In Search of Innovators in the University Community

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Abstract

An interdisciplinary team of faculty charged with developing an entrepreneurship program discovered that innovation flourishes outside of business and engineering. In the summer of 2003, eight faculty members – six from the School of Business and two from the School of Engineering – gathered to construct an entrepreneurship program that would prepare students to conceive, evaluate and launch entrepreneurial ventures. As a first step, a survey was conducted to measure students' interest in entrepreneurship. To the surprise of the authors, students outside the engineering and business schools appeared to be more interested in starting their own business. These students have more new venture ideas and were more alert to opportunities for new businesses. These survey respondents came from Science and Math, Arts and Humanities, Nursing and Education.

Now where are the engineering and business faculty members to teach innovation, new product processes and entrepreneurship to non-engineering and non-business students? Do you have entrepreneurial faculty who can develop and champion entrepreneurship programs? Who among your faculty is capable of teaching the appropriate mix of theory and practice to feed the entrepreneur's passion for innovation? These innovators need practical interdisciplinary courses to assess the feasibility of their ideas. Further many need to work with engineering professionals to transform their ideas into realistic designs and prototypes. Have you got faculty who are comfortable doling out engineering as needed? The quick answer to all these questions is probably, "No." Are we missing the opportunity to build the communities in which we live by failing to encourage, support, and lead innovation?

Introduction

In the spring of 2003 the Center for Entrepreneurship located in the Seidman Business School at Grand Valley State University received a grant to develop a program in entrepreneurship. A call for interested parties was put out to the University. The result was a committee made up of two engineers, one Small Business and Technology Development Center (SBTDC) director, and several business school professors. The

interdisciplinary faculty committee was charged with exploring the potential for a program in entrepreneurship. At first the committee attempted to create a minor by packaging existing courses. Once the committee understood that a combination of traditional business and engineering courses would not add up to a coherent plan of study, the committee decided to step back and reexamine their assumptions.

Since faculty from the business and engineering schools made up the committee, it was assumed that business and engineering students would populate the entrepreneurship program. As discussion unfolded, many committee members shared anecdotal information about non-engineering and non-business students who were interested in starting their own businesses or had ideas for new products. The committee also discussed the whether to offer a minor or a major program. A survey was commissioned to help the committee determine who was interested in studying entrepreneurship and how many courses interested students were willing to take.

In designing the survey, the faculty began with business and engineering. The expectation was that in-class surveys would be used. It became obvious that this was far too narrow an approach and, like many previous studies, the population would be limited. The results would probably generate to some extent what the faculty already knew. It would not provide the committee with the big picture of the potential for entrepreneurship in the university. In the end the challenge became to find a methodology that would allow all students in the university an equal opportunity to provide express their interest in entrepreneurship.

Following the goal of assessing the level of interest in new ventures and new venture courses across all university areas, three important research questions were identified.

1. To what extent do students across the University population possess the characteristics that are commonly viewed as indicators of entrepreneurial intent?
2. To what extent do students have an interest in innovating new products or services?
3. What is the level and extent of interest in taking courses in new ventures (entrepreneurship)?

Methodology

The study was conducted among all students enrolled in courses during the summer of 2003 semester at Grand Valley State University. The questionnaire was developed and refined by the interdisciplinary committee of faculty members.

Using an incentive of $1.00 to complete the survey, it was pre-tested with a quick convenience sample of fifty students in the University's Student Union. After refining and improving the questionnaire, it was posted on Blackboard (course authorware) and announced to all students enrolled in summer classes (approximately 5,000) via an e-mail message. The e-mail directed students to a site on Blackboard where they could

complete the 27-item questionnaire electronically. An incentive was offered for completing the survey - entry into a drawing for one of six $25 gift certificates redeemable at the University Bookstore.

The questionnaire contained seventeen statements designed to measure interest in entrepreneurship and characteristics of entrepreneurs to which students responded using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree); for example, "I am a risk taker." It also queried students regarding specific demographic descriptors, such as academic major and minor, academic rank, and gender.

Findings

In total, 728 students responded to the e-mail and completed surveys during a one-week period in June 2003, representing a response rate of approximately 15 percent. A profile of student respondents appears in Table 1. The sample was composed of 1.5 percent freshmen, 9.2 percent sophomores, 27.3 percent juniors, 42.0 percent seniors, 18.4 percent graduate students, and 1.5 percent other status. With respect to academic major and gender, the sample was judged as quite representative of the university's student population during the "regular" academic year. The population of freshmen, however, is unquestionably under-represented since the survey was administered during the summer (2003), before the majority of incoming freshmen had arrived on-campus.

Academic Discipline	**Number of Students in Sample**
Other Disciplines	13
School of Nursing	81
Social Sciences	98
Science & Math	184
School of Education	56
Arts & Humanities	104
School of Business	143
School of Engineering	24
School of Social Work	3
Not Specified	22
Total	**728**

Table 1 – A Profile of Student Respondents by Academic Major

Evidence of Interest in Entrepreneurship

Using a five-point Likert scale, respondents were asked to indicate their level of agreement with two statements regarding a career in entrepreneurship: (1) "I would like to start my own venture;" and (2) "I would like to work for myself." Among all students, the percentage who answered "Strongly Agree" to the first question was 23.0 percent (167 of 727 respondents) and the percentage answering "Somewhat Agree" was 36.2

percent (263 of 727). With respect to the desire for self-employment, 38.7 percent (281 of 727) indicated "Strongly Agree" and 34.9 percent (254 of 727) indicated "Somewhat Agree."

By combining Strongly Agree and Somewhat Agree responses, 73.6 percent (535 of 727) indicated that they wanted to be self-employed and 59.2 percent (403 of 727) expressed a desire to start their own new venture. If the summer sample can be generalized to the University's summer population, it appears there may be well over 1,000 students interested in entrepreneurship. If the same findings occurred during the regular academic year, based on this University's student population of approximately 20,000, it might indicate that upwards of 5,000 students (one-fourth of the student population during the regular academic year) are at least somewhat interested in starting and/or operating their own firm. This suggests strong market potential for entrepreneurship offerings. These statistics provide a clear indication of overall interest in entrepreneurship across the University's student population, both inside and outside of the business school.

Additionally, this research found that nearly six percent of students currently owned a business. Interestingly, the highest incidence of business ownership was found within Social Sciences wherein 7.1 percent of students sampled (7 of 98) indicated that they are currently business owners. Once again, this suggests that entrepreneurship holds appeal for certain segments of the University's student population.

Academic Major

Chi-square testing failed to reveal a difference between business and engineering majors (B&E) and other majors (non-B&E) with respect to the statement "I would like to start my own venture" ($X = 5.408$, df = 4, sig. = 0.248). Due to the small sample size of engineering majors ($n = 24$), the chi-square test yielded three cells (20.0 percent) with an expected count less than five, violating the assumptions of the test. As shown in Table 2, however, it was found that both the number and the percentage of non-business and engineering students aspiring to entrepreneurship (non-B&E) is higher than their classmates from business and engineering.

Student Major	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
Business & Engineering (n = 166)	12.0 (n=20)	13.9 (n=23)	21.7 (n=36)	34.3 (n=57)	18.1 (n=30)
Non-Business & Engineering (n = 539)	9.3 (n=50)	12.6 (n=68)	16.7 (n=90)	36.9 (n=199)	24.5 (n=132)
Total	**9.9 (n=70)**	**12.9 (n=91)**	**17.9 (n=126)**	**36.3 (n=256)**	**23.0 (n=162)**

Table 2 – Student Interest in Starting a Business: Business and Engineering Majors versus Other Majors *(N = 705, percentages shown)*

Table 3 shows the percentage of students interested in starting a business broken down by academic discipline. An analysis of variance was conducted that revealed no statistically significant differences between academic major and interest in starting a business. In reviewing the data, it is noteworthy that the highest levels of interest in starting a business exist outside the Schools of Business and Engineering; namely, the School of Nursing, Social Sciences, Science and Mathematics, School of Education, and Arts and Humanities. Perhaps this serves as support for the observation that those who major in business and engineering tend to seek employment within larger, more established firms, as opposed to newer, smaller ones.

Academic Discipline	**Percentage**	**Number of Students in Sample**
Other Disciplines	69.3	13
School of Nursing	65.5	81
Social Sciences	64.3	98
Science & Math	60.9	184
School of Education	60.7	56
Arts & Humanities	56.7	104
School of Business	53.5	143
School of Engineering	45.9	24
School of Social Work	33.3	3
Not Specified[a]		22
Total		**728**

Table 3 – Student Interest in Starting a Business by Academic Major
(N = 728, percentages shown for the sum of Somewhat Agree plus Strongly Agree)

Characteristics of Entrepreneurs

The survey contained six statements describing characteristics of entrepreneurs to which students responded using a 5-point Likert scale (1=Strongly Disagree, 5=Strongly Agree). The six statements included:

1. I am a risk taker.
2. I have an idea for a new product or service.
3. I like to tinker with ideas for new products.
4. I like to dream about new services.
5. I have many ideas for possible new businesses/organizations.
6. I am on the alert for new venture ideas.

Analysis of variance testing was conducted to determine if there were significant differences between business and engineering majors and other students with regard to their level of agreement with each statement. No significant differences were found at the $\rho \leq .05$. Interestingly, we found a higher percentage of agreement among "other" majors than among business and engineering majors, as shown in Table 4.

Entrepreneurial Characteristic	Bus.	Eng.	Other Majors	F Statistic	Sig.
I am a risk taker.	3.80	3.64	3.76	.205	.815
I have an idea for a new product or service.	3.41	3.45	3.47	.094	.910
I like to tinker with ideas for new products.	3.71	3.73	3.77	.123	.884
I like to dream about new services.	3.88	4.00	4.00	.491	.612
I have many ideas for new businesses/organizations.	3.47	3.64	3.72	1.954	.143
I am on the alert for new venture ideas.	3.34	3.64	3.54	1.191	.305

Table 4 – Students' Entrepreneurial Characteristics Among Intending Entrepreneurs[a] *(N = 595, means shown)*

[a] *Entrepreneurial Intent is measured by summing "Somewhat Agree" and "Strongly Agree" (or "Somewhat Disagree and Strongly Disagree") to the question, "I would like to start my own venture." Students who were neutral about starting a business were excluded from this analysis.*

Perceptions of New Venture Opportunities

The questionnaire contained three statements designed to measure students' perceptions concerning new venture opportunities to which students responded using a five-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree).

1. There are many opportunities for new businesses in my major field(s) of study.
2. Students in my discipline should be exposed to new venture opportunities.
3. Grand Valley State University students are encouraged to pursue new ventures.

The survey results revealed no statistically significant differences between business students, engineering students, and other majors on any of the three statements. Indeed, students perceive opportunities for entrepreneurship across academic disciplines; (e.g., "There are many opportunities for new businesses in my major field(s) of study" [F = .188, sig. = .829]).

Once again, these results would suggest that perceptions of new venture opportunities do not lie exclusively within business and engineering schools; instead, they are perceived to exist throughout University disciplines.

Interest in an Entrepreneurship Program

The data was filtered to focus on those students who were classified as "intending entrepreneurs" – those who indicated "Strongly Agree" or "Somewhat Agree" with respect to level of interest in starting a new venture. When asked, "If a new venture program is offered to provide the basic skills and applied work, I would be most interested in _____ ?" Response options included: (a) a major (30 credit hours); (b) a

minor (21 credit hours); (c) 1 - 3 courses; and (d) N/A - No interest in new venture course.

The distribution of responses is shown in Table 5. From this we conclude that the majority of entrepreneurial-oriented students at this particular university want to take courses in entrepreneurship, although their preference is for fewer courses and a minor over a major. One possible explanation of this finding is that a high percentage of the sample (42 percent) were seniors and possibly quite near to graduation. Consequently, for them, adding or switching to a major in entrepreneurship could entail additional coursework, possibly jeopardizing planned graduation dates.

Entrepreneurship Program Type	**Business**		**Engineering**		**Other Majors**	
	n	**%**	***n***	**%**	***n***	**%**
Major (30 cr. hrs.)	4	5.3	1	9.1	21	6.4
Minor (21 cr. hrs.)	18	23.7	2	18.2	88	26.7
1 – 3 courses	43	56.6	6	54.5	198	60.0
N/A – No interest	11	12.5	2	18.2	23	7.0
Total	76	100.0	11	100.0	330	100.0

Table 5 – Interest in Entrepreneurship Program among Those Desiring to Start a Business[a] ***(N = 417)***

[a] *Entrepreneurial Intent is measured by summing "Somewhat Agree" and "Strongly Agree" (or "Somewhat Disagree and Strongly Disagree") to the question, "I would like to start my own venture." Students who were neutral about starting a business were excluded from this analysis.*

Moreover, the data suggests that students view an entrepreneurship curriculum as "supporting" their already-selected majors in other disciplines, rather than a stand-alone or second major, as is also suggested by the preference for courses at the 100- and 200-level.

Discussion

The findings illustrate that a considerable percentage of students aspire towards entrepreneurship, regardless of their academic discipline. From the data we gathered, it appears as though the entrepreneurial spirit is alive and well across the university population (e.g., nursing, social sciences, and arts). Indeed, these findings imply that entrepreneurial aspirations, as well as the perceived need for entrepreneurship training/education, may be most fervent outside of the business and engineering schools. The authors have used these results to persuade colleagues and the administration to develop an entrepreneurship minor open to non-engineering and non-business students. As currently envisioned the engineering and business schools would share the responsibility for developing and staffing the minor.[2]

Engineers and engineering faculty have a great deal to contribute to the teaching of entrepreneurship. At a minimum, entrepreneurs with ideas for physical product must

learn to work with engineers if they are to develop a successful product. If the majority of the entrepreneurs come from disciplines other than engineering, are engineering faculty members prepared to collaborate with colleagues from across the university to develop modules, courses and curricula to teach product development topics to students from other disciplines? Engineering professors have traditionally taught in strict discipline silos. Are engineering faculty willing to learn and teach important non-technical topics like creativity, ideation, product concept development, screening and product concept testing? This will entail breaking out of the traditional teaching mode for both students and faculty in quest of a "right" answer.

The faculty will need to help students to sort through ideas in a structured process. Are engineering faculty members ready to break away from focusing on the engineering problems of how does it work and how do we make it and ask other questions? What need does it solve? Who needs it? How large is that segment? How can that need be verified? Are engineers ready to teach explosive ideation? Can engineering faculty help guide from inception to delivery of the product to retail? Are they willing to ask to investigate how a product might get to a retail outlet? These are all challenges faced by the entrepreneur.

Do engineering schools have an entrepreneurial faculty? Entrepreneurship seems to be a consuming passion to conceive and bring a business to life. How many businesses have your faculty started? Do you have the kind of faculty that would score high on risk taking, that are willing to take chances to try something new with or without rewards? Who on your faculty would stay with entrepreneurs who are not interested in learning more theory than they need to get to the next step? You may not have to be an entrepreneur to understand one, but you need to be able to understand one as they are driven by a different set of needs to learn. Further complications may arise given that numerous studies have found that entrepreneurs tend to possess certain personality characteristics, including internal locus-of-control, risk tolerance, confidence and self-esteem, energy level, and need for autonomy[1]. Are engineering faculty members prepared to "deal" with business owners? Not only could students know more about business ownership than the faculty members who teach them, but they could also be better risk-takers than the faculty.

Beyond accommodating new topics and students with different attitudes and motivations, can the engineering topics that would benefit entrepreneurs from outside of engineering be identified? How can these topics be taught so that they are accessible to non-technical students? The challenges are clear. The reward for an engineering school willing to take on the challenges is the chance to become a leader in the areas of entrepreneurship and innovation. Innovation and Entrepreneurship go hand in hand. Innovation and innovative people drive economies. At a time when the design and product development jobs, as well as manufacturing jobs, are rapidly being exported to lower cost areas teaching innovation and entrepreneurship to non-engineers may be a method to stimulate innovation for it is out of innovations that jobs are developed and communities sustained.

Limitations

It is unusual that researchers are able to collect data from a large sample in a very short period of time. By using Blackboard and Internet technology, we were fortunate enough to do precisely that, and we were pleased with both the students' response and their level of interest in entrepreneurialism and studying entrepreneurship. While the distribution of academic majors and gender of respondents was judged to be representative of this University's population of students, it was not representative of the distribution of students by academic rank since it was administered during June, before incoming freshmen had arrived on campus. Consequently, while the data unquestionably under-represents these students, we have no reason to believe that their opinions would have been substantially different from sophomores since we failed to find evidence of significant difference by academic rank along items of interest. Nevertheless, in order to ensure proper representation of the student population during the regular academic year, we believe it would be prudent to re-administer the study during the fall or winter semester.

Implications for Future Research

It is the hope of the researchers that funding can be found to apply a very similar survey to the whole student body at this university and then to expand to other universities. Is it potentially true that we have been teaching entrepreneurship in all the wrong places? If this study is born out by further studies that will suggest that we need to be looking for ways to find entrepreneurs, and innovators, especially those who have physical product ideas with which the engineering school can be so helpful.

Reference

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