2006-2164: I2P™ INTERNATIONAL COMPETITION: A GLOBAL EDUCATIONAL FORUM FOR TECHNOLOGY ENTREPRENEURSHIP

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I2P® International Competition: A Global Education Forum for Technology Entrepreneurship

Abstract

In November of 2002, 6 student teams competed in the first Idea to Product® International Competition at the University of Texas at Austin. One of the driving ideas behind the program was to extend the student-led local I2P® competition to a broader international audience. Since that time the competition has grown to include more teams from a variety of leading universities across the country and around the world. 38 teams from 10 countries have traveled to Austin to participate. The first Asian regional competition was held in Singapore in Fall 2005 and I2P® International Europe is scheduled for the Summer 2006. Other universities in the US are preparing regional or conference-wide competitions and initial planning for national competitions has begun in several countries.

The competition engages students in the early stages of emerging technology commercialization. The competition website provides additional information and may be found at www.ideatoproduct.org. Student teams prepare a commercialization assessment addressing technical status, intellectual property, market needs and market characteristics. The teams present their assessments to a panel of faculty, business leaders and entrepreneurs. While several examples of technology licenses and the development of new companies illustrate the impact of the competition, the real value and focus of the competition lies in education. The case for the I2P® UT Austin Competition as an education program for engineers has been established in a separate paper. Starting from that and a more recent formal educational assessment of the competition a more comprehensive examination of the international competition is possible, which frames the body of this paper.

The creation of the competition was facilitated in many ways by the culture at The University of Texas at Austin. Yet, this culture was deliberately created through the tireless efforts of a core group of students, faculty and community supporters over a period of many years. Universities appropriately change slowly, but they do change. It can still be said that the local competition established an academic and community forum for examining the potential of emerging technologies while at the same time focusing on educating technical students about entrepreneurial issues. Exploring I2P® International establishes evidence that the needs and goals of international engineering education resonate with those established within the US. Further, the I2P® program is a model that is readily adapted to a variety of cultures and local educational and community environments. More importantly, the competition has evolved to support a more global perspective on entrepreneurship enriching the educational experience of the students who have participated. The paper also examines the effects of the broader cross-cultural transport of ideas in terms of technical education and provides some basic guidelines for entrepreneurship education in general.

Introduction

There is, and fortunately will continue to be, an ongoing debate in the literature about the state of engineering education and how it might be better connected to engineering practice. From a small sample of the available work it is possible to gather some of the most prevalent subjects

that are being recommended as essential components of engineering education; innovation, leadership, management, communications, overall system responsibility and risk management.[1, 2, 3, 4,5] Each of these is critical to entrepreneurship and it is easy to see how the argument can be made that entrepreneurship belongs in engineering education.[4] From an economics or management perspective, there is a need to integrate technology issues considering the large and vibrant segment of the economy that is driven by the development of technology-based products and services. In a way, engineering belongs in entrepreneurship. Regardless, it is difficult to cover just the technical material for engineers within the scope of a four-year degree, emphasizing the value of an extracurricular program.

Universities have experienced enormous expansion of technology commercialization activity in the past two decades. This spans actual technology transfer activity such as licensing, shifts in research protocol, educational programs supporting technology entrepreneurship, and greater connections to the business sector. In many European nations, the transfer of technology has become the university's "third mission." In the United States, technology transfer is driven in a similar fashion and related to *potential* revenue and also a desire to connect research more directly to promoting the public good. Of course technology commercialization activity must be placed into proper perspective with more important transfer conduits such as publication, graduation and consulting where all of these match the mission of public universities in terms of education, research and especially service. Further, the educational mission of universities extends from students to faculty and to the community at large, which resonates with the desire to connect engineering practice to engineering education, and especially the area of entrepreneurship. It can also be connected to university trends incorporating technology commercialization into their missions. There is an opportunity within academia to address engineering entrepreneurship, university technology commercialization and the mission of universities to engage the community at large simultaneously.

While several business plans have stemmed from the work of several student teams, I2P® is *not* a business plan competition. As illustrated by Figure 1, the competition focuses more on the issues associated with the 'Imagine' and 'Incubate' stages of technology commercialization as identified by Jolly.[6] While there are examples of technologies near commercial viability, emphasized by the trend in business plan competitions toward entries that are based on new technology[7], the majority of university research results in technologies that may just break into this 'Imagine' stage. Many of them require significant work to make the "techno-market insight" that establishes the earliest sense of the opportunity to commercialize. Imagine, as an example, a wireless communication technology that multiplies the bandwidth a single broadcasting and receiving unit could process. Research at a university would likely include modeling of the new system and a bench prototype used to validate the models to academic criteria before filing for intellectual property protection. Outlining the actual value of the technology with respect to other wireless technologies or other methods of data transfer would take additional work. Discovering the real advantages of the technology for telecommunications, internet data transfer or other applications would also require effort. It is easy to imagine that faster, or smaller, or cheaper is actually better, but it is the potential customer (somewhere in an overall value chain) who decides this. Plus they change their minds. Cell phones may not *need* higher transfer rates, there may be other systems that would need to be invented to allow computers to take advantage of the new technology or new FCC regulations may be required to allow the new technology to

operate. Like one of the issues with the Iridium satellite phone system, an alternate technology might undermine your market. Of the dozens of potential markets the one, just one, market must be found or predicted that is needy enough, accessible and large enough to support a new venture or compel a company to license the technology. None of these issues are the direct providence of university researchers and yet they are all essential to the actual practice of technology commercialization that universities increasingly pursue.

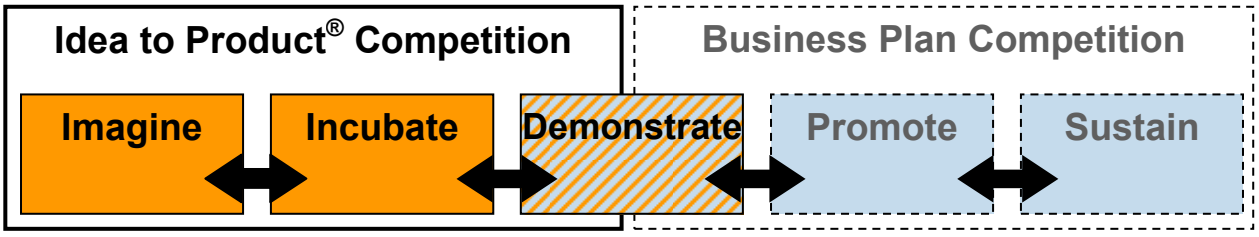

Figure 1: Emerging Technology Scope of the I2P® Competition

For engineers, understanding these market issues is central to an ability to deliver technical solutions to 'customers.' It is also important to recognize that engineers are educated in terms of creating new technology (which is especially true for graduate students) and in the use of design methods that largely attack current problems using available technology. There is little to connect the solution of engineering design problems to the creation of new technology or to imagine customer needs for a market that will exist in the future.

The Idea to Product® International Competition gives engineering and technical students the opportunity to explore the process of technology commercialization and learn about entrepreneurship. Through technology sourcing, mentorship and competition judging faculty and members of the community participate both in the education process and in live (as opposed to representative) commercialization activity. This competition may be put into perspective in two important ways. First, competitions such as those sponsored by SAE or the many "Rube Goldberg" competitions are proven educational tools for engineers. Second, there are many different technology entrepreneurship programs that have been developed at universities around the world. This indicates both an interest in the area and the existence of many programs and champions that can support and develop the I2P® concept further. The portability of the I2P® model and its core function of connecting students, faculty and the communities of international universities for the purpose of actual commercialization activity is a noteworthy contribution to education practice in the area. The I2P® International Competition is hosted by The University of Texas at Austin (UT), but the model is being adopted and evolved by universities around the world: It is no longer a just a UT program, the concept is owned and evolved by those who choose to compete.

History and Format of the Competition

When students in what is now called the Technology Entrepreneurship Society (TES) decided in the fall semester of 2000 that they wanted to create a competition for budding technology entrepreneurs, there was the right combination of courses, supportive faculty, student interest and willing support from community entrepreneurs and business leaders to make it happen. This was the result of many years of work to promote this type of culture at the university. This, "right combination" was created. In the following spring the first competition featured 10 teams

mainly consisting of computer science and engineering students. Even before the third year of the competition, with 72 entries, faculty members in engineering and in the business school were working with potential community supporters to design and host an international version of the competition.

The local competition, held each spring semester, is designed to allow any student with simply an interest in entrepreneurship to be competitive. The I2P® program coordinator, Ms. Jennifer Parks and TES collaborate on a variety of programs during the semester. During the first couple of weeks of the spring semester, they hold a kickoff event to promote the competition, educate students about the early stages of technology commercialization and facilitate the formation of teams and the creation of entries based on student research or available university technologies. Several students have also competed with their own inventions. Throughout the spring semester they work to host several workshops on various topics including, general entrepreneurship marketing and IP. A one-page project summary is submitted mid-semester for what is the essentially the first round of the competition. These summaries are judged by a panel of previous competitors and faculty and about 15 teams are chosen to compete in the presentation rounds near the end of the semester. A committee of TES students and the coordinator connect the 15 teams with faculty or business mentors and work to prepare a 5-page project summary which is submitted before the initial dry-run presentations. The dry-runs which are given to a panel of faculty and previous competitors have been shown to have a dramatic impact on the quality of competitions. They are an invaluable educational tool. The teams then compete in semi-final and final presentations given to panels of local business leaders, entrepreneurs and faculty which are on subsequent days to allow further evolution of the presentations and driving the highest level of competition in the final round. Through the variety of technologies that students consider and through mentorship and judging the competition reaches many different faculty members. More than 400 students from 5 colleges and 13 different departments have competed in the competition. Local venture capitalists, entrepreneurs, lawyers and business leaders have donated their time and have learned about technologies available for licensing at UT. A more thorough discussion of the local competition may be found in a separately published paper.

Within the first two years of the I2P® UT Austin competition Dr. Steve Nichols and Prof. John Doggett lead faculty members from engineering and management departments respectively in the creation of an intercollegiate version of the competition. After discussing the concept with colleagues at other universities as well as local technology business and law supporters, it became clear that there was an opportunity to go further and create an international competition, and also the potential for regional competitions around the world. At the time it was not known if there was a market for a derivative of the local competition that would provide a similar educational experience and forum for emerging technology commercialization to the students and local communities of many different institutions. The plan was to first establish an international competition where students from many schools could compete and then to promote the adoption of the competition at those participating schools.

The international competition required careful consideration of participant eligibility, international intellectual property rights, more challenging team support, different types of mentors and the creation of more comprehensive web support so that a greater variety of teams

could be competitive. Instead of an initial screening stage an a one-page submission, the I2P® coordinator has worked with UT faculty members to invite teams to compete in the I2P® International Competition. This was seen as an essential element in giving the competition the best chance for success and growth. During the first two years of the competition only universities with known programming in emerging technology entrepreneurship and at least one faculty supporter at the participating institution were selected for the competition. During the third yearly competition in November of 2005, there were at-large invitations and a new source of participants, the winners of the first I2P® Asia Competition held at the National University of Singapore in September of 2005, featuring teams from 5 nations. The first I2P® Europe is will be hosted by Imperial College of London during the summer of 2006 at Imperial College of London and Purdue University has created an I2P® Undergraduate National Competition which is planned for 2006. While UT officials have assisted in the development of each of these derivative competitions, the host institutions have taken ownership of them and have provided innovation of their own. What is clear from this development is that the core educational model established in the local UT competition can be transported to other universities and can be a forum for students from many different parts of the world to participate in the commercialization of emerging technologies. Additional information about the many versions of the competition may be found at www.ideatoproduct.org.

Assessment

What is the effect of this competition? How can its evolution be managed (to perpetuate the core mission of the competition) and at the same time cultivated (to facilitate a distributed ownership of new versions and more regional competitions)? To address both of these questions an assessment function was integrated into the 2005 I2P® International Competition. Students were asked to complete three surveys before, during and after the competition. Similar surveys and more structured feedback from team advisors and judge participants are also being planned. One way of looking at this is that the further development of the I2P® family of competitions should be directed by a careful, systematic process and with the participation of the widest variety of host universities and participants.

The pre-competition surveys and the surveys completed after each team received feedback from dry-run competitions is interesting. Students reported significant improvements in their understanding of IP and market issues. Most reported spending an additional 6 hours to rework their presentations for the following day (of real competition). Several teams reported working for 12 hours. The career ambitions of the participants spanned academia, start-up companies and large firms. One of the most interesting responses from the students was the prevalence of learning from and connecting to other teams. A more complete discussion of the surveys including the post-competition survey results will be published separately.

It is also important to admit an intentional omission in the above discussion which we will correct here. There is prize money. The winning team in the 2005 I2P® International Competition was awarded $10,000. But, it is not about the money. Money is an important incentive to students and is an indispensable part of how the competition is perceived by all who participate. It is interesting to note, however, that only one student surveyed even mentioned money as a reason for competing and placed it second to making connections and to learning

about entrepreneurship. This indicates that the priority of the competition and its central goal are being addressed.

Conclusions

In this paper the expansion of the Idea to Product® UT Austin competition into both an international competition and to regional competitions hosted at a variety of universities has been discussed. Beyond the UT students from 5 colleges and 13 departments that have competed in I2P® are those representing 18 universities from 8 different nations (US, Mexico, UK, Ireland, Singapore, China, Japan and India) that have contributed to the international competitions. For each of the institutions faculty members and local assets have been engaged both in real technology commercialization and in support of the education of the student participants. The trend toward greater adoption of this concept and the opportunity to adapt the basic concept to support other segments of entrepreneurial education are clear.

Many different programs across the country have begun to bring together the different research activities, community assets and educational disciplines that support technology transfer and entrepreneurship. Several discussions of these programs may be found in the literature. These range from courses, to certificates and degree programs to muti-disciplinary research centers. Examples include the Enterprise of Technology course at The University of Texas at Austin[8], the certificate program at the Center for Technology Commercialization at the University of Southern California, the Master of Science in Science and Technology Commercialization at the IC^2 Institute and the TI:GER program at Georgia Tech.[5] These programs serve to support Many different programs have been established that can be used to promote entrepreneurship and technology commercialization within engineering education. The Idea to Product® Competition could resonate with each of these.

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