreneurial companies partnering with ASU through the Distributed and Enterprise Applications Consortium (DEAC). A centerpiece event for the AME Project is a collaborative workshop between students as entrepreneurs, faculty, and entrepreneurs from DEAC and other industry partners. The

AME project formally kicks off on June 1, 2008, but the following major activities are already planned:

1. Cohort program for multidisciplinary capstone teams. Capstone projects in the DCS at ASU Poly are executed using the Software Enterprise model [1][2]. This model does not address entrepreneurial activities such as market definition, product or service packaging, and opportunity analysis. The small business entrepreneurial capstone in the MSMA supports these concepts. Instead of creating a new curricular structure, we intend to create cohorts across capstone project boundaries and let students fuse these concepts through team-oriented project activity.
2. There will be curricular enhancements to computing curricula in areas including *intellectual property issues; open source software licensing models; the dot-com hangover: surviving to-market strategies for fast-paced technology companies*. Further, DCS and MSMA have agreed on cross concentrations making the complementary aspects of project definition, implementation, and delivery available to students in respective degree programs.
3. This project will support a range of *entrepreneurial embeddedness* activities such as having local industry members perform knowledge creation activities at ASU and having students "follow an employee to work". Examples these activities have already taken place. Finally, the major activity is a 2-day entrepreneurial workshop where students, faculty, and industry participants will attend an offsite workshop to foster the creative and risk-taking spirit of entrepreneurship.
4. The final entrepreneurial activity is *awareness*. The AME project will promote awareness among students, faculty, and the community as to entrepreneurial opportunities and activities through speakers and panels, PolyTech Day, industry partnership groups such as DEAC.

SUMMARY

Two projects at Arizona State University's Polytechnic campus are just underway to promote entrepreneurship as part of the student (and faculty) experience. Consistent with the mission of the polytechnic, we believe the best way in which to teach and learn about entrepreneurship is through the trial-and-error process inherent to hands-on learning. This process must constantly engage students to promote a culture of entrepreneurship. The "from .EDU to .COM" and AME projects at ASU Poly manifest this approach. These projects are new. By the time of the FIE conference the "from .EDU to .COM" project will be just completed, while the AME project will be approximately halfway completed.

REFERENCES

1. Gary, K., "The Software Enterprise: Preparing Industry-ready Software Engineers", *appears in Software Engineering: Effective Teaching and Learning Approaches and Practices*, Ellis, H. (ed.). IGI Global 2008.
2. Gary, K. Gannod, G., Koehnemann, H., Lindquist, T., and Whitehouse, R., "WIP: The Software Enterprise", *Frontiers in Education*, 2005.