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Editor

Tennessee Tech University

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Thank you for your interest in The Journal of Entrepreneurship Education.

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ELEMENTS OF ENTREPRENEURIAL ORIENTATION AND THEIR RELATIONSHIP TO ENTREPRENEURIAL INTENT

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ABSTRACT

Entrepreneurial orientation has been associated with high performance firms in some circumstances (Covin & Slevin, 1989; Lumpkin & Dess, 1996). Further research shows that the concept of entrepreneurial orientation can also apply to individuals (Bolton & Lane, 2012; Rauch, Wiklund, Lumpkin & Frese, 2009). Some of the personal characteristics most frequently associated with entrepreneurial orientation include autonomy, competitive aggressiveness, innovativeness, proactivness and risk-taking (Bolton &Lane, 2012; Fillis, 2010; Hamidi, Wennberg & Bergland, 2008; Lumpkin & Dess, 1996; Rauch et al., 2009; Ward, 2004). The latter three have been most commonly used and have been shown to be the most strongly related to entrepreneurial intent (Bolton & Lane, 2012; Covin & Slevin, 1989; Lumpkin & Dess, 1996; Miller, 1983; Tarabishy, Solomon, Fernald & Saghkin, 2005). Following Bolton and Lane, this study examines these three the elements of entrepreneurial orientation and their relationships to entrepreneurial intent, as measured in surveys conducted before and after an intensive two-week entrepreneurship course.

INTRODUCTION

The concept of entrepreneurial orientation can apply to both organizations and individuals. Competitive aggressiveness, autonomy, innovativeness, proactiveness and a willingness to take risks are five of the characteristics commonly associated with a personal entrepreneurial orientation (Bolton & Lane, 2012; Covin & Slevin, 1989; Fillis, 2010; Hamidi, Wennberg & Bergland, 2008; Lumpkin & Dess, 1996; Miller, 1983; Rauch, Wiklund, Lumpkin & Frese, 2009; Tarabishy, Solomon, Fernald & Saghkin, 2005; Ward, 2004). Bolton and Lane (2012) determined that the latter three were the most strongly related to entrepreneurial intent. These three are also logically related to each other. A willingness to take risks is necessary for creativity and innovation because there is seldom a guarantee that a new idea will work. Without proactiveness, few innovative projects will be started, much less completed.

Most of the literature supports a positive relationship between entrepreneurial orientation and firm performance (Avolontis & Salavou, 2007; Johan & Dean, 2003; Moreno & Casillas, 2008; Rodrigues, 2005). Other studies (Hart, 1992; Li, Zhang & Chan, 2005; Stam & Elfring, 2008; Tang, Tang, Marino, Zhang & Li, 2008) have found a negative relationship or no statistically significant relationship between company performance and entrepreneurial orientation. One reason for these discrepancies may lie in the difference between firm and individual orientations. For a firm, entrepreneurial orientation involves creating a strategy that provides the "basis for entrepreneurial decisions and actions" (Rauch et al., 2009, p. 762). On an individual level, the willingness to be proactive, take risks and creatively innovate are highly important characteristics for entrepreneurs.

Training in topics related to entrepreneurship can increase the skills and abilities necessary for starting a business as well as the motivation to do so (Barr, Baker, Markham & Kingson, 2009). This study reports the results of pre- and post-tests conducted before and after an intensive two-week entrepreneurship course intended to help students increase their entrepreneurial orientation. Students voluntarily completed surveys regarding their attitudes toward risk-taking, innovation and proactiveness and their intent to become entrepreneurs. The following section provides a brief review of the literature related to entrepreneurial orientation. The methodology and results of this study are then presented

CREATIVITY AND INNOVATION

Creativity and innovation are important to entrepreneurs as they develop new products, markets, new methods, etc. Strictly speaking, creativity is the process of coming up with an idea, whereas innovation pertains to the execution of the idea (Govindarajan, 2010; Gurteen, 1998). For entrepreneurs, this means turning the idea into a viable business. Both of these are important because a potential entrepreneur must have an idea before developing it, and undeveloped ideas do not build businesses. Creativity is itself an essential element of idea development. Therefore, for the purposes of this study, these two are viewed as part of the same concept.

Creative ideas can often come from the juxtaposition of dissimilar elements. This course introduced students to topics that were likely to be new to them, providing fodder for creativity (Couger, 1995). Guest lecturers spoke on such diverse topics as sustainability, alternative energy, peak oil, materials science and judicial systems, as well as more business-related themes such as product development, negotiation and networking. The most popular guest was a manager of an international snack firm who told about his trip to a maritime museum. The scrimshaw art on display was in no way related to snacks, but it inspired him with an idea he then used to solve a major product development problem.

Many students believe they are not very creative and that they cannot come up with innovative ideas. It is also possible that students are simply unwilling to take the risks necessary to be creative. Business students often tend to limit their business ideas to restaurants and retail shops because those are the types of enterprises with which they are most familiar. This course encouraged students to think outside-the-box to develop new and different ideas, and also sought to build their confidence in their own abilities to be creative and innovative. To convince them that there are different ways to be creative, such as developing and improving upon others' ideas (Couger, 1995; Kuratko, Goldsby & Hornsby, 2012), this course included a variety of creative activities. For example, student groups were challenged to create "bad ideas" for products. The point of the exercise was to let students have fun and free them from the pressure to think of viable products. Other student groups then attempted to develop these bad ideas into good ones.

To further introduce an element of fun, the overall course was designed as a large competition. Groups voted for their favorite ideas, with the most popular ideas being rewarded with points that accumulated until the last day. In this way, students received feedback, but were freed from the pressure of having their ideas graded (the pass-fail grade was based on participation and written assignments submitted before and after the two-week course). This focus on creating and developing outside-the-box ideas instead of completing a business plan was meant to build confidence and creativity so that students would have these necessary skills before they moved on to more concrete business plans. Barr and associates (2009, p. 378) also followed this philosophy in a course about technology commercialization:

Our primary goal is not to turn the greatest number of our students into entrepreneurs. It is, instead, to get our students to understand that entrepreneurship is an option for them and to increase their confidence and self-efficacy in regard to making this career choice….Prior research provides evidence that entrepreneurship training can substantially increase cognitive and motivational precursors to entrepreneurial activity, which suggests that the training may open up entrepreneurship as a choice to students who would otherwise remain closed to it.

Most of the students had not previously considered entrepreneurship, but were enticed to enroll in the course because of the embedded travel program. The purpose of the entrepreneurship course was therefore to introduce them to entrepreneurship and encourage them to think about including it in their plans for the future. The next section describes the results of pre-tests and post-test conducted with students before and after they completed the course.

METHODOLOGY AND RESULTS

A total of 30 students (19 females and 11 males) from Norway and 2 female American students completed the entrepreneurship course, which was held at a university in the northeastern United States. They were asked to voluntarily complete a survey at the beginning and end of the course, and to use some sort of indicator that would allow the pre-tests to be matched to the post-tests while preserving anonymity. Some students failed to provide the same indicator on the pre-test and post-test, leaving 26 matched sets of surveys. Three students could not participate in the program several days due to sickness, yet their surveys may have been included in the results because the anonymous nature of the survey prevented their omission.

Survey items for risk taking, innovation and pro-activeness were taken from Bolton and Lane (2012), with three items for each category. The total sum for each category was divided by three to obtain the mean for the category. Entrepreneurial intent was measured by four items based on Cooper and Lucas (2006). The total sum for this category was divided by four to obtain a mean entrepreneurial intent rating. Participants were asked to indicate their level of agreement with each of these 13 statement using a Likert scale (1=strongly disagree to 5=strongly agree). The entrepreneurial intent means ranged from 2.0 to 4.75. The 14 students whose means were 3.5 or greater were categorized as having high intent, while the 12 students with less than 3.5 were placed in the low intent group. The cut-off point of 3.5 was chosen because 30% of the students had 3.5 as their mean entrepreneurial intent, and the majority of them agreed or strongly agreed with the statement, "At least once, I want to take a chance and start my own company." In this way, the students with a mean entrepreneurial intent mean of exactly 3.5 were more similar to those with higher means and were grouped with them. Additional analysis was conducted with these students being included in the low intent category, but the results did not change significantly.

Comparison of the individual pre- and post-tests for entrepreneurial intent showed that 6 students moved from the low intent group (pre-test) to the high intent group (post-test), and none of the students went from the high (pre-test) to the low (post-test) intent group. It should be noted that only post-test intent means were used to create the high and low intent groups. Therefore, the low intent category is comprised solely of students who indicated low

entrepreneurial intent in both the pre- and post-tests, while the high intent category contains those 6 who moved from the low intent category (pre-test) into the high intent category (post-test) as well as those who started and ended with a high entrepreneurial intent rating.

As shown in Table 1, paired sample means-tests were conducted for the pre- and post-tests within the high and low intent groups (read vertically). Only statistically significant results are presented. The pre-test ratings of the low intent and high intent groups were also included in paired sample means-tests (read horizontally).

Table 1: Risk Taking Ratings by Low and High Intent Groups					
Risk Taking Item	Overall	Low intent	High intent	t	P<
I like to take bold action by venturing into the unknown --pre-test --post-test	2.4 3.0	2.2 2.8	2.6 3.1		
Pre-test and post- test ratings within groups	t=3.43 p<.002	t=2.55 p<.027	t=2.28 p<.040		
I am willing to invest a lot of time and/or money on something that might yield a high return. --pre-test --post-test	3.0 3.1	2.8 2.8	3.1 3.4		
I tend to act "boldly" in situations where risk is involved. --pre-test --post-test	2.5 3.0	2.0 2.8	2.9 3.1	2.4	.024
Pre-test and post-test ratings within groups	t=2.24 P<.035	t=2.69 p<.021			
Mean risk-taking rating --pre-test --post-test	2.6 3.0	2.3 2.8	2.9 3.2	2.07	.049
Pre-test and post-test ratings within groups	t=2.75 p<.011	t=2.53 p<.028			

Analysis of these results shows a statistically significant increase between the pre- and post-tests for the overall group of 26 for two of the items and the risk-taking mean. Closer analysis shows the increase was greatest among those in the low intent category. "I like to take bold action by venturing into the unknown" was the only item that showed increased ratings in the high intent group. The high intent group had higher ratings than the low intent group for this item in the pre-test and the mean, but not the post-test. The low intent group increased their risk-taking orientation to levels similar to those of the high intent category by the end of the course. This suggests that attitude toward risk-taking can be changed through training, particularly for those who are risk-averse. It does not support the concept that those who intend to become entrepreneurs are more inclined to take risks.

No statistically significant changes in innovation ratings were found in the pre- and post-test ratings in the low intent group, but high intent students increased their ratings during the two weeks (see Table 2).

Table 2: Innovation Ratings by Low and High Intent Groups					
Innovation Item	Overall	Low intent	High intent	t	P<
I often like to try new and unusual activities that are not typical, but not necessarily risky. --pre-test --post-test	3.2 3.6	3.3 3.4	3.1 3.7		
Pre-test and post-test ratings within groups			t=4.16 p<.001		
In general, I prefer a strong emphasis on project with unique, one-of-a-kind approaches rather than revisiting tried-and-true approaches that have been used before. --pre-test --post-test	3.1 3.3	3.1 3.1	3.1 3.4		
Pre-test and post-test ratings within groups			t=2.28 p<.040		
I favor experimentation and original approaches to problem solving rather than using methods other generally use for solving their problems. --pre-test --post-test	2.9 3.2	2.5 2.9	3.3 3.4	2.46	.022
Mean innovation rating --pre-test --post-test	3.1 3.4	2.9 3.1	3.2 3.5		
Pre-test and post-test ratings within groups			t=2.65 p<.020		

The rating for the item, "I favor experimentation and original approaches to problem solving rather than using methods others generally use for solving their problems" was greater in the high intent group in the pre-test, but not in the post-test. The mean for the high intent group increased by 0.1, while the low intent group increased by 0.4. This brought the two groups closer together, even though neither group increased its rating by a statistically significant margin. In contrast, ratings for the other two items and the mean increased significantly among the high intent students, but not among the low intent students. It is possible that students who became more innovative during the course also increased their entrepreneurial intent given that the groups were based on post-test ratings. The item "I often like to try new and unusual activities that are not typical, but not necessarily risk" achieved the highest rating in the post test, despite starting with the lowest rating within the high intent group. This increase may be related to the variety of new and different activities the students engaged in during the course.

The items in the proactiveness category scored the highest ratings of the entire survey (see Table 3). The lowest rating for proactiveness (3.6 in the pre-test, low intent group) was greater than the highest ratings for risk-taking (3.2 in the post-test, high intent group) and innovation (3.5 in the post-test, high intent group). The statement "I prefer to get things going on projects rather than to wait for someone else to do it" received ratings of 4.2 in the high intent group and 4.3 in the low intent group in the poast-test. The overall mean for this item showed a significant increase, as did the mean for the low intent group. The high intent group increased by 0.5 but this increase was not statistically significant. These findings suggest that the students who chose to participate in this course tended to be self-starters.

Table 3: Proactiveness Ratings by Low and High Intent Groups					
Proactiveness Item	Overall	Low intent	High intent	T	P<
I usually act in anticipation of future problems, needs or changes.					
--pre-test	3.3	3.1	3.6		
--post-test	3.5	3.3	3.7		
I tend to plan ahead on projects.					
--pre-intent	4.0	3.9	4.0		
--post-intent	3.9	3.7	4.1		
I prefer to get things going on projects rather than to wait for someone else to do it.					
--pre-test	3.8	3.9	3.7		
--post-test	4.2	4.3	4.2		
Pre-test and post-test ratings within groups	t=2.52 p<.019	t=2.35 P<.039			
Mean proactiveness rating					
--pre-test	3.7	3.6	3.8		
--post-test	3.9	3.7	4.0		

The entrepreneurial intent ratings for the low intent group were unchanged over the two weeks, but the ratings for the high intent group increased significantly (see Table 4). In addition to the 6 students whose mean entrepreneurial intent increased from below 3.5 (pre-test) to 3.5 or greater (post-test), 8 students who were in the high intent group at the beginning also gave ratings over 3.5 in the post-test. The 12 students in the low intent group increased their orientation towards risk-taking, but did not increase their entrepreneurial intent rating enough to be included in the high intent group. The students in the high intent group increased their mean ratings for every item except "I often think about ideas and ways to start a business." This may reflect the relatively short time between the pre-test and post-test given the course was only 2 weeks long. There were significant differences between the post-test ratings of the students in the high and low intent groups for every item except "If I see an opportunity to join a start-up company in the next few years, I'll take it." It can be concluded that the students in the low intent group may not want to start their own businesses, but they would be willing take the risk working in a start-up company.

Table 4: Entrepreneurial Intent Rating by Low and High Intent Groups					
Entrepreneurial Intent Item	Overall	Low intent	High intent	T	P<
If I see an opportunity to join a start-up company in the next few years, I'll take it.					
--pre-test	2.8	2.5	3.1		
--post-test	3.3	2.8	3.6	2.21	.037
Pre-test and post-test ratings within groups	t=2.10 P<.046		t=2.19 p<.047		
The idea of a high risk/high payoff venture appeals to me.					
--pre-test	3.0	2.9	3.1		
--post-test	3.2	2.5	3.7	4.8	.001
Pre-test and post-test ratings within groups			t=2.22 p<.045		
I often think about ideas and ways to start a business.					
--pre-test	3.0	2.1	3.8	5.82	.001
--post-test	3.1	2.3	3.7	3.89	.001
At least once, I want to take a chance and start my own company.					
--pre-test	3.3	3.0	3.6		
--post-test	3.6	3.3	4.0	2.32	.029
Pre-test and post-test ratings within groups	t=2.31 p<.029		t=2.82 p<.014		
Mean entrepreneurial intent rating					
--pre-test		2.7	3.4	3.60	.001
--post-test		2.7	3.8	6.48	.001
Pre-test and post-test ratings within groups			t=2.23 p<.044		

Further analysis of the ratings for "At least once, I want to take a chance and start my own company" shows that 30% of the students increased their level of agreement between the pre-test and post-test, 65% remained the same, and only 1 student (4%) decreased to 3 (neither agree nor disagree) from 4 (agree). As shown in Table 5, the proportion of students who agreed with this statement remained the same while the proportion of those who strongly agreed increased by 9 percentage points to 15%. In the pre-test, equal proportions of students rated their agreement as 4 or 5 (agree/strongly agree) and 1-3 (strongly disagree/disagree/neither agree nor disagree). In the post-test, those who agreed or strongly agreed were in the majority (61%).

Table 5: Item: "At Least Once, I Want To Take A Chance And Start My Own Company"		
Rating	Pre-Test	Post-Test
1 – strongly disagree	4%	0%
2 – disagree	12	12
3 – neither agree nor disagree	35	27
4 – agree	46	46
5 – strongly agree	4	15

The overall means for risk-taking, proactiveness, innovation and entrepreneurial intent were included in a correlation analysis (see Table 6) to determine if these elements of entrepreneurial orientation suggested by Bolton and Lane (2012) were associated with the entrepreneurial intent items taken from Cooper and Lucas (2006). None of the entrepreneurial

orientation elements were associated with entrepreneurial intent in the pre-test, but risk-taking and innovation showed a relationship with intent in the post-test. As shown earlier, the students in both the high and low intent groups saw themselves as proactive and there was little change in this attitude during the course. The fact that 6 students moved from the low intent group to the high intent group was not a factor in this test because it was based on the overall means for each of the categories. However, the increases in ratings for risk-taking and innovation as well as entrepreneurial intent could play a role.

Table 6: Entrepreneurial Orientation And Intent Correlation				
Entrepreneurial orientation average rating	Pre-test Intent		Post-test Intent	
	Spearman's rho	p<	Spearman's rho	p<
Pre-test risk-taking	.296	.142	.279	.167
Post-test risk-taking	.075	.716	.409	.038*
Pre-test innovation	.304	.131	.090	.662
Post-test innovation	-.041	.841	.396	.045*
Pre-test proactiveness	.385	.052	.175	.392
Post-test proactiveness	.148	.469	.387	.051

Although risk-taking and innovation were associated with entrepreneurial intent in the post-test, there were no statistically significant differences between the post-test ratings of the low intent and high intent groups. The only differences were found in the items relating to entrepreneurial intent. Therefore, categorizing the students into these two groups was useful for examining the pre- and post-test increases within groups (of which there were several), but not for comparing students' ratings for entrepreneurial orientation factors. The small number of participants in this study limited the extent to which those with truly high entrepreneurial intent could be placed in a separate category. Only four students strongly agreed with the statement regarding their desire to start their own business. With a larger sample, those who strongly agree could be placed in their own category so their answers could be compared with those of students who are not as enthusiastic about entrepreneurship. This is an area for future research.

CONCLUSIONS

Entrepreneurship is an important topic for today's university students. According to the Kauffman Foundation (2011), more than half of people (ages 18-34) would like to start their own businesses. It is only logical that students who develop the right skills and attitudes are more likely to start businesses with high potential for growth. However, this course did not seek to have all students start businesses or write business plans. As with Barr and associates' (2009) program, this course was intended to increase students' understanding of entrepreneurship, encourage them to view entrepreneurship as a future possibility and to increase their self-confidence in this regard.

Many students stated at the beginning of the course that they did not see themselves as creative and seemed to feel that it would be impossible for them to develop their creative side. These students may have surprised themselves if they were among those whose innovation ratings increased over the two weeks of the program. The element of risk, which also can relate to creativity and innovativeness, is indeed a problem for some potential entrepreneurs. The Kauffman Foundation (2011) reports that more than one-third of the people who want to start a business think that the risk is too great. Students in this study gave the lowest ratings to risk-taking, but some increased their orientation toward risk-taking significantly. Greater emotional

support and encouragement, combined with a variety of ways that students can find ways to be creative and learn about risk-taking may also be beneficial (Schmidt, Soper & Facca, 2012).

The vast majority of the participants in this study were from Norway, a country that scores an 8 on masculinity in the Hofstede cultural dimensions system (Hofstede, 2012). Only Sweden scores lower in masculinity. People from both countries place great value on quality of life and caring for others rather than competition, achievement and success (being the best). Norwegians tend to have a somewhat higher level of uncertainty avoidance compared to the United States (51 vs. 46), meaning they may be less willing to take risks than their American classmates. The United States scores 91 in individualism in contrast to Norway's 69, meaning Norwegians are less likely to be individualistic. Attitude toward risk and innovation may be related to these aspects of culture. The entrepreneurial orientation scale (Bolton & Lane, 2012) used in this study may have not been suitable for students from this country. Future researchers may find it more effective to modify the items.

REFERENCES

Avlontis, G.J. & Salavou, H.E. (2007). Entreprenuerial orientation of SMEs, product innovativeness and performance. *Journal of Business Resaerch, 60(5)*, 566-575.

Barr, S. H., Baker T., Markham, S.K. & Kingson, A. I. (2009). Bridging the valley of death: Lessons learned from 14 years of commercialization of technology education. *Academy of Management Learning & Education, 8(3)*, 370-388.

Bolton, D. L. & Lane, M. D. (2012). Individual entrepreneurial orientation: Development of a measurement instrument. *Education + Training, 54(2)*, 219-233.

Boocock, G., Frank, R. & Warren, L. (2009). Technology-based entrepreneurship education: Meeting educational and business objectives. *Entrepreneurship and Innovation, 10(1),* 43-53.

Boyles, T. (2012). 21st century knowledge, skills, and abilities and entrepreneurial competencies: A model for undergraduate enterprise education. *Journal of Entrepreneurship Education, 15*, 41-55.

Cato, M.S., Arthur, L., Keenoy, T. & Smith. (2008). Entrepreneurial energy: Associative entrepreneurship in the renewable energy sector in Wales. *International Journal of Entrepreneurial Behaviour and Research*, 14 (5), 313-29.

Cooper, S. Y. & Lucas, W. A. (2006). Enhancing self-efficacy for entrepreneurship and innovation: An educational approach. *Regional Frontiers of Entrepreneurship 2006,* 667-683.

Couger, J. D. (1995). *Creative problem solving and opportunity finding.* Danvers, MA: Boyd & Fraser Publishing.

Covin, J. & Slevin, D. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10,* 75-87. doi: 10.1002/smj.4250100107.

Dangelico, R. M. & Pujari, D. (2010). Mainstreaming green product innovation: Why and how companies integrate environmental sustainability. *Journal of Business Ethics*, 95, 471-486.

Day, G. S. & Schoemaker, P. J. H. (2011). Innovating in uncertain markets: 10 lessons for green technologies. *MIT Sloan Management Review,* 52(4), 37-45.

De Graaff, E. & Ravesteijn, W. (2001). Training complete engineers: Global enterprise and engineering education. *European Journal of Engineering Education, 26(4)*, 419-427.

Deakins, D. & Freel, M. (1998). Entrepreneurial learning and the growth process in SMEs. *The Learning Organization, 5(3),* 144-155.

Elia, G., Margherita, A., Secundo, G. & Moustaghfir, K. (2011). An "activation" process for entrepreneurial engineering education: The model and application. *Journal of Enterprising Culture, 19(2)*, 147-168.

Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*. Oxford: Capstone.

Fillis, I. (2010). The role of creativity in entrepreneurship. *Journal of Enterprising Culture,* 18(1), 49-81.

Frank, A. I. (2007). Entrepreneurship and enterprise skills: A missing element of planning education? Planning. *Practice and Research, 22(4),* 635-648.

Gielnik, M. M., Frese, M., Graf, J. M. & Kampschulte, A. (2012). Creativity in the opportunity identification process and the moderating effect of diversity of information. *Journal of Business Venturing, 27*, 559-576.

Gibb, A. (1997). *Enterprising culture: Its meaning and implications for education and training,* Bradford: MCB University Press.

Govindarajan, V. (2010). Innovation is Not Creativity. August 3, 2010. http://blogs.hbr.org/govindarajan/2010/08/innovation-is-not-creativity.html

Gurteen, D. (1998). Knowledge, creativity and innovation. *Journal of Knowledge Management, 2(1),* 5-13.

Hamidi, D. Y., Wennberg, K., & Bergland, H. (2008). Creativity in entrepreneurship education. *Journal of Small Business and Enterprise Development*, 15(2), 304-320.

Hart, S. L. (1992). An integrative framework for strategy-making processes. *Academy of Management Review, 17*, 327-351.

Hofstede, G. (2012). What about Norway? Retrieved 26 February 2012 from http://geert-hofstede.com/norway.html

Johan, W. & Dean, S. (2003). Examining the entrepreneurial attitudes of US business students. *Education + Training, 50(7),* 568-81.

Jones, C. & English, J. (2004). A contemporary approach to entrepreneurship education. *Education + Training, 46(8/9)*, 416-324.

Jones-Evans, D., Williams, W. & Deacon, J. (2000). Developing entrepreneurial graduates: An action-learning approach. *Education + Training, 42(4/5),* 282-288.

Kauffman Foundation. (2011). An Entrepreneurial Generation of 18- to 34-Year-Olds Wants to Start Companies When Economy Rebounds, According to New Poll. November 10, 2011. http://www.kauffman.org/newsroom/millennials-want-to-start-companies-when-economy-rebounds-poll-says.aspx

Keough, P. D. & Polonsky, M. J. (1998). Environmental commitment: A basis for environmental entrepreneurship? *Journal of Organizational Change Management,* 11(1), 38-49.

Kirkwood, J. & Walton, S. (2010). What motivates ecopreneurs to start businesses? *International Journal of Entrepreneurial Behavior & Research*, 16(3), 204-228.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall.

Kuratko, D. F., Goldsby, M.G., & Hornsby, J.S. (2012). *Innovation acceleration: Transforming organizational thinking*. Upper Saddle River, NJ: Pearson.

Li, H., Zhang, Y. & Chan, T.S. (2005). Entrepreneurial strategy making and performance in China's new technology ventures: The contingency effect of environments and firm competences. *Journal of High Technology Management Research, 16*, 37-57.

Linnanen, L. (2002). An insider's experiences with environmental entrepreneurship. *Greener Management International,* 38 (Summer), 71-80.

Lumpkin, G. T. & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *The Academy of Management Review, 21(1),* 135-72.

Mangan, K.S. (2004, May 28). Entrepreneurs in every department. *Chronicle of Higher Education, 50*, A10-A11.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science, 29*(7), 770-791. Doi: 10.1287/mnsc.29.7.770.

Minniti, M. & Bygrave, W. (2011). A dynamic model of entrepreneurial learning. *Entrepreneurship Theory & Practice, 23(4)*, 41-52.

Moreno, A. & Casillas, J. (2008). Entrepreneurial orientation and growth of SMEs: A causal model. *Entrepreneurship Theory and Practice, 32(3)*, 507-528.

Rasmussen, E. & Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation, 26(2)*, 185-194.

Rauch, A., Wiklund, J., Lumpkin, G. T. & Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. *Entrepreneurship Theory and Practice, 33(3), 761-87.*

Rodrigues, R. G. & Raposo, M. (2011). Entrepreneurial orientation, human resources information management, and firm performance in SMEs. *Canadian Journal of Administrative Sciences, 28*, 143-153.

Schmidt, J. J., Soper, J. C. & Facca, T. M. (2012) Creativity in the entrepreneurship classroom. *Journal of Entrepreneurship Education*, 15, 123-131.

Shinnar, R., Pruett, M. & Toney, B. (2009). Entrepreneurship education: Attitudes across campus. *Journal of Education for Business, January/February*, 151-158.

Stam, W. & Elfring, T. (2008). Entrepreneurial orientation and new venture performance: The moderating role of intra- and extra-industry social capital. *Academy of Management Journal, 51,* 97-111.

Tang, J., Tang, Z., Marino, L., Zhang, Y. & Li, Q. (2008). Exploring an inverted U-shape relationship between entrepreneurial orientation and performance in Chinese ventures. *Entrepreneurship Theory and Practice, 32(1),* 219-239.

Tarabishy, A., Solomon, G., Fernald, L., & Saghkin, M. (2005). The entrepreneurial leader's impact on the organization's performance in dynamic markets. *Journal of Private Equity, (*Fall), 20-29.

Ward, T. (2004). Cognition, Creativity, and Entrepreneurship. *Journal of Business Venturing,* 19,173-188.

CULTIVATING BLACK TECHNOLOGY ENTREPRENEURS THROUGH HBCU ENGINEERING & BUSINESS PROGRAMS

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ABSTRACT

In today's society, the black community is suffering from high unemployment rates and low levels of entrepreneurial activity. The phenomenon of technology entrepreneurship has dominated the discussion as a solution to business creation and job growth. As a result, many top-tier academic institutions have incorporated a focus on entrepreneurship within their engineering programs, in addition to a technology-oriented focus on entrepreneurship in business programs. To assess the involvement of historically black colleges and universities HBCUs in the promotion of entrepreneurship, a review of accredited engineering and business programs was conducted to identify the existence of an entrepreneurship focus. Based on the findings, it was concluded that entrepreneurship education is relatively nonexistent within HBCU engineering programs. However, the majority of HBCU business school programs offer entrepreneurship courses in varying forms. Suggestions to increase the entrepreneurship focus in HBCU engineering programs are offered as a means to address elevated unemployment and diminished technology entrepreneurship in the black community. Practical implications and considerations for future research are also discussed.

Key Words: HBCU, engineering, entrepreneurship, education, job growth, black unemployment

INTRODUCTION

Entrepreneurs, new venture creation, and the small business sector significantly contribute to the U.S. economy (Reynolds, Carter, Gartner, & Greene, 2004; Schumpeter, 1934), with some estimates crediting entrepreneurial activity being responsible for half of U.S. GDP (Cornwall, 2008). To this end, new ventures and small businesses have created most of the net new jobs in the U.S. economy over the last several decades (Birch, 1987; Kirchoff & Phillips, 1988; Scarborough, Wilson, & Zimmerer, 2009; Van Stel & Storey, 2004). Last year was no different. In 2012, businesses with less than 500 employees hired more workers than businesses with 500 or more employees. The highest number of total jobs was found within the group of businesses with less than 20 employees (U.S. Census Bureau, 2013).

While the unemployment rate remains high among all Americans as a result of ongoing global economic weakness, it is particularly high within the black community. In 2012, among all racial groups, the highest total rate of unemployment was found in the black population (13.8 percent). This was far higher than the unemployment rates within the white (7 percent) and Hispanic (9.7 percent) populations (U.S. Department of Labor, 2013). Improving the rate of entrepreneurship within the African American community is particularly important when one

considers that over the last five decades, the unemployment rate within the black population has consistently remained about double that of white Americans (Badgett, 1994; Hoynes, 2000; Spriggs & Williams, 2000).

Given the high rates of unemployment and the lower labor participation rate of blacks, scholars such as Bates (2006) argue that the formation and expansion of black-owned ventures is a viable strategy to address the persistently high black unemployment rate. However, research has consistently found that the new venture creation and self-employment rates of blacks are lower than those of other racial groups in the U.S. (Bradford, 2003; Butler, 1991; Ede, Panigrahi, & Calcich, 1998; Fairlie, 1999; Fairlie & Meyer, 2000). Research has also found that blacks exit out of entrepreneurship at higher rates than entrepreneurs of other races in the general population (Fairlie 1999). So, not only are there fewer African American entrepreneurs per capita, but these entrepreneurs are less likely to be successful than their white counterparts.

To understand the reasons for the disparities in black and white entrepreneurship, research has focused on such things as household income (Fairlie, 1999), educational achievement (Hisrich, Peters & Shepherd, 2005; Singh & McDonald, 2004), and family structures (Dunn & Holtz-Eakin, 2000; Lentz & Laband 1990). Obviously, exploring the unique social characteristics, economic factors, and entrepreneurial processes of black entrepreneurs (see Crump, 2008; Ogbolu, 2011; Singh, Crump, & Zu, 2007) is important; however, in this paper, we go beyond these issues that have been explored and focus on technology entrepreneurship and the role that HBCUs can play in spurring entrepreneurship through engineering programs.

While future economic growth is expected from a wide array of sectors, the technology sector is expected to account for one quarter of high-growth firms (Motoyama & Danley, 2012). The anticipated increase of high-growth firms in the technology sector will create a significant portion of new jobs moving forward (Stangler, 2010). Given the disproportionate rates of black unemployment and successful entrepreneurship discussed above, a remedy for this issue can be found by increasing the level of entrepreneurial activity among blacks within the technology sector, especially given the anticipated growth in the number of technology-based firms.

In order to encourage technology entrepreneurship within the black population, we argue that emphasis can be placed on the education of black engineering students. Researchers have identified relationships between entrepreneurship education, entrepreneurial intentions, and new venture creation (Sanchez, 2011; Souitaris, Zerbinati & Al-Laham, 2007). For example, in their study on the impact of entrepreneurship education within a group of engineering and science students, Souitaris, Zerbinati and Al-Laham (2007) found that entrepreneurship courses inspired students to become business owners, leading to increased entrepreneurial intentions. Also, according to a study conducted by Sanchez (2011), participation in an entrepreneurship course was found to exert positive influence on students' entrepreneurial intentions.

Many universities currently offer entrepreneurship education, primarily through schools of business, and as observed by Singh (2008), there is a growing prevalence of programs and courses focused on entrepreneurship at the collegiate-level. Additionally, students pursuing technical degrees are being exposed to entrepreneurship, as many top-tier academic institutions have incorporated a focus on entrepreneurship within their engineering programs (Standish-Kuon & Rice, 2002). Although several academic institutions provide some degree of entrepreneurship education to engineering students, many institutions have yet to introduce an entrepreneurship focus in their engineering programs (Waters, 2010). Minority serving institutions, specifically historically black colleges and universities (HBCUs), have also been cited as lacking a focus in

technology entrepreneurship (Holifield, 2011; Lesesne, 2013).

In order to promote technology venture creation within the black community, courses in entrepreneurship should be available at the institutions serving this demographic group. Recognizing that 40 percent of black engineering graduates hail from HBCUs (U.S. Commission on Civil Rights, 2010), ensuring access to entrepreneurship education for these students may positively impact the rates of black technology entrepreneurship. Knowing that black business owners are inclined to employ workers of the same race (Bates, 1994; Bates, 2006; Walstad & Kourilsky, 1998), the progression of black technology entrepreneurs has the potential to significantly influence and reduce future unemployment rates.

In light of the discussion above, we discuss the role of HBCUs in promoting entrepreneurship. More specifically, we focus our attention on black technology entrepreneurship and the efforts of HBCUs to provide entrepreneurship education to engineering students. HBCU engineering programs are investigated to assess the presence of course offerings in entrepreneurship and some evaluation of these programs is made. Following the discussion of our findings, practical implications and broad suggestions for improving access to entrepreneurship education at HBCU engineering schools are provided, and considerations for future research are offered.

THE CURRENT STATE OF BLACK TECHNOLOGY ENTREPRENEURSHIP

Unlike some industries that may be dominated by white males, new firm creation in the technology sector has occurred from various demographic groups, and immigrant entrepreneurs primarily descending from India and China have maintained a strong entrepreneurial presence, especially in Silicon Valley (Saxenian, 1999). From 1995 to 2005, immigrant entrepreneurs were involved in founding more than one quarter of the nation's engineering and technology firms, and accounted for 450,000 jobs (Wadhwa, Gereffi, Rissing, & Ong, 2007). Since 2006, immigrant entrepreneurs from India founded more than one third of the nation's technology firms, followed by other Asian immigrant groups (Wadhwa Saxenian, & Siciliano, 2012). Even though some minority groups are actively involved in creating technology ventures, black Americans maintain a disproportionately low rate of involvement in technology sector entrepreneurship. Data from a CB Insights (2010) research report highlights the racial background of founders whose firms received venture capital support. In the first half of 2010, whites owned 87 percent of these firms, followed by Asians (12 percent) and blacks (1 percent). The problem is likely due to the fact that there are so few technology-based new ventures that are being created by black entrepreneurs.

Recent popular press articles discuss the lagging rates of black technology entrepreneurship in spite of several efforts to remedy the issue and spur minority business growth (Gage, 2012; Klein, 2013). Further evidence of the low participation rates of blacks in technology entrepreneurship is presented through to data obtained from the U.S. Census Bureau Survey of Business Owners, which is published every five years and highlights various characteristics of U.S. businesses. In the 2007 survey, the percentages of black-owned firms in the healthcare (15.4%) and transportation (13.4%) sectors where shown to be much higher than the ownership rates in the information (6.2%) and technical services (4.3%) sectors (U.S. Census Bureau, 2012). The survey findings align with the overall perception that the involvement of blacks in technology firm ownership is disproportionately low, but not surprising given that blacks maintained a seven percent ownership rate among all U.S. businesses (U.S. Census

Bureau, 2012).

Due to the high expectations for growth in the technology sector, there are obviously significant benefits to forming technology-based ventures. Perhaps most notably, there is significant funding available. Data from the National Venture Capital Association (2012) shows more than $28.7 billion in funds were invested by venture capitalists in 2011. While venture capital expenditures were spread across various industries, the most attractive avenue for venture capital investment lies within the technology sector (Ernst & Young, 2012). If black entrepreneurs engage in entrepreneurship within the technology sector, they may benefit from the heightened flow of venture capital funds; especially considering that access to financing is often cited as a barrier for black entrepreneurs (Lucas, 2006; Robb & Fairlie, 2007).

Research has shown support for the role of education in black nascent entrepreneurship (Reynolds *et al.*, 2004; Singh & Crump, 2007). Improving the current state of technology business ownership within the black population may be possible through effective education about entrepreneurship and entrepreneurial processes to this demographic, and HBCUs are positioned to be primary drivers of this change. The importance of education and the role that HBCUs can play in promoting technology entrepreneurship are discussed below.

ENTREPRENEURSHIP EDUCATION AND ENGINEERING PROGRAMS

Historically, academic institutions have played an important role in providing entrepreneurship education to the next generation of entrepreneurs. The late 1800s formed the beginning of U.S. entrepreneurship education (Katz, 2003), and tremendous growth in the number of entrepreneurship course offerings has occurred since the 1980s (Katz, 2003; Kuratko, 2005; Singh, 2008).

Results from the Panel Study of Entrepreneurial Dynamics (PSED) suggest that the education of nascent entrepreneurs impacted their involvement in new venture creation (Reynolds *et al.*, 2004). Nascent entrepreneurs with higher levels of formal education engaged in startup activity at higher rates. From an ethnicity perspective, education had a more pronounced effect on the startup activity of minority groups (African Americans, Hispanics) when compared to Caucasians (Singh & Crump, 2007).

Education is not only limited to influencing entrepreneurial intentions and activity, it has been linked to firm performance. According to Wadhwa, Freeman, and Rissing (2008), entrepreneurs with a college education achieved higher firm revenues than entrepreneurs without a college education. This has been especially true of education specifically focused on entrepreneurship (Sanchez, 2011). Elmuti, Khoury, and Omran (2012) identified a positive link between entrepreneurship education and the performance of business ventures, through a survey of existing business owners and nascent entrepreneurs. Further, Colombo and Grilli (2005) determined that entrepreneurs with education related to business and technology experienced higher growth in technology-based firms.

Traditional engineering education has primarily focused on preparing students to obtain careers in their respective fields. Upon completing their degree, students are equipped with the technical background necessary to achieve success in various engineering-related industries. Well-educated engineering students may even find themselves gainfully employed during times of economic recession. In addition to pursuing engineering careers, engineering graduates are pursuing opportunities outside of the engineering field, such as small firms and startup ventures (Creed, Suuberg, & Crawford, 2002). For these students, the traditional engineering education

may not provide them with all of the skills necessary to accomplish this goal, and education in entrepreneurship may help to fill this void (Dabbagh & Menascé, 2006). After surveying over 600 executives of U.S.-based technology firms, Wadhwa *et al*. (2008) found that nearly half of the survey respondents held degrees in engineering and technology. Furthermore, Walker (2012) suggested that universities should offer entrepreneurship courses, as they can encourage the identification and exploitation of entrepreneurial opportunities, potentially leading to commercializable technology. These findings suggest a link between the possession of a technology-related degree and future involvement in technology entrepreneurship, and also highlight the potential ability to create an entrepreneurial culture in academic environments.

Entrepreneurship education has been infused into many of the nation's colleges and universities (Duval-Couetil, Reed-Rhoads, & Haghighi, 2011), including leading engineering schools (Standish-Kuon & Rice, 2002). For example, the Technology Ventures Program at Stanford University (2013) is the institution's business incubation center located in the engineering school. The program focuses on providing technology-driven entrepreneurship education to students, hosts a lecture series with the purpose of exposing students to leaders in technology entrepreneurship, and provides students with actual work experience at Silicon Valley technology ventures through a residency program. Although Stanford's proximity to Silicon Valley may afford certain competitive advantages, there is no debating the university's impact on technology sector entrepreneurship. In 2010, Stanford ranked as one of the top two academic institutions in producing entrepreneurs who received venture capital funding (CB Insights, 2010). From 2007 to 2011, entrepreneurs educated at Stanford raised $4.1 billion in venture capital and angel funds, with nearly 65% of the investments directed towards technology sector firms (CB Insights, 2012).

While some institutions offer entrepreneurship programs similar to Stanford through engineering schools, others take an alternate approach to encouraging entrepreneurship among engineering students. The Technological Innovation: Generating Economic Results (TI:GER) program at Georgia Institute of Technology (2013) is an example of a program not based in an engineering school. Operating out of the business school, the TI:GER program combines students from diverse backgrounds to form teams focused on technology commercialization. The two-year program is centered on a technological idea identified by a science or engineering doctoral student who is teamed up with students pursuing MBA and JD degrees. This interdisciplinary approach combines expertise from the diverse student backgrounds, with the goal of learning the various steps of taking a product to market. After completing an application process, participants admitted to the program receive a certificate in technological innovation by completing four required courses. Involvement in the TI:GER program has also led some participants to create technology ventures centered on their developed technological innovations.

U.S. News and World Report provides an annual ranking of the top American academic institutions. In their 2012 ranking of top engineering schools, Massachusetts Institute of Technology, Stanford University, and University of California at Berkeley were listed in the top three (U.S. News, 2013). These institutions were also ranked of the top six U.S. schools in terms of the combined amount of venture capital funds raised by alumni in 2011 (CB Insights, 2012). Each of these institutions provides education in entrepreneurship to some degree, and the benefits of entrepreneurship education can be seen in the number of startup firms whose founders are linked to these top engineering schools. Despite the number of institutions where entrepreneurship is encouraged, research shows a small number of engineering schools offering entrepreneurship courses, and nationwide, engineering schools in general are lacking a focus on

entrepreneurship education (Waters, 2010). In their review of the entrepreneurship programs at 160 U.S. academic institutions, Streeter, Kher, and Jaquette (2011) found entrepreneurship courses in nearly 90 percent of the undergraduate business programs, but less than half of the engineering programs offered courses in entrepreneurship. This may suggest an opportunity for more institutions to initiate formal efforts aimed at exposing engineering students to aspects of entrepreneurship. If successful, their efforts can potentially increase the number of technology firms created by engineering students educated at these institutions.

HBCUS: THEIR ROLE AND PROGRAMS OF ENGINEERING AND ENTREPRENEURSHIP

According to the United Negro College Fund (2013), the existence of HBCUs dates back to the 1800s, but the formal classification of these institutions, created to serve the needs of black Americans, was defined in the Higher Education Act of 1965. Prior to the desegregation of higher education institutions, HBCUs were the primary avenue for blacks seeking college degrees (Cantey, Bland, Mack, & Davis, 2012). Since desegregation, HBCUs have been in competition with traditionally white institutions, but still remain a significant provider of higher education opportunities to black students (Palmer, Maramba, & Lee, 2010). Approximately 20 percent of undergraduate degrees conferred to black students in the U.S. are conferred by HBCUs (Palmer *et al*., 2010), and they also account for about 30 percent of black science, technology, engineering and math (STEM) graduates (Perna *et al*., 2009). In addition, HBCUs are credited with producing most of the black graduate and doctorate degree-seeking students (Gallo & Davis, 2009).

The societal contribution of these institutions can be seen through data provided by Fryer and Greenstone (2007), which states that "among blacks, 40 percent of all congressmen, 12.5 percent of CEOs, 50 percent of professors at non-HBCUs, 50% of lawyers, and 80% of judges are HBCU graduates" (p. 1). However, in recent years, HBCUs have been plagued with a myriad of issues, including financial troubles due to declining enrollment and reduced revenues (Gasman, 2009), and fundraising challenges due to the low levels of alumni giving (Williams, 2010; Williams & Kritsonis, 2007). These issues have resulted in researchers and media pundits suggesting the mission of HBCUs is irrelevant, and that they are no longer necessary (Goode, 2013; Turner, 2011). In fact, the value proposition of HBCUs has been the subject of increased scrutiny (Cantey *et al*., 2012).

In light of the challenges faced by HBCUs, and concerns regarding their purpose, an opportunity to quell the questioning of their relevance exists in championing efforts to reduce black unemployment through business creation. Leaders of these institutions can enact measures to create a culture of entrepreneurship and increase student engagement in new venture creation, leading to a potential escalation in the number of students engaging in business ownership. To assist the development of minority businesses, Adebayo, Adekoya, & Ayadi (2001) propose that HBCUs embrace entrepreneurship education, create centers for business incubation, and facilitate networking between business owners and potential investors.

Given that the rates of black entrepreneurship lag behind the rates of entrepreneurship among whites (Köllinger & Minniti, 2006), the residual effects of an entrepreneurship culture at HBCUs may lead to an increase in the number black-owned firms and jobs available to black workers. In addition, research has shown that student-led startups tend to be physically located in the communities surrounding academic institutions, and these firms positively influence local

economic development (Astebro & Bazzazian, 2010). By encouraging entrepreneurship across the university, HBCUs may also improve the economic standing of the local communities in which they serve. Over time, if HBCUs are able to positively impact economic development in the black community, skeptics may refrain from debating the value of these institutions.

For 2011, data from the American Society for Engineering Education showed that blacks received 4.2 percent of the 83,000 awarded bachelor's degrees, 4.9 percent of the 46,940 awarded master's degrees, and 3.5 percent of the 9,582 awarded doctorate degrees (Yoder, 2011). Also, of the top 20 institutions graduating black engineers at the undergraduate level, HBCUs accounted for 45 percent of these schools. As they account for a significant proportion of blacks in engineering and technology, HBCUs have the potential to improve the involvement of this group in technology entrepreneurship. Through education focused on teaching entrepreneurial skills and processes, research supports the resulting effects of increased entrepreneurial intentions and firm creation (Mueller, 2011; Sanchez, 2011; Walker, 2012). Support also exists for the relationship between earning a technical degree and business ownership, as Wadhwa *et al.* (2008) revealed 92 percent of technology firm founders held at least a bachelor's degree, and a third of the degrees were in engineering.

Given the prior discussions on the role of HBCUs in black education and employment, the importance of education in entrepreneurship, and the lack of black technology entrepreneurs, our focus now shifts to examining the current involvement of HBCUs in providing access to entrepreneurship education.

The White House Initiative on HBCUs maintains a list of 101 accredited HBCUs (U.S. Department of Education, 2013a), and the National Center for Education Statistics also identifies 101 academic institutions that maintain the specialized mission of HBCUs (U.S. Department of Education, 2013b). Both lists included four-year colleges and universities, as well as two-year community colleges and other specialty schools. Our comparison of the two lists found that Hinds Community College in Utica, MS was missing from the NCES list, and Shorter College was not included in the White House listing. Based on these lists, we found that there are a total of 102 HBCU institutions.

With the focus of this paper directed towards engineering schools, a list of bachelor's degree granting HBCUs recognized by the Accreditation Board for Engineering and Technology (ABET) in 2012 was obtained. ABET (2013) is regarded as the premier global accrediting body for engineering, technology and computer science programs in the U.S. The engineering programs of 526 academic institutions were found to maintain ABET accreditation. Cross-referencing the ABET schools with the list of accredited HBCUs resulted in the identification of 22 ABET-accredited HBCUs, which was approximately 21.6 percent of all HBCUs and 4.2 percent of the total ABET-accredited population (see Table 1).

Table 1	
LISTING OF HBCUS WITH ABET ACCREDITATION	
ABET Accreditation (n = 22)	
Alabama A & M University	North Carolina A & T State University
Central State University	Prairie View A & M University
Fayetteville State University	Savannah State University
Florida A&M University	South Carolina State University
Grambling State University	Southern University and A & M College
Hampton University	Tennessee State University
Howard University	Texas Southern University
Jackson State University	Tuskegee University
Mississippi Valley State University	University of the District of Columbia
Morgan State University	Virginia State University
Norfolk State University	Winston-Salem State University

The potential for partnerships between engineering and business schools within HBCUs led to the inclusion of business schools in our review. A list of U.S. schools that have attained accreditation from the Association to Advance Collegiate Schools of Business (AACSB) was also obtained (AACSB, 2013). AACSB is an international organization responsible for granting accreditation to business schools. The list included 494 schools with AACSB accredited business programs. A comparison was made between the list of HBCUs and AACSB accredited schools. The comparison revealed 23 AACBS-accredited HBCUs, accounting for 4.7 percent of the AACSB-accredited population and 22.5 percent of all HBCUs (see Table 2).

Table 2	
LISTING OF HBCUS WITH AACSB ACCREDITATION	
AACSB Accreditation (n = 23)	
Clark Atlanta University	Prairie View A & M University
Delaware State University	Savannah State University
Elizabeth City State University	South Carolina State University
Fayetteville State University	Southern University and A & M College
Grambling State University	Southern University at New Orleans
Howard University	Tennessee State University
Jackson State University	Texas Southern University
Morehouse College	Tuskegee University
Morgan State University	University of Maryland Eastern Shore
Norfolk State University	Virginia State University
North Carolina A & T State University	Winston-Salem State University
North Carolina Central University	

Out of the total number of HBCUs, 10 schools offering bachelor's degrees in engineering maintained ABET-accredited and AACSB-accredited programs (see Table 3). These schools form the basis of our review, as the focus is placed on current involvement in entrepreneurship education across HBCU engineering and business schools. Even though courses in engineering and business are provided at many HBCUs, our review focused exclusively on accredited programs to establish a baseline for comparing each of the selected institutions.

Table 3 JOINT LISTING OF HBCUS WITH AACSB AND ABET ACCREDITATION HBCU AACSB / ABET Accreditation (n = 10)
Howard University
Jackson State University
Morgan State University
Norfolk State University
North Carolina A & T State University
Prairie View A & M University
Southern University and A & M College
Tennessee State University
Tuskegee University
Virginia State University

REVIEW OF HBCU ENTREPRENEURSHIP OFFERINGS WITHIN ENGINEERING PROGRAMS

The curricula for the engineering and business programs at each HBCU were evaluated to determine if a focus on entrepreneurship currently exists at the undergraduate level. For the engineering programs, emphasis was placed on the core courses required for all engineering majors, regardless of discipline. In the assessment of business programs, emphasis was placed on the offering of courses related to entrepreneurship, and whether a formal system was in place that allowed engineering students to gain degree credit for these courses. The review of HBCU engineering and business programs was conducted to assess the current efforts of these institutions, and categorize them into one of three groups. The categories defined in our review were adopted from the classification scheme used by Standish-Kuon and Rice (2002) and Waters (2010). Category A HBCUs offered entrepreneurship courses as a major academic requirement or degree concentration. Category B HBCUs offered entrepreneurship education primarily as a minor academic requirement, or as an elective course. Category C HBCUs did not possess an academic requirement (major or minor) or elective course in entrepreneurship. Additional research was conducted to determine if any entrepreneurship or business incubation centers were in operation at each institution.

A review of the current programmatic offerings of the 10 HBCUs revealed interesting findings about their involvement in promoting entrepreneurship (see Table 4). As a starting point, none of the HBCU engineering programs offer a required or elective course in entrepreneurship. However, half of the engineering schools offer a required course in engineering economics, and one school listed engineering management as a requirement. All but one of the institutions reviewed offer coursework in entrepreneurship.

HBCU	Category	Entrepreneurship Course Offering	School (Bus. or Engr.)	Entrepreneurship Center / Business Incubator
Howard University	B	Mgmt. Conc. (1 Entr. Required, 1 Small Bus. Mgmt. Elective)	Business	Small Business Development Center Intellectual Property Center
Jackson State University	A	Entr. Major (8 Required, 2 Elective)	Business	Small Business Development Center Technology Transfer & Commercialization
Morgan State University	A	Entr. Major (4 Required) Entr. Minor (4 Required)	Business	Entrepreneurial Development and Assistance Center
Norfolk State University	A	Entr. Major (8 Required) Business Minor (1 Entr. Elective)	Business	Ernest M. Hodge Institute for Entrepreneurship
North Carolina A & T State University	A	Entr. Conc. (5 Required) Entr. Certificate	Business	Interdisciplinary Center for Entrepreneurship and E-Business
Prairie View A & M University	B	Mgmt. Entr. Minor (4 Required) Bus. Entr. Minor (3 Required) Non-Bus. Entr. Cert. (3 Required)	Business	Small Business Development Center
Southern University and A & M College	A	Entr. Conc. (4 Required)	Business	N/A
Tennessee State University	B	Entr. Minor (4 Required)	Business	N/A
Tuskegee University	C	None	N/A	Youth Entrepreneurial Initiatives
Virginia State University	B	Mgmt. Conc. (1 Entr. Elective)	Business	N/A

Table 4
Listing of HBCUs with Entrepreneurship Focus

Category A: Five HBCUs met the criteria for Category A (Jackson State University, Morgan State University, Norfolk State University, North Carolina A & T State University, Southern University). Each of these institutions offers a major degree program or concentration in entrepreneurship, accompanied by a number of related courses available to business students. Jackson State offers the highest number of entrepreneurship courses, with eight required courses in the entrepreneurship major and two electives. Morgan State is the only Category A school to provide an entrepreneurship minor (four required courses) to students outside of the business school. North Carolina A & T provides non-business students with a certificate option in entrepreneurship through the university entrepreneurship center.

Category B: Four HBCUs were placed in Category B (Howard University, Prairie View A & M University, Tennessee State University, and Virginia State University). This group of schools includes entrepreneurship courses in program curricula as a minor or elective. Prairie View A & M offers a minor degree option with four required courses in entrepreneurship for management students. The completion of three entrepreneurship courses leads to a minor degree for non-management students, and a certificate degree for non-business students. Tennessee State also offers an entrepreneurship minor degree. Open to all majors, the minor requires the

completion of four out of six offered courses in entrepreneurship. Howard and Virginia State are the only Category B institutions not offering a minor in entrepreneurship. At Howard, students that select the management concentration are required to complete an entrepreneurship course and have the option to complete an entrepreneurship elective. For students seeking the bachelor's degree in business management, Virginia State offers an elective entrepreneurship course.

Category C: Tuskegee University was the sole HBCU that does not offer courses in entrepreneurship as a major, concentration, minor, or elective.

Entrepreneurship / Business Incubation Centers: The presence of an entrepreneurship center or business incubator exists at nearly all of the HBCUs. In Category A, Southern University is the only institution lacking a center or business incubator for entrepreneurs. Small business development centers are maintained at Howard and Prairie View A & M, two of the four Category B schools. Howard and Jackson State also host centers for technology commercialization. Although courses in entrepreneurship are not available, Tuskegee (Category C) conducts youth outreach programs directed towards entrepreneurial engagement.

DISCUSSION

Given the lower rate of participation in technology entrepreneurship within the black community (see CB Insights, 2010), additional research is needed to understand how blacks can be encouraged to form technology ventures. The results of our review contribute to the study of entrepreneurship education by highlighting existing programmatic offerings at HBCUs. In general, there is a need for an entrepreneurship focus within engineering schools. This is particularly true for engineering students who attend HBCUs, given the need for job creation in the black community, the rapid growth of the technology sector, and the apparent link between successful entrepreneurship and engineering graduates that was discussed earlier.

A review of the current state of ABET accredited HBCU engineering programs revealed a relatively nonexistent focus on entrepreneurship. However, HBCU business programs exhibited a well-developed focus on entrepreneurship education. Most business schools offered a major and/or minor degree option in entrepreneurship, and provided opportunities for non-business students to earn degree credits through entrepreneurship courses. The review also revealed a number of established entrepreneurship centers and business incubators across each of the HBCUs. Although some traditionally white institutions have embraced entrepreneurship education and business incubation within their engineering and business schools (Standish-Kuon and Rice, 2002), most schools have not (Waters, 2010). Thus, the lack of entrepreneurship courses in HBCU engineering programs is not necessarily surprising; in fact it appears that most schools do not offer entrepreneurship education to engineering students. However, the unique focus, mission, and importance of HBCUs to improving black communities make them an ideal place for promoting and offering educational programs that can spur black entrepreneurship in general, and black technology entrepreneurship more specifically. We believe that such efforts would increase new venture creation, which would help address critics of HBCUs who question their ongoing need by allowing HBCUs to demonstrate their relevance.

Reviewing the ABET educational outcomes reveals accreditation standards that do not require any focus on entrepreneurship (see ABET General Criteria 3: Student Outcomes). Because of this, some may say that since entrepreneurship is not required of engineering students, its inclusion in an academic program would diminish the quality of the education and run afoul of accreditation standards. In stark contrast to the engineering school course offerings,

the vast majority of HBCU business schools offer courses in entrepreneurship. It should be noted that AACSB does not require business schools to offer courses in entrepreneurship (see AACSB Accreditation Standards). These courses are often included in curricula due to each member institution's perception about the importance of entrepreneurship education. The point is that ABET accreditation standards which do not require entrepreneurship training for engineering schools should not prevent the inclusion of entrepreneurship courses within engineering schools, because it has not stopped AACSB-accredited schools from doing the same.

Creating an environment in which entrepreneurship education is made available to engineering students may require resources currently not available to HBCUs, especially given the financial hardships faced by some schools. In light of resource constraints, engineering schools at HBCUs can address the lack of an entrepreneurship focus in various ways. Programs offering a course in engineering economics can alter course objectives to reflect learning outcomes related to entrepreneurship. HBCUs that offer entrepreneurship education to business students can allow engineering students to participate in these courses for degree credit. In addition, minor and/or dual degree programs geared toward entrepreneurship can be provided to engineering students. In place of requiring engineering students to take a course in entrepreneurship, such a course could be promoted as an elective, or perhaps a series of entrepreneurship-related courses that constitute an approved minor could be established. Again, this could be done in concert with business programs already at the university. For those HBCUs that do not offer entrepreneurship courses and who may not have entrepreneurship faculty already, engineering programs may be able to recruit resident experts in entrepreneurship to serve as course instructors.

For schools that require students to complete a senior design project, a unique opportunity exists to emphasize entrepreneurship. Taking cues from Georgia Tech's TI:GER program, engineering students can be partnered with business students to form teams tasked with analyzing the technical and entrepreneurial potential of their design project. Combining students from engineering and business backgrounds into courses may even provide unintended benefits in terms of promoting a culture of entrepreneurship. For instance, through their survey of engineering and business students that were enrolled in graduate-level entrepreneurship programs, Berglund and Wennberg (2006) observed that both groups responded differently to tests on creativity. As a result, the authors suggested that entrepreneurship programs containing a mix of business and engineering students would be beneficial to both groups by leveraging their creative differences. The current availability of business incubation and technology transfer programs at select HBCUs can also assist students who desire to use their design to start a business.

In conjunction with educating entrepreneurs, HBCUs can also provide connections to private/public sector entities that are interested in funding student-led startup efforts. Technology startups gain access to financing critical to early firm development through strategic alliances with existing technology firms (Carayannis, Kassicieh, & Radosevich, 2000). Recognizing this benefit, organizations, such as the Google-sponsored NewMe Accelerator based in Silicon Valley, are addressing the low number of black-owned technology startups by assisting black entrepreneurs in forming these critical alliances. NewMe provides a collaborative working environment for minority-owned startups, housing the entrepreneurs in the same facility over a 12-week period. In addition, the entrepreneurs are assigned mentors, and exposed to established Silicon Valley entrepreneurs during their time in the program. This example presents another opportunity for HBCUs to lead the charge in changing the current state of black technology

entrepreneurship. HBCUs can utilize their existing business incubators and entrepreneurship centers, or establish partnerships with those within their local areas, to offer a similar program to the NewMe program described above. Beyond helping individual students grow and learn, such collaboration can build links to the local community that can have many different positive outcomes for HBCUs. These may include access to donors, positive press, and developing goodwill within the local community surrounding the university.

Facilitating the accumulation of entrepreneurial knowledge through work experience serves as another way to encourage technology entrepreneurship among HBCU engineering students, especially considering the link identified by researchers between experience and entrepreneurship. Kourilsky and Walstad (2002) studied the factors motivating high-technology entrepreneurs and found that 75 percent of those surveyed were influenced by prior technology-related work experiences. Given this finding, HBCUs can utilize internship programs to supplement coursework and provide students with opportunities to gain additional education in entrepreneurship through real world experiences. Similar programs exist, such as the Mayfield Fellows Program at Stanford that offers selected students opportunities to intern for technology startup firms.

Professional and technical organizations within engineering schools can also assist in creating an entrepreneurial culture. The National Society of Black Engineers (NSBE), a professional organization supporting students seeking engineering careers, maintains student-led affiliate chapters at many HBCUs. At the national-level, NSBE sponsors various activities related to business ownership through its NSBEpreneur initiative. During regional and national conferences, NSBE hosts a business plan competition, business training workshops and an entrepreneur showcase. By partnering with NSBE, HBCU engineering schools can encourage support of the NSBEpreneur initiative by supporting students to attend NSBE conferences, or hosting NSBEpreneur activities within the university.

Advancing Minorities Interest in Engineering (AMIE), a technical organization based at Morgan State University, also encourages minority participation in engineering careers. Housed within the engineering school, AMIE achieves its goals through a partnership with 14 HBCU engineering programs that maintain ABET accreditation. Given the organization's mission to encourage collaboration among accredited HBCU engineering programs, the group of AMIE-affiliated engineering schools can collaborate to drive the discussion on entrepreneurship education in an effort to cultivate interest in technology entrepreneurship among their students.

Implications

There are significant potential implications of the discussion in this paper. Considering that HBCUs produce a significant percentage of black engineers, providing entrepreneurship education to engineering students within these institutions may be an important way of increasing the number of black-owned technology firms. This can help address the disproportionately low rate of black entrepreneurship. Due to expected technology sector growth, black entrepreneurs can focus their startup efforts on technology-related businesses and better position themselves to secure venture capital funding.

Implications also exist for unemployment and job creation among black Americans. According to Benedict, McClough and Hoag (2012), business owners with a degree in one of the STEM fields were found to be associated with larger-sized firms, employing at least 100 workers. This finding suggests that the firms founded by engineering and technology graduates

have the potential to contribute economically through job creation. If HBCU engineering programs are able to influence black technology entrepreneurship rates, the resulting effects may lead to economic improvements in the form of reduced unemployment and job availability, as well as the creation of much needed wealth in the black community (Pinkett & Robinson, 2011) through business ownership.

Limitations and Future Research

Before offering directions for future research, we want to mention several limitations of this paper. First, of the 102 HBCUs, we only studied a small subset of these schools in our review. The requirement that schools maintain ABET and AACSB accreditation led to the exclusion of most of the HBCUs. While our review covered 10 institutions, we identified a total of 22 ABET-accredited engineering programs and 23 AACSB-accredited business programs. Many HBCUs that do not offer a bachelor's degree in engineering do offer some type of technology-related courses. We chose to focus on the 10 schools because they represent premier programs that meet strong accreditation requirements in both engineering and business (i.e., entrepreneurship). Future research exploring the technology and business programs at HBCUs may find unique programs and best practices that could be emulated at schools that do not have accredited engineering and/or business schools, but who do wish to promote entrepreneurship.

The scope of our analysis was limited to the examination of HBCU undergraduate degree programs in engineering and business. Future studies may consider alternate undergraduate degree programs related to the STEM fields, such as computer science or industrial technology, given that entrepreneurship education in these areas may also influence overall black entrepreneurship rates within advanced technology fields. Consideration may also be given to graduate level programs in engineering and business at HBCUs. According to Winter (2002), schools offering the master of business administration (MBA) degree have also recognized the need to infuse engineering/technology with business. Data on the education of technology firm founders shows a large percentage of founders possessing graduate degrees in business and engineering (CB Insights, 2010; Wadhwa *et al.*, 2008). To assess the role of graduate education on technology entrepreneurship, future research should examine graduate degree programs in these fields to gauge their focus on entrepreneurship.

Additional studies on entrepreneurship education within engineering schools can look beyond HBCUs to consider other mission-specific schools. Hispanic-serving institutions (HSIs), similar to HBCUs, are focused on serving the educational needs Hispanic students. Given the elevated rates of unemployment in the Hispanic community, a similar study focused on HSIs may highlight opportunities to encourage entrepreneurship among this demographic group. As this demographic group is expected reach one-third of the U. S. population by 2050 (Greenhalgh & Lowry, 2011), findings from a study on entrepreneurship education at HSIs may have wide-reaching implications.

CONCLUSION

The review of HBCU engineering education revealed HBCUs to be lacking in their support of educating the next generation of technology entrepreneurs. While the results do not depart from current efforts at most engineering schools, the argument can be made that HBCUs should provide opportunities for engineering students to engage in learning about

entrepreneurship mainly as a way to support their relevance and encourage black technology entrepreneurship. With HBCU business schools largely engaged in providing entrepreneurship education, opportunities for collaboration across business and engineering programs currently exist to ensure that engineering students gain much-needed exposure to entrepreneurship.

There is a link between technology venture creation and unemployment reduction, and with the expected growth of the technology sector, it is likely that technology-related businesses will continue to attract a significant portion of investor funding. By encouraging blacks to engage in technology entrepreneurship, they may be able to take advantage of a fast growing field and attain funding for potential business ventures. If they are successful in creating a sustainable business or enterprise, they can then seek to bring other blacks into their firms, thereby providing a source of additional job creation that the black community can utilize to decrease elevated unemployment rates.

As the relevance of HBCUs continues to be questioned, leading the reversal of current trends in black unemployment and technology entrepreneurship is an area in which these institutions can show their value. Achieving these goals would result in HBCUs serving as a national model for addressing similar issues in other underrepresented groups, through minority-serving higher education institutions.

REFERENCES

AACSB. (2013). Accredited Programs. Retrieved on February 28, 2013 from the AACSB Web site: http://www.aacsb.edu/accreditation/accreditedmembers.asp.

ABET. (2013). Accredited Programs. Retrieved on February 28, 2013 from the ABET Web site: http://main.abet.org/aps/Accreditedprogramsearch.aspx.

Adebayo, A. O., Adekoya, A. A., & Ayadi, O. F. (2001). Historically Black Colleges and Universities (HBCUs) as Agents of Change for the Development of Minority Businesses. *Journal of Black Studies*, 32(2): 166-183.

Astebro, T., & Bazzazian, N. (2010). Student startups and local economic development. In DRUID conference (pp. 17-19).

Badgett, M. V. (1994). Rising black unemployment: Changes in job stability or in employability? *Review of Black Political Economy, 22*(3): 55-75.

Bates, T. (1994). Utilization of minority employees in small business: A comparison of nonminority and black-owned urban enterprises. *Review of Black Political Economy, 23*(1): 113–22.

Bates, T. (2006). The urban development potential of black-owned businesses. *Journal of American Planning Association, 72*(2), 227-237.

Benedict, M. E., McClough, D., & Hoag, J. (2012). STEM: A path to self-employment and jobs? *Journal of Entrepreneurship Education, 15*: 99-122.

Berglund, H., & Wennberg, K. (2006). Creativity among entrepreneurship students: Comparing engineering and business education. *International Journal of Continuing Engineering Education and Life Long Learning, 16*(5): 366-379.

Birch, D. L. (1987). *Job creation in America.* New York: Free Press.

Bradford, W. D. (2003). The wealth dynamics of entrepreneurship for black and white families in the U.S. *Review of Income and Wealth, 49*(1): 89-116.

Butler, J. S. (1991). *Entrepreneurship and self-help among black Americans: A reconsideration of race and economics*. Albany: State University of New York Press.

Cantey, N. I., Bland, R., Mack, L. R., & Davis, D. J. (2012). Historically black colleges and universities: Sustaining a culture of excellence in the 21st century. *Sociology, Social Work, & Urban Professions Faculty Research*. Paper 1. http://digitalscholarship.tnstate.edu/sswandurbanp_fac/1.

Carayannis, E. G., Kassicieh, S. K., & Radosevich, R. (2000). Strategic alliances as a source of early-stage seed capital in new technology-based firms. *Technovation, 20*(11): 603-615.

CB Insights. (2010). *Venture capital human capital report: Gender, race, age, education demographics on VC backed company founders*. Retrieved February 28, 2013 from the CB Insights Web

site: http://www.cbinsights.com/blog/venture-capital/venture-capital-human-capital-report-gender-and-education.

CB Insights. (2012). *The university entrepreneurship report*. Retrieved February 28, 2013 from the CB Insights Web site: http://www.cbinsights.com/blog/venture-capital/university-entrepreneurship-report.

Colombo, M. G., & Grilli, L. (2005). Founders' human capital and the growth of new technology-based firms: A competence-based view. *Research Policy*, *34*(6): 795-816.

Cornwall, A. (2008). Unpacking participation models, meanings and practices. *Community Development Journal, 43*(3): 269-283.

Creed, C. J., Suuberg, E. M., & Crawford, G. P. (2002). Engineering entrepreneurship: An example of a paradigm shift in engineering education. *Journal of Engineering Education, 91*(2): 185-196.

Crump, M. E. S. (2008). A survey of the literature on black entrepreneurship: What is known, who is publishing, and future research directions. Ph.D. dissertation, Morgan State University.

Dabbagh, N., & Menascé, D. A. (2006). Student perceptions of engineering entrepreneurship: An exploratory study. *Journal of Engineering Education, 95*(2): 153-164.

Dunn, T. & Holtz-Eakin, D. (2000). Financial capital, human capital, and the transition to self-employment: Evidence from intergenerational links. *Journal of Labor Economics, 18*: 282-305.

Duval-Couetil, N., Reed-Rhoads, T., & Haghighi, S. (2011). Investigating the impact of entrepreneurship education on engineering students. Paper accepted and presented at the 2011 *National Collegiate Inventors and Innovators Alliance Annual Conference*. Washington, D.C., March.

Ede, F. O., Panigrahi, B., & Calcich, S. E. (1998). African American students' attitudes toward entrepreneurship education. *Journal of Education for Business, 73*(5): 291-296.

Elmuti, D., Khoury, G., & Omran, O. (2012). Does entrepreneurship education have a role in developing entrepreneurial skills and ventures' effectiveness? *Journal of Entrepreneurship Education, 15*: 83-98.

Ernst and Young. (2012). *Globalizing venture capital: Global venture capital insights and trends report 2011*. Retrieved February 28, 2013 from the Ernst and Young Web site: http://www.ey.com/GL/en/Services/Strategic-Growth-Markets.

Fairlie, R. W. (1999). The absence of the African-American owned business: An analysis of the dynamics of self-employment. *Journal of Labor Economics, 17*(1): 80-108.

Fairlie, R. W., & Meyer, B. D. (2000). Trends in self-employment among white and black men during the twentieth century. *Journal of Human Resources, 35*: 643-669.

Fryer, R. G., & Greenstone, M. (2007). The causes and consequences of attending Historically Black Colleges and Universities. *National Bureau of Economic Research*, Working Paper No.13036, April 2007.

Gage, D. (2012). More women and minority entrepreneurs entering tech. *The Wall Street Journal*. http://blogs.wsj.com/venturecapital/2012/08/30/more-women-and-minority-entrepreneurs-entering-tech/.

Gallo, R., & Davis, R. (2009). The impact of town-gown relationships on the sustainability of African American communities: An examination of the role of HBCUs. *Journal of African American Studies, 13*(4): 509-523.

Gasman, M. (2009). Historically black colleges & universities in a time of economic crisis. *Academe, 95*(6): 26-28.

Georgia Institute of Technology. (2013). *Technological Innovation: Generating Economic Results (TI:GER) Program*. http://tiger.gatech.edu/

Goode, R. W. (2013). The HBCU debate: Are black colleges & universities still needed? *Black Enterprise*. http://www.blackenterprise.com/lifestyle/are-hbcus-still-relevant/.

Greenhalgh, L., & Lowry, J. H. (2011). *Minority business success: Refocusing on the American dream*. Stanford, CA: Stanford University Press.

Hisrich, R. D., Peters, M. P., & Shepherd, D. A. (2005). *Entrepreneurship* (6th ed.). McGraw-Hill, New York, NY.

Holifield, J. (2011). Fearing the future for HBCUs. Black Innovation and Competitiveness Initiative. Retrieved March 11, 2013 from the Black Innovation Web site: http://blackinnovation.org/hbcu/.

Hoynes, H. (2000). The employment and earnings of less skilled workers over the business cycle. In R. Blank and D. Card (Eds.), *Finding jobs: Work and welfare reform* (pp. 23-71). New York: Russell Sage Foundation.

Katz, J. A. (2003). The chronology and intellectual trajectory of American entrepreneurship education: 1876–1999. *Journal of Business Venturing*, *18*(2): 283-300.

Kirchhoff, B., & Phillips, B. (1988). The effect of firm formation and growth on job creation in the United States. *Journal of Business Venturing, 3*(4): 361-372.

Klein, K. E. (2013). Education, mentors, money: How to boost black tech entrepreneurs. *Bloomberg Businessweek*. http://www.businessweek.com/articles/2013-05-30/education-mentors-money-how-to-boost-black-tech-entrepreneurs#p1.

Köllinger, P., & Minniti, M. (2006). Not for lack of trying: American entrepreneurship in black and white. *Small Business Economics, 27*(1): 59-79.

Kourilsky, M. L., & Walstad, W. B. (2002). The early environment and schooling experiences of high technology entrepreneurs: Insights for entrepreneurship education. *International Journal of Entrepreneurship Education*, *1*(1): 1-20.

Kuratko, D. F. (2005). The emergence of entrepreneurship education: Development, trends, and challenges. *Entrepreneurship Theory and Practice*, *29*(5): 577-598.

Lentz, B. F., & Laband, D. N. (1990). Entrepreneurial success and occupational inheritance among proprietors. *Canadian Journal of Economics, 23*: 563-579.

Lesesne, C. (2013). Tech venture initiative launched on HBCU campuses. *Diverse: Issues In Higher Education*. March 7, 2013. http://diverseeducation.com/article/51781/#

Lucas, L. M. (2006). Capital accessibility, gender, and ethnicity: The case of minority women-owned firms. *New England Journal of Entrepreneurship, 9*(1): 41-60.

Motoyama, Y., & Danley, B. (2012). *The ascent of America's high-growth companies: An analysis of the geography of entrepreneurship*. Ewing Marion Kauffman Foundation. September 2012. Retrieved February 18, 2013 from the Kauffman Foundation Web site: http://www.kauffman.org/research-and-policy/the-ascent-of-americas-high-growth-companies.aspx.

Mueller, S. (2011). Increasing entrepreneurial intention: Effective entrepreneurship course characteristics. *International Journal of Entrepreneurship and Small Business, 13*(1): 55-74.

National Venture Capital Association. (2012). *National Venture Capital Association Yearbook 2012*. Retrieved February 28, 2013 from the National Venture Capital Association Web site: http://www.nvca.org/index.php?option=com_content&view=article&id=344&Itemid=103.

Ogbolu, M.N. (2011). Exploring the depressed rate of black entrepreneurship: The impact of consumer perceptions. Ph.D. dissertation, Morgan State University.

Palmer, R. T., Maramba, D. C., & Lee, J. M. (2010). Investigating black students' disinclination to consider and attend historically black colleges and universities (HBCUs). N*ational Association of Student Affairs Professionals Journal, 13*(1): 23-45.

Perna, L., Lundy-Wagner, V., Drezner, N. D., Gasman, M., Yoon, S., Bose, E., & Gary, S. (2009). The contribution of HBCUs to the preparation of African American women for STEM careers: A case study. *Research in Higher Education, 50*(1): 1-23.

Pinkett, R., & Robinson, J. (2011). *Black faces in white places: 10 game-changing strategies to achieve success and find greatness*. New York, NY: AMACOM.

Reynolds, P. D., Carter, N. M., Gartner, W. B., & Greene, P. G. (2004). The prevalence of nascent entrepreneurs in the United States: Evidence from the panel study of entrepreneurial dynamics. *Small Business Economics, 23*(4): 263-284.

Robb, A. M., & Fairlie, R. W. (2007). Access to financial capital among U.S. businesses: The case of African American firms. *The Annals of the American Academy of Political and Social Science, 613*(1): 47-72.

Sánchez, J. C. (2011). University training for entrepreneurial competencies: Its impact on intention of venture creation. *International Entrepreneurship and Management Journal, 7*(2): 239-254.

Saxenian, A. (1999). *Silicon Valley's new immigrant entrepreneurs*. San Francisco, CA: Public Policy Institute of California.

Scarborough, N. M., Wilson, D. L., & Zimmerer, T. W. (2009). *Effective small business management: An entrepreneurial approach (9th Edition),* Upper Saddle River, NJ: Prentice Hall.

Schumpeter, J. A. (1934). *The theory of economic development*. Cambridge, MA: Harvard University Press.

Singh, R. P. (2008). The shortage of academically trained entrepreneurship faculty: Implications, challenges, and opportunities. *Journal of Entrepreneurship Education, 11*: 117-131.

Singh, R. P., & Crump, M. E. (2007). Educational attainment: A key factor for improving the lagging rate of black entrepreneurship. *The Review of Black Political Economy, 34*(3): 217-229.

Singh, R. P., Crump, M. E. S., & Zu, X. (2007). Family matters: Examining how self-employed blacks and whites differ in having self-employed parents. *Academy of Management Meeting*, Philadelphia, PA, August 2007.

Singh, R. P., & McDonald, G. (2004). Reasons for pursuing new venture creation: Differences between black and white nascent entrepreneurs. Paper accepted and presented at the 2004 *Academy of Management*

Meeting. New Orleans, Louisiana; August.

Spriggs, W., & Williams, R. (2000). What do we need to explain about African American unemployment?. In R. Cherry and W. R. Rogers, III (Eds.), *Prosperity for all? The economic boom and African Americans* (pp. 188-207). New York: Russell Sage Foundation.

Souitaris, V., Zerbinati, S., & Al-Laham, A. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *Journal of Business Venturing, 22*(4): 566-591.

Standish-Kuon, T., & Rice, M. P. (2002). Introducing engineering and science students to entrepreneurship: Models and influential factors at six American universities. *Journal of Engineering Education, 91*(1): 33-39.

Stanford University. (2013). *Stanford Technology Ventures Program*. http://stvp.stanford.edu/

Stangler, D. (2010). High-growth firms and the future of the American economy. *Kauffman Foundation Research Series: Firm Formation and Economic Growth*, March 2010. Retrieved March 2, 2013 from the Kauffman Foundation Web site: http://www.kauffman.org/uploadedfiles/high-growth-firms-study.pdf.

Streeter, D. H., Kher, R., & Jaquette, J. P. (2011). University-wide trends in entrepreneurship education and the rankings: A dilemma. *Journal of Entrepreneurship Education*, *14*: 75-92.

Turner, J. L. (2011). A comparative analysis: The pioneer HBCU vs. the modern HBCU. *Proceedings of The National Conference On Undergraduate Research (NCUR)* 2011 Ithaca College, NY. March 31-April 2, 2011.

Van Stel, A. J., & Storey, D. J. (2004). The link between firm births and job creation: Is there a upas tree effect? *Regional Studies, 38*(8): 893-909.

United Negro College Fund (2013). Retrieved February 28, 2013 from the United Negro College Fund Web site: http://www.uncf.org/aboutus/hbcus.asp.

U.S. Census Bureau. (2012). *2007 Survey of Business Owners*. Retrieved June 22, 2013 from the Census Bureau Web site: http://www.census.gov/econ/sbo/07menu.html.

U.S. Census Bureau. (2013). *Statistics of US Businesses*. Retrieved February 28, 2013 from the Census Bureau Web site: http://www.census.gov/econ/susb/.

U.S. Commission on Civil Rights. (2010). *The Educational Effectiveness of Historically Black Colleges and Universities: Briefing Report*. Retrieved February 28, 2013 from the Commission on Civil Rights Web site: http://www.usccr.gov/pubs/HBCU_webversion2.pdf.

U.S. Department of Education. (2013a). *Listing of HBCUs*. White House Initiative on HBCUs. Retrieved January 31, 2013 from the White House Initiative on HBCUs Web site: http://www.ed.gov/edblogs/whhbcu/one-hundred-and-five-historically-black-colleges-and-universities/.

U.S. Department of Education. (2013b). Listing of HBCUs. The National Center for Education Statistics. Retrieved January 31, 2013 from the National Center for Education Statistics Web site: http://nces.ed.gov/COLLEGENAVIGATOR/.

U.S. Department of Labor (2013). *The Employment Situation - January 2013*. Bureau of Labor and Statistics http://www.bls.gov/news.release/pdf/empsit.pdf.

U.S. News and World Report. (2013). *Best Engineering Schools, 2012 Rankings*. http://grad-schools.usnews.rankingsandreviews.com/best-graduate-schools/top-engineering-schools/eng-rankings.

Wadhwa, V., Freeman, R., & Rissing, B. (2008). *Education and tech entrepreneurship*. Ewing Marion Kauffman Foundation. May 2008. Retrieved December 18, 2012 from the Kauffman Foundation Web site: http://www.kauffman.org/uploadedFiles/Education_Tech_Ent_061108.pdf.

Wadhwa, V., Gereffi, G., Rissing, B. A., & Ong, R. (2007). Where the engineers are. *Issues in Science and Technology*: 73-84.

Wadhwa, V., Saxenian, A., & Siciliano, F. D. (2012). *Then and now: America's new immigrant entrepreneurs, Part VII*. Ewing Marion Kauffman Foundation. http://www.kauffman.org/research-and-policy/americas-new-immigrant-entrepreneurs-then-and-now.aspx.

Walker, K. (2012). The technopreneurship process: Academic entrepreneur university spin-offs. *RIThink, 2*: 11-22.

Walstad, W. B. and Kourilsky, M. L. (1998). Entrepreneurial attitudes and knowledge of black youth. *Entrepreneurship Theory and Practice, 23*(2): 5-18.

Waters, R. (2010). Time to think outside the box? Technical entrepreneurship and engineering management education. *Engineering Management Journal, 21*(4): 54-57.

Winter, R. (2002). An executive MBA program in business engineering: A curriculum focusing on change. *Journal of Information Technology Education, 1*(4): 279-288.

Williams, M. G. (2010). Increasing philanthropic support through entrepreneurial activities at Historically Black Colleges and Universities. *International Journal of Educational Advancement, 10*(3): 216-229.

Williams, M. G., & Kritsonis, W. A. (2007). National implications: Why HBCU presidents need entrepreneurial focus. *Focus on Colleges, Universities and Schools, 1*(1): 1-5.

Yoder, B. (2011). *Engineering statistics: Sample from the 2011 Profiles of Engineering and Engineering Technology Colleges*. American Society for Engineering Education. http://www.asee.org/papers-and-publications/publications/college-profiles.

EDUCATING ENTREPRENEURIAL LEADERS

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ABSTRACT

This paper addresses how to educate entrepreneurial leaders who challenge, change, and create solutions inside existing organizations and in new ventures. Entrepreneurial leaders create value for their organizations, their stakeholders, and the wider society. The distinguishing trait of these leaders is the way they think and act, which we call entrepreneurial thought and action, ETA®. We focus on the mind and the method of entrepreneurial behavior, not its outcomes. We argue that educational institutions that infuse entrepreneurial thought and action into their DNA create graduates who will be well equipped to address the risk, uncertainty and "unknowability" challenges of the 21st Century.

We outline a methodology for creating an eco-system in which students learn about and live as entrepreneurial leaders. In the eco-system, curriculum, co-curricular activities, and culture are consciously designed and mutually supportive. Traditional curriculum integrates discipline specific learning goals with ETA® learning goals so both are accomplished efficiently. Co-curricular and social activities are planned to introduce or reinforce these learning goals; with conscious design, slowly an entrepreneurial culture emerges and students internalize entrepreneurial leadership principles. We illustrate how design teams apply these design principles in our organization and for our partner institutions.

INTRODUCTION

In their book The New Entrepreneurial Leader, (Greenberg, McKone-Sweet and Wilson, 2011) describe the mind and the method of the new entrepreneurial leader. They also pose a challenge to the academic community – particularly business schools -- to alter the way we educate students so they become entrepreneurial leaders rather than traditional business managers. As they put it: "How can management educators introduce system wide changes to reorient student learning toward educating entrepreneurial leaders?" (Greenberg, McKone-Sweet and Wilson, 2011:21).

The purpose of this paper is to answer the question posed above – that is, how best to educate the next generation of entrepreneurial leaders. Our emphasis on the word educate is meant to underscore that we use the term not in its narrow meaning of a formal academic curriculum, but as a broad concept that includes the total educational experience of a student both in and outside the formal classroom. We are interested in created an educational eco-system that develops entrepreneurial leaders.

We begin by describing the conceptual foundations of entrepreneurial leadership. We then use these foundational concepts to describe the anatomy or competencies of an entrepreneurial leader, which includes what they know and how they act. In the next section, we discuss the how the academic curriculum can be used to develop these leadership competencies.

We follow with a discussion of how the co-curricular experience (sports, clubs, etc.) shape competencies and actions and detail the role that the campus' culture and social experiences (values, networking, diversity, etc.) play in shaping entrepreneurial leaders. The last two sections use Babson College as a live case to illustrate how we develop entrepreneurial leadership in practice and how we export our practices and put these principles into action when designing educational programs for partner schools.

CONCEPTUAL FOUNDATIONS OF ENTREPRENEURIAL LEADERSHIP

"Entrepreneurial leaders are individuals who, through an understanding of themselves and the contexts in which they work, act on and shape opportunities that create value for their organizations, their stakeholders, and the wider society." (Greenberg, McKone-Sweet and Wilson, 2011:2) Entrepreneurial leadership does not focus solely on new venture creation, the traditional domain of entrepreneurship, but instead represents a new model of leadership. Entrepreneurial leaders challenge, change, and create solutions inside existing organizations and in new ventures. The distinguishing trait of these leaders is the way they think and act.

Research on serial entrepreneurs and our own experience with Babson students and alumni have enabled us to develop our ideas about entrepreneurial behavior and entrepreneurial leadership. Research shows that entrepreneurial behavior is not simply the act of engaging in a new startup; rather it is the thinking and acting that goes into the process of engaging in new startups that is distinct and can be applied to all walks of life. Sarasvathy's (2008) work with serial entrepreneurs shows that what distinguishes entrepreneurs from managers is that they use a distinctive mode of thinking. Sarasvathy calls this "effectual thinking." Similarly Lange et al. (2012) performed a survey of Babson College alumni. Their study shows that while most of them do not start businesses upon graduation, many do so later in their career. However, while not all students start businesses, they all find that being exposed to entrepreneurial thinking and acting that is at the heart of the Babson experience very valuable in whatever career they choose to follow. This was borne out by a recent survey of Babson College alumni conducted by the office of institutional research. (Delaney, 2013) One of the key questions in the survey asked students to reflect on how their out-of-class experiences and Babson's focus on entrepreneurship transformed their lives. The typical response, regardless of job or concentration in college, stated that the focus on entrepreneurship had fostered a sense of "creativity" and opened their eyes to "possibilities". Several mentioned that they approached their jobs differently from other colleagues as they were always "looking for opportunities" to reshape their jobs and more open to out-of-the-box solutions to problems.

This is the reason why we are interested in the mind and the method of entrepreneurial behavior -- not its outcomes. We believe that by immersing students in this methodology, we prepare them to become entrepreneurial leaders who are able to introduce new products, processes and ventures in established organizations; tackle big social problems and create new social ventures or offer new services in existing social agencies; and engage in political and social policy making in governments and non-governmental organizations (NGOs). In short, we can train students to practice Entrepreneurship of All Kinds®.

Babson College calls the unique methodology that entrepreneurial leaders employ Entrepreneurial Thought and Action® (ETA). For us, ETA® is a method of engaging with the world that can be codified and taught. More importantly, it is a generalizable life skill that anyone can use when faced with challenging and unstructured problems. It is very important to

note that we are not claiming that everyone can be an entrepreneur in the classic sense of starting a new venture. What we are saying is that everyone can learn to think and act in an entrepreneurial way regardless of their chosen vocation in life. This is no different than saying that everyone can learn to apply the scientific method but not everyone can be or desires to become a great scientist.

The method Babson calls ETA® is rooted in fields as diverse as philosophy, behavioral economics, organizational control, management, organizational behavior, and decision making under uncertainty. While ETA® recognizes the importance of analytical logic when problems are structured; it calls into question the use of predictive logic when the task at hand requires an act of creation. In other words, ETA® emphasizes the need to recognize the nature of problems and be ambidextrous to match predictive and creative logics to the task at hand. As discussed below, the logic of creation embedded in ETA® departs from classical theories of rational decision making in several important ways.

Risk & Uncertainty V Unknowability

Rational choice theories handle risk through formal risk-return calculus. Faced with alternative possible outcomes, decision makers use prior observed results to develop probability estimates of future results. They compute the expected returns of alternatives based on each alternative's probability of occurrence and forecasted net benefit to choose the action that maximizes their payoff.

As far back as 1921, the economist Frank Knight challenged this view by pointing out that many decisions are made under uncertainty rather than risk, because the underlying probability distributions of results are unknown. He argued that it was inappropriate to handle such situations with probability computations. Knight's recognition gave rise to decision making under uncertainty, and the use of experts and other methods to make subjective assessments of probabilities to be incorporated into decision making models.

More recently, many have argued that in so-called "wicked problems" even the notion of specifying all of the outcomes is not possible. That is, not only can we not specify the probability of heads or tails, we also do not know if the coin, when tossed, will come up heads, tails, keep going into space, fall and burn, spin on its side, and so on. This is the world of "unknowability" – what former Defense Secretary Donald Rumsfeld called the "unknown unknowns." No expert can identify all possible results or make informed judgments about the likelihood of each occurring. This unknown world is a world quite familiar to entrepreneurs who introduce new technologies, products or services to new groups trying to develop markets and viable businesses.

Role Of Human Agency

The second important way in which ETA® differs from the neo-classical theory of rational choice is in the role of human agency. Philosophers have long argued about the nature of reality -- whether it exists and we seek to understand and then alter it through action, or whether action itself creates reality. Classical decision theory considers predicting the future and acting to change it as the role of human agency. The alternative view, best exemplified by Kurt Lewin's work in action research during the 1940's, argues that action creates reality. Under this view the role of human agency is to control the future by acting on it rather than trying to predict it. This

line of research recognizes the tension between predictive logic and a more action-oriented logic in which reality is an act of co-creation between an actor and her environment.

More recently, Sarasvathy (2008) applied this line of reasoning to entrepreneurs. Sarasvathy (2008) studied successful entrepreneurs, who had started multiple enterprises ranging in size from $200 million to $6.5 billion, and ways they took action. She found there was a strong consistency in how they thought about events or contexts and how they acted upon opportunities. She called this method "effectuation" – which has many similarities to what we call ETA®.

Sarasvathy concluded that a little less than 90% of the time, entrepreneurs, fueled by a passion or desire, act, learn, and act again. We know that actions have consequences or effects, and entrepreneurs learn from those consequences, build or change based on what they have learned, and act again. They act, learn, build, and repeat. This methodology takes what is real and currently knowable and encourages taking steps towards an action. Ironically the method limits risk. It allows entrepreneurs to shape opportunities and proactively change the future. Contrast Sarasvathy's description of entrepreneurial behavior with prescriptive managerial behavior taught in business schools. Students are taught rational decision making and predictive logic. Students must analyze situations based on past data, create plans based on that analysis and predict future outcomes. They are trained that good managers line up the resources needed for the ends they desire. They are taught that capital is given on the basis of plans that make projections years in the future. Students aren't trained to surface and test key assumptions behind their forecasts in low cost ways. When they are faced with unexpected results, students don't know how to act and tend to analyze more. Rarely are students expected to identify key assumptions, test them, and suggest ways to pivot.

Action Rooted In Awareness And Desire

Entrepreneurial Thought and Action® recognizes that acts of creation start with awareness of self and context. Entrepreneurial leaders understand their values, passions, capabilities and limitations. They are also aware of the historical, cultural and societal context in which they operate. Awareness of self and context helps entrepreneurial leaders create opportunities connected to their values, passions and abilities and to anticipate others' responses. Often opportunities emanate from a deep and long-felt passion about something or a commitment to an idea or an ideal, but absolute passion about an idea is not a requirement for ETA®.

Means-End Logic

Unlike rational logic which starts with predefined ends and requests the resources to get to those ends , ETA® starts with means at hand to accomplish a set of soft goals. The "means at hand" include direct resources such as time, money, credit lines and other assets, technical education and industry knowledge, and indirect resources, including personal relationships and professional networks. The questions that drive action are: "Who am I? What do I know? What am I good at? What do I have available to work with? Who do I know that I might be able to get help from? What steps can I take given what I have?"

Affordable Loss

Rational decision theory is rooted in the idea that action is motivated by choosing actions that maximize the actor's payoff. In ETA®, action is based on the logic of affordable loss (Sarasvathy, 2008) – that is, the actor does not ask what will I win? Rather, they ask, what can I afford to lose? Affordable loss includes money, but also time, reputation, and personal and professional opportunity costs. In effect, understanding affordable loss and the sources of risk in their plans means that an entrepreneur can work to "de-risk" their ideas by making the actual risk involved in taking action more palatable. If entrepreneurs deem the affordable loss too high, then they don't take that action.

Self-Selected Stakeholders

Rational choice theory is rooted in a concept of individual action based on analytic logic pointing the way to achieve predetermined outcomes. ETA® is rooted in a theory of collective action. That is, it acknowledges that smart action is rooted in the ability of a decision maker to bring along committed stakeholders to co-create outcomes rather than achieve predetermined outcomes. The co-creators' involvement can range from active investment of time and money to the provision of resources through reputational capital, borrowed assets, or who serve as connections to other resources. Enrolling others is also a confirmation of one's judgment that the actions taken are worthwhile.

Leveraging Surprises

Rational choice theory views unexpected results or surprises as opportunities to take corrective action to restore stability and to get back on the path to original goal accomplishment. People who use ETA® recognize that creation requires embracing surprises. They take small action steps which they treat as a series of controlled experiments or discoveries. Each discovery builds on prior results and offers new lessons. Knowledge acquired through small actions keeps the decision maker either moving toward an evolving "soft" goal or causes him/her to "pivot" to a new idea.

ANATOMY OF AN ENTREPRENEURIAL LEADER

If entrepreneurial leadership is learned behavior, then the right question to ask is: what are the competencies that an entrepreneurial leader must acquire?

Understanding Of Self And Contextual Awareness

The practice of entrepreneurial leadership begins with a journey of self-exploration that requires a leader to understand who they are, how the context they live in shapes their everyday behavior, what values guide their choices. The "Who Am I?" is not just about introspection; it is about how individuals construct their conception of self in relation to others. It is about understanding how their individual perspective shapes their objective realities. Entrepreneurial

leaders know their beliefs and values and have the capacity to act on them. They are aware of the discrepancy between espoused behavior and actual behavior.

The values of a leader set the culture and influence the success of an organization. It is therefore important that a leader is firmly grounded in a set of values that he or she can share with the community. Leaders need to live their values and attract other stakeholders with similar values. Entrepreneurial leaders succeed when the basis of their actions stems from values that others can at least admire if not completely share. It is important that in educating entrepreneurial leaders, we provide them with opportunities to explore their values and to understand their relations to others.

DISCOVERING SELF IN A SOUTH AFRICAN VILLAGE

Sameer Khan is a student at Babson. He comes from an affluent business family in South Asia. As part of his study abroad, he went to South Africa where he was, in his own words, "supposed to teach the villagers about entrepreneurship". What he ended up learning came as a surprise to him. As he tells it, he came across two young women in the South African village where they were doing their "teaching" and found out that they had a small business delivering hot lunches to farmers in the field. While the business made a small profit, what Khan discovered is that the two young women were motivated to start this business because they wanted to ensure that the other young women could go to school and get an education. If there was no one to make and deliver hot lunches to the farmer fathers, the daughters would have been forced to stay home and make meals. The availability of hot lunches at an affordable price not only provided the business with enough profit to sustain itself, it allowed girls in the village to get educated!

As Khan describes it, "I realized that these women had more to teach me about entrepreneurship than I could ever teach them. It also made me think about the purpose of business and its role in a community. My own family business has a very distant instrumental relationship with their workers. It became clear to me that my own values about the role of business and how to treat workers had been altered forever. I also know that my beliefs will be sorely tested when I go back because it is not the way things work back home."

Sameer has experienced something that we could never manufacture in a classroom – life as it lived at the bottom of the pyramid and the survival of human spirit that makes every day living an entrepreneurial experience!

Enrolling Others

Entrepreneurial leaders succeed because they are adept at enrolling others. Our choice of the word "enroll" over sell or buy-in is deliberate. The latter terms imply the leader has the right answer and others have to be brought on board. Enrolling, however, is an invitation to co-create solutions to common problems. Enrolling is different in two fundamental ways from traditional notions of selling or getting buy-in. First, enrolling requires leadership without advocacy. Inviting others to co-create is disingenuous if a leader has the solution she wants to advocate. Second, if one is to lead without advocacy, then conversations about choices need to be framed as trade-offs. Most important decisions in life are about choosing more of something in exchange for less of something else. It is easier for a community to co-create or reach consensus if members understand the tradeoffs they are making with their choices rather than believing that it is possible to select an optimal solution that will meet all their needs.

LINUS TORVALDUS ENROLLS OTHERS
Linus Torvaldus was a graduate student in the computer science department at the University of Helsinski. He was enrolled in a class teaching him fundamentals of operating systems in 1991. Like many, he was frustrated with the tools used to teach concepts within the classroom. Most tools were owned by for-profit entities or intentionally kept proprietary by few programmers. Students found this very frustrating when they wanted to learn and extend a program. Linus decided to do something about it. He was going to write a better operating system and he was going to change the world of software. He called his operating system Linux.   Writing an operating system is not a simple task. Companies spend millions of dollars and employ hundreds of programmers to develop such systems. The requirements are very dynamic and determined by the user community. In addition, many third-party developers earn their living developing operating systems and so the details are shrouded in secrecy.   Linus took a different approach. He created an agenda for software development, wrote the first bare-bones version of the software, and then posted both on the existing on-line communities for everyone to see. Interestingly, many developers began to respond to his software program with suggestions. He quickly realized that he had tapped into a big need in the market. Instead of trying to predict and meet the demand by himself, he wrote his now famous note on a discussion board asking others to actively participate and freely distribute the software. In part, his note said: ". . . I'm doing a (free) operating system (just a hobby, won't be big and professional . . . This has been brewing since April, and is starting to get ready. I'd like any feedback on things people like/dislike in minix, as my OS resembles it somewhat (same physical layout of the file-system (due to practical reasons) among other things). . . I'll get something practical within a few months, and I'd like to know what features most people would want. Any suggestions are welcome, but I won't promise I'll implement them :-)"   This note launched a movement that got millions of interested in the project. Several developers started writing products that met their needs by extended the operating system.   Linus Torvaldus' class project had successfully enrolled many stakeholders each making their own tradeoff between giving up the security of the well-established Windows operating system for a more flexible and personalized but less known operating system called LINUX.

Shaping Opportunities

The path from an identified idea or opportunity to its final execution is seldom linear or predictable. There are a lot of surprises en route. Entrepreneurial leadership, therefore, is not about selecting an idea or opportunity from what flows across one's "in box"; rather it is selecting those opportunities that show the most promise of being shaped into something significant. This requires leaders to recognize that they need to be committed to a general direction – a "soft" goal that may change and not a "hard" goal that is to be achieved at all costs. They understand that an opportunity is in reality version 1.0 and that by the time the idea is shaped into a product or service, it may be version 5.0 or higher. The essence of entrepreneurial leadership is not to follow the well-known Plan-Do-Check-Act (PDCA) cycle – particularly when faced with ambiguous opportunities -- but to proactively shape them using the Act-Learn-Build (ALB) cycle. This in turn means breaking a problem into bite-sized chunks and designing small experiments to take the next step forward.

CHEGG SHAPES AND PIVOT
Chegg is a text book rental company enjoying great success in the marketplace. The founders, Osman Rashid and Aayush Phumbra, originally wanted to create a job for themselves when they could not find one after graduation. They decided to launch a Craigslist-like service for college students. But then Facebook decided to do classifieds and derailed their idea. So they decided to do a product pivot with about 4 months of cash left of an initial 25k angel investment. They shut down their Craigslist for college site and, drawing inspiration from Netflix, decided to pivot to text book rentals. Textbooks were the most popular item on their website anyway. The textbook market was primed for disruption with book and course materials costs exceeding $1,213 per year for students. The founders wanted to reduce these costs by allowing students to rent these books at 30% of its purchase price. Once this decision to pivot was made there was no looking back. Although they had no experience in that field nor any assets that would help with the infrastructure needed to launch, they did so anyway. Since they had no shipping infrastructure or supplier relationships, to cope with the situation, they bought books from Amazon on their credit cards and sent them out to their customers. Once their customers were done using their books, they would to send them back to Chegg. As a company Chegg ended up doing much better than their most optimistic projections. The pivoted product just worked. Rentals went through the roof. They could buy a text book then rent it again and again because they own the book and discovered an incredibly profitable business model. Today Chegg is extremely successful in the college textbook marketplace. They have over million customers, 300+ employees and have attracted over $219 million in funding.

Cognitive Ambidexterity

Entrepreneurial leaders encounter situations and problems that vary from highly structured to highly unstructured or ambiguous. Predictive analysis is best suited for the highly structured situations where uncertainty can be handled by assigning probabilities to outcomes and computing payoffs. Plans can be made and executed because the past is a good reference point for the future. A good example is introducing existing products to existing or new markets or new products to existing markets.

Leadership, however, is seldom tested when problems are highly structured and the world is ordered and predictable. It is usually tested when the world is unknowable – introducing new solutions to new markets. These situations, in which leaders have to deal with the "unknown-unknowns", do not lend themselves to sophisticated forecasting. They require acting with means at hand, keeping losses affordable, building support from stakeholders, and learning from taking actions and pivoting when things don't work out. Through action entrepreneurial leaders gain information that allows them to forecast.

Entrepreneurial leadership, therefore, embraces both logics and recognizes that an entrepreneurial leader must have the cognitive ambidexterity to switch between predictive and creation logics depending on the nature of the problem they are trying to solve. In other words, there is time to think your way into new ways of acting and there is a time to act your way into new ways of thinking.

The Ambidexterity of Honda
Over the years, Honda's successful entry into the US market has been the subject of much academic debate and discussion. The Boston Consulting Group ascribes their success to their ability to carefully plan increased market share by taking advantage of scale economies and technology to keep costs low. Richard Pascale attributes Honda's success to their ability experiment, adapt, and learn. According to him, "how an organization deals with miscalculation, mistakes, and serendipitous events outside its field of vision is often crucial to success over time." [1984: 57]. Finally, Prahalad and Hamel attribute Honda's success to their core competence in internal combustion engines. In evaluating which of these three versions of the Honda story is true Richard Rummelt concludes that there is an element of truth in all three stories. He writes: "A great deal of business success depends on generating new knowledge and on having the capabilities to react quickly and intelligently to this new knowledge. Thus, peripheral vision and swift adaptation are critical. At the same time, I believe that . . . forces like scale economies, accumulated experience, and the cumulative development of core competencies over time . . . are strong forces and are not simply countered. We agree with Rummelt. What Honda has clearly demonstrated is the ability to use the analytical calculus of market share, experience curves, cost analysis and core competence in manufacturing engines. At the same time, when entering a new and unknown market like the US, it has also use creative logic of acting, reflecting, adapting and learning to keep moving forward.

ETA And Technical Knowledge

Just as the scientific method is not the singular domain of scientists, entrepreneurial leadership is an attribute – a mindset and an orientation to action – that is not the singular domain of entrepreneurs. Everyone can benefit from such training. The real challenge, therefore, is how to incorporate this into an educational model that does not lead to the creation of new business startups in the classic entrepreneurship sense.

The challenge for an entrepreneurial leader, therefore, is to master not only the skills discussed thus far, she must also have a good understanding of the technical aspects of her chosen field of endeavor -- be it business, medicine, law, engineering, music, architecture, or any other field of practice. Formal technical education in one's field is what lays the foundation to create entrepreneurial solutions to wicked and unstructured problems in the area of one's specialization. However, technical knowledge is insufficient for effective leadership. An entrepreneurial leader must understand not only what something is, they must also understand how it works alone, how it interacts with other parts, and how it relates to the environment, and how to create innovative solutions.

The final challenge of educating entrepreneurial leaders is to blend the creative with the technical. To train effective business leaders, we must not only focus on the technical skills they need to develop a holistic and integrated view of the disciplines that constitute the technical field of study, they must at the same time develop some of the key habits of thought and action that we have discussed in the previous pages of this paper. The same is true for leaders in other fields – for example, medicine. Effective medical leaders understand not only the basics of medicine and how the world of patients, doctors, nurses and support services (such as medical records) interact to deliver health care. They also must have a good understanding of self and the context in which medical services are being delivered; have the ability to create innovative solutions; shape opportunities; and enroll others in their enterprise.

In the section EXPORTING THE BABSON EDUCATIONAL MODEL, we discuss how to blend technical skills with attributes of entrepreneurial leadership in the context of a business education to produce leaders who are technically competent and practice the habits that make entrepreneurs succeed in their endeavors.

SHAPING THE ENTREPRENEURIAL LEADER—THE CURRICULUM

Educational institutions have many tools at their disposal to shape and mold entrepreneurial leaders. The first is the formal academic curriculum. With proper intentionality, the academic curriculum provides an opportunity not only to provide technical knowledge but also to build the competencies entrepreneurial leaders need. An academic curriculum, like a pyramid, has three faces – learning goals, content and pedagogy.

Defining learning goals is the first step in designing any curriculum. These goals must be clear and assessable. It is not enough to identify competencies if they cannot be translated into operational learning goals that can be measured, assessed, and used as a basis of continuous improvement.

There are two types of learning goals – those that focus on technical skills and knowledge and those that build thinking and acting skills. Technical learning goals are typically discipline specific. For example, in medicine the learning goal of a class in biology may be to "describe how the human heart circulates blood throughout the body." Similarly in law, the goal may be to "apply the concept of an implied contract to a real world situation". Thinking and acting skills, on the other hand, focus on developing the thought process and the behaviors specific to a profession. For example, while doctors must understand the circulatory system, they must also be able to recognize patterns (so they can diagnose a disease from a set of symptoms) and have empathy for patients. Lawyers are taught critical reasoning so they can develop a reasoned argument and communication skills so they can persuade judges and juries with that argument.

In order to build entrepreneurial leadership skills we propose the following thinking and behavioral learning goals for each of the ETA® competencies:

For entrepreneurial leaders to be cognitively ambidextrous, students must be able to apply:
    Predictive logic
    Critical thinking and problem solving
    Quantitative reasoning
    Creation logic
    Design thinking

For entrepreneurial leaders to become self and contextually aware they must identify and analyze:
    Cognitive decision styles
    Personality types
    Social and global problems
    Economic, political and legal context in which they live

For entrepreneurial leaders to enroll other stakeholders in their ventures, must be able to use:
    Team building skills
    Persuasion and negotiation
    Communication – oral, written and interpersonal
    Networking skills

For entrepreneurial leaders to shape opportunities and pivot as appropriate, they must demonstrate the ability to:
    De-risk opportunities
    Create from means at hand
    Leverage surprises

Content is both the easiest and hardest part of the design of any academic system. The easy part is that the formal knowledge needed for deep functional expertise in any field is relatively straight forward to define. The hard part is that disciplinary experts tend to take a narrow view and consequently interdisciplinary perspectives and thinking and acting skills suffer at the expense of cross-functional knowledge.

Pedagogy is the link that connects learning objectives to content. We need a mix of pedagogies so students acquire the four competencies of entrepreneurial leaders outlined in this paper.

Ability to use predictive logic and quantitative reasoning may be well-handled by the traditional lecture format and practiced through hands on exercises. Lectures are an efficient way to provide a one-way flow of information from an expert to a novice student. Lectures are particularly well-suited when students are first exposed to predictive logic and quantitative reasoning. Note the high rate of success enjoyed by the Khan Academy and Coursera's Massive On-line classes (MOOCs) is because these classes have been mostly confined to quantitative topics such as algebra, software design, micro-circuit design – all situations that lend themselves well to a one-way flow of information, responses to practice problems and quick feedback. Another part of predictive logic, the ability to reason critically is better handled by the case method or a Socratic teaching technique. Both of these methods engage a student in the process of developing a position and defending it against opposing viewpoints.

While the lecture, case method and Socratic technique work well for developing predictive logic skills, creation logic and design thinking classes benefit from a more active approach, such as a studio that enables the act of creation. This is where the pedagogy of performing arts – speech, drama, role play, and creative hands-on exercises work much better than lectures or cases. This is not a universal statement and it is possible to use cases to introduce messy, wicked or ill-defined problems that have no set solutions but instead require creation.

The second competency, self and contextual awareness, benefits from a combination of clinical and field based learning. Self-awareness includes taking diagnostic tests and reflecting on one's strengths and weaknesses. Self-awareness combines clinical and reflective methodologies. On the other hand, contextual awareness may be better handled by service learning and field studies. Many schools and colleges have field experiences grounded in community service or an intensive immersion project such as teaching entrepreneurship to poor villagers in Ghana or participating in a Habitat for Humanity project. These practicums and field studies are not only a great way to apply theoretical knowledge to real world problems or undiagnosed problems; they are also a great way of experiencing the world around us.

The third competency, enrolling other stakeholders, lends itself well to peer to peer learning. Through participating in team projects, using social media, and providing peer feedback on discussion boards, students learn to work with others and to enroll them in their projects even when separated by time and space. These skills are essential for building the ability to co-create solutions with other stakeholders.

The last competency, ability to shape opportunities and pivot when faced with surprises or failures, requires a mix of action learning and reflective thinking. The pedagogies most suited for this purpose include action projects and field work that requires students to work on real world businesses or solve real world problems. These projects encourage students not to just plan but to act. Reflective thinking assignments that require students to reflect on what they have learned from their actions are an important way to reinforce the act-learn-build cycle – an

essential ingredient for shaping opportunities. It is important to note that the pedagogy that encourages learning from failure is opposite of what academic institutions typically do and students expect; this requires a different approach when planning educational experiences and setting expectations.

EDUCATING THE ENTREPRENEURIAL LEADER – THE CO-CURRICULAR

Co-curricular experiences such as student orientation, freshmen seminar, club activities, sports, and student government are vehicles that universities can use intentionally to shape entrepreneurial leaders. Co-curricular activities serve a dual purpose, reinforcing curriculum learning goals and providing an opportunity for students to live the university's values. On most campuses, co-curricular experiences simply happen. Most of them are assumed to provide benefit and no attempt is made to determine how they reinforce classroom learning or university values. While there is nothing wrong with this approach, we believe that the co-curricular experiences can benefit from some of the same intentionality, thoughtfulness, and debate that are part of process of designing the academic curriculum.

Academics do not ask how a particular activity such as baseball or living in a "green" (as in sustainable) residence hall contributes to the achievement of learning goals. Academics focus instead on designing the time students spend in the classroom. Relying solely on the academic curriculum to achieve both technical and process level learning goals is a Herculean task. Most students, on average, merely spend about fifteen hours per week in a classroom. The good news, however, is that leaves over one hundred and fifty hours for other activities. While most universities and colleges take a laissez faire approach to the non-academic hours, we advocate structuring co-curricular activities around learning goals and community values in addition to allowing activities to perk up based on current student interest.

Consider sports and club activities. These are great opportunities for students to take action and to learn. Many activities such as starting a new club, organizing an event, or running for student government require students to take action, learn to use the means at hand because resources are limited, get their fellow students to cooperate, to pivot when things don't go according to plan, and so on. All these behaviors are a great way for them to learn and practice entrepreneurial leadership skills. Often these experiences have as profound a role in shaping them as does their academic curriculum.

It is important that educators put in the same thought and purpose on co-curricular activities as they do on the design of the curriculum. Activities should be allowed to "bubble up" from students and staff. Student life staff should encourage students to take charge of student centered activities. It takes just as much effort to manage student life from a bureaucratic perspective as it does from an entrepreneurial perspective.

A particularly good example of a co-curricular activity that allows students to "live entrepreneurially" are incubators and venture accelerators that encourage students to develop and launch their own businesses. During their time in such accelerators they learn about and critique ideas of their peers and build social networks with other entrepreneurs. Similarly, special interest housing (e.g. sustainability or global) also reinforce the development of entrepreneurial leaders. These living environments allow students to organize their interest groups, manage activities such as idea exhibitions, and share ideas and resources. It is a place that reinforces and explicitly takes advantage of the other 150+ hours that students are not in class. Many schools have great

service learning and co-curricular programs – all they need is a deliberate linkage to entrepreneurial leadership themes.

EDUCATING ENTREPRENEURIAL LEADERS—THE CULTURE

The third and no less crucial aspect of shaping entrepreneurial leaders is the reinforcement they receive from the campus social life and culture. In a recent commentary, Khurana and Snook (2011) point out those students who attend business schools learn more than just the intellectual content they are exposed to in the classroom. In fact, the social experiences may do more to transform students into the professionals they become than their academic coursework. Khurana and Snook's observation applies not just to business but to all other fields as well. Students not only learn the technical knowledge of their field, but they also develop a sense of identity, an understanding of what it means to be a business person, a doctor, or a lawyer, and how such professional leaders interact with society.

If the campus culture is to develop entrepreneurial leaders, it too must reinforce and allow students to be aware of their self and context, become cognitively ambidextrous, practice enrolling others, and shape opportunities. In many campuses there are activities that develop these skills – often without much intentionality. For example, debate societies encourage logical reasoning and development of argumentation skills. Theater and drama groups develop creation logic. Intentionally diverse campuses help students learn how to work with others from different social and cultural backgrounds. The concept of an honor code used by many schools instills self-awareness by having students think about their core values. Service learning activities promote an understanding of context.

A culture that promotes experimentation and learning by doing can go a long way in developing skills such as enrolling others and shaping opportunities. Consider for example student clubs or other student sponsored activities. These are great opportunities for students learn how to get others to join the club, develop membership rules, and manage their finances. This is a "startup" activity and builds many of the same leadership capabilities as a business startup. In some schools, for example, new technology courses such as web design or smart phone applications development are being taught by students because they are ahead of their instructors. Encouraging this practice is a great exercise in entrepreneurial classroom learning.

To create these intentional social experiences, we believe that all campuses, particularly residential ones, can provide students designed social experiences. Students will use these opportunities not only make friends and network connections, but they also learn about context and differences in a nurturing and stimulating environment. Students use these experiences to deepen their sense of self and explore what values they hold and what values they should hold.

DEVELOPING ENTREPREURIAL LEADERS AT BABSON COLLEGE

In this paper we have presented the argument that to negotiate an increasingly complex and unknowable world, educational institutions should develop students to practice ETA®. In this section we briefly describe how the three C's of curriculum, co-curricular and culture are practiced at Babson College.

The mission of Babson College is to prepare entrepreneurs of all kinds. With that in mind, there are several aspects of our required curriculum that are critical to educating

entrepreneurial leaders and thus important for this paper. Some of the more important ones are described in the following sections.

Entrepreneurship In The Curriculum

This two-decade old award winning class is required of every freshman undergraduate student at the College. It is a two-semester course in which small teams of 10-14, students conceive of and actually run a real business. Venture funds of up to $3,000 are available from the College. During the course of their ideation, planning, and execution, they have class work on idea generation, marketing, and organizational behavior and dynamics. They test their leadership capabilities every day, and receive extensive feedback on their behavior and activities. Creativity and Entrepreneurship Class

Every MBA student has a required course in Entrepreneurship and Creativity, although the course itself is different for every type of MBA program. Full-time MBAs spend time in teams with an artist creating a project that "adds value" to the cohort experience. Fast-track and evening MBAs spend time learning creative thinking during their first weeks on campus. Each method enhances students' abilities to think creatively about opportunity assessment and idea generation. When experienced within the context of the Entrepreneurship class, students learn valuable entrepreneurial leadership skills.

The Management Consulting Field Experience (MCFE) course has small teams of 4-6, students work with an established enterprise on a specific project. In assessing the project and making action recommendations, students test their abilities as leaders to make and implement change.

Co-Curricular

On the co-curricular dimension, one of the most important activities is the Butler Summer Venture program. This program supports and advances student entrepreneurial business from the beginnings of an idea to its launch. By providing support, incubator workspace, peer and faculty mentoring, select student businesses can put their learning about entrepreneurial leadership into practice.

Another important aspect of the co-curricular experience is the E-Tower – a residential hall devoted to students interested solely in new start-ups. Students discuss ideas with each other and arrange their own annual project exhibits. Faculty and fellow students are invited to walk through exhibits, hear pitches and ideas for new businesses and provide feedback. It is a student self-directed activity that builds organizational capabilities and ability to enroll others as mentors and partners.

In addition to these types of co-curricular activities, Babson's student life staff members actively look for opportunities to provide students entrepreneurial developmental experiences. These may range from startup of new clubs to organizing social movements focused on sustainability.

Culture

Finally, the culture at Babson is designed to encourage entrepreneurial behavior, experimentation and learning by doing. All faculty members, regardless of their discipline,

mentor students as they develop their economic or social projects. New ideas are never discouraged or ridiculed. Even when faculty members believe a student's idea is unworthy, they encourage students to take steps to test their idea and find out for themselves whether it is worthwhile. Students learn from experience and by taking small actions rather than planning.

EXPLORTING THE BABSON EDUCATIONAL MODEL

As one of the top ranked educational institutions in entrepreneurship, Babson College receives requests to help other entities design new institutions and/or curricula to emphasize Entrepreneurial Thought and Action (ETA®). Babson College created a wholly owned subsidiary, Babson Global, to engage with organizations from around the globe to further the teaching and practice of ETA®. In the last few years, Babson Global has designed an MS program in entrepreneurship in cooperation with member schools, an MBA program in Abu Dhabi, an MS program for a school in Thailand, and both a graduate and undergraduate program for a school in India. Currently Babson Global is working on an entrepreneurial university blue print for Mexico and Indonesia in which the entrepreneurial thought and action methodology will be used across all programs – not just business.

Figure 1
A Blueprint for Developing Entrepreneurial Leaders
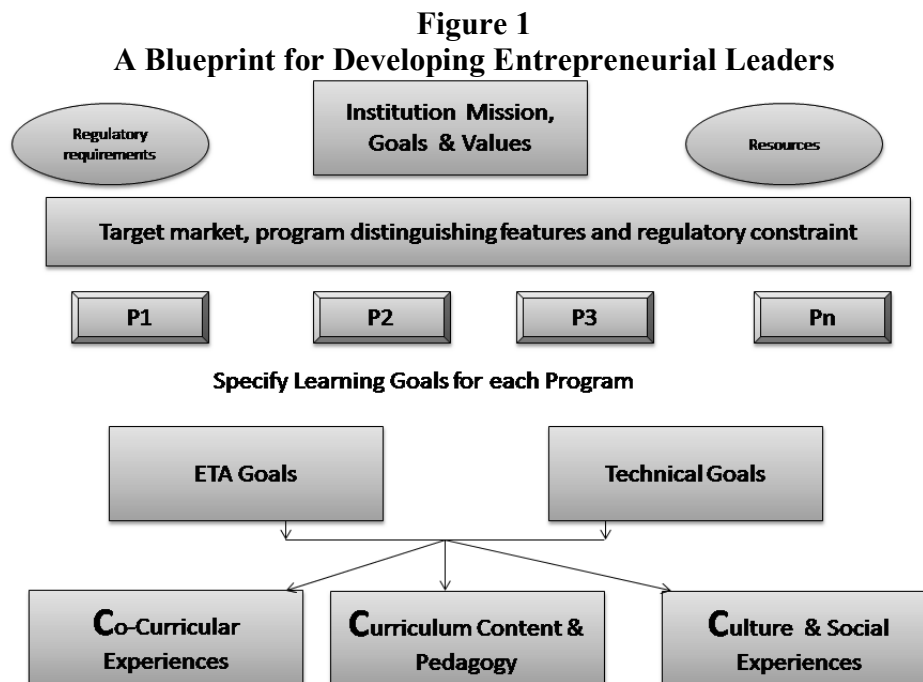
Figure 1 shows the steps that Babson Global design teams use to implement the design principles discussed in this paper. Given the three different dimension, curriculum co-curricular and culture, we try to populate teams with faculty, staff and students so we have a holistic perspective on design.

Design teams begin their work by understanding the institution's vision, mission, long term goals and values. For instance, an institution's vision may be to serve as a valuable resource for its county's industry and society through excellence in technical education. The mission may include developing the local populations' potential so that intellectually capable and

entrepreneurial leaders emerge in a range of professions. The long term goals may be to increase the percent of the indigenous population who complete college, to increase the number of new business ventures started, and to increase the percent of the native population employed in public and private sector professional jobs.

The second step is to understand (or develop) the programs through which those goals will be accomplished. Each program will be tailored to a target market or specific group of students for instance, undergraduates, graduates or managers with at least 10 years' experience. The program goals are designed to differentiate and distinguish it from other competing programs – for example, an MBA with weekend/evening format or an MS in technology entrepreneurship with a three month internship.

The third step is for the design team to understand the target market and regulatory requirements for the program. Together these two variables inform the desired degree length and the constraints on how innovative or different the program can be. For instance, many countries still define credit hours in terms of seat time. This makes the use of on-line instruction or project based work more difficult to count toward a degree. Similarly, constraints on the qualifications of faculty restrict the ability to use practitioners. One of the most important constraints in establishing an eco-system is the location and preferences of the student population. Residential campuses make it easier to create an eco-system; commuter campuses make it harder.

Finally, the design team needs to understand the resources available to the institution such as faculty, staff, technology, physical facilities, and so forth. Resources are an extremely import part of thinking about the sustainability of the curricular and non-curricular activities. Innovation that is constraint free is not sustainable. It is therefore important not to design activities that are not sustainable. For example, if a partner has to rely on Babson faculty to deliver certain courses, or if the program has a student exchange component that is expensive, then these are important design constraints.

Therefore, before embarking on a design effort, we encourage our design teams to explicitly consider, or better still, develop an inventory of resources and constraints to ensure that the resulting design will meet the goals of the target market, is financially viable, can achieve regulatory approval, and is sustainable.

Designing The Curriculum Content

Once the design team has documented the mission and vision and has an understanding of the program's goals, it is ready to design the formal academic curriculum. This means identifying the number and types of courses that are available to the designers. The starting point, typically, is the constraints set by the regulatory framework of the educational licensing body of the country. Most countries, like the US, require all students in a degree program to take certain number of "general education" courses, a required number of technical or discipline focused courses in their area of study, and electives. For example, a typical Bachelor's degree in business in the United States requires roughly 40-50 percent of the courses in general breadth education courses, and the other in business courses with roughly two thirds of the remaining business courses are required and the last third is typically a set of constrained or free electives.

The next step is for the design team to develop learning goals that include both the appropriate amount of technical knowledge required for proficiency in the field and also ETA® learning goals designed to develop the entrepreneurial leadership traits. Table 1 shows a typical map of required courses in a degree program. We design the program in a way that ensures that

each learning goal is taught conceptually, practiced, and assessed for continuous improvement at some point in the curriculum. Only the program's required or core courses are mapped, because these required courses impart knowledge and skills to all students in a specific program while electives only touch a selected few.

Consider two examples from Exhibit 1 which represents an MBA program designed by the Babson team -- Introduction to ETA® (Intro. to ETA) and Data and Decision Modeling (Data & DM). The Introduction to ETA® is a 5 day intensive "kick-off" designed to provide a program overview, to introduce ETA® through a series of hands on discovery exercises, to make students aware of self and context, and to teach and practice team work skills. The week's events culminate in a set of deliverables including a short presentation by newly formed teams on their idea for a sustainable business, their target market, their affordable loss, and how they plan to test their idea's feasibility. As Exhibit 1 shows, this course has learning goals primarily devoted to ETA® and also has coverage of a few specific technical learning goals such as building technical research skills. On the other hand, the Data and Decision Modeling course has learning goals that are primarily technical – e.g. learn to present data visually, compute descriptive statistics, etc. It covers the theory and application of basic quantitative tools used for data analysis, ability to make decisions using descriptive statistics, probabilities, decision analysis, sampling, hypothesis testing and linear regression. In addition to imparting technical knowledge, its learning objectives include practicing or teaching most of the skills required for cognitive ambidexterity and leveraging surprises from results. In this sense the course fulfills the ETA goal of cognitive ambidexterity.

Exhibit 1
Blue Print for Infusing ETA® throughout the Curriculum

GOALS => / SubGoals =>	Cognitive Ambidexterity					Self & Context				Enroll Others				Shape & Pivot			Technical Learning Goals				
	G_{11}	G_{12}	G_{13}	G_{14}	G_{15}	$G_{2\,1}$	$G_{2\,2}$	G_{23}	G_{24}	G_{31}	G_{32}	G_{33}	G_{34}	G_{41}	G_{42}	G_{43}	TG_1	TG_2	TG_3	TG_4	TG_n
Required Courses																					
Intro. to ETA	T,P			T,P		T,A	T,A	T	T	T,P		P/A		T	T	T					
Accounting	T	T									T			T			T		T		T,P
Data & DM	P	T,P														P	T,P	T,P		T,P	
Marketing					T,P			T,P	P	P		P	P	T,P	P	P	P	P		P	P
Finance						P	P		P		T,P						T	P			
Org. Behavior			T				T			T									T	T,P	
Economics		P,A															T,P	T,P		T,P	T,P
																	P,A		P,A		
Leadership	P,A	P,A		P,A		P,A	P,A			P,A		P,A		P/A					P,A		
$Course_i$		P,A		P,A			P,A					P,A		P/A			P,A		P,A		

Legend
T=teach using a conceptual approach to topic
P=practice concepts with hands on applications
A=assess learning using relevant metrics and processes

The matrix is checked to make sure that delivery is properly sequenced and that a knowledge/skill is taught, practiced and assessed. Typically teaching knowledge or skills precedes their application, but not always; sequencing should represent a conscious design choice.

If a learning goal is only practiced but not taught, the knowledge/skill should exist in the incoming students (determined by admission criteria) or content must to be added to core courses. For example, one of the ETA® related learning goals we outlined earlier in the paper (see part IV) under enrolling others was the ability to communicate. Since communications is not being taught within the sample program in Exhibit 1, this means that all students accepted into the MBA program must pass a communication test at a specified competency level. This requirement must be compared to established or proposed admission standards; the comparison may highlight a discrepancy with the definition of the target market. This also suggests that support programs may need to be created that will further develop students who pass admission standards but who still require additional development.

Design Of Co-Curricular Activities And Social Experiences

Throughout the design of a program, design teams focus on creating an entrepreneurial eco-system at the institution that integrates curriculum with supporting co-curricular activities and social experiences. The teams consider opportunities to use co-curricular activities such as orientation of new students, freshmen seminar, study abroad, and service learning projects to reinforce ETA® and technical learning goals. The course design matrix in Exhibit 1 can be used to identify areas in which the course work is inadequate and where co-curricular activities and experiences are better at delivering on these goals.

Exhibit 2
Blue Print for Infusing ETA® through Co-Curricular Activities

GOALS =>	Cognitive Ambidexterity					Self & Context				Enroll Others				Shape & Pivot			Technical Learning Goals				
SubGoals =>	G_{11}	G_{12}	G_{13}	G_{14}	G_{15}	G_{21}	G_{22}	G_{23}	G_{24}	G_{31}	G_{32}	G_{33}	G_{34}	G_{41}	G_{42}	G_{43}	TG_1	TG_2	TG_3	TG_4	TG_n
Required Courses																					
Orientation	T	T									T			T			T		T		T,P
First Year Seminar					T			T,P	P	P		P	P	T,P	P	P	P	P		P	P
Leadership Coaching						P	P		P	T,P							T	P			
Entrepreneurial Leadership Forums			T				T			T									T	T,P	
Study Abroad						T,P				P							P		P		
Volunteer Income Tax Assistance Program			T			P,A												T		T	
Activity$_i$		P		P		P						P		P/A			P,A		P,A		

Legend
T=teach using a conceptual approach to topic
P=practice concepts with hands on applications
A=assess learning using relevant metrics and processes

Exhibit 2 provides a parallel structure to Exhibit 1. When the matrix is complete, the team would have created and identified opportunities to teach and practice those learning goals that are best achieved through co-curricular and social activities. Consider networking, for example. The Organizational Behavior course in Exhibit 1 may be good for teaching concepts such as networking and present its benefits and best practices, but networking is best practiced through co-curricular events like entrepreneurial project presentations or women's leadership mixer. Studying the curriculum, design teams create a series of co-curricular and social events to provide networking opportunities that will be included each year at regularly scheduled times. Further, design teams may request a database that contains information about network connections and suggest a process to make that network information available to students, faculty and staff.

Assume that program designers identify that fear of failure may prevent students in a certain culture from putting forth innovative or out-of-the-box ideas. Designers then brainstorm and surface ideas that involve co-curricular activities and social experiences. For example, a co-curricular activity such as "Entrepreneurial Leadership Forum" or a "First Year Seminar" could be used bringing to campus a few well-known but local leaders in different arenas who would discuss an initiative that he/she pursued that failed, what was learned, and how that event shaped the person or their career. This co-curricular activity would provide networking and public relations opportunity as well as making students aware that successful people have had ideas that failed. Students would have local, entrepreneurial role models who have tested ideas, learned from failure, and pivoted to a new idea.

This type of creative use of co-curricular activities will relieve some of the pressure on the curriculum side as the limited time in classrooms is often not sufficient to create the kind of transformative experience that educations is designed to achieve.

Creating A Culture

Designing a culture is the hardest part of a design team's job. This is because it takes a long time to build and reinforce the culture of an organization. The design of social and cultural life on campus starts by looking at program goals and translating them into a set of core values that a campus needs to ensure the attainment of program goals. In order to build a culture that is supportive of ETA, design teams usually focus on three cultural values: inclusion; inquiry; and integrity.

Inclusion requires placing value on the power of diversity and inclusion. It means creating an environment in which every individual feels valued. Design teams ensure that the host institution's culture focuses on building and encouraging a diverse community on many different dimensions: race, color, religion, nationality, economic status, etc. The team usually does this through policies related to admissions and financial support for under-represented groups. In addition, opportunities such as team projects and social activities are designed to support diversity. For example, many universities have dorms that intentionally mix domestic and international students to encourage assimilation and diversity at the same time. It is clear that in some settings this can be a challenge as the societal norms and culture inhibit people from mixing freely. In these situations, the design challenge is to find acceptable ways to promote inclusion.

Inquiry requires building a culture that empowers students to have free, critical, thoughtful but civil and supportive discourse. The value of supportive dialog is essential if

students are to feel free to explore different ideas and experiment with projects that may not succeed. With tolerance and supportiveness, we can build a safe environment in which entrepreneurial leaders can learn to experiment. One way design teams accomplish this objective is through faculty development programs. The faculty need to understand that supporting free and critical inquiry requires them to model this behavior by encouraging students to think, question, experiment and when necessary learn from failure. If faculty members do not encourage students to question every aspect of what they do – from subject matter discussion, to class policies, to grades – they will not be serving as role models for their students when it comes to freedom of inquiry. Faculty must move away from the "sage on the stage" model of delivering education to "guide on the side". Sadly, this aspect of the culture is often hard to change and is very difficult to deal with in societies that are hierarchically organized and where fear of failure is high.

Integrity is the third key element our design teams build. While lots of campuses emphasize integrity in the form honor codes for cheating on exams or and plagiarism, building an entrepreneurial leadership culture requires a special emphasis on honoring and not disclosing intellectual property that belongs to others. As we said earlier, entrepreneurial behavior requires students to share ideas and enroll others in their ventures. If fellow students are permitted to steal ideas and take them for their own benefit, it is highly unlikely that students will be encouraged to share and enroll. This is why the culture must add respect for intellectual property that belongs to others and emphasize the value of sharing and building on other people's ideas.

Cultural values, like co-curricular activities, can be reinforced through managing the environment. For example, another way to deal with the fear of failure issue identified previously in this paper, can be dealt with by placing pictures of famous innovators and their best known innovations in the classroom and in the halls. A short story would appear under the picture that discussed an original failure followed by learning and success. Slogans such as "Act-Reflect-Learn-Pivot!" might be put on signage in prominent locations to address fear of failure as well.

CONCLUDING COMMENTS

In this paper we have argued that to develop entrepreneurial leaders, educational institutions must create an eco-system in which students do not just learn about entrepreneurial leadership but actually live it. The eco-system requires a curriculum in which technical subject matter goals of a discipline are integrated with learning goals that develop the skills necessary for entrepreneurial leadership. This means that courses that impart technical knowledge also should be designed to cover ETA® competencies. In addition, the eco-system must develop co-curricular and social activities and a culture that creates an environment in which students don't just learn about entrepreneurial leadership -- they live it twenty-four hours a day. A process similar to using learning goals to design curricula can be repeated for co-curricular activities. Building culture is more difficult and requires time; inculcating core values that support entrepreneurial leadership is an important first step in building a supportive culture.

In the previous section of this paper we illustrated how design teams at Babson apply these design principles to create an "eco-system" for our partner institutions. The outcome we hope to accomplish over time is that the graduates that emerge from such an eco-system will deploy an entrepreneurial approach to their professional and personal lives. If graduates master the four key behavioral competencies: cognitive ambidexterity, a deep sense of self and the societal context in which they live, the ability to enroll self-selected stakeholders in any venture

they undertake, and the ability to shape opportunities by acting, reflecting and pivoting, they will affect the way business, medicine, politics, or law are practiced. Institutions that infuse ETA® into their DNA will create graduates that will be well equipped to deal with the challenges of the 21st Century.

REFERENCES

Coleman, J. S. and T. J. Fararo.1992. Rational Choice Theory: Advocacy and Critique. Newbury Park, London, Sage.

Delaney, Anne Marie, "Undergraduate Student Experience Report". 2013. Office of Institutional Research, Boston: Babson College.

Greenberg, D., K. McKone-Sweet, et al. (editors). 2011. The New Entrepreneurial Leader. San Francisco: Berrett-Koehler.

Knight, F. 1921. Risk, Uncertainty, and Profit. Boston, MA, Hart, Schaffner & Marx; Houghton Mifflin Co.

Lange, Julian, Edward Marram, Ajay Solai Jawahar, Wei Yong, and William Bygrave. 2012. "Does entrepreneurship education have a lasting value? A study of careers of 4,000 alumni." Frontiers of Entrepreneurship Research, Wellesley, MA & Syracuse, NY: Babson College and Syracuse University.

Lewin, K. 1946. "Action Research and Minority Problems." Journal of Social Issues 2(4): 34-46.

Rumelt, Richard P., July 1995. "The Many Faces of Honda" UCLA, Anderson School Working Paper, Los Angeles:UCLA.

Sarasvathy, S. and N. Dew. 2008. "Effectuation and Over-Trust: Debating Goel and Karri." Entrepreneurship Theory and Practice 32(4): 727-737.

Simon, H. 1969. The Sciences of the Artificial. Cambridge, MA, MIT Press.

Snook, S., N. Nohria, et al. 2012. Introduction: Teaching Leadership -- Advancing the Field. The Handbook for Teaching Leadership: Knowing, Doing, and Being. S. Snook, N. Nohria and R. Khurana. Thousand Oaks, CA., Sage Publications.

ENABLING ENTREPRENEURIAL MINDS: USING APPRECIATIVE INQUIRY AS A PEDAGOGICAL TOOL FOR UNCOVERING SELF- AWARENESS AND FOR GENERATING CONSTRUCTIVIST LEARNING

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ABSTRACT

Constructivist learning is one of the stepping stones to developing an entrepreneurial mind. In this paper, we explore the use of appreciative inquiry as a pedagogical tool for constructive learning and suggest that an individual's form and identity construction is, at least partially, dependent and connected to the larger social structure. We provide directions on creating constructivist learning platform to enable students' schemata to re-configure and be redefined, enabling them to develop an entrepreneurial mindset. Further, this paper calls for shifts in policies in our schools, classroom environments, assessment tools, and course contents to reflect the social nature of entrepreneurship and innovation and to create the imperative skills and broad competencies such as the ability to solve ill-defined problems, to be creative, and to be adaptable (Hilton, 2008) in our workforce.

Keywords: appreciative inquiry, entrepreneurial mind set, pedagogical shifts, constructivist learning.

INTRODUCTION

The focus on entrepreneurship (small business and corporate) in university curricula is gaining traction. The need for such curricula is compelling since 'labor market requires graduates with enhance skills who can think on their feet and be innovative in a global economic environment' (UK Quality Code for Higher Education, 2012: 2). Increasingly, universities are offering courses that stress entrepreneurial behavior and skills. The underlying assumption in offering such courses seems to lie in their ability to better equip students for entrepreneurship efforts. One of the core skill sets of a potential entrepreneur lies in his/her (entrepreneurial) mindset – entrepreneurship literature identifies skills such as creative problem solving, comfort with ambiguity and uncertainty, resilience, and calculated risk-taking for the success of an entrepreneur (Human, Clark & Baucus, 2005; Morris, Kuratko & Covin, 2008). Therefore, one of the objectives of entrepreneurship courses is to help students discover the skill sets they possess as well as their potential areas for improvement.

In this paper, we examine the process used in a core course for entrepreneurship students at a university in the Midwest United States. One section of this course is designed expressly to help students explore their entrepreneurial ability and mindsets. While self-discovery is important, what's equally important is for students to recognize the assumptions upon which their self-realizations rest. We further explore the source of students' assumptions about the

skills they possess and do not possess. While traditional pedagogy follows a technical-functional approach, what is required for the journey towards self-realization is a conversational, dialogical approach (Neville, 2008). This course, therefore, uses appreciative inquiry as a pedagogical tool as students embark upon their journey towards self-realization.

In this article, we outline the appreciative inquiry approach in general and then explain how this approach is applied in an entrepreneurship class for the undergraduate business students. Along the journey, students realize their selves and uncover the underlying assumptions for their self-realization. In this paper, we discuss how an individual's form and identity construction is, at least partially, dependent upon and connected to the larger social structure. On this basis, we discuss the challenges we face as faculty in managing the subtleties of enabling an entrepreneurial mindset and examine how current classroom practices for educating students for entrepreneurship may not be adequate.

APPRECIATIVE INQUIRY

The principles: Appreciative inquiry (AI) is a positive philosophy and methodology to change organizations whereby members of whole systems convene to inquire for change (Cooperrider & Srivastava, 1987). AI recognizes the power of the whole and builds on conversational learning that emerges out of the whole. It is a social constructionist approach based on the assumption that human systems move in the direction of their members' shared image and idea of the future (Cummings & Worley, 2008). It was developed to shift the traditional mindset about change from one of fixing what is broken (i.e., problem solving) to one of embracing strengths and developing greater capability for the system by building on a shared understanding of and appreciation for the positive attributes of the whole. Change, therefore, is based on intentional examination of what has worked best in the past and what could be grown from that past for the future. In this sense, AI suggests that human organizing and change is a relational process of inquiry that is grounded in affirmation and appreciation (Whitney & Trosten-Bloom, 2003). Advocates of this philosophy have used it to create change in diverse settings. For example, Vuuren & Crrous (2005) have used AI to create a shared meaning of ethics in organizations, and Finegold et al. (2002) have used this methodology to generate a systems change in a midwestern university. Typically, the process involves having participants work through the four phases: Discovery, Dream, Design and Delivery (Conklin, 2009).
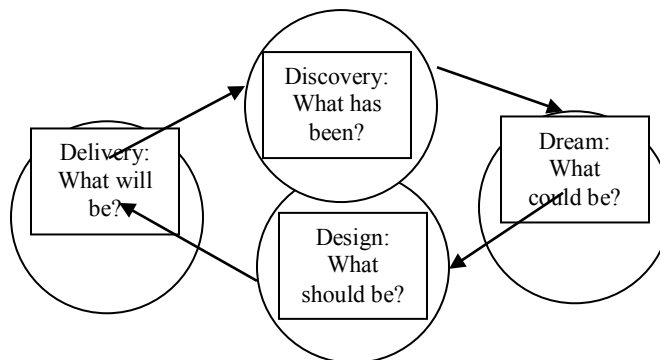
(Adapted from Conklin, 2009)

Discovery (*What has been*?). In this phase, participants inquire into and discover the positive capacity of the group, organization or community. People are encouraged to use stories to describe their strengths, assets, peak experiences and successes to understand the unique conditions that made their moments of excellence possible. This process builds connections and develops a psychological comfort among the participants.

Dream (What could be?). Building on the moments of excellence of the participants, this phase encourages the participants to imagine what would happen if their moments of excellence were to become a norm. Participants dream for the ideal conditions and build hope and possibility of an ideal future.

Design (What should be?). In this phase, design principles are used to help the participants realize their dream. Participants are encouraged to stretch their imagination to move the system from where it currently is to where the participants want it to be.

Delivery (What will be?). At this phase, participants are encouraged to think of the various sub-systems that are needed to 'sustain the design from the dream that it discovered' (Cooperrider et al, 2003, pg. 182). Participants are encouraged to decide what they will commit themselves to do.

We now discuss how this process is used as the foundation for enabling students in a course to become creative and develop entrepreneurial mindsets.

COURSE DESIGN

Creativity is considered to be the soul of entrepreneurship (Morris, Kuratko & Covin, 2008) – it is vital for spotting trends and patterns that define an opportunity. The AI approach is applied in a course called 'Creativity & Innovation' for undergraduate students at a midwestern university. This course is the first core course for entrepreneurship majors or minors. Students majoring in other disciplines such as Management, Human Resources, and Communication Arts also take this course as an elective.

A primary objective in this course is to develop students' courage to create, and to risk making mistakes in the quest for ideas that lead to a true innovation of a product, service or process. The content of this course, therefore, has two components. First, the students in this course learn the process of how they can generate capitalist creativity – i.e. generating ideas that have a potential to reflect profitability and bottom-line practicality. This process includes problem finding, generating multiple creative solutions, assessing opportunities and implementing creative solutions.

Since research has suggested that various factors such as personal characteristics (personality, cognitive style) and contextual characteristics (job complexity, spatial configuration, etc.) have a potential to enhance and/or stifle creativity (Shalley, Zhou & Oldham, 2004), the second component of the course examines the attitudes and behaviors that the students will need to establish themselves as entrepreneurs or intrapreneurs. These attitudes and behaviors include a propensity to take risks, an ability to deal with ambiguity and exercise initiative. For example, individuals with high confidence and high tolerance for ambiguity are able to recognize divergent information and opinions and therefore score higher on a test of their creative potential (Oldham & Cummings, 1996). Upon completion of this course, the expectation is that students should (1) become familiar with the creative process, and (2) should be able to recognize their own innate creative ability and, therefore, entrepreneurial potential. For the purpose of this paper, we focus on the second component of the course, i.e., the mindset of an entrepreneur.

In order for students to determine their own mindsets, they use a diagnostic self assessment tool called the 'Do you have what it takes to be an entrepreneur' test (Human et al., 2005) since diagnostic self-assessment is a well established pedagogical tool for helping individuals examine their own selves and accept the need for change (Human, Kilbourne, Shriberg & Cunningham, 1999). Some of the questions in this tool include questions such as 'Do you have unbridled enthusiasm, for example, for your business idea?; Do you believe you control events in your life?; Do you take risks and enjoy the excitement associated with taking risks?; Can you view uncertainty and ambiguity in a neutral way, not letting it create fear or frustration?; Can you bounce back from setbacks or failures?; Do you like to experiment with new and different approaches to problems?

Students work on this self assessment tool prior to coming into the class. They are asked not only to fill up the dimensions in the tool, but also to reflect upon their experiences to provide substantiation to what they are saying. For example, if the students say that they rate themselves high in their risk taking ability, they are required to provide examples that substantiate their claim. On the day of the discussion, the students are required to bring in the completed self assessment tool.

The steps for classroom discussion and use of the self-assessment are:

1. The instructor sets a common context for the class, explaining to them why we are doing what we are doing.

2. The instructor further sets the context by creating a hospitable space for the students. Some studies in the creativity literature have examined the effect of adequate physical environment (overall density of the setting and noise levels) on individuals' creativity (Oldham, Cummings & Zhou, 1995). In addition to the physical space, psychological space (in terms of team-member relations) may also impact team member engagement and their creative outputs (Amabile et al, 1996). Therefore, the intent is to develop a hospitable space – a hospitable physical space and a hospitable psychological space - in the class. Using flipcharts, minimizing use of PowerPoint slides, and staggering the tables so students face each other rather than just facing the instructor (indicates egalitarian and promotes conversations) are some measures useful in creating a hospitable physical space. In an attempt to build a hospitable psychological space, the instructor also attempts to develop psychological safety (Edmondson, 1999) in the class, so students are comfortable speaking their minds without any fear and hesitation. Psychological safety is defined as a shared belief held by the group that the group is safe for interpersonal risk-taking. A climate of psychological safety is positively related to learning (Edmondson, 1999) and innovation initiatives (Baer & Frease, 2003). Therefore, in order to engage in constructive learning in the course, developing such a hospitable space is important.

3. The instructor encourages the students to respect ground rules that maintain the positive context. This ensures that the process proceeds in an affirming way. Since the answers depend upon the type of questions that we ask, as a starting point, the instructor encourages students to explore their peak/positive characteristics. Included as prompts for this processing are questions such as:
   i. What positive characteristics do you consider yourself to possess?
   ii. Can you provide support/substantiation to (i)?
   iii. Please recall the conditions that made these experiences possible. For example, if a student says that he/she is comfortable with ambiguity, the student is

asked to share examples of why he/she thinks that he/she is comfortable with ambiguity. Further, the student is asked to try to recall what made her/him comfortable dealing with ambiguity.

By the nature of inquiry, some characteristics may not necessarily become a part of the conversation. Therefore, students are also encouraged to explore the other questions that matter to them.

4. The instructor encourages the students to listen to everyone's perspectives, emphasizing that divergent perspectives are equally important as convergent ones and that an open mind and an appreciation of divergence are necessary to have fruitful discussion. The students are encouraged to listen to each other and to notice patterns of similarities and differences.

During class time, the role of instructor evolves from being an instructor to being a facilitator and a co-explorer in the class. This shift in role allows the instructor to assist students in exploring the content of their conversations, identifying where students resonate similar patterns and where students experience paradoxes. Using appreciative inquiry, students engage in an emergent dialogue to self explore themselves. Students use positive imagery to unleash their potential and the potential of others through affirmation.

In class, students work in groups of 4-5 members. An appropriate group size is essential for allowing the design principles to unfold. To establish the groups, at the beginning of the exercise, the instructor asks the students to pick and choose the people they would like to have on their first team. This tactic is deliberately employed to maximize their comfort level within their groups. They choose to be with people with whom the students associate and already have relationships. This process is useful to generate a comfort level and psychological safety for the students. The instructor reminds the students of the basic parameters that they need to keep in mind as they begin their journey.

Once the teams are in place, and the initial discussion of each person's test results has been completed, the class moves to specific application of the AI process.

THE PROCESS

Discovery (What has been?). In this step, students reflect on the past to recollect instances when they believed they showed entrepreneurial ability. They are asked to reflect upon those peak moments of greatness and ask them to map the characteristics they believe they possessed during those instances. In this step, the students' discussions are guided by instructions to do the following:

1. Share instances when you believe you demonstrated entrepreneurial ability.
2. What did you do to make that happen (your characteristics)?
3. What did others do to make that happen (context)?

As students discuss, they start generating a dense web of understanding – an understanding and an appreciation of their strengths, assets, peak experiences and the unique conditions that made their moments of excellence possible. These discussions last about 15 minutes, after which the groups share their findings with the entire class. Representative examples of common themes and characteristics of entrepreneurial mindset have included the following:

1. When I am passionate and enthusiastic;
2. When I possess an internal locus of control: a belief that that he/she controls the events in his/her success and/or failure;
3. When I possess a high need for achievement.
4. When there is no serious reprimand for failing – a non-threatening environment
5. When the situation/context has allowed for viewing uncertainty and ambiguity in a neutral way and for not letting it create fear or frustration
6. When the situation has allowed me to bounce back from failures – e.g., teacher has allowed me to experiment

Dreaming (What could be?). The next step in applying AI is to begin the process of dreaming. In this step, students use the budding notions about what characteristics make an entrepreneurial mindset that they generated in the previous step. As students share their stories, the focus of the process shifts to their dreaming a perfect desirable state for themselves. As they make this journey, the goal is to enable the students to build positive energy around their strengths as also to dream about the direction in which they feel comfortable moving.

In this step, the discussion with the students specifically coalesces around topics such as:
1. What characteristics of an entrepreneurial mindset are desirable?
2. What do they dream of when they think about an entrepreneurial mindset?

After spending about 15 minutes discussing those points, students are shifted to discuss the entrepreneurial skills that they believe are desirable for the success of entrepreneurship, innovation and creativity and the specific expectations for the class. Examples from their dream list include:
1. increased ability to take risks
2. build resilience
3. increased ability to tolerate ambiguity

Designing (What should be?). For this step in applying the AI process, the students reform into small groups and discuss what changes they envision so that characteristics such as risk-taking propensity, tolerance of ambiguity and resilience were to become a norm in the mindset of our students. At this stage, students are encouraged to imagine a perfect world without any constraints. Students suggest that their risk-taking propensity, tolerance towards ambiguity, and resilience are likely going to be promoted if classes are structured such that improvisation, more than perfection, is desired and encouraged.

Students are, in essence, asked what they think would have to happen for this class to help develop an entrepreneurial mindset for themselves?

Typical responses from the students about a perfect world of entrepreneurial training include:
1. There is no fear of failure – no embarrassment
2. Failures may be seen as 'lessons learnt'
3. Encourage the speed with which learning happens and is put into practice
4. There is less structure provided to the questions – questions are ill-defined and carry with them some bit of ambiguity to mirror real world situations.
5. There is no such thing as only one right answer.
6. Improvisation, not perfection – there is no negative attribution of grades for not getting the 'one perfect right answer'.

<u>Delivery (What will be?)</u>. As noted in Conklin (2009) 'this step involves [moving] from the nominal list that reflects the grand desires of the class to something that reflects the will of the class' (pg. 11). In this phase, students are encouraged to discuss how their dream design can be sustained over the semester. In doing so, students inadvertently articulate the various sub-systems (of the complex inter-connected system) that they believe could potentially help realize their dream. The method of education, by far, appears the most important sub-system where students would like to see some changes. Students articulate that all along in their education journey, 'we have been trained to find one right answer', 'we have been told that there is just one right answer – therefore if you get it wrong, you are graded negatively', and 'deviance from the one right answer is discouraged'. It is natural, then, that 'we are unable to initiate' – therefore, 'don't ask us to create questions – if you give us one, we can provide you with right answers'.

At this step, students articulate that developing an entrepreneurial mindset is influenced by various factors at various stages of their life. The one common thread all along has been their 'education journey'. For our students to deliver on a truly entrepreneurial spirit and ability, the task for faculty members seems to be to provide students with a system where their entrepreneurial mindsets can be reared and harnessed. As academics, it requires us to reconsider a social structural shift towards building constructivist thinking, not just in one course but all along our education curriculum.

DISCUSSION

After using self-discovery as a conversational, dialogical approach in multiple semesters with a varied set of students, anecdotal evidence points to the fact that an individual's thoughts, behaviors and actions are, at least partially, dependent upon and connected to the larger social structure. The way individuals think – their schemata - have an effect on their behaviors and actions (Weick, 1995). While individually held, schemata are powerfully influenced and shaped by the surroundings of the individuals, thus reflecting the duality of structuration of Giddens (1979, 1984). Therefore, if our structures continue to emphasize the fear of failure, negative attributions of grade for any deviance from the 'one perfect right answer' approach, then we are likely to see regurgitation and replication of risk-averse schemata and behavior. Over time, such risk-averse schemata is likely to become auto-referential and could become the main obstacle to any change (Leonard-Barton, 1992). If we believe that 'people achieve their knowing through culturally located systems' (Blackler, 1995, p.1021), then we need to identify the changes that are occurring within such systems, and the processes through which new knowledge may be generated.

Academic as well as practitioner discourse suggests that we have shifted from an industrial to a knowledge economy that is based on the creation of knowledge and innovation (Sawyer, 2006). The social nature of an entrepreneurial mindset in today's economy is the need of the day. But question arises whether structured, overly directed education is helping create an entrepreneurial and an innovative mindset in our future generations. As educators, the question for us is to examine how we could identify systems that could help break these vicious cycles and enable our schemata to be re-configured and redefined for the development of an entrepreneurial mindset.

The evidence from the classes discussed here demonstrates the need for us to advance from viewing students as passive receptors of knowledge to considering them as co-creators of knowledge. This paradigm shift would require a shift in the mindset of educators in the way we

build the content for our classes, our method for instruction, and the context we create for our students. While creative collaboration in the classroom aligns with the social nature of innovation in today's economy, we need to address the question whether our schools, our education system, our curricula and method of instruction truly reflect the disciplined improvisation approach (Sawyer, 2006)? Applying the AI process seems to achieve that end.

Specifically, evidence from this class points us to two pedagogical pillars for entrepreneurship education: critical thinking and experiential learning. Considering that analysis, skepticism and judgment are fundamental to an entrepreneurial mindset, entrepreneurship education requires for us to embrace critical thinking much more than, perhaps, any other academic discipline. Therefore, design of entrepreneurship requires for us to build exercises to enhance levels of critical thinking as students progress through their courses in entrepreneurship education, thereby steering students from being passive receptors to active co-creators.

The second pillar relates to infusing experiential learning in entrepreneurship education. As students engage with their own social context in an experiential manner (e.g. guest speakers, field visits, live case studies, consulting assignments, etc.), a process of self-discovery relative to the social structure around them, will shift students from being merely passive receptors.

This paper suggests some important implications for entrepreneurship education, for the design of course content, instructional delivery and the student-context relationship. We now present suggestions based upon experiences from the application of AI in a core entrepreneurship class.

Course content: Deliberate open-ended structure should be built into the course. Initially, students will feel uncomfortable building their own interpretations and will have trouble jump starting and initiating on their journey to constructivist learning. The discomfort is natural – students will need to push their mental models to adjust from the rigid scripted curriculum to one that is evolutionary and constructivist. Naturally, such course content thrives on not referring to the 'one right answer'- students are likely to arrive at different destinations depending upon their willingness to explore, tolerate and consider new and unfamiliar experiences. This has the potential to raise their 'openness to experience' (McCrae, 1987) trait which is a desirable trait for entrepreneurs.

Instructional delivery: Designing the course content as described above has significant implications on instructional delivery. One of the most important implications is that, since the course is likely to evolve differently in different classes, the instructor is likely to feel overworked and stressed managing such unpredictability. Further, the instructor's ability to relinquish control to serve as a facilitator encouraging dialogical inquiry rather than as an instructor conducting a monologue is another significant change in the instructional delivery. As we train future faculty members in PhD programs for academic posts, our pedagogies should, therefore, start to include facilitation and mediation techniques as well as conventional pedagogical techniques.

Designing the student-context relationship: The primary exigency in designing the student-context relationship is to eliminate the fear of students have about knowing or getting the "right answer." Creating psychological safety in the class is instrumental. Demonstrating tolerance of failure is also critical – tolerating failure in terms of trial-and-error in a productive manner is necessary to communicate and "live by" in the class. The implication for the instructor is to (1) clearly communicate expectations, (2) closely monitor students' diligence on the tasks, and (3) focus on the constructive learning from failures by the students. In that sense, the intent

is for the instructors to emulate such practices at companies like 3M, Nokia (where 'failure' is celebrated) and IDEO (where the motto is 'to fail often to succeed sooner').

While our focus in the discussion section has been on the structure of classes in the universities, we would also point out a caveat – such attempts are likely to have the most impact if all our schools, instructors, classroom environment, assessment tools, textbooks and curricula are re-designed to emulate and reflect the social nature of innovation. However, it will still not be enough to stop here. The work environment that our students graduate into needs to enable the perpetuation and encouragement of the entrepreneurial mindset of individuals. In that respect, we are in a complex web of interaction and system. Using a systems theory approach, all these various parts of the broader social system have an influence to generate and maintain a system of continued entrepreneurial activity. Otherwise, the entrepreneurial mindset nurtured in academia will be redeveloped into the "follow orders" mindset we are trying to overcome!

Early evidence points to the fact that the most imperative skills for our workforce are broad competencies that include the ability to solve ill-defined problems, to be creative, to be adaptable and to work in teams (Hilton, 2008). The National Research Foundation promotes the discussions about the demands for future skills. This paper has argued for the social structural shift towards constructivist learning away from rote memorization and towards dialogical inquiry away from passive reception of education in an attempt to build these desirable future skills.

BIBLIOGRAPHY

Amabile, T.M. (1996). *Creativity in context*. Boulder, CO: Westview.

Baer, M. & Frese, M. (2003). Innovation is not enough: Climates for initiatives and psychological safety, process innovations and firm performance. *Journal of Organizational Behavior*, 24 (1), 45 – 68.

Blackler, F. (1995). Knowledge, knowledge work and organizations: An overview and interpretation. *Organization Studies,* 16(6), 1021-1046.

Brown, J. & Isaacs, D. 2005. *The World Café – Shaping our futures through conversations that matter*. Berett-Koehler Publishers Inc. San Francisco, California.

Conklin, T.A. (2009). Creating classrooms of preference: An exercise in Appreciative Inquiry. *Journal of Management Education*, 33, 772-779.

Cooperrider, D.L. & Srivastva, S. (1987). Appreciative Inquiry in Organizational Life. In W. Pasmore and R. Woodman (eds), *Research in Organization Change and Development*, 1, 129-169, Greenwich, CT: JAI Press.

Cooperrider, D.L, Whitney, D. & Stavros, J.M. (2003). *Appreciative inquiry handbook*. Lakeshore, Bedford Heights, OH. pg. 182.

Cummings, T.G. & Worley, C.G. (2008). *Organization Development and Change*. Mason, OH: South-Western Cengage Learning.

Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44(2), 350-383.

Edmondson, Amy C. (2003). Managing the Risk of Learning: Psychological Safety in Work Teams. In M. West *(Ed.), International Handbook of Organizational Teamwork*. London: Blackwell.

Finegold, M.A., Holland, B.M. & Lingham, T. (2002). Appreciative Inquiry and public dialogue: an approach to community change. *Public Organization Review*, 2 (3), 235-252.

Giddens, A. (1979). *Central problems in social theory: action, structure and contradiction in social analysis*. University of California Press, Berkeley, CA.

Giddens, A. (1984). *The constitution of society*. University of California Press, Berkeley, CA.

Hilton, M. (2008). Skills for work in the 21st century: what does research tell us? *Academy of Management Perspectives*, 22.4, 63-78.

Human, S.E. Kilbourne, L. Shriberg, A. & Cunningham, B. (1999). Using web-enhanced instruction in an inter-personal course. *Journal of Management Education*, 23(5) 584- 606.

Human, S.E., Clark, T. & Baucus, M. (2005). Student on-line self-assessment – structuring individual level learning in a new venture creation course. *Journal of Management Education*, 29(1) 111-134.

Leonard-Barton, D. (1992). Core capabilities and core rigidities: a paradox in managing new product development. *Strategic Management Journal*, 13, 111-125.

McCrae, R.R. (1987). Creativity, divergent thinking and openness to experience. *Journal of Personality and Social Psychology*, 52, 1258-1265.

Morris, M.H., Kuratko, D.H. & Covin, J.G. (2008). *Corporate Entrepreneurship & Innovation*. South-western. Ohio.

Neville, M.G. 2008. Using appreciative inquiry and dialogical learning to explore dominant paradigms. *Journal of Management Education*, 32(1), 100-117.

Oldham, G.R., Cummings, A., & Zhou, J. (1995). The spatial configuration of organizations. In G. Ferris (ed.), *Research in personnel and human resources management*, 13, 1-37. Greenwich, CT: JAI Press.

Sawyer, R.K. (2006). Educating for innovation. *Thinking skills and creativity*, 1, 41-48.

Shalley, C. E., Zhou, J. & Oldham, G.R. (2004). The effects of personal and contextual characteristics on creativity: where should we go from here? *Journal of Management,* 30 (6). 933 – 958.

The UK Quality Code for Higher Education (2012). *Enterprise and entrepreneurial education: Guidance for UK higher education providers*, 1-31.

Vuuren, L.J. & Crous, F. (2005). Utilizing Appreciative Inquiry in creating shared meaning of ethics in organizations. *Journal of Business Ethics*, 57, 399-412.

Weick, K.E. (1995). *Sensemaking in organizations*. Sage Publications, Thousand Oaks, CA.

Whitney, D. & Trosten-Bloom, A. (2003). *The power of appreciative inquiry*. Berrett-Koehler, San Francisco.

USING FORMAL INTERNSHIPS TO IMPROVE ENTREPRENEURSHIP EDUCATION PROGRAMS

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ABSTRACT

Student internships have the potential to benefit the student, the school, and the employer. While internships are sometimes offered within business curricula, more often than not they are simply an option and not a requirement. In this paper, we argue that internships should be incorporated into formal entrepreneurship education programs. Requiring internships can enhance student experiences and the chances for entrepreneurial success. We discuss the advantages and present a framework for differing internship programs in various types of universities. The end result can help strengthen entrepreneurship curricula and heighten the potential for successful new venture creation by post-graduates.

Keywords: Confidence, Entrepreneurship, Internship, Opportunity Recognition, Social Networking

INTRODUCTION

It has been suggested that internships should be a requirement for entrepreneurship students (Hiltebeitel, Leauby, & Larkin, 2000; Knemeyer & Murphy, 2001) because they allow students to better understand the connection between their studies and real world experiences, as well as provide benefits to the institution and the employer (Mello, 2006). An internship allows an employer to see the work ethic of the student without having to fully hire them into the company (Coco, 2000; Gault, Redington, & Schlager, 2000; Knemeyer & Murphy, 2001). Further, it can also benefit the institution by allowing them to build relationships with firms in the surrounding community (Divine, Linrud, Miller, & Wilson, 2007).

It may be especially important for entrepreneurship students, where there is a need to try to strengthen students in their alertness to opportunities, and ability to utilize their intuition (Hulbert, Brown & Adams, 1997). In many cases, entrepreneurship classes are taught by adjunct faculty members or instructors who specialize in other disciplines and who have not been fully exposed to entrepreneurship theory (Katz, 2003; Singh, 2008a). This may hinder the quality of entrepreneurship education that the student receives. Requiring internships can help strengthen the classroom discussion and lead to higher levels of new venture creation. In a study done by Weible (2010), almost 35% of entrepreneurship students that had an internship were more inspired to pursue a new venture after graduation, and over 85% of faculty who supervised internships felt that they were more a part of their business community.

While there would appear to be significant benefits to internships – particularly with respect to entrepreneurship students – very few business schools make internships a requirement prior to graduation (Weible, 2010). This is unusual because students understand the value of partaking in an internship (Hergert, 2009). In fact, about 82% of high school students are more

likely to attend a university that offers internship programs as opposed to those that do not offer one (Weible, 2010). Being aware of the need is not enough to make it truly beneficial for all parties involved. A structure needs to be created in order to ensure the optimal benefits are being gained (Hergert, 2009). In this paper, we discuss how internships add value to all parties involved, paying particular attention to students with an entrepreneurial focus, and the connection between internships and entrepreneurship theory. We conclude with a broad framework for effective internship programs within entrepreneurship education programs in differing types of universities.

THE VALUE OF AN INTERNSHIP PROGRAM

The first internship program can be traced back to 1906 at the University of Cincinnati (Gault, *et al.*, 2000; Thiel & Hartley, 1997). It was drawn from teaching practicums in the education field (Gault, *et al.,* 2000). Research has shown that students learn the difficulty in trying to differentiate themselves when they try to find a job after college, and often use internship experience to do just that (Cannon & Arnold, 1998). While some internships are for education credit, they are offered as an option in 90% of all colleges (Cook, Parker, & Pettijohn, 2000; Divine, *et al.*, 2007; Gault, *et al.*, 2000). However, not all students choose to work through an internship. A study by Coco (2000) showed that of the schools offering an internship program, less than 50% of students actually completed one. Faculty members understand the benefits that can be gained from internships (Divine, *et al.,* 2007), but only 6% make it a requirement (Weible, 2010). When it is offered as an elective, it is often up to the student to find the company to work for. This can present a challenge, which may be a reason why students often choose not to do an internship (Divine, *et al.,* 2007).

The Association to Advance Collegiate Schools of Business (AACSB) recognizes internships as one of the ways that business schools can and should connect with the real world (Hergert, 2009). An undergraduate degree is seen more and more as a bare minimum requirement for the vast majority of entry-level positions (Cannon & Arnold, 1998). Employers demand proficiency in teamwork with culturally diverse individuals, expertise in information technology, and outstanding communication abilities (Wood, Farmer, & Smith, 2000). Schools should not assume that students have the capability to understand how to apply theory in practice (Hergert, 2009). While there is still reluctance among some university administrators to fully support internship programs (Gault, *et al.,* 2000), it is one of the best ways to provide synergy in benefits for both the student intern and the employer (Coco, 2000).

There is a cost advantage to both students and employers through experience gained and opportunity to assess the likelihood of fit without the long-term commitment (Divine, *et al.,* 2007). It is not only a trial period for the employer, but also the student, without having to fully become an employee (Coco, 2000). It allows employers to utilize students as resources during busy periods (Divine, *et al.,* 2007). Internships can also be a useful strategic tool to fill human resource needs during weaker economic periods (Gault, *et al.,* 2000). For students who work through an internship, they gain valuable "real world" experience and can reduce the adjustment period that occurs when going from the classroom to the work environment (Joseph, 2003; Taylor, 1988). It also makes students more marketable by providing exposure and allowing them to gain experience with specific job related skills (Garavan & Murphy, 2001). Internships have even been known to increase ambition, lead to more job satisfaction, and more stability (Gault, *et al.,* 2000; Hergert, 2009). Offering optional internships results in the more academically

ambitious students being the main ones that pursue it, when in reality the less ambitious, academically, would probably benefit the most (Devine, *et al.,* 2007). It also aids in securing a post-graduation position in more selective career choices and options (Hergert, 2009). On average 30% of graduates receive job offers prior to graduating, but the percentage rises to 58% if the student has participated in an internship (Coco, 2000). Internships often complement a student's coursework and in-class discussions can benefit as students discuss their internship experiences within a class setting (Coco, 2000; Divine, *et al*., 2007).

Colleges can also benefit by being the recipient of scholarship and grant money, as well as equipment donations from the companies that establish a relationship with the school through internships (Thiel & Hartley, 1997). An internship program can help with job placement of graduates, which also helps the school with ratings (Coco, 2000). It essentially provides a connection with the community that could lead to employers becoming a part of a school's advisory board (Divine, *et al.,* 2007), or reduction in class sizes by allowing students to utilize local resources (Thiel & Hartley, 1997). It can even extend to finding potential guest speakers and funding for research (Divine, *et al.,* 2007; Gault, *et al.,* 2000). This can, in turn, provide good word-of-mouth for the company (Pianko, 1996). The potential benefits of internship programs do not stop there. Table 1 provides a summary of the benefits for students, universities, and employers.

TABLE 1: BENEFITS OF INTERNSHIPS		
To the Student	**To the Institution**	**To the Employer**
1. Potentially earn money while receiving a learning experience (Thiel & Hartley, 1997) 2. Better interpersonal skills (Beard & Morton, 1999 *from Divine, et al., 2007)* (Thiel & Hartley, 1997) (Gault, Redington & Schlager, 2000) 3. Faster job placement and advancement (Coco, 2000; Taylor, 1988) 4. Higher personal as well as social skills (Beinstein, 1976 *from Hall et al. 1995 p. 41*) (Page, Geck & Wiseman, 1999) 5. Greater satisfaction (Taylor, 1988) 6. More assured career path (Hall, Stiles, Kuzma, & Elliot, 1995; Page, Geck & Wiseman, 1999) 7. Improved industry knowledge (Coco, 2000; Divine, *et al.*, 2007) 8. Professional development (Page, Geck, & Wiseman, 1999) 9. More maturity and confidence (Thiel & Hartley, 1997) 10. More job offers "(Coco, 2000; Swift & Kent, 1999; Taylor, 1988)" *from Divine et al., 2007* (Thiel & Hartley, 1997)	1. Enhance the qualifications of professors (Divine, *et al.*, 2007; Thiel & Hartley, 1997) 2. Keeping faculty up-to-date on the community (Divine, *et al.*, 2007) 3. Assists in fundraising potential (Coco, 2000; Gault, Redington, & Schlager, 2000) 4. Can lead to company donations (Thiel & Hartley, 1997) 5. Enriched classroom conversation from student interns (Swift & Kent, 1999) 6. Potentially increase enrollment through the attraction of the required offering (Divine, *et al.*, 2007) 7. Employers utilized as a source of knowledge for classroom discussion (Thiel & Hartley, 1997) 8. Attract nontraditional students (Thiel & Hartley, 1997)	1. reduce turnover (Crumbley & Sumners, 1998; Knemeyer & Murphy, 2001) 2. Ability to evaluate potential employers prior to full-hire (Divine *et al.*, 2007; Gault, Redington, & Schlager, 2000) 3. Showing social responsibility to the community (Thiel & Hartley, 1997) 4. Strengthens relationships with universities (Divine *et al.*, 1996) 5. Highly motivated workers (Coco, 2000; Gault, Redington, & Schlager, 2000) 6. Commitment to the profession (Crumbley & Summers, 1998) 7. "Cross fertilization of ideas" (Thiel & Hartley, 1997, p. 20) 8. Ability to create brand loyalty among those involved (Thiel & Hartley, 1997) 9. Inexpensive resources of student interns (Coco, 2000)

11. leadership skills (Cook, Parker, and Pettijohn, 2000 *from divine 2007)* (Gault, Redington & Schlager, 2000 12. job acquisition skills (Divine, 2007) (Gault, Redington & Schlager, 2000 13. Better equipped and more qualified (Divine *et al.*, 2007; Taylor, 1988) 14. Higher starting salaries (Taylor, 1988)		

Entrepreneurship-Focused Internships

As discussed above, internships offer a wide range of benefits, but these benefits may be of particular importance to students who focus on entrepreneurship. Entrepreneurship entails aspects that are seen as laying the groundwork for economic advancement. These aspects include things "such as an innovative approach to problem solving, high readiness for change, self-confidence and creativity" (Heinonen, 2007, p. 310). With the interest in new venture creation and entrepreneurship growing (Katz, 2003; Singh, 2008a), there is a shift toward more periods of freelance, contractual, self-employment, and project-specific work (Heinonen, 2007). As the importance and relevance of the entrepreneurship field increases, the need for an applicable structure within the field has never been greater (Heinonen, 2007).

We believe that an entrepreneurship-focused internship can be broadly defined. One may work in a family-owned business, a non-profit business, a franchise, an innovative firm, or an imitative firm. However, for all such internships, the university should focus on setting up internship opportunities with small business owners to allow direct contact with the owners of the company. In fact, universities should work with firms who allow student interns to work with the owner or top management rather than the lower level employees. This would provide first-hand experience in the way the company is run on a daily basis, allowing for interns to better comprehend the complex environment (Plumly, Marshall, Eastman, Iyer, Stanley, & Boatwright, 2008).

In order to be successful, entrepreneurship students must grasp, as well as accept, the challenges that will present themselves within an atmosphere that focuses on risk-taking and creativity (Plumly, *et al.,* 2008). This has led some to call for a more non-traditional approach to educating entrepreneurship students (Plaschka & Welsch, 1990; Plumly, *et al.*, 2008); one which allows students to experience entrepreneurship (Plumly, *et al.*, 2008). The environment within entrepreneurship is highly unstructured and unsure. Thus, extensive first-hand experience within the community is more beneficial for students to be able to add value to real endeavors (Plumly, *et al.*, 2008).

These types of internships can also enhance student learning. Many entrepreneurship faculty members have been formally trained in the broad management fields (i.e., organizational behavior, organization theory, HR), marketing, and finance, and did not receive formal training in entrepreneurship theory during their doctoral program (Singh, 2008a). This is likely to change as the number of entrepreneurship courses being offered at the university level continues to increase, and there are increasing numbers of outlets for journal publications (Heinonen, 2007; Katz, 2003; Singh, 2008a); however, the number of academically trained faculty with knowledge

of entrepreneurship theory – while growing – is not keeping up with growth in academic programs (Singh, 2008a). This presents an educational challenge that can be partially addressed through internships. More specifically, students who may not be exposed to faculty well-grounded in entrepreneurship theory, can benefit from the practical education and experience that comes from internships.

Any successful entrepreneurship internship program needs to be "geared toward creativity, multidisciplinary and process-oriented approaches, and theory-based practical applications. It should focus on being more proactive, problem-solving, and flexible in its approach rather than . . . . [a] functional approach" (Plaschka & Welsch, 1990, p. 61). A more interactive and experiential method will allow students to better comprehend the various situations and issues faced by entrepreneurs (Plaschka & Welsch, 1990; Plumly, *et al.*, 2008). It can provide a connection for the student between theory and practice, and strengthen the quality of class discussion (Divine, *et al*., 2007; Fender & Watson, 2005). This can help bring outside experience into the classroom. The professor could then function as a facilitator at times by making connections with textbook material and/or their knowledge of the academic literature. Internships can also allow students to assess whether or not an entrepreneurial venture is something they actually want to pursue after graduation (Divine, *et al.,* 2007; Fender & Watson 2005; Gault, *et al.,* 2000; Taylor, 1988). As a result, the student may learn more about the entrepreneurial process prior to going through new venture creation on their own.

An internship allows students to set up contacts prior to graduation within a certain industry, and have better knowledge of the market (Divine, *et al*., 2007; Gault, *et al.*, 2000). Even if a student does not decide to pursue a new venture after graduation, he or she will still have the ability to think entrepreneurially (Ulrich, 2009). Entrepreneurially minded, or "champions" as they are termed in corporate entrepreneurship, are those individuals that facilitate connections, embrace ideas, and encourage individuals during the entrepreneurial process (Dess & Lumpkin, 2005; Lumpkin & Dess, 1996; Ulrich, 2009). With the more decentralized, rapidly innovative and ever changing society of today, there is also a need for firms to develop corporate entrepreneurship within their own companies, and entrepreneurial graduates are often pursued because of their cross-functional capabilities (Singh, 2008a). An entrepreneurship-focused internship can also help with interview skills, social networking, and the creative thinking process as a whole (Gault, *et al.*, 2000). In no other program are these skills more essential than in the field of entrepreneurship (Ulrich, 2009).

LINKING INTERNSHIPS AND ENTREPRENEURSHIP THEORY

We described the elements and some of the potential benefits of entrepreneurship-focused internships in the previous section; we expand on the discussion by linking such internships to entrepreneurship theory concepts. While there are many potential benefits, we focus our attention on four additional areas that could be significantly impacted by entrepreneurship internships – new venture creation by minority and women, opportunity recognition, social networks, and entrepreneurial confidence. These are not the only benefits that could be derived from entrepreneurially-focused internships, but we use them to illustrate the broader implications and how it may be possible to increase new venture creation and improve the potential success rate of future entrepreneurs who have experienced an entrepreneurship-focused internship.

Minority And Female Entrepreneurship

Every year in the United States there are over 500,000 new ventures started (Reynolds, 2000). However, Singh (2008b) points out that over 50% of all new ventures fail within the first five years of operation. Approximately 12% of whites are self-employed compared to just 4% of blacks, and the depressed rate of entrepreneurship within the black community has been fairly constant for decades (Bates, 1995; Fairlie, 1999; Fairlie & Meyer, 2000). Improving the rate of entrepreneurship within the African American community is particularly important when one considers that over the last 50 years, the African American unemployment rate has consistently remained about double that of white Americans (Badgett, 1994; Hoynes, 2000; Spriggs & Williams, 2000). Last year, U.S. Census Bureau (2012) statistics showed that, again, among all self-employed people, 86% were white and just 5% were black. It also showed that just 35% of self-employed people were women. With women and the African American community showing a lack of established self-employed businesses consistent with the percentages they makeup within the American population, a closer look into why these difference are so significant is needed.

The lower self-employment rate of black people and women can be explained, in part, by the fact that there are so few entrepreneurs who can serve as role models or mentors (Singh, Crump & Zu, 2009). There is a vicious cycle in which there are so few models of black and female entrepreneurs who can mentor younger individuals like themselves that it limits the number of future black and female entrepreneurs. By its nature, entrepreneurship is an unstructured activity that requires a wide range of skills and abilities. One needs everything from passion to knowledge of markets to industry experience to financial resources to be successful as a business owner. Entrepreneurial role models and mentors can help serve as informal sources of information that be tapped to overcome the challenges and difficulties faced by entrepreneurs. For black and female individuals who may not have access to entrepreneurs like themselves within their social networks, an entrepreneurship-related internship may be the answer. Although not necessarily critical, they may even be able to find a demographically similar entrepreneur who can provide them with guidance that may shepherd them through the pre-founding stage of their business.

Opportunity Recognition

Opportunity recognition has been identified as a key component of entrepreneurship (Baron, 2006; Lehner & Kaniskas, 2012; Shane & Venkataraman, 2000). The process of venture creation focuses on taking potential ideas, and having the ability to enhance them into a profit-seeking potential business opportunity (Singh & Hills, 2003). Entrepreneurs are constantly scanning for changes in the environment, and look for ways to exploit these changes (Gaglio & Katz, 2001). They have often gained the information necessary to identify these opportunities from prior experience and comprehend the potential future value (Shane & Venkataraman, 2000). From this perspective, entrepreneurial opportunities are discovered, not because entrepreneurs have special characteristics, but because prior knowledge allows certain people to discover them over others (Shane, 2000). This would suggest that experience within an industry is critical to successful opportunity recognition.

With industry experience, one can gain information and specialized knowledge about the industry that can lead to more successful entrepreneurship. Obviously an entrepreneurship-related internship can provide useful information to would-be entrepreneurs, it is an individual's

knowledge base and available information that allows for the possibility to make a risky or more conservative decision, not their individual traits (Shaver & Scott, 1991). Bhave (1994) pointed out that this whole process of recognizing an opportunity does not occur in a linear way. Opportunity recognition is a relational and collectively formed process (Fletcher, 2006). People create meaning and establish value through their understanding of reality through social construction (Fletcher, 2006; Gaglio & Katz, 2001). In fact, one of the most important resources that a company can have is the personal social network of the founding entrepreneur (Singh, Hills, Lumpkin, & Hybels, 1999).

Social Networks

We touched on the importance of mentors who may be a part of an entrepreneur's social network earlier, but social networks provide much more than just mentors. A social network is comprised of people or firms that are connected through a social relationship that can provide information and knowledge (Sequeira, Mueller, & McGee, 2007). We all have limits to what we can know. No economic actor has perfect information with which to make rational choices and decisions; individuals are limited in their ability to process and store information which results from bounded rationality (Simon, 1976). Nonetheless, one's social network can help expand the boundaries of rationality by allowing access to knowledge from which to assess and determine a course of action. Through one's network ties, a solid business idea/opportunity can be identified, screened and assessed, and then, if appropriate, acted upon (Singh, et al., 1999). The more people within someone's social network the more opportunities that can be recognized (Singh, et al., 1999). Additionally, a person's social network allows for a recognized opportunity to be evaluated and potentially refined during the formulation process (Hills, Lumpkin, & Singh, 1997).

The ability to recognize an opportunity is the ability to identify a profit-oriented possibility that involves either starting a new venture or dramatically changing an existing one, which can occur at any time (Singh, et al., 1999). A previous study done by Singh and Hills (2003) suggested that contacts within a nascent entrepreneurs' social network were used as a source of ideas in almost 70% of all instances. Another study done by Robinson and Stubberud (2009) suggested that a man's social network mostly includes professional acquaintances, while a woman's social network encompasses friends and family. Thus, a woman's social network is generally more informal and less likely to provide specific or beneficial information in a particular field (Robinson & Stubberud, 2009). The quality of the social network, therefore, has an effect on the types of opportunities that are feasible. This suggests that if a person has more work-related people within a person's social network they are more likely to recognize entrepreneurial opportunities.

Not only do potential entrepreneurs need to recognize an opportunity, they also need to have the resources necessary in order to carry it out. Hulbert et al. (1997) point out the three necessary resources as financial, human, and operating. While the creative combination of these three resources is the responsibility of the potential entrepreneur, the resources must exist in order to do so. Social networks within a professional environment allow for more potential access to these three types of resources, and most certainly, working in an entrepreneurial internship should help students connect and interact with professional contacts who may be able to help them in the future as they try to found their ventures.

Entrepreneurial Confidence

Hayward, Shepherd, & Griffin (2006) indicated that while the potential for failure is very high, potential entrepreneurs are still pursuing new opportunities because they feel that it will not happen to them. Based on "hubris theory," individuals often exhibit overconfidence and still pursue their ventures even though the odds are against them (Hayward, *et al,* 2006). There is a positive relationship between industry experience and success (Singh, 2008b). Those entrepreneurs without industry experience are more likely to have overconfidence, and essentially underestimate the amount of resources needed and risk taken on (Hayward, *et al.,* 2006; Singh, 2008b). Internships can provide a more realistic understanding of the work environment through hands-on industry experience (Svinicki & McKeachie, 2011). While it is important to have a certain amount of confidence, having too much can be problematic, and overconfidence increases the likelihood of failure (Hayward, *et al.,* 2006; Singh, 2008b). Since confidence is socially constructed, it will have an impact on the way potential entrepreneurs construe information (Hayward, *et al.,* 2006). That is, information that is consistent with what a confident entrepreneur believes is given great weight, but information that may not be consistent with what he/she believes is devalued and discounted. An entrepreneurship-related internship creates the environment for more potential opportunities to be recognized, but also can help to moderate confidence. Students that work through an entrepreneurship-related internship should have more realistic expectations of what is involved, making them less likely to suffer from overconfidence.

Figure 1 provides a model based on the effect of social networks on opportunity recognition and confidence level as described above.

FIGURE 1: EFFECT OF INTERNSHIPS
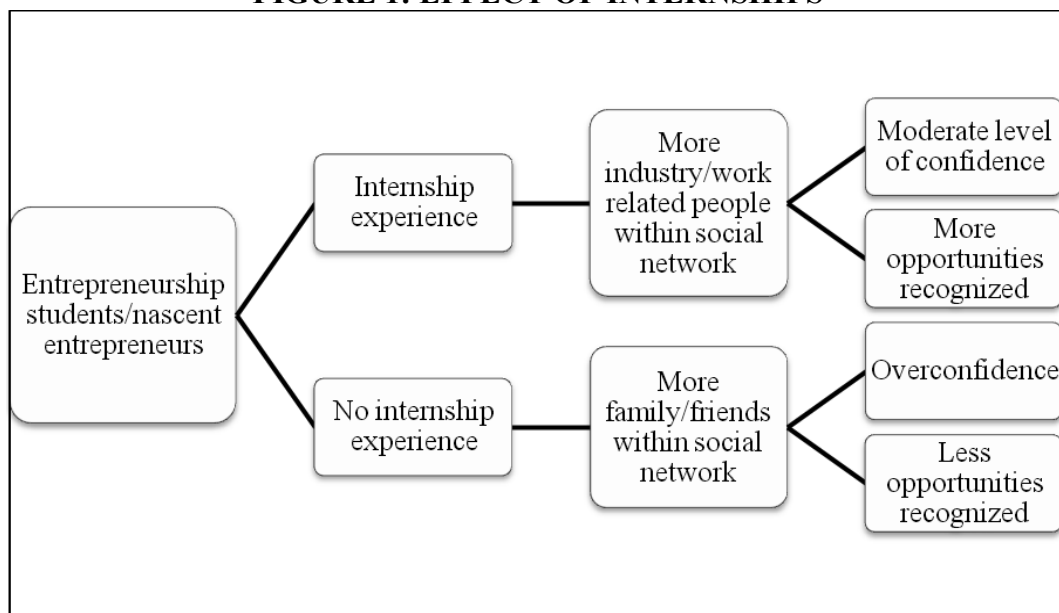
Network-centered learning is an important aspect of education (Taylor & Thorpe, 2004), especially within the field of entrepreneurship. The ultimate success is only allowable when all parties involved understand its value and are committed to the process (Crumbley & Sumners, 1998). The research will continue to grow as the awareness of internship benefits increases

(Gault, *et al.,* 2000). In the next section, we propose a framework for structuring entrepreneurship internships based on characteristics and the type of university.

STRUCTURING INTERNSHIPS TO MATCH UNIVERSITY TYPE

There is agreement among faculty, students and recent graduates that an internship is the most effective recruiting strategy for a school (Scott, 1992). As discussed earlier, internships can enhance an institution's reputation (Weible, 2010), but there are challenges (Scott, 1992). Thiel and Hartely (1997) point out five barriers to successful internship programs based on responses from students, universities, and employers. These barriers include the issue of it being optional for students, interns and faculty often do not take internships seriously, employers do not see themselves as an important mentor role, and the inconsistency in expectations for all involved (Theil & Hartely, 1997). Additionally, some schools see internships as simply another part-time job, thus giving students an easy 'A' towards course work (Gault, *et al.*, 2000). It is thought that these "programs lack sufficient quality control across departments varying widely in terms of education, supervision, organization, and cost" (Gault, *et al.*, 2000, p. 52). Moreover, some interns do not take the opportunity seriously, businesses view them as inexpensive labor, and school supervisors sacrifice time that does not seem to provide benefit to them (Hall, Stiles, Kuzman, & Elliot, 1995). While some universities invest time and effort in finding and preparing students for an internship, if the company is not prepared, it can ruin the experience for the student (Coco, 2000). The problem lies in inconsistent expectations between interns, universities, and firms due to unclear standards (Hall, *et al.*, 1995). Some professors feel that internships require a lot of effort without much benefit to them (Hall, *et al.*, 1995). All of these issues point to the need to have formalized programs with clear objectives that institutionalize best practices.

Everyone involved must be willing to take responsibility and be accountable for the success of the process in order for internships to provide the potential benefit (Fender & Watson, 2005). Having a required internship program means more than just requiring students to participate; universities must create a standard for all students to participate in which allows for a valuable learning experience. The unfavorable elements of internships described above can be avoided with programs that are meticulously designed through clear objectives, standard evaluation methods, and adequate content (Gault, *et al.*, 2000).

The ideal faculty coordinator would define the goals and course of action, and maintain close contact through quality engagement throughout the process (Hall, *et al.*, 1995). Appropriate construction of the program allows employers to have a positive opinion of the university (Gault, *et al.*, 2000). The employer can rely on the faculty members involved for a guarantee of the structure of the program, reducing their need to spend excessive time on trying to create an appropriate format. Required internships would then provide an understanding of the importance to employers with an emphasis on implementing the appropriate structure, as well as having the ability to deliver students that need the internship (Divine *et al.*, 2007). It is in the best interest of the school to ensure as much of a uniform process as possible for all students (Divine, *et al.*, 2007). Having a standardized program for all students will reduce the dissatisfaction for all parties involved after the internship is over (Gault, *et al.*, 2000).

As previously mentioned, an entrepreneurship-related internship would have unique features that would differentiate it from a standard internship. It would focus on establishing the program with small business owners. This would allow the intern to really see what management does day to day in order to run the business. During the establishment of the agreement between

the school and university, it would additionally be emphasized that the intern would be assisting the owner or upper management. Even if the company is not very successful, the intern could still gain valuable knowledge of the difficulty in owning your own business. Having this focus is not enough to gain the most benefit. The university also needs to emphasize the importance of the program.

Universities should implement formal internship programs. However, this does not mean that one structure should be used by all schools. It should be tailored to fit each individual school. Divine *et al*. (2007) provides a model for allowing schools to assess how their current structure fits within the better fit/worse fit framework. Generally, it shows that schools with a research orientation, budget constraints, high percentage of part-time students, weak assessment culture, longer distance from employers, and focus on promoting the brightest students (we label these schools at "Type 1" schools) are not ideally suited for internship programs (Divine *et al*., 2007). On the other hand, schools that are equally or more focused on teaching rather than research, enjoy a strong budget, have a high percentage of full-time students, have a strong assessment culture, are in close proximity to employers, and are student-centered with a focus on assisting all students (Type 2 schools) would be a good fit for making internships a requirement.

However, we believe that internships can provide value for not only the 'good-fit', but also the 'worse fit' type of school, as identified by Divine *et al.* (2007). Internships can be required in both types of schools, but structured in a way that will heighten the benefits for each type of school. A structure based on whether the school meets certain criteria should first be determined, and then an applicable program can be put into place.

The structure of an entrepreneurship-related internship program should be based on the school's fit with either Type 1 or Type 2, rather than a good fit/worse fit analysis. The criteria for a Type 1 school would be identified as the same criteria that Divine *et al.* (2007) identified in their discussion of 'worse fit,' and the criteria for a Type 2 school is based on the criteria that they address as 'good fit' for an internship program. Additionally, the internship program structure should be viewed as a continuum, where a Type 1 school would be on one extreme of the continuum as a less formal/short-term type of program, while a school fitting all the criteria for a Type 2 school would be on the other extreme as a more formal/long-term type of program. As Table 2 shows, we believe there are certain criteria that fit better with the certain internship type.

TABLE 2: INTERNSHIP TYPES FOR UNIVERSITY PROGRAMS		
Criteria	**Type 1 University**	**Type 2 University**
Orientation	Research orientation	Teaching orientation
Budget	Weak budget	Strong budget
Part-time vs. Full-time	High percentage of part-time students	High percentage of full-time students
Culture	Weak assessment culture	Strong assessment culture
Proximity	Distance from employers	Closeness to employer
Focus	Showcasing the brightest students	Benefits for all students
Internship Type	**Less Formal/Short Term ←——→ More Formal/Long Term**	
Part of this table is derived from Divine, et al., 2007.		

A structure more applicable for less formal/short-term internship type would be similar to the 'Quality Model,' which was originated from the Longwood College School of Business and

Economics (Wood, *et al.,* 2000). Within this program each student was required to complete at least a week of work experience within their specific concentration. This allowed every student to have some exposure in their field prior to graduation. Longwood College administrators felt that this part of the requirement was important because employers actually want to have recent graduates that are well rounded in their interests, exposure, and open-mindedness (Wood, *et al.,* 2000). While this would only be a week, it would require some preparation for the program in the beginning. There must be a uniform focus on ensuring clear objectives, standard evaluation forms, and specific content (Gault, *et al.,* 2000). The professor must also work closely with the organizations, and provide structure details to employers (Gault, *et al.,* 2000; Hall, *et al.,* 1995). The key is to get employers to systematize internship activities and evaluate students throughout the process, which benefits both companies and the students them in the end (Crumbley & Sumner, 1998). For students in Type 1 schools, entrepreneurship-related internships should be short-term internships (as short as one week), but still require evaluation forms, clear objectives, and standardized work assignments.

At the other end of the continuum of schools would be Type 2 schools, where a more formal, comprehensive, and long-term internship program would be a better option. Thiel and Hartley (1997) identified a more extensive process that entailed recruitment, preparation of the students, locating potential employers, strategically placing students with the appropriate internship, introductory meetings for each specific location, assignments and assessment, and overall program outcomes. Obviously, greater resources are needed and having a more student-centered teaching mission is more consistent with this level of program planning. When this type of program was implemented at Robert Morris College (a Type 2 college), Thiel and Hartley (1997) found it to be successful. In the end, more formal/long term internship programs take all the requirements of the less formal/short term programs, but extend the duration of the internships. Viewing the types of schools as more of a continuum and trying to determine where one fits on the continuum is a key to structuring the right type of internship program. Not every school will fit within the criteria of a Type 1 or Type 2 school, and because of that, flexibility in the program structure is needed. In this paper we are deliberately broad in our discussion because requiring an internship is a major step that requires a lot of planning and there is a wide range of universities. Given the relatively novel discussion, we feel it is better for universities to self-determine where they fit on the continuum between Type 1 and Type 2 universities and develop their own plans for internship programs.

Again, we want to point out that entrepreneurship-related internships should not be the same as common internships. The distinguishing difference between a standard internship in the business program and one specific to students with a focus in entrepreneurship should be the students' access and ability to work with the actual entrepreneur. The opportunities to benefit from this interaction are more likely to take place in smaller companies where entrepreneurs often have to deal with a wide range of issues. In addition, Plumly, *et al.,* (2008) indicated that only 25% of new jobs came from large businesses, while entrepreneurial small business owners were responsible for the other 75% of net new jobs created. This is consistent with the finding that entrepreneurs sustain 50% of the growth in the U.S. economy (Headd & Kirchoff, 2009). Allowing students to learn from these important job creators who are vital to U.S. economic fortunes can be invaluable.

A required internship program, regardless of where the school fits on the continuum, would allow universities to be more responsive to societal demands, as emphasized by the AACSB (see Hills & LaForge, 1992). A college degree no longer ensures a position post-

graduation (King, 1997). Even if students are hired after graduation, there is an increasing salary gap between recent graduates with internship experience and those without (Gault, *et al.,* 2000). Employers are expecting more and more from graduates, and experience through internships is still one of the most important resume builders that graduates can offer their potential employers (Gault, *et al.*, 2000). If students see the importance of the program through the emphasis that the faculty and employers make, they will take a much more active role, allowing this form of learning to be more effective (Ulrich, 2009).

CONCLUSION

While internships are often available for students in business schools, we believe that there is a need to make it a requirement for entrepreneurship students. As we have discussed in this paper, there are many benefits to students, universities, firms, and society in general. Simply providing internships as a voluntary activity limits the educational and economic value that can be created through well-structured entrepreneurship-related internship programs. More specifically, entrepreneurship student learning can be enhanced with direct access to entrepreneurs who are dealing with day-to-day decisions for their firm, universities can build links to their local communities, firms can gain valuable human resources and possibly creative solutions from energetic students, and for society in general, the result may be better prepared entrepreneurs who help move the economy forward.

Entrepreneurship is an inherently practical pursuit and just as doctors must complete residency programs, so to can students gain insights and knowledge from experiencing entrepreneurship through the type of internship that we have discussed throughout this paper. We drew from the entrepreneurship literature and theory to show how internships can improve the chances for success of new entrepreneurs, But as we also pointed out, there should be flexibility in the type of internship program based on the type of university and its student body. Certainly one size does not fit all when it comes to the right type of entrepreneurship-related internship. Whether a university has a research or a teaching mission, whether it is in a college town or an urban area, whether it has significant financial resources or not all play a part in the type of internship program it can and should offer. That said, we believe that all entrepreneurship programs should require some form of entrepreneurship-related internship to its students.

We hope our discussion will lead faculty and business school administrators to consider offering entrepreneurship-related internships within their curricula. If and when this happens there will be greater opportunities for research and assessment of programs and outcomes in order to find best practices. This can further refine the broad model we present and improve the types of internships that can be offered.

REFERENCES

Badgett, M. V. (1994). Rising black unemployment: Changes in job stability or in employability? Review of Black Political Economy, 22(3): 55-75.

Baron, R.A. (2006). Opportunity recognition as pattern recognition: How entrepreneurs 'connect the dots' to identify new business opportunities. Academy of Management Perspectives. 20(1): 104-119.

Bates, T. (1995). Small businesses appear to benefit from state and local government's economic development assistance, Urban Affairs Review, 31, 206-221.

Bhave, M.P. (1994). A process model of entrepreneurial venture creation. Journal of Business Venturing. 9: 223-242.

Cannon, J.A., & Arnold, M.J. (1998). Student expectations of collegiate internship programs in business: A 10-year update. Journal of Education for Business. 73(4): 202-205.

Coco, M. (2000). Internships: A try before you buy arrangement. S.A.M. Advanced Management Journal. 65(2): 41-43, 47.

Cook, S.J., Parker, R.S., & Pettijohn, C.E. (2004). The perceptions of interns: A longitudinal case study. Journal of Education for Business. 79(3): 179-185.

Crumbley, D.L., & Sumners, G.E. (1998). How businesses profit from internships. Internal Auditor. 55(5): 54-59.

Dess, G. G. & Lumpkin, G.T. (2005). The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship. Academy of Management Executive. 19(1): 147-156.

Divine, R.L., Linrud, J.K., Miller, R.H., & Wilson, J.H. (2007). Required internship programs in marketing: Benefits, challenges, and determinants of fit. Marketing Education Review. 17(2): 45-52.

Fairlie, R. W. (1999). The absence of the African-American owned business: An analysis of the dynamics of self-employment, Journal of Labor Economics, 17, 80 – 109.

Fairlie, R. W., & Meyer, B. D. (2000). Trends in self-employment among white and black men during the twentieth century. Journal of Human Resources, 35(4), 643-669.

Fender, D.L., & Watson, L.E. (2005). OSH internships: One program's perspective on benefits for students, employers and universities. Professional Safety. 50(4): 36-40.

Fletcher, D.E. (2006). Entrepreneurial processes and the social construction of opportunity. Entrepreneurship Theory and Practice. 16(3): 91-100.

Gaglio, C.A., & Katz, J.A. (2001). The psychological basis of opportunity identification: Entrepreneurial alertness. Small Business Economics. 16: 95-111.

Garavan, T.N., & Murphy, C. (2001). The co-operative education process and organizational socialization: A qualitative study of student perceptions of its effectiveness. Education & Training. 43(6): 281-302.

Gault, J., Redington, J., & Schlager, T. (2000). Undergraduate business internships and career success: Are they related? Journal of Marketing Education. 22(1): 45-53. – Did a study focusing on post-grad results.

Hall, M., Stiles, G., Kuzman, J, & Elliott, K. (1995). A comparison of student and employer expectations with regard to business internships. Marketing Education Review. 5(3): 41-49.

Hayward, M. L. A., Shepherd, D. A., & Griffin, D. (2006). A hubris theory of entrepreneurship. Management Science, 52: 160-172.

Headd, B., & Kirchhoff, B. (2009). The growth, decline and survival of small businesses: An exploratory study of life cycles. Journal of Small Business Management. 47(4): 531-550.

Heinonen, J. (2007). An entrepreneurial-directed approach to teaching corporate entrepreneurship at university level. Education & Training. 49(4): 310-324.

Hergert, M. (2009). Student perceptions of the value of internships in business education. American Journal of Business Education. 2(8): 9-13.

Hills, G. E. & LaForge, R. W. (1992). Research at the marketing interface to advance entrepreneurship theory. Entrepreneurship Theory and Practice. 16(3): 33-59.

Hills, G. E., Lumpkin, G. T., and Singh, R. (1997). Opportunity recognition: Perceptions and behaviors of entrepreneurs. Frontiers of Entrepreneurship Research, 17: 168-182.

Hiltebeitel, K.M., Leauby, B.A., and Larkin, J.M. (2000). Job satisfaction among entry-level accountants. The CPA Journal. 70(5): 76-78.

Hoynes, H. (2000). The employment and earnings of less skilled workers over the business cycle. In R. Blank and D. Card (Eds.), Finding jobs: Work and welfare reform: 23-71. New York: Russell Sage Foundation.

Hulbert, B., Brown, R.B., & Adams, S. (1997). Towards an understanding of 'opportunity'. Marketing Education Review. 7(3): 67-73.

Joseph, L. (2003). Making internships work. Canadian HR Reporter. 16(20): 7-8.

Katz, J.A. (2003). The chronology and intellectual trajectory of American entrepreneurship education 1876-1999. Journal of Business Venturing. 18: 283-300.

King, J. (1997). Companies use interns as hiring pools. Computerworld. 31(7): 63.

Knemeyer, A.M. & Murphy, P.R. (2001). Logistics internships: Employer perspectives. Transportation Journal. 24(1): 16-26.

Lehner, O.M., & Kaniskas, J. (2012). Opportunity recognition in social entrepreneurship: A thematic meta-analysis. Journal of Entrepreneurship. 21(1): 25-58.

Lumpkin, G.T. & Dess, G.G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. Academy of Management Review. 21(1): 135-172.

Mello, J.A. (2006). Enhancing the international business curriculum through partnership with the United States department of commerce: The "E" award internship program. Journal of Management Education. 30(5): 690-699.

Page, N., Geck, S., & Wiseman, R.L. (1999). College/university coordinators' perceptions of quality indicators for co-op/internship sites. Journal of Cooperative Education. 34(1): 43-53.

Pianko, D. (1996). Power internships. Management Review. 85(12): 31-33.

Plaschka, G.R., & Welsch, H.P. (1990). Emerging structures in entrepreneurship education: Curricular designs and strategies. Entrepreneurship Theory & Practice. 14(3): 55-71.

Plumly, L.W., Marshall, L.L., Eastman, J., Iyer, R., Stanley, K.L., & Boatwright, J. (2008). Developing entrepreneurial competencies: A student business. Journal of Entrepreneurship Education. 11: 17-28.

Reynolds, P.D. (2000). National panel study of U.S. business startups: Background and methodology. Databases for the Study of Entrepreneurship. 4: 153-227.

Robinson, S., & Stubberud, H.A. (2009). Sources of advice in entrepreneurship: Gender differences in business owners' social networks. International Journal of Entrepreneurship. (13): 83-101.

Scott, M.E. (1992). Internships add value to college recruitment. Personnel Journal. 71(4): 59-62.

Sequeira, J., Mueller, S. L., & McGee, J. E. (2007). The influence of social ties and self-efficacy in forming entrepreneurial intentions and motivating nascent behavior. Journal of Developmental Entrepreneurship, 12(3), 275-293.

Shane, S. (2000). Prior knowledge and the discovery of entrepreneurial opportunities. Organization Science. 11: 448-469.

Shane, S. & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. Academy of Management Review. 25: 217-226.

Shaver, K.G., & Scott, L.R. (1991). Person, process, choice: The psychology of new venture creation. Entrepreneurship Theory and Practice. 16(2): 23-245.

Simon, H. A. (1976). Administrative behavior, 3rd edition. New York: Free Press.

Singh, R. P. (2008a). The shortage of academically trained entrepreneurship faculty: Implications, challenges, and opportunities. Journal of Entrepreneurship Education. 11: 117-131.

Singh, R.P. (2008b). Exploring why so many entrepreneurs fail: Is entrepreneurial overconfidence a mental defect? 2008 Academy of Management Meeting. Anaheim, CA, August.

Singh, R. P., Crump, M. E. S., and Zu, X. (2009). Family matters: Examining how self-employed blacks and whites differ in having self-employed parents. Entrepreneurship and its Economic Significance, Behavior and Effects. New York, NY: Nova Science Publishers.

Singh, R. P., & Hills, G. E. (2003). Recognizing opportunities vs. deciding to become an entrepreneur: A test of Bhave's model. Research at the Marketing/Entrepreneurship Interface. University of Illinois at Chicago.

Singh, R. P., Hills, G. E., Lumpkin, G. T., & Hybels, R. C. (1999). The entrepreneurial opportunity recognition process: Examining the role of self-perceived alertness and social networks. Academy of Management Meeting Best Paper Proceedings. Chicago, Illinois, August: G1-G6.

Spriggs, W., and Williams, R. (2000). What do we need to explain about African American unemployment. In R. Cherry and W. R. Rogers, III (Eds.), Prosperity for all? The economic boom and African Americans: 188-207. New York: Russell Sage Foundation.

Svinicki, M., & McKeachie, W.J. (2011). McKeachie's Teaching Tips: Strategies, Research, and Theory for College and University Teachers. CA: Wadsworth, Cengage Learning, 13th Edition.

Swift, C.O., & Kent, r. (1999). Business school internships: Legal concerns. Journal of Education for Business. 75(1): 23-26.

Taylor, D.W., & Thorpe, R. (2004). Entrepreneurial learning: A process of co-participation. Journal of Small Business and Enterprise Development. 11(2): 203-211.

Taylor, M.S. (1988). Effects of college internships on individual participants. Journal of Applied Psychology. 73(3): 393-401.

Thiel, G.R. & Hartley, N.T. (1997). Cooperative Education: A natural synergy between business and academia. S.A.M. Advanced Management Journal. 62(3): 19-24.

Ulrich, T.A. (2009). Entrepreneurially-minded undergraduate business students' educational preferences. Journal of Entrepreneurship Education. 12: 93-109.

U. S. Census Bureau. (2012). Class of worker by sex and selected characteristics: 2012 [Statistical Abstract of the United States: 2012 (131st Edition)]. Retrieved from http://www.census.gov/compendia/statab/2012/tables/12s0605.pdf

Weible, R. (2010). Are universities reaping the available benefits internship programs offer? Journal of Education for Business. 85: 59-63.

Wood, C.N., Farmer, B.M., & Smith, E.D. (2000). Defining the arts of quality: A quality model at longwood college. S.A.M. Advanced Management Journal. 65(2): 44-47.

RESEARCHING PECULIARITY OF ENTREPRENEURS: FROM POSITIVISM TO SOCIAL CONSTRUCTIVISM

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ABSTRACT

This paper attempts to uncover the social reality of entrepreneurship from South Asian context. Socio-culturally-bound actors, social actions and outputs in entrepreneurial activity requires context-sensitivity, expressed through cognizance of institutional characteristics, the interface between cultural values and business, and historical and cultural forces which impact on entrepreneurship. Successful theories of entrepreneurship in the South Asia need to be formed in context sensitivity shaped by local culture and values. This paper, therefore, outlines the development of a research framework and a research process used to better understand links between society, community and entrepreneurial activity in the South Asia. This process brought new insights of the interplay between social realities and the field of entrepreneurial activity.

INTRODUCTION

Entrepreneurial actions are involved with complex human interactions and embraced a range of artifacts and objective realities. As a result, some entrepreneurship researchers observe artifacts and objective realties in the physical world and view them as reality. Others take an open-system or environmental approach emphasising the impact of external environmental factors (socio-economic, political, educational, legal) on entrepreneurial practices and effectiveness. Both approaches result in socio-cultural realities being viewed as secondary influences on entrepreneurial behaviour. Failure to recognise socio-cultural realities is often attributed to reductionist approaches to knowledge and understanding of entrepreneurship. This paper discloses that socio-cultural values are of particular relevance to understanding entrepreneurship as a social phenomenon. The selection of an appropriate subjective ontology is required to understand the context fully. A qualitative research methodology and inductive holistic case study approach including grounded theory analysis are selected to explore peoples' experiences and behaviour. This process brings new insights of the interplay between social realities and the field of entrepreneurial activity.

TRANSFERABILITY OF KNOWLEDGE OF ENTREPRENEURSHIP IN ONE SOCIETY TO ANOTHER

The dominant ideology of entrepreneurship development in the South Asian and developing countries is mostly based on western viewpoints, with the tacit assumption that western ideology is universal. Normative western entrepreneurship and management theories are based on the rationality of logical positivism, but in practice, they have produced unexpected consequences of socio-cultural conflicts in South Asian context (Jayawardena, 2000; Wickramasinghe et al. 2001; Gamage et al., 2004, Chen 2008). Nanayakkara (1999) asserts that training institutions have failed to attract the participation of managers in key positions in

organizations into training courses. From this perspective, management and work activities in an enterprise depend critically on socio-cultural values and indigenous management practices.

The validity and transferability of knowledge is questioned based on the utility and impact of such knowledge and cultural diversity. How many transferred ideologies actually take root and bear fruit in the South Asian developing setting is not precisely known. However, concerned researchers, trainers, and entrepreneurs have noted the failure of such "transplants" to lead to ongoing insights (Kao et al. 1999; Wickramasinghe and Hopper 2000, Gamage 2004). The functionalist, rational and positivist framework of the western paradigm does not enable an understanding from a socio-cultural perspective Gamage et al., (2004),) and also difficult to evaluate and understand cultural factors through the lenses of other cultures (Wickramasinghe and Hopper 2000). Different national cultural characteristics mean that the possibility of adopting mainstream entrepreneurial ideas, concepts and theories usefully between nations is highly unlikely because the culture of every day life is complex and not easily ignored. This limited returns to the application of western models of entrepreneurship reinforced the need for a new research approach to entrepreneurship which is described in this paper.

ENTREPRENEURSHIP AS A SOCIAL PHENOMENON IN THEORY GENERATION

Entrepreneurship as a human activity is a social phenomenon and socio-cultural values are of particular relevance to understanding entrepreneurship (Moriano 2012). Entrepreneurial behaviour should identify the social processes because social actions (by entrepreneurs) are meaningful human behaviours (Weber cited in Runciman 1978) which cannot be separated from their social and cultural context (Armitage and Conner 2001, Gamage 2004, Douglas 2004). Thus, the entrepreneurial world is a channel through a well-integrated society and culture in which the value system becomes the crucial determinant of an individual's actions (Hofstede et. Al. 2004), including economic actions. In this sense, studies of entrepreneurial activity must recognize the importance of human volition. Human inferences are shaped by culture (Cafagna 1960; Hutchins 1980; Hofstede 2001), the underlying contextual beliefs and value systems on which actions are based.

Culture is manifested throughout a society and it is through culture that entrepreneurship operates. Thus culture can be cited as an explanatory variable in entrepreneurial behaviour (Morrison 1998, Begley and Tan 2001). Culture' seems to carry a wide meaning covering many aspects of a society (Nanayakkara 1999a). For Cafagna (1960) culture refers to any socially inherited element in the life of humans, both material and spiritual. The social values, norms, perceptions and expectations generated by the culture are interwoven into the business styles and functioning of the South Asian entrepreneurs. This evidence for the research that aimed at examining the entrepreneurship phenomena on the same western theoretical tracks and methodology (objective rationalism and hypothetico deduction) appear to be incapable of explaining the deep-rooted socio-cultural, ethno-religion, and political contextual setting, which triggers the problem of blind faith in western models by policy makers and practitioners in the South Asian context.

The usefulness and endurance of a theory is determined by the way the theory is generated. Established social theories, including Weber's theory of bureaucracy and the Marxist

theory of power, which were inductively developed from social research, suggest that it is not possible to completely separate those theories from the society. Therefore, research into entrepreneurial behaviour in developing countries should consider cultural issues (Gamage 2004, Douglas, 2004) and identify the social processes. Naturalism must choose the subjective view as in the empirical world, man is subjective, not objective, except when he is likened to one by himself or by another subject (Matza 1969), and consequently it must combine the methods with the distinctive tools of humanism - experience, intuition and empathy. Thus, the paradigmatic disposition chosen to consider entrepreneurial activity should encompass the social world (subjective elements) of the entrepreneur's actions as well as the physical (objective) elements, as illustrated in Figure 1. The 'physical world' includes resources, systems of management and environmental factors (state policies, legal and technological systems) which are objectively defined as 'artefacts'. 'The social world' includes social, cultural and political ideologies which are meaningfully and subjectively interpreted.

A POSSIBLE BOTTOM-UP RESEARCH APPROACH TO ENTREPRENEURIAL REALITY

If people matter in entrepreneurship, then the cultural context of people must have an impact on the practice of entrepreneurship in different societies. Therefore, a socio-cultural analysis of entrepreneurial activity is ethical and unlike the more traditional models and theories that focus on economic reality or personality traits of the individual entrepreneur (Gamage 2004, Covin and Slevin 1991), it requires holism which has the potential to lead to a satisfying alternative paradigm for entrepreneurial reality.

Figure 1: The entrepreneurial realism: social world and objectivity reality

Arrows indicate influence and direction of one component on the other. For example, Arrow 1 shows that subjective world influencing social, cultural and political ideologies in the entrepreneurial world, Arrow 2 shows the influence of the social world on the physical world and Arrow 3 represents objective elements (artefacts) as products of entrepreneurial social actions in the physical world.

The World Is Subjective

A study of the socio-cultural realities affecting entrepreneurial performance includes social actors embedded within the social system. Social actors, both the entrepreneur or other groups of people involved with him/her. Human beliefs, values and attitudes are neither measurable nor precise; it is more useful to think of them as meaningful in the world. Their meanings are multiple, changing, and contextual - universality and generalization are secondary to the world of meaning. Human interactions involved in entrepreneurship are characterized by diverse minds, psyches, emotions, thoughts, feelings, senses, attitudes, beliefs, views, self, individuals, ideas, motivations, consciousness, experience, education, skills, training and behavioural patterns. This implies that the meanings which underpin entrepreneurial actions could be explored through the form of multiple mental constructions, socially and experientially from the actor's point of view.

Subjective Realism

Reality is socially constructed and anthropocentric. Social actions involve frequent discontinuities and change in the real life context; thus there are multiple realities (Denzin & Lincoln 2003). Social actions are a representation of each individual's socio-cultural constructions, and their perceptions: the research task is to seek to understand the subjective realism rather than to impose objective rationalism (Mason 1996). It is important that the researcher not have preconceived beliefs in exploring social realties. Wickramasinghe and Hopper (2000) identify the risk that "cultural dimensions are predetermined by researchers independently from observations in cultural settings, enabling researchers to 'nicely pack' their 'facts' into the typology 'box'"(p1). Interpreting and understanding the meanings of social reality through close interaction with the knower and the known (Denzin and Lincoln 2003) requires active interaction between the researcher and the individual or community who is experiencing the phenomenon.

Inductive Holism

It is necessary to understand the actor's feelings, attitudes, meanings, values and beliefs through the actor's own interpretation of their real life experiences. The inductive and holistic study of human experience requires qualitative methodology to explore the inward and outward interactions of entrepreneurial experience. The researcher must live in the context, seeking to understand the actor's feelings, attitudes, meanings, values and beliefs through the actor's own interpretation of their real life experiences.

Holistic case studies appropriate to the phenomenon (Glaser and Strauss 1967; Mintzberg 1989, Mintzberg, Raisinghani et al. 1976; Burgelman 1983; Patton 1990; Yin 1994; Merriam 2002) hold the key to discovering theoretical understanding from empirical data in relation to entrepreneurship in the South Asian context. The exploratory case study approach explores the question, 'why has it (phenomenon being researched) occurred'?, (Eisenhardt 1989) through bottom-up translations of actions consistent with the beliefs and values of the actors involved as illustrated in Figure 2.

The inductive case strategy is as relevant because the behaviours of entrepreneurs and their performance could not be controlled (Glaser & Strauss 1967; Yin 1994). Using detailed stories of small rich informative case studies enable the researcher to gain a relatively complete picture (Eisenhardt 1989a) of the range of entrepreneurial experiences.

Figure 2: A possible bottom-up approach to entrepreneurial reality
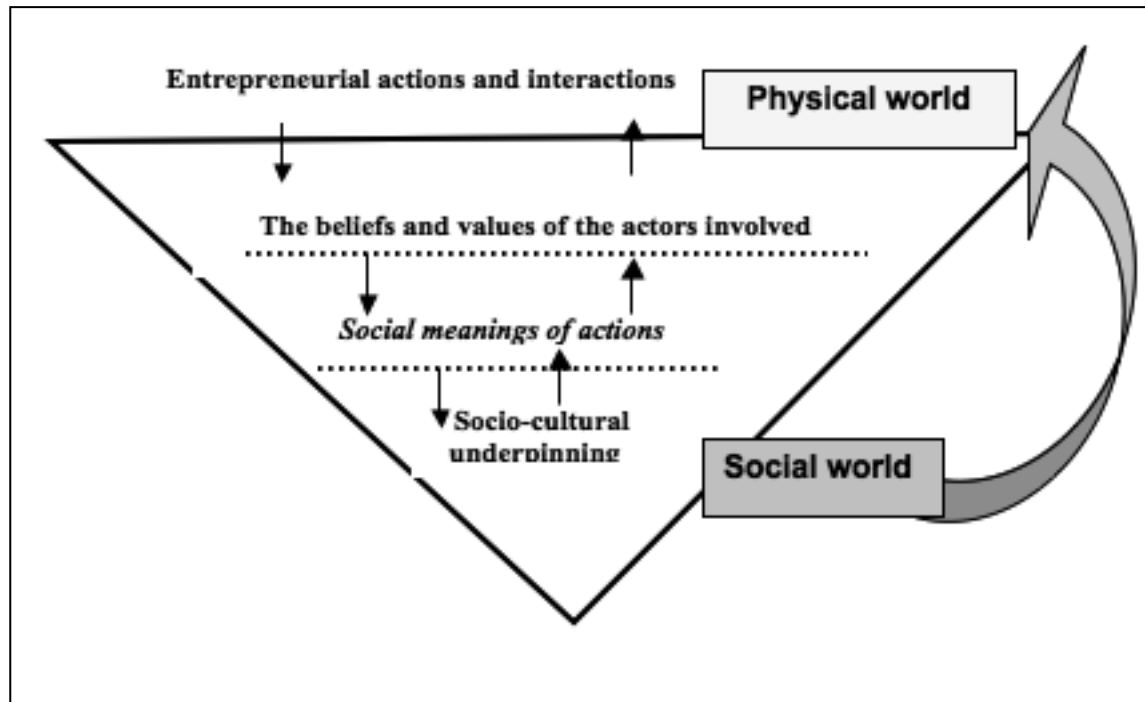
GENERAL FORM OF RESEARCH QUESTIONS

Within an ontological framework of subjective realism of entrepreneurship will be an inductive exploratory study (cf. Patton 1990; Yin 1994; Merriam 2002), which does not conform to any existing hypotheses (cf. Kuhn 1998). The necessary research questions must be general (Glaser and Strauss 1967, Glaser 1998) and based on 'why' questions (Baron 2004). Although the emphasis of questions can be changed or modified throughout the field study (see Bulmer 1978), these questions simply guide the study towards exploring persuasive stories (Hopper et al. 1995) through an integrative process to understand the interface between exogenous factors, the unique elements of the existing local culture, and entrepreneurial performance. The aim is a substantive theoretical understanding emerging from the data (Strauss and Corbin 1998; Merriam 2002; Patton 2002) to bring new insights to the field of entrepreneurial activity.

SEARCHING FOR CROSS-CASE PATTERNS

Within-case analysis and searching for cross-case patterns are significant in the building of theoretical understanding, as it facilitates observing the patterns of behaviour of different cases and identifying the similarities and dissimilarities in the building of relationships through a constant iterative process (Glasser 1998). Figure 3 illustrates the process. The inductive data

generation strategies (such as open interviews, observations, participation and analysing artefacts) provide opportunities to explore emerging themes, based on grounded theory techniques with triangulation of data sources. The role of the researcher is to act as an empathizing participant who does not influence the behaviours of entrepreneurs, thereby affecting their performance. Because the experiences of another

Figure 3: The process of identifying social meanings attached to themes
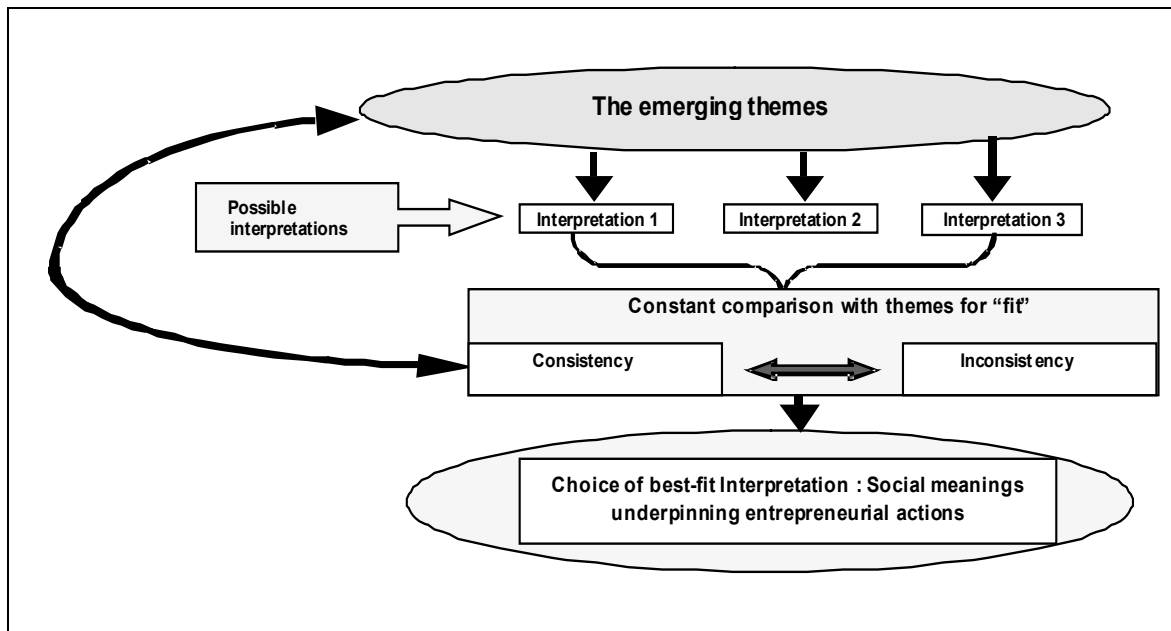
person cannot be fully understood (Patton 2002) and their interpretation is time consuming, the researcher must make decisions in relation to the research strategy and the unit of analysis. Should the researcher study a narrow range of experiences for a larger number of entrepreneurs or a broader range of experiences for a smaller number of entrepreneurs? For generating theoretical understanding, the number of cases is not so crucial; even a single information rich case can indicate a general conceptual category (Glaser and Strauss 1967; Eisenhardt 1989). However, theory generation by comparative analysis requires a multitude of carefully selected cases (Glaser and Strauss 1967) in which practicable and ethical selections are considered (Mason 1996). Theoretical saturation in practice often combines with pragmatic considerations such as time and money to dictate when case collection ends (Eisenhardt 1989; Strauss and Corbin 1998).

ACTIVE INVOLVEMENT OF THREE PHASE ANALYSIS

The process is an iterative and interpretive methodology (Walsham 1995). Ongoing theoretical comparisons and reflection through exploration of an initial focus problem were employed as a tool to stimulate researcher's thinking about emerging themes and sub-themes neutrally rather than naming or classifying themes without a thorough examination of the

elements in the data. As a result, theoretical understanding slowly emerge from evidence through an incremental approach.

Themes emerging from the empirical data require further iterative processes to explore the foundation value sets (social meanings) underpinning particular actions. The foundation value sets discovered are interpretations of socio-cultural realities in the context, based on understanding how entrepreneurial behaviours fit in the society and culture. The literature about the historical origins of religions and politics also contribute to understanding the deep-rooted reality of behavioural patterns and actions within society. Figure 4 outlines the deep rooted social cultural process that leads to insights into entrepreneurial performance in a cultural sensitive approach.

Figure 4: Steps towards uncovering deep-rooted social reality
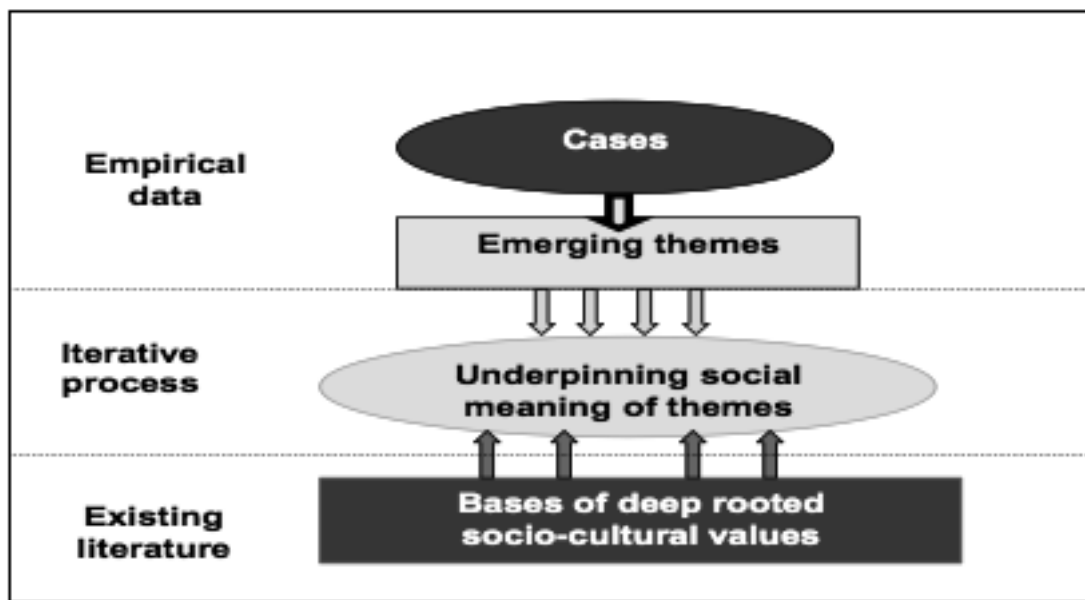
ENSURING RELIABILITY AND VALIDITY

Data triangulation is pertinent to this type of study about human activities (Yin 1994; Merriam 2002). Figure 5 illustrates how method triangulation could be used to generate data in this study. Data collection processes should include interviewing not only the entrepreneur, but also his/her family members involved in the business, as well as employees, in addition to attending meetings, looking at secondary documents, and some participant observation. Investigator triangulation may be employed to get different viewpoints of a critical situation, to see deviations between proposed and actual actions, and to avoid the researcher's biases. The three round field study (Bulmer 2000; Merriam 2002) is more appropriate The first round establish social contacts and built awareness of background information in the field; the second round involved in-depth investigation and the final round is used to ensure reliability and validity through replicating and checking on comparative evidence either internally (within a study), externally (outside a study), or both. In this approach, human aspect and the concept of culture are elusive and all-embrace a holistic understanding.

Figure 5: Possible means of triangulation
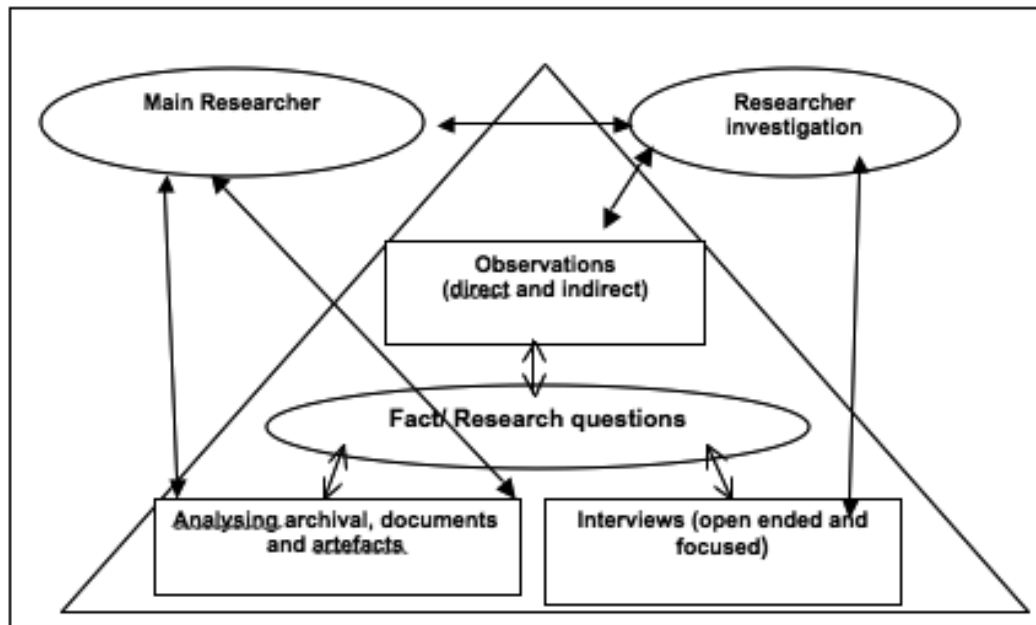
CONCLUSION

Understanding of socially and culturally bound social actors, social actions and social outputs in entrepreneurial activity must be subjective. This includes: a) institutional characteristics, b) the interface between cultural values and business, and c) historical and cultural forces which impact on entrepreneurship. Our conclusion is that this has to be explored through bottom-up translations of actions consistent with the beliefs and values of the actors involved. This lead to the need for a qualitative methodology to ground the reality of human behaviour embedded in deep-rooted cultural and social contexts. Thorough interpretation of holistic case studies that are capable of capturing the actors' viewpoints brings appropriate insights to the field of entrepreneurship. The research process successfully conceptualise the association between cultural characteristics and entrepreneurship and in turn help to overcome the deficiencies of normative well-known western approach.

REFERENCES

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. British Journal of Social Psychology, 40(4), 471-499.

Baron, R. A. (2004). The cognitive perspective: A valuable tool for answering entrepreneurship's basic ''why'' questions. Journal of Business Venturing, 19(2), 221-239.

Begley, T. M., & Tan, W.-L. (2001). The socio-cultural environment for entrepreneurship: A comparison between East Asian and Anglo-Saxon countries. Journal of International Business Studies, 32(3), 537-553.

Bulmer, M. (1978). *Social policy research*. London: Macmillan.

Bulmer, M. (2000). *Sociological research methods: An introduction* (3rd ed.). London: Macmillan.

Burgelman, R. A. (1983). Corporate entrepreneurship and strategic management: Insights from a process study. *Management Science*, 29(12): 1349-1363.

Cafagna, A. C. (1960). A formal analysis of definitions of culture. In R. L. Carneiro (Ed.), *Essays in the Science of Culture.*. New York: Thomas Y Crowell, 111-132.

Chen, F.F. *(*2008*)*. What happens if we compare chopsticks with forks? The impact of making inappropriate comparisons in cross-cultural research. *Journal of Personality and Social Psychology,* 95*(5),* 1005–1018.

Covin, J. G., and Slevin, D. P. (1991). A conceptual model of entrepreneurship as firm behaviour. *Entrepreneurship Theory and Practice*, 18(1): 7-25.

Denzin, N. K., & Lincoln, Y. S. (2003). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), Strategies of qualitative inquiry (2nd ed.) Thousand Oaks, CA: Sage.

Douglas, D. (2004). Entrepreneurship Research and Grounded Theory – Some Methodological Reflections, 3rd European Conference on Research Methods in Business and Management, Reading University, UK.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4): 532-550.

Gamage, H.R. (2004). Understanding the Social Realities of Entrepreneurial Performance in Sri Lanka: An Alternative Paradigm, The University of Queensland, Australia.

Glaser, B. (1998). Doing Grounded Theory. California: Sociology Press.

Glaser, B. G., and Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research.* Chicago: Aldine.

Hofstede, G. (2001). Culture's consequences: Comparing values, behaviors, institutions, and organizations across nations. Thousand Oaks, CA: Sage.

Hofstede, G., N.G. Noorderhaven, A.R.M. Wennekers, L. Uhlaner, A.R. Thurik and R.E. Wildeman (2004), "Culture's role in entrepreneurship: self-employment out of dissatisfaction," in J. Ulijn and T. Brown (eds) *Innovation, Entrepreneurship and Culture: The Interaction between Technology, Progress and Economic Growth*, Cheltenham, UK and Brookfield, US: Edward Elgar, 162-203.

Hopper, T., Annisette, M., Uddin, S. and Wickramasinghe, D.P. (1995). Some challenges and alternatives to positive accounting research. In Jones *et al.*, (Eds.) *Accounting Theory: A Contemporary Review*, Harcourt Brace.

Hutchins, E. (1980). *Culture and inference.* Cambridge: Harvard University Press.

Jayawardena, K. (2000). *No bodies to somebodies: The rise of the colonial bourgeoisie in Sri Lanka*. Colombo- Sri Lanka: Social Scientists' Association.

Kao, H. S. R., Sinha, D., and Bernhard, W. (Ed.). (1999). *Management and cultural values*. London: Sage Publications.

Kuhn, T. (1998). Objectivity, value judgment, and theory choice. In D. Roth-bart (Ed.), Science, reason, and reality. Fort Worth: Harcourt Brace.

Moriano, J.A., Gorgievski, M., Laguna M., Stephan, U. and Zarafshani, K. (2012). A Cross-Cultural Approach to Understanding Entrepreneurial Intention, *Journal of Career Development,* 39 (2): 162-185.

Morrison, A. J. (1998). *Entrepreneurship and culture specificity*. Paper presented at the Internationalizing Entrepreneurship Education and Training, 8th annual conference, European Business School, Germany.

Mason, J. (1996). *Qualitative researching.* London: Sage Publications.

Matza, D. (1969). *Becoming deviant.* Prentice-Hall: Englewood Cliffs N.J.

Merriam, S. B. (2002). *Qualitative research in practice: examples for discussion and analysis.* San Francisco: Josey Brass.

Mintzberg, H 1989, Mintzberg on management: inside our strange world of organizations, Free Press, New York.

Mintzberg, H., Raisinghani, D., and Theoret, A. (1976). The structure of 'unstructured' decision processes. *Administrative Science Quarterly*, 21: 246-275.

Nanayakkara, G. (1984). Cultural imperatives of policy science. *Vidyodaya*, Silver Jubilee Issue: 85-103.

Nanayakkara, G. (1999a). *Culture and management in Sri Lanka*. Colombo- Sri Lanka: Postgraduate Institute of Management, University of Sri Jayawardenapura.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). London: Sage Publications.

Runciman, W. G. (Ed.). (1978). *Max Weber: Selections in translation*. London: Cambridge University Press.

Strauss, A., & Corbin, J. (1998 (2nd Edition)). Basics of Qualitative Research - Techniques and Procedures for Developing Grounded Theory. California: Sage.

Walsham, G. (1995). Interpretive case studies in IS research: nature and method. *European Journal of Information Systems*, 4 (2): 74-81.

Wickramasinghe, D., and Hopper, T. (2000). *Cultural political economy of management accounting controls: A case study of chronological episodes of budgeting in a mill.* Paper presented at the Interdisciplinary Perspectives in Accounting Conference, London.

Wickramasinghe, D., Hopper, T., and Rathnasiri, C. (2001). *Reconstruction of Japanese management wisdom: A case study of management controls in a privatized public utility.* Paper presented at the Annual Research Sessions 2000/2001 of Faculty of Management Studies and Commerce, University of Sri Jayawardenapura, Sri Lanka.

Yin, R. K. (1994). *Case study research: Design and methods* (2nd ed.). London: Sage Publications.

TECHNOLOGY AND DISTANCE EDUCATION ENTREPRENEURSHIP PROGRAMS: AN EIGHT-POINT FRAMEWORK FOR BEST PRACTICE

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ABSTRACT

Distance education entrepreneurship programs have unique requirements for numerous technology resources to fulfill several overlapping purposes. These purposes especially include the establishment and maintenance of a public persona on the part of the program, its faculty, students' entrepreneurial pursuits, and other constituencies. Consideration is given to an "ideal" platform for technology that would support a robust and effective distance education entrepreneurship curriculum, leading to the suggestion of an eight-point framework for evaluation. After presenting and justifying this framework, it is used to analyze extant learning management systems in an effort to assess the current state-of-the-art of such resources. The result indicates considerable shortfall in current offerings. Suggestions are provided throughout for addressing these gaps and enhancing the learning experience, interpersonal networking opportunities, longevity of assets and marketability of programs.

INTRODUCTION

"The chief objective in many online communities is to allow for knowledge sharing and learning" (Keswani & Chaturvedi, 2013, p. 119). The evolution of this present paper and the framework introduced herein began as a memorandum written approximately three years ago meant to facilitate discussions for program needs between entrepreneurship faculty and IT personnel, specifically those who were focused on supporting a learning management system (Barbosa Cabral, Pedro, & Gonçalves, 2012; Hsui-Ping & Shihkuan, 2008; Kim & Lee, 2008; Williams van Rooij, 2012) that had been adopted by the university which employed all of the parties thereto.

One of the authors of the current paper has persisted, and is now joined by a second author. Both have extensive entrepreneurial backgrounds within high technology fields. Faculty who were responsible for delivering an exclusively online master's degree program through an AACSB accredited college of business voiced that existing learning management systems (LMSs)—given that they were by default designed to deliver instruction to a captive audience of users who were logged-in, and unable to access work after courses concluded—were not designed to leverage the creation of ongoing, and to the extent possible, preferably perpetual online learning communities.

For instance, once courses concluded, learning management systems' discussion boards, therefore archived "knowledge" and histories of students' experiences, were gone (Camarero, Rodríguez, & José, 2012). Faculty wanted course experiences to build upon one another, and for the entire program to be available to students as they progressed. They argued that numerous

tools such as bulletin and discussion boards on the Internet existed, did offer options for secure log-on (i.e., private) areas, and did maintain continuity of content over time. But, the university had invested heavily in a software licensing agreement with a well-known and widely adopted LMS provider, and the institution's response on the part of support personnel was a valiant attempt to customize the LMS's functionality. The author of the aforementioned memorandum likened this effort, although appreciated, as ineffectual (relative to the eight-point framework for best practice presented herein).

Technology resources directly impact the delivery (Hawks, 2008) of any distance education program, its curriculum (Colbert, 2005), its pedagogy, in effect "the product," and hence there are also marketing implications (Adams & Eveland, 2007; Akeusola, Daniel, & Iyere, 2011; Keramidas, 2012; Lorenzetti, 2005; Pituch & Lee, 2006; Randall et al., 1996; Savic, 2005). Entrepreneurship education differs from more traditional (theoretical) disciplines, because those who are enrolled have both a practical orientation and a need to immediately apply course teachings to their current or prospective ventures. As such, any program, to be perceived as viable, must be current relative to its technologies as a minimum standard, and would likely only prosper over time if received as one that is reputed to be operating on the "cutting edge" relative to technology, curriculum, pedagogy and its marketing communications.

One of the primary distinguishing attributes of those who are successful in entrepreneurial ventures is that they have an established interpersonal network (Merwe, Pitt, Murgolo-Poore, & Berthon, 2002; O'Donnell, 2004; Zontanos & Anderson, 2004), and entrepreneurship educators are therefore compelled to support the development of strong relationships to include those with faculty, but also with the cohort and alumni, and members of the business community at large (Castaldo, 2007; Merwe et al., 2002; Morris, Schindehutte, & LaForge, 2002; Zontanos & Anderson, 2004). From a technology perspective, necessary tools (Camarero et al., 2012; Finney, 2004; Harris & Park, 2008; Little, 2011; Ralph & Stahr, 2010; Wiid, McCormack, Warren, Buckley, & Cahill, 2013) for enabling students who are working at a distance to come together and work collaboratively include video, audio, textual, and other asynchronous as well as synchronous communications methods. Thus far, courses with some programs have involved the use of the aforementioned tools in order to allow students to collaborate and build the social network they will need to be successful both in their academic pursuits and as practicing entrepreneurs (Scott, 2013; Zontanos & Anderson, 2004).

Another primary attribute of successful entrepreneurs is that they typically distinguish themselves in publicly visible ways (preferably as experts in their chosen field and/or industry). The pedagogy and curriculum entrepreneurship educators therefore should include work products—with students often working in collaboration with one another during the creative and execution phases of the assignments—that leverage numerous technology and communication platforms. Some of these work products and entrepreneurial results, both good and not so good, may also have an impact on the overall brand image of an institution.

REVIEW OF EXISTING LITERATURE

We have conducted a series of searches in the academic literature which revealed that scholarly study of component parts of our topic have been supported by significant bodies of research, respectively. For instance, searching databases such as *Academic Search Premier* revealed "distance delivery" has been researched extensively. Other topics such as "social capital" are also treated extensively in the literature. Adler and Kwon (2002) observed "a

growing number of sociologists, political scientists, economists, and organizational theorists have invoked the concept of social capital in the search for answers to a broadening range of questions being confronted in their own fields" (p. 17). Within the entrepreneurship discipline we would submit that as a logical construct the notion that: "the core intuition guiding social capital research is that the goodwill that others have toward us is a valuable resource" (Adler & Kwon, 2002, p. 18), applies to the framework we have proposed.

Using the database *Academic Search Complete* with limiters set for full text scholarly (i.e., peer reviewed) journals returns from the query displayed 30,785 search results for the terms "online learning communities" and "social media." After setting limits for publication dates we found that almost 18,808 of these results have been published in the last five years (from 2008 to 2013). However, in searching for "online learning communities" and "entrepreneurship" with the same limits set for full text scholarly journals using "Boolean searching or exact phrase searching" we determined that no search results were found. Using the terms "social media" and entrepreneurship" with parameters set the same as the last-mentioned example above, we found only six articles were returned, none of which bore a resemblance to our topic here.

In contrast to the lack of attention from both a research perspective and facilitation by providers of LMSs, practitioners at large seem to be forging ahead with the integration of social media, display of work efforts and assets, and the clear advantages this confers to participants. For example, a cover story article entitled "*LinkedIn*: How it's changing business (and how to make it work for you)" in *Fortune Magazine* observed:

> In the past year LinkedIn has emerged as one of the most powerful business tools on the planet. Long considered a repository for digital résumés, the network now reports 225 million members who have set up profiles and uploaded their education and job histories. These days they're doing far more than prospecting for new gigs. LinkedIn users are building professional portfolios that showcase their best work, from publications to videos to PowerPoint presentations. They are relying on a growing array of LinkedIn apps, like CardMunch, which lets users scan business cards to upload contact information. They're recommending one another for particular business attributes. (Hempel, 2013, p. 70).

Given the paucity of search results overall and especially those lacking in the entrepreneurship discipline with which we as researchers are primarily concerned, we have embarked on redressing the lack of attention in this area, despite the disparate explorations of components of the topic. Hence, we next present an eight-point framework for technology best practice in distance education entrepreneurship programs that is derived from anecdotal experience in working for over 20 collective years in online pedagogy and by synthesizing research undertaken from several disciplines.

ANALYSIS OF LEARNING MANAGEMENT SYSTEMS

The authors of this paper propose eight critical characteristics that can be considered as potential requirements for an overall distance entrepreneurship program platform (hereafter referred to as "the system"; see Figure 1): 1) confidentiality/security, 2) availability and support, 3) visibility, 4) consistency, 5) integrated single platform (gateway) for communication, 6) interpersonal networking capabilities, 7) longevity or legacy, and 8) promotion of the program. These are further elucidated below, followed by a reflection on how an "ideal," all-inclusive platform that might provide these eight critical characteristics has yet to emerge in the market of technologies and tools (i.e., required social networking technology for distance entrepreneurship education) available to entrepreneurship educators.

Figure 1: An Eight-Point Framework for Best Practice

AN EIGHT-POINT FRAMEWORK FOR BEST PRACTICE
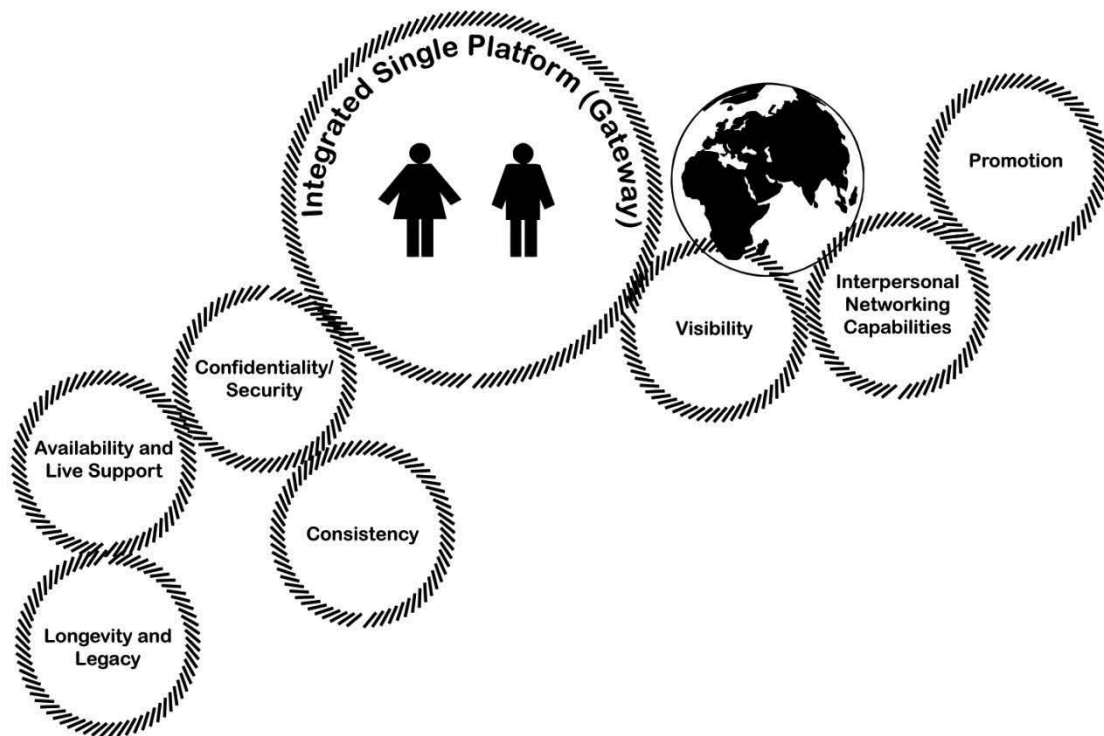
Confidentiality/Security

The system must be secured and only people that are subject to nondisclosure and other agreements can have access to certain information within the system. In this way, a "sandbox" of sorts emerges where students of entrepreneurship, perhaps in early stages of the development of real business ideas, can speak freely amongst a learning community. This is often the only way students will feel free to share and develop their ideas for new ventures. Knowing that their ideas, vetting, and interaction will be held in confidence and safely cordoned off from outsiders, serves the purpose of a veritable safe haven incubator. This confidentiality and security must extend to backups of the system and access by those personnel that support the software systems. There are also unavoidable issues of privacy laws (e.g., FERPA) for the protection of students' personal information and other sensitive data.

Availability And Live Support

The systems (JarmÉUs et al., 2012; Pituch & Lee, 2006; Savic, 2005) must be available for users to access 24 hours each day, seven days per week if expectations for (Keramidas, 2012) participation exist. Support for the system must likewise be available on a similar or identical

schedule. However, some universities do not provide "around-the-clock" information technology support. With budgets constrained as they often are, this can be acknowledged as a real challenge. Many working professional distance students' use "off" or "odd" hours to complete assignments, and when things go wrong, they need access to solutions. For example, programs that may be available to members of the United States Armed Forces typically enroll students located around the globe. Military students engage in coursework by getting online when they are off duty, which, owing to differences in time zones depending on where they are deployed, can often vary considerably from "normal working hours" in the United States. To be sure, this same issue of disparate locations/disparate time zones and its corresponding impact on support convey just as importantly to global recruiting and international students participating in online education from their home countries.

Visibility

To be integrative and foster the creation of social capital, the system must have both a public and a private side. The private side is for the students in the program. The public side must be easily found in search engines for marketing purposes and the development of both student and program reputation. As well, the program's website should be a place that people outside the program can find out about not only the curriculum, but also students and their businesses, (e.g., testimonials and human interest stories), as well as faculty engagement and publishing. With limited or no funding for marketing, as is the case with many academic institutions and programs, it is critical that the program be able to "spread the word" virally. This naturally includes select work output and interactions among students that would occur in an integrated system.

Consistency

Over the past several years, most institutions, in keeping up with the evolution of technology, have adopted a "system" that amounts to a constellation of multiple curriculum platforms as well as intranet and website technologies. Despite the evolution of a plethora of technologies that attempt to serve the needs of academia, and the temptation to adopt such tools, it is important to keep in mind that users need to focus their learning on the curriculum, not learning different platforms. So, while continued changes are natural and they often come with benefits, they must be managed and supported.

From a communications standpoint, alumni need to be able to have a consistent way to easily stay in touch with one another, including the possibility of serving as mentors for current students, and with faculty. Continuity of identity, reputation indices, and access to assets and material that are part of a student's, team's, cohort's, or learning community's repertoire of intellectual capital is also important. The ability to consistently present and maintain, with ease-of-use, this ideally uniform "thread" of personal and pedagogical interactions is an important part of a robust system.

Integrated Single Platform (Gateway)

Building a sustainable online distance education platform that facilitates a learning community requires a common gathering place for users. A single portal should exist as a

gateway for program information, curriculum, networking, guests and speakers, visiting subject matter experts, research and publications, alumni and constituency communications. This does not mean that all of these functions must run on the same software, but rather that the gateway should simply be transparent to the users. Such a "meta-interface" is not uncommon amongst social media and other software platforms at large (e.g., *HootSuite, TweetDeck*).

Interpersonal Networking Capabilities

The social networks students develop with classmates, past and future attendees, faculty, and outside resources need a virtual (Ralph & Stahr, 2010; Savic, 2005) meeting place. This meeting place must begin with their entry into the program and then continue to support them as alumni. This functionality should be available for people inside and outside of an institution's domain and must be both secure and confidential for various "internal" user roles, and yet public facing for other "external" user roles. This is no different than many public-facing websites where users who are members of an appropriate group, such as employees or clients, are allowed to log-in and exercise privileges that are afforded to them in accordance with their user role, all the way down to an asset level (i.e., with a specific document or item, being able to see some or all of the material).

Longevity And Legacy

A given program's primary resource is its participants and the legacy of the activities in which they have partaken. Systems must continue to support all of a program's community members while they are in that program, and for years thereafter, if universities are planning to live up to claims to the effect that they support continual learning, learning communities, and the like. For instance, LMS discussion boards in particular (Nagel & Kotzé, 2010) currently expire at the end of each course for which they were deployed, or shortly thereafter. But with that expiration a body of knowledge and relationships with participants that was created therein unfortunately also expires. Thus, to foster true organizational learning systems (Lawrence & Chang, 2010), the platform that is utilized must begin with the students' admission, be available for all of their classes, and continue to be a resource for them as post-graduate alumni. Reiterating a point raised at the beginning of the current paper, at the very least it is beneficial for students in a given program to be able to access their previous work, especially when that work is designed (as it should probably be) in a sequential, cascading "building block" type fashion from a curricular point of view (Graf & Tzu-Chien, 2009).

Promotion

In culmination, having the aforementioned integrated platform for initial contact, class information, delivery and archiving, interpersonal networking, and public-/private-facing resources becomes a powerful marketing tool. Such a system could serve as a veritable beacon that draws visitors and prospects to a program, and where appropriate, brings them in or showcases those who are matriculated already as members of a learning and support community that is apparently or in reality spinning-off entrepreneurial successes. Quite conveniently, this marketing instrument essentially "builds itself" by virtue of simply engaging in and executing a learning community approach to pedagogy.

REQUIRED SOCIAL NETWORKING TECHNOLOGY FOR DISTANCE ENTREPRENEURSHIP EDUCATION

In light of these eight characteristics, we now reflect on the current state-of-the-art with Learning Management Systems (LMS), situating their abilities at large in terms of means to deliver on the aforementioned rubric. Our approach considers the broader notion of LMSs in general, given extant functionality, without leveraging this evaluation against specific brands. Note, however, that the authors are certainly familiar with and thus in the main cast their analysis against an "aggregated" understanding of the more popular ones (e.g., Blackboard, Banner). To that end, we preface the following analysis by clarifying that, to our knowledge, a single platform that achieves at least a modicum of results for *all* of the proposed eight characteristics does not presently seem to exist. This assertion can be made based upon one inherent design feature of all such systems, which is a log-in feature and requirement for the protection of students' private information. Hence, the framework we present indicates both private and public arenas in which learning community activities take place.

Confidentiality/Security

LMSs meet the requirement of providing and maintaining the infrastructure necessary for confidential and secure transmission and storage of course-related data, including profile information, communications through digital media, assessments and evaluations, and file repositories. This might be regarded as the "priority requirement" of any information technology system that houses such data. It should be noted, however, that there is typically a trade-off of sorts between confidentiality/security and convenience. To that end, data that a student or cohort might want to transfer into a public, non-secure domain (perhaps after vetting, editing, sanctioning by the learning community and professors) would ideally be accomplished with as little difficulty as possible. This level of "friction-free" data access control and transferability, while achievable, does not appear to be readily available in current LMSs.

Availability And Live Support

LMSs appear to be moving along the path of progress toward being accessible anytime, anywhere, with corresponding support from system administrators and troubleshooting technicians. On the first issue of availability, LMSs are largely rooted in an (increasingly erstwhile) web-based paradigm, having often evolved since their inception as web pages and web systems. With the emerging phenomenon of mobile device adoption, Apple iOS and Android-based smartphones, tablets, and the corresponding burgeoning market of "apps" has become the new platform of choice for consumers, especially younger students. As such, LMSs will need to adapt (or perhaps entirely re-envision) their products to accommodate this preferred interface. Adopting these new technologies, and the corresponding philosophy of anytime, anywhere, "any how" mobile access (Hong-Ren & Hui-Ling, 2010; Menefee, Parnell, Powers, & Ziemnowicz, 2006) is crucial for LMSs moving forward. To be sure, like general consumers at large in broader markets, students and professors will likely continue to expect access to crucial data, social circles, and the corresponding communications involved therewith, from the mobile

platforms through an integrated process. As well, expectations continue to increase with regard to uptime, continued ease-of-use, and best practice in modern user interfaces.

Live customer support of LMS systems, given their critical nature, is continually held to scrutiny and can become a key differentiator among producers of such systems. By and large, along with software systems in general, it appears that LMSs are responding, as evidenced by delivery of increasing service levels and facilities for students, institutional administrators, and instructors.

Visibility

While it is ostensibly crucial for students, teams, cohorts, professors and other members of a learning community to find and interact with one another *within* a system (i.e., the private side of a platform), the need to have a public side, for purposes of marketing and networking, is especially important for students of entrepreneurship and their corresponding programs. However, currently the valuable aggregation of assets, work outputs, credentials, artifacts, and even threads of interaction and conversation that occur internally on the private side of an LMS, whether in whole or in part, cannot readily be made to "cross the gap" into the public sphere of "big data" (i.e., indexed, *Google* searchable information). In other words, internal visibility appears to have been (and continues to be) the priority for LMS providers.

What is developed and built behind the firewall of LMSs, while often robustly visible to constituents within that private system, stays behind the firewall, and unfortunately some work that probably could be shared to the benefit of students and members of a business community at large never sees the "light of day." Therefore, this material cannot serve as valuable reputation-building collateral for students, their institutions, or their nascent business ventures. Contrast this with modern social networking platforms like *LinkedIn* that allow users to effectively "export" select (and likely flattering) elements of their professional profiles, assets and conversations to the public, quickly and easily, while keeping other material selectively available or completely private.

Consistency

Since many institutions probably take a "hodgepodge" approach to adopting multiple technologies as part of their system, users can be left bewildered, confused and likely dissatisfied with the experience. In particular, communications and learning assets can be strewn across multiple technologies (e.g., the LMS proper, email, text messages, file repositories like *DropBox* etc.) whether it is the intention of educators or not. Students and faculty, like any consumers of technologies, often seek the path of least resistance and most fluid response in their choice and use of collaborative software systems. With current LMS offerings, simply keeping track of one another, not to mention the trail of materials associated with that attempt, is a challenge. Social media and corresponding cloud-based, seamless applications, have emerged as a solution that can accommodate such possibilities.

Indeed popular platforms such as *Facebook* and *LinkedIn* are specifically effective tools in this arena, but for the most part they are "out there" (extraneous to the academic ecosphere) and usually utilized because someone took initiative on their own to use these as tools. In other words, universities often lose contact not with people *per se* (development offices often do an amazing job of keeping in touch and soliciting), but rather with the ability to maintain *deeper*

personal relationships. Students move on and purposefully retaining them through robust social networking technologies could be mutually beneficial and impact curriculum, pedagogy, and marketing (Hansen, 2004; Trim, 2003).

Social media platforms also have limitations as learning management systems. For instance, as was determined through research findings reporting an effort to use *Facebook* as a LMS:

> Facebook is a popular social networking site. It, like many other new technologies, has potential for teaching and learning because of its unique built-in functions that offer pedagogical, social and technological affordances. In this study, the Facebook group was used as a learning management system (LMS) in two courses for putting up announcements, sharing resources, organizing weekly tutorials and conducting online discussions at a teacher education institute in Singapore. This study explores using the Facebook group as an LMS and the students' perceptions of using it in their courses. Results showed that students were basically satisfied with the affordances of Facebook as the fundamental functions of an LMS could be easily implemented in the Facebook group. However, using the Facebook group as an LMS has certain limitations. It did not support other format files to be uploaded directly, and the discussion was not organized in a threaded structure. Also, the students did not feel safe and comfortable as their privacy might be revealed. (Wang, Lit Woo, Lang Quek, Yang, & Liu, 2012, p. 428)

Nevertheless, useful attributes of broader social media platforms do not appear to have been integrated into LMSs (e.g., Blackboard), despite the opportunity that such integration presents in helping solve the "consistency" problem. Rather, in what seems like an attempt to accommodate the desire among users to leverage such features, LMS producers have recently appeared to show interest in imitating elements and some functionality of social media.

However, despite mimicking attributes of popular social media like *Facebook* and *LinkedIn*, these proprietary implementations are ultimately and unfortunately "closed" within their respective systems (whereas much of the benefit of the social integration which they achieve should in fact occur *without* the academic environment). As such, they do not integrate into the broader, popular and publicly available social media platforms. This appears to be happening in spite of the abundance of fluid APIs and technology support for integrating popular extant social media platform functionality into existing, proprietary systems.

Integrated Single Platform (Gateway)

Attempts to leverage technology in distance education entrepreneurship programs have resulted in deployment of a wide cross-section of tools. Namely, students and faculty typically must enter one system for email, another system for discussion board/forum type activities, perhaps even another for a repository of course-related, server based files, and yet another for grade and instructor-student feedback. Moreover, many of these systems used for discrete activities have begun to afford cross-functionality, such that the Learning Management System used by a university might provide (duplicate) private messaging services, akin to email. As well, there are many competitors in the virtual web conferencing software (e.g., *Skype*, *GoToMeeting*), which often stands alone and apart from other systems (e.g., LMSs). As mentioned, of importance is the "portal" or gateway effect of having a single, outward-facing interface to end users and, even more conveniently, a single sign-on. Currently, LMSs or similar providers have offered neither a single platform nor a single gateway that aggregates platforms.

Interpersonal Networking Capabilities

While availability of and constant improvements on virtual meeting spaces and community tools have been a mainstay of popular social networks such as *Facebook* and *LinkedIn*, LMSs still find themselves woefully behind in this regard. Of note, while LMSs certainly offer such functionality, they do not do so in an easy-to-use fashion. Witness the difference between the relatively seamless and user-friendly "status update" mechanisms of popular social media "news feeds" and "life streams" (which by design invite users to post information, comment on one another's posts, quickly add media and attachments, take conversations public or privately quickly, etc.) versus the "average" entry page for LMSs, which typically require awkward navigation to "deep linked" interpersonal networking tools. Akin to social media news feeds, additional tools like *Twitter* (Domizi, 2013) and other widely used messaging services are more robust than the mass email, private discussion forums and similar functionalities that are built in to most LMSs.

Perhaps owing to the majority demand of broader academic constituents (e.g., history, literature, science departments), who may or may not need to value interpersonal networking (O'Donnell, 2004) to the same degree as students of entrepreneurship, LMSs have generally exhibited a "nice to have" or "tack on" philosophy toward such tools. While meeting the demands of the "student and instructor masses" (JarmÉUs et al., 2012; Ralph & Stahr, 2010; Sánchez, Salinas, Contreras, & Meyer, 2011) which do, naturally, tend toward the average, such platforms again fail to meet the unique needs of distance education entrepreneurship programs in that they cannot be adequately likened to tools that would be used as students embark upon their future entrepreneurial pursuits.

That is, in this latter context, as entrepreneurs they very likely will need to leverage blogs, *LinkedIn*, *Facebook*, *Twitter*, virtual meeting tools, and myriad other technologies that without instructor intervention or students' own personal initiative, would not be part of their academic experience. In other words, their entrepreneurship education would exclude exposure to the tools that these students will probably use, need to use, or benefit from using in the real world.

Longevity And Legacy

The ultimate expiration of valuable learning assets, conversation threads, user profiles and other records that are artifacts of student work and interaction poses a hindrance to the long-term potential benefit of a distance education entrepreneurship experience. Typically upon completion of a program or degree, students are no longer able to access LMSs and the materials, people and opportunities contained therein. This short "shelf life" also has implications for previously mentioned career networking and publicly-facing marketing opportunities. For example, an excellent "virtual" business plan (perhaps for a venture that was imagined, but never realized by a team) created several semesters ago is, unless overt action is taken by participants, lost forever.

At minimum, it is accessible probably only to administrators or professors. To transfer the information to a usable platform, while certainly possible under these conditions, is not at all easy to do, as earlier mentioned. The abbreviation of the life of these materials and associated interactions ultimately detracts from the broader sense of identity and community that could be

created in an imagined different situation: one where an accretion of prior work and community serves as the "base camp" for an entire program, cohort or community.

Promotion

Achieving integration into the "ideal" platform as described here would likely present considerable marketing opportunities not only for students, as has been described vis-à-vis enhanced networking capabilities, but also for program administrators, departments, colleges, and universities. At issue is the ability to not only present to publics (including potential students) a largely superficial website replete with proper branding ("ASK? NAJ," 2006) and carefully written ad copy, but also a properly controlled (but easy-to-use) portal into learning assets, appropriate parts of professor and student profiles, and conversation threads identified as appropriate for public consumption.

Currently, tools like blogs (Lahm Jr, 2006)—which by nature are intended to be publicly facing instruments and it has been argued an almost indispensible tool for entrepreneurial firms—while often resident as a function inside LMSs, are not readily "exportable." Under the current regime of LMSs, it could be argued that few students, especially entrepreneurship students who are likely steeped in modern, flat and flexible, cloud-based integrated systems (Lawrence & Chang, 2010) such as *Basecamp* and *Zoho*, would necessarily be impressed by the offerings.

Many features that would lead to a well-supported, highly visible, consistently presented, single platform that easily integrates secure areas with public facing areas for professional networking, all while staying accessible for the long haul, is something that readily exists in the realm of many areas of productivity software, not the least of which includes social media (Hsiu-Ting & Steve Chi-Yin, 2010). But, to date, the availability of such in the market of LMSs has not been realized, thus nor has the opportunity to leverage such a platform to tout the efficiency and effectiveness of a distance education entrepreneurship program.

BARRIERS TO IMPLEMENTATION OF EIGHT-POINT FRAMEWORK FOR BEST PRACTICE

Our suggested eight-point framework portends several opportunities for improving distance entrepreneurship education, but barriers to implementation clearly exist. These barriers generally fall under three areas, which include limitations of the following: LMSs, instructors, and institutions (see Table 1). Each of these categories will be discussed in turn, with attention given to the individual barriers.

Table 1: Suggested Barriers to Implementation by Category		
LMSs	**Instructors**	**Institutions**
Lack of usability testing	Underdeveloped appreciation of "open source" model of pedagogy and research	Lack of funding
Lack of integration in keeping with current trends in technology	Aversion to change due to issues of workload, burnout	Lack of adequate training resources
Long-term contracts and negotiated service levels	Curricula that do not take advantage of existing or potential LMS technology	Legacy of focus on brick and mortar infrastructure as compared to "virtual infrastructure"
Difference in revenue models vs. mainstream Social Network Systems (SNSs)	Lack of intrinsic motivation to adopt new systems	
Natural tensions between design complexity and user simplicity	Lack of extrinsic rewards to adopt new systems	

LMSs

Popular Learning Management Systems have developed organically over time, as much software does. As such, original functional requirements which drove the initial incept of these systems have predictably blossomed as producers of LMS software continue to attempt to meet the needs of educators and the users to whom courses are disseminated with these LMSs as the means of distribution. However, as per our given framework for best practice in this manuscript, much progress is still necessary. Also, the world does not stand still relative to these systems' operating environments. For example, bandwidth capacity increases on the part of ISPs (Internet Service Providers) at large have enabled more video and audio streaming. Changes in browsers, introduction of new browsers, a proliferation of browser add-ons (and their potential security and compatibility issues), the advent of mobile computing with tablets, smartphones and other devices, and numerous other changes in an extremely dynamic operating environment do present a constant set of challenges and opportunities.

Owing to a need to keep up, it appears that usability testing, a common procedure in mainstream software development, could be lacking on the part of most LMSs. From the perspective of the authors, usability testing of LMSs appears limited to nonexistent as evidenced by our regular documentation of a significant number of awkward and often prohibitive limitations of some of the most popular LMSs. While this process of documentation has entailed an informal approach including screen recordings, screenshot captures, and the collection of qualitative data, these are not "bugs" inasmuch as they are often egregious and glaring oversights in functionality and user interface—issues which have typically already been resolved in mainstream groupware and communication software packages. As a shining example, a current edition of Blackboard fails to allow users to copy and paste from even plain text source files and the popular word processor Microsoft Word without suffering an array of formatting issues, whereas many other platforms have solved or significantly mitigated such problems with smart paste functionality.

To this end, by all appearances few lessons are being learned from current trends in modern communications technologies like social media, which have continuously improved in terms of the means by which they have increasingly allowed users to easily collaborate, communicate, coordinate, and network interpersonally. By all means, the "trappings" or outer appearances of social media have started to make their way into the interfaces of some LMSs. However, the core and highly useful functionality (and reason social media are so popular) such as the "Newsfeed" update (familiar to users of *Facebook*, *Myspace*, *LinkedIn*, etc.), is still nowhere to be found among LMSs.

From an administrative standpoint, long-term contracts and all of the limitations that accompany such arrangements, including service level provisions or the lack thereof in terms of their adequacy, are also a barrier. As it stands, schools are at the mercy of the tools they sign on to use. Similar to long-term cellular phone contracts which lock users in despite potentially poor service (or lack of ability to upgrade their phones), this results in much dissatisfaction and, importantly, a dis-incentive on the part of the producer to make headway in terms of listening to customers' wants and needs. In order to provide internal and external support for existing LMSs, typically universities—for the sake of efficiency—adopt a given system (i.e., brand) of LMS. Providers of these systems may offer the system itself, support, upgrades, hosting, training, and other benefits to university clients, and to ensure the continuity of such services contractual arrangements would also be typical. Hence, it is mutually desirable for both providers and universities to obligate themselves to one another for a sustained period of time.

Ultimately, the barrier to steadfast innovation (that emulates mainstream software development in terms of testing and functionality) could be attributed to the significant differences in revenue models between education-oriented LMSs and popular, mainstream market communication tools and collaborative systems. As most social media work toward deeper and more effective integration into the communication and lifestyle arcs of their constituent consumers, they do so in effect to sell ads in a more clever fashion. No such incentive exists on the part of LMS producers and, as such, nor does the incentive to innovate in a similar fashion.

We also acknowledge a natural tension between the design complexity of any technology and a need to create user simplicity. It is a constant that human beings are in need of systems that are easy enough to use while also sometimes delivering performances in the background that are massively complex. Speech recognition is one such example of a very complex technology that has evolved over the years and is still evolving. Users merely want to talk while these systems do the typing. Users measure success by virtue of accuracy (despite accents, changes in the user's voice pattern based on an illness, for instance). Yet, the programming underneath such speech recognition relies on extremely complex algorithms. LMSs are already difficult to use as students report, and as instructors may quickly discover upon adopting them (or being told to use them) for the delivery of instruction. Nevertheless, they are sorely in need of further development.

Instructors

Barriers exist as well in terms of instructors' adoption and deployment of LMSs. Even under the best conditions (i.e., a system that adheres to the "ideal" outlined in this paper, as per the eight-point framework), many instructors are, quite simply, reluctant to change. Understandably, people are often averse to constantly adopting new systems and undergoing the training and re-training necessary in order to prepare to use such systems. As well, germane to

the argument made in this paper, entrepreneurship professors may not cohesively agree on the importance of learning communities and the short- and long-term benefits that come with such a network. In the end, due to this aversion to change, which could be a result of burnout, extensive workload, other priorities, or just obstinacy in general, "internal" barriers are at play as much as the largely "external" ones explicated in the previous section.

Moving from individual instructors to instructors as a constituency, namely as part of programs, departments, colleges and universities, may not be in a "culture of change" with regard to curriculum overhaul. To be sure, the "ideal" LMS outlined in this paper has endemic implications. As such, it is not an "additive" supplement to an extant curriculum, but might be viewed as an "ecological" or systemic force for change. Whether or not colleagues, program directors, department heads/chairs, support personnel and administration are "on board" with adopting such a profound juggernaut of disruption have a direct impact on success and, therefore, serve as individual and collective barriers.

Institutions

Other external barriers exist at the level of the institution. As has been mentioned earlier in this paper, a plain and simple lack of funds could serve as a barrier, even in light of being presented with the "ideal" (and, we admit, likely expensive) LMS. Even where funds exist, unless at an institutional level an "audit" and deep-dive investigation into the needs of faculty for an LMS, including potentially idiosyncratic ones like those outlined here for an entrepreneurship program, there might simply be no awareness, no agreement on needs, nor the base justification for the need for a better system. Where these needs are defined, it is often at the level of faculty support groups or "teaching centers." A less than optimal or lack of institutional cohesion and collaboration between these groups and ultimate end users (i.e., faculty and instructors) could stand as a significant barrier.

From a marketing point of view, and relative to some public-facing ramifications of the socially networked constituencies with which institutions interact, there appears to be tremendous conflict at a policy level. This is true in the private sector world as well. Many organizations still seek to control social media conversation by limiting access or otherwise governing what participants—in particular employees—might say. Yet, as most faculty acknowledge, smart phones, tablets, and other devices are a constant in terms of classroom ubiquity in the brick and mortar environment, as students are actively engaging in all manner of social media interactions. In other words, there is a conversation out there that institutions may wish they could control, but they cannot. Thus, institutions may need to recognize that "control" means joining the conversation, conveying a reasonable point of view, and being perceived as worthwhile value-creators by a majority of discussants.

Institutions must also, at a broad and more abstract level, have an understanding of the impact of the need for change in infrastructure from legacy brick and mortar orientation to that which would facilitate distance delivery of courses and programs. Despite the rapidly changing face of education and a spoken acknowledgement of distance education as being very much associated with the future of education, facilities planners, for instance, may only acknowledge hardware infrastructure needs such as pulling cable, routers, and so forth. However, new "virtual infrastructure," including that of an "ideal" LMS, has resounding and replete ramifications on other infrastructure, course preps, pedagogical philosophy at large, intensity, mode and quality of course delivery, etc. Public institutions are doing a poor job at changing business processes. It is

well-known that teaching distance courses can be significantly different in terms of imposing a greater workload on faculty (yet we see little evidence of accommodation relative to standard 3-3 to 4-4 loads for undergraduate teaching). As we write this, to bring an example of a process not ready for "distance delivery," a student has just messaged, needing our original signature for a paper form in connection with an online, distance course. As we have pointed out to administrators, we are working at a distance, too.

CONCLUSION

The distance education landscape at present is comprised of a cobbled-together approach as institutions and their respective programs adopt and learn to utilize both front facing (i.e., public) and student‐facing (i.e., private) technologies. Further, new ones are evolving at a rate that often outstrips the ability of faculty ("Course Quality and Instructor Workload: Pt. 1," 2005; Finney, 2004) and institutions as a whole to keep up. Yet, because entrepreneurship programs must pursue the development of holistic learning communities that enable the cultivation of not only traditional skills and knowledge within the discipline, but perhaps just as importantly the social capital necessary to succeed as new venture leaders, they should leverage technologies and push for the development of platforms that blend the functionality of social networking sites as well as learning management systems. Research to date in this regard is limited, as is the case with the tools for doing so. The current work hopes to serve as a springboard for such research, providing a framework for consideration and modification, and, at minimum, an exhortation to discuss what could be "a better world" for entrepreneurship pedagogy.

REFERENCES

Adams, J., & Eveland, V. (2007). Marketing Online Degree Programs: How Do Traditional-Residential Programs Compete? *Journal of Marketing for Higher Education, 17*(1), 67-90.

Adler, P. S., & Kwon, S.-W. (2002). Social capital: Prospects for a new concept. *Academy of management review, 27*(1), 17-40.

Akeusola, O., Daniel, I. O., & Iyere, T. (2011). Analytical studies of various marketing approaches that could assist the growth of educational programmes of the open and distance learning institutions. *International Journal of Academic Research, 3*(3), 700-705.

ASK? NAJ. (2006). *Distance Education Report, 10*(2), 3-3.

Barbosa Cabral, P., Pedro, N., & Gonçalves, A. M. (2012). LMS in Higher Education: Analysis of the Effect of a Critical Factor 'Faculty Training'. *World Academy of Science, Engineering & Technology* (66), 613-618.

Camarero, C., Rodríguez, J., & José, R. S. (2012). An exploratory study of online forums as a collaborative learning tool. *Online Information Review, 36*(4), 568-586.

Castaldo, N. (2007). Marketing that matters: 10 practices to profit your business and change the world. *Journal of Applied Management and Entrepreneurship, 12*(3), 89.

Colbert, R. (2005). The Case for Bringing Distance Learning Into Schools. *Media & Methods, 42*(1), 30-30.

Course Quality and Instructor Workload: Pt. 1. (2005) (Vol. 9, pp. 4-7): Magna Publications Inc.

Domizi, D. (2013). Microblogging To Foster Connections And Community in a Weekly Graduate Seminar Course. *TechTrends: Linking Research & Practice to Improve Learning, 57*(1), 43-51.

Finney, R. Z. (2004). Reaping the Whirlwind: Challenges for Professors in the Era of Distance Education. *Phi Kappa Phi Forum, 84*(4), 41-43.

Graf, S., & Tzu-Chien, L. (2009). Supporting Teachers in Identifying Students' Learning Styles in Learning Management Systems: An Automatic Student Modelling Approach. *Journal of Educational Technology & Society, 12*(4), 3-14.

Hansen, K. (2004). Marketing: An Eye for Opportunity. *Distance Education Report, 8*(2), 3-3.

Harris, H., & Park, S. (2008). Educational usages of podcasting. *British Journal of Educational Technology, 39*(3), 548-551.

Hawks, S. R. (2008). Design and Development of an MPH Program for Distance Education Delivery. *Proceedings of World Academy of Science: Engineering & Technology, 43*, 439-442.

Hempel, J. (2013). LinkedIn: How it's changing business (and how to make it work for you) *Fortune Magazine, 168*(1).

Hong-Ren, C., & Hui-Ling, H. (2010). User Acceptance of Mobile Knowledge Management Learning System: Design and Analysis. [Article]. *Journal of Educational Technology & Society, 13*(3), 70-77.

Hsiu-Ting, H., & Steve Chi-Yin, Y. (2010). Educational use of social networking technology in higher education. *Teaching in Higher Education, 15*(6), 703-714.

Hsui-Ping, Y., & Shihkuan, H. (2008). Designing a learning management system to support instruction. *Communications of the ACM, 51*(4), 59-63.

JarmÉUs, P., Sundberg, C., Masog, S., Andersson, P., Rosenqvist, C., & Koulouvari R, P. (2012). Improving the learning experience by harnessing digital technology. *Journal of Systemics, Cybernetics & Informatics, 10*(1), 35-41.

Keramidas, C. G. (2012). Are Undergraduate Students Ready for Online Learning? A Comparison of Online and Face-to-Face Sections of a Course. *Rural Special Education Quarterly, 31*(4), 25-32.

Keswani, B., & Chaturvedi, S. (2013). Innovative learning: Face book vs Linkedin. *Researchers World: Journal of Arts, Science & Commerce, 6*(1), 118-121.

Kim, S. W., & Lee, M. G. (2008). Validation of an evaluation model for learning management systems. *Journal of Computer Assisted Learning, 24*(4), 284-294.

Lahm Jr, R. J. (2006). State of the entrepreneurial blogosphere. *Entrepreneurial Executive, 11*, 27-37.

Lawrence, W. J., & Chang, J. K. (2010). Cloud Computing and Virtualization: The "Entrepreneur without Borders" Workbench for 21st Century Enterprise Development. *International Journal on Computing, 1*(1), 99-105.

Little, G. (2011). The Revolution Will be Streamed Online: Academic Libraries and Video. *Journal of Academic Librarianship, 37*(1), 70-72.

Lorenzetti, J. P. (2005). A New Approach to Marketing Strategies for Distance Education. *Distance Education Report, 9*(8), 1-5.

Menefee, M. L., Parnell, J. A., Powers, E., & Ziemnowicz, C. (2006). The role of human resources in the success of new businesses. *Southern Business Review, 32*(1), 23.

Merwe, R. v. d., Pitt, L. F., Murgolo-Poore, M., & Berthon, P. (2002). Spotting holes: Opportunities in online markets, social network theory, and entrepreneurship. *American Marketing Association. Conference Proceedings, 13*, 3.

Morris, M. H., Schindehutte, M., & LaForge, R., W. (2002). Entrepreneurial marketing: A construct for integrating emerging entrepreneurship and marketing perspectives. *Journal of Marketing Theory and Practice, 10*(4), 1.

Nagel, L., & Kotzé, T. G. (2010). Supersizing e-learning: What a CoI survey reveals about teaching presence in a large online class. *Internet & Higher Education, 13*(1/2), 45-51.

O'Donnell, A. (2004). The nature of networking in small firms. *Qualitative Market Research, 7*(3), 206.

Pituch, K. A., & Lee, Y.-k. (2006). The influence of system characteristics on e-learning use. *Computers & Education, 47*(2), 222-244.

Ralph, L., & Stahr, B. (2010). When Off-Campus Means Virtual Campus: The Academic Library in Second Life. *Journal of Library Administration, 50*(7/8), 909-922.

Randall, B., Bishop, J., Johnson, M., Shearin, E., Godley, P., & Caudle, K. (1996). A marketing approach to distance education technology: A statewide survey. *Community College Review, 23*(4), 15.

Sánchez, J., Salinas, A., Contreras, D., & Meyer, E. (2011). Does the New Digital Generation of Learners Exist? A Qualitative Study. *British Journal of Educational Technology, 42*(4), 543-556.

Savic, M. (2005). What you need to know about media distribution systems. *Media & Methods, 42*(1), 17-17.

Scott, K. M. (2013). Does a university teacher need to change e-learning beliefs and practices when using a social networking site? A longitudinal case study. *British Journal of Educational Technology, 44*(4), 571-580.

Trim, P. R. J. (2003). Strategic marketing of further and higher educational institutions: Partnership arrangements and centres of entrepreneurship. *The International Journal of Educational Management, 17*(2/3), 59.

Wang, Q., Lit Woo, H., Lang Quek, C., Yang, Y., & Liu, M. (2012). Using the Facebook group as a learning management system: An exploratory study. *British Journal of Educational Technology, 43*(3), 428-438.

Wiid, C., McCormack, C., Warren, A., Buckley, S., & Cahill, M. (2013). Public and private blogging during placements: perspectives of occupational therapy students. *International Journal of Therapy & Rehabilitation, 20*(2), 79-85.

Williams van Rooij, S. (2012). Open-source learning management systems: a predictive model for higher education. *Journal of Computer Assisted Learning, 28*(2), 114-125.

Zontanos, G., & Anderson, A. R. (2004). Relationships, marketing and small business: an exploration of links in theory and practice. *Qualitative Market Research, 7*(3), 228.

ENTREPRENEURSHIP EDUCATION LITERATURE IN THE 2000S

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ABSTRACT

There seems to be a gap in the literature on entrepreneurship education that prevents it from making stronger contributions towards practice. This study addresses this issue by reviewing the state of the art about entrepreneurship education through the analysis of the contributions made over the 2000s.

Theoretical contributions on entrepreneurship education have been increasing and improving in terms of scope and methodology, but there still seems to be a lack of articles that expand knowledge by simultaneously making new theoretical propositions and testing those propositions in new experimental settings

Articles centered on the development of methods, programs, and frameworks often reflect experiences that are context-specific; empirical validation, when offered, is usually limited to those specific contexts. Theory-building and theory-testing are rooted in single paradigms, limiting the generation of more complete and eclectic knowledge. Entrepreneurship education seems to be more focused on what works in the classroom than on developing cutting edge theoretical contributions. Several lines of inquiry are proposed in order to push the boundaries of existing paradigms and trends and improving practice through theory-building.

The present work contributes to the literature by providing an overview of the current state of the field, highlighting main trends and gaps. The application of a taxonomy based on the Business and Management literature to analyze theoretical contributions in the field of entrepreneurship education is original and can provide a means for evaluation of progress in the field over time

INTRODUCTION

Entrepreneurship education has progressed in great strides and has spread widely around the world in recent decades. This proliferation has been supplemented by increasing diversity in pedagogic approaches and an increasing number of courses addressing special subjects within the entrepreneurial process (Vesper and Gartner, 1997; Katz, 2003). Entrepreneurship is now a well-established academic discipline (Gartner and Vesper, 1994; Fiet, 2000b) and a legitimate course of study (Vesper and Gartner 1997; Katz, 2003).

Theory-building and its role in the advance of entrepreneurship education has been a longstanding concern in entrepreneurship education research, as emphasized by several authors (e.g. Sexton and Bowman, 1984; Hills, 1988; Katz, 2003). Theory-building is the process by which theoretical contributions are generated, tested and refined (Gioia and Pitre, 1990). Theoretical contributions are one of the frequent prerequisites of top-tier journals and are fundamental to the advance of the field.

Whetten (1989) highlights the importance of theory in challenging and advancing scientific knowledge and guiding research, and contends that "the theory development process and criteria for judging theoretical contributions need to be broadly understood and accepted so that editors and contributors can communicate effectively" (Whetten, 1989: 495). Over the years there have been a number of efforts to communicate the ingredients for a good theoretical contribution in the field of management, and different frameworks and writings have been put forward. Significant contributions include: Whetten (1989); Van de Ven (1989); Eisenhardt (1989); Gioia and Pitre (1990); Weick (1995); Kilduff (2006); Colquitt and Zapata-Phelan (2007); Rindova (2008); and Corley and Gioia (2011).

Gioia and Pitre (1990) presented different approaches to theory-building, founded on different paradigms, earlier proposed by Burrel and Morgan (1979). Kuhn (1970), Burrel and Morgan (1979) emphasized the importance to use several paradigms to analyze the organizational phenomenon, avoiding a biased vision of the reality. Béchard and Grégoire (2005) emphasize the lack of established paradigms in the early stages of theory development in the field of entrepreneurship. Ireland et al. (2005), claim that, in general, entrepreneurship research is characterized by low paradigm development. In turn, Busenitz et al. (2003: 237), referring to research into multiple fields in entrepreneurship, conclude that "no powerful unifying paradigm exists, nor do multiple coherent points of view." Weick (1995) argues that in low paradigm fields of research it is sometimes difficult to build theory and, most important, to discern whether the work produced is theory.

On the other hand, literature reviews are important to organize and analyze recent research and also to reflect about the course of future developments, such as Dainow (1986) and Gorman et al. (1997) emphasize. However, there have been no impactful literature reviews on entrepreneurship education over the last decade. It seems, therefore, a good time to provide a analysis of the progress in the field, focusing on the analysis of theoretical contributions produced. In an attempt to close existing gaps that prevents this literature from making stronger contributions towards practice, we develop this study, by reviewing the state of the art in theory-building about entrepreneurship education, through the analysis of the contributions made over the last decade, following several author's contributions and appeals (e.g. Whetten, 1989; Van de Ven, 1989; Fiet, 2000a, 2000b; Rindova, 2008). This study also attempts to anticipate future problems by identifying the main gaps in the literature, and offers some suggestions for future challenges or avenues for further research.

Some recent works have analyzed trends in theory-building in management sciences and proposed different frameworks of analysis. For instance, Colquitt and Zapata-Phelan (2007) look at articles published in the Academy of Management Journal (AMJ), while Corley and Gioia (2011) analyze literature from the Academy of Management Review (AMR). Despite the fact these analyses are based on wider time periods, this paper uses a different approach, focusing on the last 11 years (due to the significant developments in entrepreneurship education on the last decade); applying those frameworks to entrepreneurship education research; and, extending the analysis to a much wider range of journals.

The paper is organized as follows. First the elements of theory-building that guide the analysis are briefly discussed; second, the methodological approach is presented; third, a typology of contributions is established; fourth, the content of theoretical contributions is analyzed; and finally, results are discussed and conclusions are drawn, as well as the implications and limitations of the study are discussed, suggesting avenues for future research.

ELEMENTS FOR AN EXAMINATION OF CONTRIBUTIONS

Although there are many definitions of the concept of theoretical contribution, there is no universal definition. According to Corley and Gioia (2011: 15), "the idea of contribution rests largely on the ability to provide *original insight* into a phenomenon by advancing knowledge in a way that is deemed to have *utility* or usefulness for some purpose." This study builds upon Rindova's (2008: 300) definition: "What makes a contribution novel is not that no one in the field ever thought about a given idea but that the idea is articulated, organized, and connected in a way that suggests new directions for researchers who, hopefully, are already thinking about it."

In order to analyze and assess theoretical contributions, this study produces a taxonomy built upon contributions and frameworks published in the AMR and AMJ, which are among management's leading conceptual journals in the Web of Science Journal Citation Reports for 2011, both in terms of impact factor and article influence score.

Taxonomy

Colquitt and Zapata-Phelan (2007) develop a taxonomy that is applied to the theoretical contribution of empirical articles. This taxonomy is based on two dimensions – theory-building and theory-testing – and encompasses five categories: "reporters", "testers", "qualifiers", "builders", and "expanders". The quotation marks are henceforth dropped from the text when referring to these categories.

Reporters have low levels of theory-building and theory-testing, and are usually related to replications of conflicting findings in past research. Testers have high levels of theory-testing and low levels of theory-building, and test existing theory in different contexts or samples. Qualifiers have moderate levels of theory-testing and theory-building, and qualify relationships or processes established in past research. Builders have high levels of theory-building and low levels of theory-testing, and include inductive studies that develop new constructs, relationships or processes. Builders can also include hypothetical-deductive studies that analyze a relationship that has not been analyzed before. Expanders have high levels of theory-building and theory-testing, focusing on constructs, relationships or processes that have not yet been theorized, while also testing existing theory. Builders, testers, and expanders make greater theoretical contributions when compared to reporters and qualifiers, whose theoretical contributions are lower.

Colquitt and Zapata-Phelan (2007) use this taxonomy to analyze trends in the theoretical contributions of AMJ articles over the past five decades finding an increase in theory-building and theory-testing in management research. Reporters have been replaced by qualifiers and expanders, which have become the most impactful articles. Builders have also increased, outpacing testers. It is important to examine entrepreneurship education literature in order to ascertain what types of articles (with regard to the weight of theory-building) have been published most frequently. While there may be a feeling that most works on entrepreneurship education are merely reporters, an examination of the recent literature might provide a different insight. An emergence of builders without a concomitant increase in testers can cause a "construct proliferation" which is not very desirable in a low paradigm field with an already fragmented literature (Pfeffer, 1993).

Assessment

Paradigms

According to Kuhn (1970), and Burrel and Morgan (1979) analysis based on only one paradigm or one way of understanding the organizational phenomenon tends to produce incomplete knowledge, especially when referring to the multifaceted nature of organizational studies and realities. Burrel and Morgan (1979) distinguish four paradigms: interpretivist and radical humanist, related to a subjective approach to reality, and radical structuralist and functionalist, related to an objective approach to reality. Gioia and Pitre (1990), applied these intellectual foundations to theory-building issue, arguing that there are different approaches to theory-building founded on different paradigms.

The interpretivist paradigm describes and explains, in order to diagnose and understand, and theory-building typically consists of substantively describing emerging concepts and relationships and showing how it all fits together. The radical humanist paradigm describes and critiques in order to revise and change the perception of reality, and theory-building usually consists of writing up dialectical analyses and showing how the level of consciousness should change.

The radical structuralist paradigm aims to understand, explain, criticize, and actively revise the structure of reality. Under this paradigm, theory-building usually consists of writing up rhetorical analyses and showing how established practice should change. In the functionalist paradigm, the goal is to search for regularities and test them in order to predict and control reality, and theory-building usually consists of writing up results and propositions, describing the regularities observed, testing these propositions, and showing how the theory is refined, supported or disconfirmed.

Most theory development is based on functionalism. However, this paradigm should not be seen as the best suited, universal approach for theory-building. Also, while theoretical perspectives based on a single paradigm should be recognized as original, they jeopardize an eclectic and holistic vision of reality. Gioia and Pitre (1990) propose a metaparadigm perspective of theory-building in which shared areas between paradigms (transition zones) exist allowing for diverse paradigmatic views, regardless of whether the viewer is typically rooted in the assumptions of a particular paradigm.

Building Blocks

Whetten's (1989) contribution to theory development remains influential and provides a standard for assessment of the consistency of theoretical contributions. Based on previous contributions to theory development (e.g. Dubin, 1969), this author suggests that good theoretical contributions are based on four building blocks: "what" refers to the identification of factors, variables, constructs and concepts that must be taken into account in the explanation of the phenomenon, while respecting the criteria of comprehensiveness and parsimony; "how" refers to an explanation of the way in which the previous factors are related, and the development of patterns of causality; "why" refers to the description of the underlying dynamics beyond the proposed factors and causal relationships; and "when" refers to the temporal and contextual factors that condition the propositions of the theoretical model and represent the range of the theory.

"What," "how" and "when" describe and constitute the domain or subject of theory, providing a framework for interpreting patterns or discrepancies. "Why" embodies the theory's assumptions and explanations, representing the elements of the theory subject to empirical testing, and specifying the implications for research of a theoretical argument. Assessment of current literature on entrepreneurship education requires an analysis of whether the research has responded to the challenge of "why," i.e. whether it has produced new insights with implications for further research that can be subjected to empirical examination across a variety of settings.

RESEARCH METHOD

Sources And Coverage

This analysis focuses on academic articles published over the period 2000-2011 on the subject of entrepreneurship education in higher education. This time period is particularly relevant since the last decade has seen significant developments in entrepreneurship education with the creation of a large number of programs inside and outside business schools, plus a variety of courses covering specific subjects within entrepreneurship (such as, for instance, opportunity recognition, business models, and entrepreneurial finance). Also, the last impactful reviews of the subject were carried out in the late 1990s (for instance: Gorman et al., 1997, and Fiet's (2000a, 2000b).

Articles are drawn from peer-reviewed journals in the subject categories of Business, Management, Education and Educational Research. Most of these journals are listed in the ISI Web of Knowledge. The selection of articles was carried out with the objective of covering the widest possible range of journals in the fields of Management and Education integrating theory and empirical articles about entrepreneurship education (methodologies, theories, contents, frameworks and evaluation of programs/subjects). Interviews, reports, introductions to special issues, and presentations were excluded. Table 1 outlines the stages pursued in the review methodology. Two searches were conducted: the first search was carried out on the websites of the most prestigious journals in each of the areas listed above, according to ISI impact factor (specifically, all the journals with a 2010 five-year impact factor greater than the aggregate impact factor for the ISI subject category where the journal is primarily listed were included); the second search covered business and academic databases (such as EBSCO), thereby adding more journals to the initial sample.

Table 1 Review Methodology	
Stage	**Description**
Selection process	
1st Search	
1	In the ISI Web of Knowledge (Journal of Citation Reports 2010 – Social Sciences Edition) list of journals, the following subject categories (journal type) were selected: Education and Educational Research; Management; and Business.
2	Journals were also selected that were not indexed on ISI Web of Knowledge, but included relevant articles about the topic, such as: *Higher Education in Europe*, *Teaching in Higher Education*, *Journal of Enterprising Culture*, *International Journal of Entrepreneurship Education*.
3	A search was conducted for articles that met four criteria: (1) peer review; (2) use of one or more of the following keywords in the title or abstract: "entrepreneurship education;" "educating entrepreneurship;" "teaching entrepreneurship;" "entrepreneurial university;" "entrepreneurship faculty;" "academic entrepreneurship;" "university entrepreneurship;" "enterprise education;" and "entrepreneurialism"; (3) publication between 2000 and 2011, inclusive; (4) focus on entrepreneurship education methodologies, theories, contents, frameworks and evaluation of programs/subjects.
2nd Search	
4	Search in business and academic databases (such as EBSCO) for articles integrating theory about entrepreneurship education, using the above mentioned keywords.
Data analysis	
5	The data were 'cleaned' by excluding interviews, book reviews, editorial notes reports, introductions to special issues, and presentations. Articles that do not look at entrepreneurship education per se (such as works focusing on university administration and technology commercialization) were also excluded. The searches resulted in a set of 152 articles that met the selection criteria.
6	Articles were then read and analyzed. A total of 92 studies were dropped from further analysis since they did not meet the criteria described in (3), 60 articles remaining in the final set.
7	A first database of all relevant articles was created and additional information such as the article title, its author(s) details, the journal, the year of publication and an overview of the article were recorded.
8	After a content analysis of the articles, a second database was created and articles were coded according to: purpose, sample/data used, data analysis/procedures, findings, consistency of the theoretical framework and participation in the programs (mandatory vs. elective).
9	All the articles of the database were reviewed and coded by the authors according to the taxonomy created, on two separate occasions, with four-month gap between reviews. After an article was coded the second time, the coding was compared to its original coding. In over 90 per cent of cases, codings were the same; differences were due to more consistent application of selection criteria. In a meeting, the coding was compared and discrepancies were discussed in order to reach a consensus.

Following the procedure adopted by Busenitz et al. (2003), Coviello and Jones (2004) and Ireland et al. (2005), the searches were based on keywords associated with entrepreneurship education in the article title or abstract. The keywords were: entrepreneurship education;" "educating entrepreneurship;" "teaching entrepreneurship;" "entrepreneurial university;" "entrepreneurship faculty;" "academic entrepreneurship;" "university entrepreneurship;" "enterprise education;" and "entrepreneurialism". Examples of articles that were excluded from the review because they did not focus on entrepreneurship education per se (for instance, works

focusing on university administration and technology commercialization) include Shane (2004) on university patenting, and Powers (2004) on technology transfer, among others.

To ensure reliability, following Dainow's (1986), all the articles in the database were reviewed and coded by the authors according to the taxonomy created, on two separate occasions, with a four-month gap between reviews. After an article was coded the second time, the coding was compared to its original coding. In over 90 per cent of cases, codings were the same; differences were due to more consistent application of selection criteria. In a meeting, the coding was compared and discrepancies were discussed in order to reach a consensus. This procedure yielded 60 peer-reviewed articles from 29 journals with the distribution shown in Table 2.

Table 2 Distribution of Articles per Peer-reviewed Journals		
Subject Category	**Journal Name (abbreviation)**	**No. of Articles**
Business and Management	*Entrepreneurship & Regional Development (ERD)*	2
	Entrepreneurship Theory & Practice (ETP)	1
	European Economic Review (EER)	1
	International Entrepreneurship Management Journal (IEMJ)	9
	International Journal of Business and Globalization (IJBG)	1
	International Journal of Entrepreneurship and Small Business (IJESB)	1
	International Journal of Entrepreneurship Education (IJEE)	1
	International Review on Public and Nonprofit Marketing (IRPNM)	1
	International Small Business Journal (ISBJ)	1
	Journal of Business Venturing (JBV)	4
	Journal of Economic Behavior & Organization (JEBO)	1
	Journal of Enterprising Culture (JEC)	2
	Journal of Small Business and Enterprise Development (JSBED)	1
	Journal of Small Business Management (JSBM)	1
	Research in Business and Economics Journal (RBEJ)	1
	Research Policy (RP)	1
	Silicon Valley Review of Global Entrepreneurship Research (SVRGER)	1
	Small Business Economics (SBE)	1
	Technology Analysis & Strategic Management (TASM)	1
	Technovation (T)	2
Education And Education Research	*Academy of Management Learning & Education (AMLE)*	6
	European Journal of Education (EJE)	1
	European Journal of Engineering Education (EJEE)	2
	Higher Education (HE)	1
	Higher Education in Europe (HEE)	3
	Industry & Higher Education (IHE)	9
	Journal of Education for Business (JEB)	1
	Journal of European Industrial Training (JEIT)	2
	Research in Higher Education (RHE)	1

Analysis

The analysis is divided into two parts. First, a taxonomy of articles is based on the contributions set out in subsection 2.1. The taxonomy is based on theory generation, i.e. articles are classified according to whether they attempt to make a significant theoretical contribution, as follows:

1. Articles that do not attempt significant theory-building – reporters – mostly include case studies that offer insights into a specific context and do not try to generate theory (as identified by Eisenhardt, 1989) and general appraisals of the practice of entrepreneurship education;

2. Articles that provide empirical tests of previously existing theory in new experimental settings – testers;

3. Articles that propose new theory, whether derived from case studies, observations and perceptions of established practice, or empirical regularities – builders and qualifiers, and expanders. Builders and qualifiers are grouped together in the analysis since the parameters employed for analyzing theoretical content are similar, and qualifiers are relatively rare (in fact, none is identified in this analysis). In general, qualifiers include articles that add cumulatively to the constructs, relationships, and processes described by previous research, while builders introduce new constructs, relationships, and processes.

The second part of the analysis examines the nature and character of theory-building presented by the articles surveyed. This examination is twofold. First, the content of theoretical contributions is examined using Whetten's (1989) building blocks as a reference. The objective is to assess whether recent research on entrepreneurship education has contributed to conceptual elevation and unification. Second, the foundations of theory-building in each paper are classified according to the paradigms described by Gioia and Pitre (1990). Specifically, the roots of the theory developed in each paper are examined, in order to determine whether there is a dominant paradigm (interpretivist, radical humanist, radical structuralist, or functionalist), or whether the paper applies a metaparadigm perspective to theory-building. Table 3 outlines the taxonomy developed.

Table 3 **Taxonomy of Theoretical Contributions**			
Taxonomy	**Description**		
Reporters	Descriptive analysis; replicate past findings		
		Content	**Foundation**
Testers	Test existing theory in new contexts	What, How, When, & Why	Interpretivist, Radical Humanist, Radical Structuralist, Functionalist, & Metaparadigm
Builders & Qualifiers	Development of new constructs, relationships or processes, and restriction/moderation of established relationships or processes		
Expanders	Development of new constructs, relationships or processes, while also testing existing theory		
Procedures			
1. **Description:** articles are classified according to whether they attempt to make a significant theoretical contribution (reporter, tester, builder and qualifier, expander);			
2. **Content:** articles with significant theoretical contributions (testers, builders and qualifiers, expanders) are examined according the content of theoretical contributions using Whetten's (1989) building blocks as a reference;			
3. **Foundation:** articles with significant theoretical contributions (testers, builders and qualifiers, expanders) are classified according to the paradigms described by Gioia and Pitre (1990).			

TYPOLOGY OF CONTRIBUTIONS

Some of the articles surveyed directly address the practice of entrepreneurship education by focusing on programs, methods, frameworks, and models. Other papers address the relationship between entrepreneurship education and other subjects of entrepreneurship research, including entrepreneurial intentions, attitudes, motivations, and propensity. This analysis does not reflect this separation, since it focuses primarily on the type and nature of contributions, and not on the specific insights generated.

Reporters

Most reporters are case studies. Eisenhardt (1989) distinguishes between two types of case studies: those that intend to generate or build theory from data presentation, and those that offer insights of a specific context and do not intend to generate theory. The articles surveyed for this paper that are based on case studies are entirely descriptive, presenting different realities as examples of good practices, and are not intended to generate theory.

Table 4 outlines the reporters surveyed. The case studies describe methods (Bager, 2011; Carey and Matlay, 2011; Clarke and Underwood, 2011); programs and subjects (Rasmussen and Sorheim, 2005; Bonnet et al., 2006; Heinonen et al., 2007; Harkema and Schout, 2008;

Papayannakis et al., 2008; Hyclak and Barakat, 2010); and entrepreneurial universities (Etzkowitz, et al., 2000; Miclea, 2006; Stankovic, 2006; Philpott et al., 2011). When addressing a theoretical framework, some are very concise (e.g. Papayannakis et al. 2008; Hyclak and Barakat, 2010), while in others, theoretical considerations are spread throughout the text (e.g. Heinonen et al., 2007). In some instances, reference to theory is non-existent (e.g. Miclea, 2006; Stankovic, 2006; Clarke and Underwood, 2011). However, there are also case studies that present a well-defined, consistent theoretical framework supporting and contextualizing the reality being studied (e.g. Etzkowitz et al. 2000; Rasmussen and Sorheim, 2005; Philpott et al. 2011).

Other reporters examine the progress of entrepreneurship education in institutional terms, focusing mostly on supply and demand. Among these, Katz (2003) develops the most comprehensive chronology of entrepreneurship education (1876-1999), while Kuratko (2005) proposes some trends and challenges for the 21st century. Some reporters analyze the general state of entrepreneurship education in different countries (Redford and Trigo, 2007; Klandt, 2004; Klandt and Volkmann, 2006; Solomon, 2007), while others focus their analysis on the institutionalization of the field (Finkle and Deeds, 2001; Finkle, 2010). Most reporters have a consistent, well defined framework, with the exception of Klandt's (2004).

Table 4
Outline of the reporters surveyed

Authors	Year Published	Journal	Main findings
Case Studies			
Etzkowitz et al.	2000	RP	Comparative analysis between USA, Latin America, Europe, and Asia links the emergence of the "triple helix" framework with the development of an entrepreneurial paradigm in universities.
Rasmussen & Sorheim	2005	T	A case study of entrepreneurship education in Switzerland, focusing on learning-by-doing and action-based activities.
Bonnet et al.	2006	EJEE	A study of entrepreneurship training at Delft University of Technology focused on engineering innovation and sustainability.
Miclea	2006	HEE	A study of asymmetries in entrepreneurial attitudes at Babes-Bolyai University, focusing on the clash between individual entrepreneurialism and institutional barriers.
Stankovic	2006	HEE	Basic description of entrepreneurial initiatives at the University of Novi Sad.
Heinonen et al.	2007	IHE	Study of the application of an entrepreneurship-directed educational approach in Finland's universities finds that participating students increase their entrepreneurial potential. Student's entrepreneurial intentions influenced the way they perceived program's objectives.
Harkema & Schout	2008	EJE	Examines the foundations of entrepreneurship education carried out at the Center of Excellence in Innovation & Entrepreneurship at the University of Professional Education in The Hague. The competence-based program is based on a constructivist perspective and learner-centered theories where students are stimulated to create their own goals.
Papayannakis et al.	2008	EJEE	Study of the experience in curricula design and implementation for entrepreneurship education at National Technical University in Greece.
Hyclak & Barakat	2010	IHE	Study of the design and implementation of high tech entrepreneurship curricula at Cambridge University.

Bager	2011	IEMJ	Presents a case study of three different Danish training programs aimed at team building, creativity, and innovation promotion.
Clarke & Underwood	2011	IHE	Study of the introduction of volunteering opportunities into business ethics and enterprise modules to develop students' skills in real-life entrepreneurial cases.
Carey & Matlay	2011	IHE	Examines the emergence of online social media in pedagogy, and the roles of risk and responsibility in the assessment and support of business ideas.
Philpott et al.	2011	T	Study of the emergence of an entrepreneurial university, highlighting the divide between disciplines (science, engineering and medicine vs. social sciences and business).
Other Reporters			
Finkle & Deeds	2001	JBV	Finds that, from 1989 to 1998, both the demand for and the supply of entrepreneurship faculty have increased in the US, even though there has been no mandate from the American Assembly of Collegiate Schools of Business for the incorporation of entrepreneurship into the curriculum of all accredited schools.
Katz	2003	JBV	Finds that, in the US, the entrepreneurship education has reached maturity, but growth is likely outside business schools and outside the US. Proposes that there are too many journals, a narrowing focus on top-tier publications and a shortage of faculty overall exacerbated by a shortage of specialized doctoral programs.
Klandt	2004	AMLE	Finds that, from 1998 to 2002 the number of professorships in entrepreneurship has increased in German-speaking Europe.
Kuratko	2005	ETP	Identifies trends and challenges in entrepreneurship education for the 21st century, including: a maturity/complacency/stagnation trap; a research/publications dilemma; and a faculty pipeline shortage.
Klandt & Volkmann	2006	HEE	Reports an increase in the number of entrepreneurship chairs at universities in Germany in the period of 1998-2004.
Redford & Trigo	2007	SVRGER	Reports trends in the development of entrepreneurship education in Portugal.
Solomon	2007	JSBED	Compares the results of a 2004/2005 survey of entrepreneurship education in the US with previous (1977-2000) national surveys, finding that, as the growth trend continued, the use of technology and the Internet started playing a major role in the field.
Finkle	2010	RBEJ	Reports an increase in US faculty positions in entrepreneurship from 1989 to 2008, as well as in candidates. Entrepreneurship tenure track positions have increased when compared with Finkle and Deed's (2001) initial study, suggesting that the field of entrepreneurship is becoming more institutionalized.

Testers

Table 5 shows a summary of the testers surveyed. Most testers examine theories that are not directly associated with entrepreneurship education, focusing instead on entrepreneurial intentions (Oosterbeek et al., 2010; Rodrigues et al. 2010; Sánchez, 2011; Giacomin et al. 2011; Liñán et al. 2011; Lanero et al. 2011); propensity (Kirby and Ibrahim, 2011); attitudes (Lena and Wong, 2003; Shinnar et al. 2008; Teixeira, 2010); and motivations (Kourilsky and Walstad, 2002). Some, however, try to measure the efficacy of entrepreneurship education (Fenton and Barry, 2011) or its impact on different countries (Lee et al. 2005). Some analyze methods (Dutta et al. 2011) and materials (Edelman et al. 2008), while others look at academic entrepreneurship (Klofsten and Jones-Evans, 2000) and faculty entrepreneurialism (Lee and Rhoads, 2004).

A particularly interesting type of testers seeks to evaluate specific entrepreneurship education programs. While some of these cases suffer from selection bias due to elective participation in programs (Fenton and Barry, 2011; Sánchez, 2011), others have devised clever ways to avoid bias (Kirby and Ibrahim, 2011; Oosterbeek et al. 2010). Lee et al. (2005) observe both elective and mandatory programs. While, in general, studies tend to find that entrepreneurial intentions are enhanced by program participation, results differ depending on whether elective or compulsory programs are being observed. In programs where participation is compulsory, participants tend to dislike the program more, which negatively affects entrepreneurial intentions (Oosterbeek et al. 2010).

Table 5 Outline of the testers surveyed			
Authors	**Year Published**	**Journal**	**Main findings**
Klofsten & Jones-Evans	2000	SBE	Examines the effects of entrepreneurial experience among academics in Ireland and Switzerland, finding that it translates into a high degree of involvement in consultancy and contract research, but not into organizational creation via technology spin-offs.
Kourilsky & Walstad	2002	IJEE	Looks at the impact of human capital and opportunity on the success of young entrepreneurs. Finds that professional experience and a technology-based idea or opportunity seem to be more important than entrepreneurship education.
Lena & Wong	2003	JEC	Finds that entrepreneurship education programs per se are not enough to promote entrepreneurial intentions and influence business start-up decisions. A positive attitude towards engagement in these programs seems important.
Lee & Rhoads	2004	RHE	Finds that teaching commitment of faculty diminishes with greater commitment to entrepreneurial activities, and also with increases in research funding.
Lee et al.	2005	IEMJ	Finds that the impact of entrepreneurship education on students' entrepreneurial intentions in Korea is much greater than in the U.S. but U.S. students have greater entrepreneurial intentions, probably because of a more entrepreneurship-oriented culture.
Edelman et al.	2008	AMLE	Finds a gap between practice and what is taught to entrepreneurship students and argues that entrepreneurship texts do not emphasize enough the activities that enhance the probability of starting a new venture.
Shinnar et al.	2008	JEB	Finds that student and faculty views on entrepreneurship often differ dramatically.
Oosterbeek et al.	2010	EER	Examines the effects of a compulsory program offered to young Dutch students. Finds that the program had significantly negative impact on entrepreneurial intentions and no impact on entrepreneurial skills.
Rodrigues et al.	2010	IJESB	Finds that (elective) entrepreneurship training has a significant influence on the propensity for new venture creation among students. Personal characteristics have an important role in shaping motivation and perceived hurdles have a negative impact on intentions.
Teixeira	2010	IHE	Finds that students who have business related competences and live in an environment that fosters entrepreneurship have a stronger desire to become entrepreneurs. Work experience and personality traits influence students' attitudes significantly.
Dutta et al.	2011	IEMJ	Finds that depth or specialization of entrepreneurship education helps facilitate the creation of new ventures. However it is breadth or diversity of educational experiences that positively influences future wealth creation.

Fenton & Barry	2011	IHE	Finds that benefits from entrepreneurship education occur mainly at the graduate level, when it is more meaningful, engaging and applied, suggesting that it should be promoted through experiential learning.
Giacomin et al.	2011	IEMJ	Finds that entrepreneurial disposition and intentions, as well as the sensitivity to each motivator and barrier, differ by country (American, Asian and European) but students across countries are motivated and/or discouraged by similar variables.
Lanero et al.	2011	IRPNM	Finds a positive effect of education on perceived entrepreneurship feasibility, which in turn positively affected entrepreneurial intentions by providing individuals with a feeling of personal competence.
Liñán et al.	2011	IEMJ	Finds that entrepreneurship education enhances perceived behavioral control, leading to greater entrepreneurial intentions. However, start-up decisions also depend on the "entrepreneurial orientation" of the individual and not only on perceived feasibility and desirability.
Kirby & Ibrahim	2011	IEMJ	Finds that entrepreneurial propensity of Egyptian students is higher than that of their counterparts in the UK.
Sánchez	2011	IEMJ	Finds that students participating in an elective entrepreneurship program increased their competencies (self-efficacy, pro-activeness, risk-taking) and intentions towards self-employment.

Builders

Builder articles are at the core of theory generation in the field. The examination of the progress of entrepreneurship education through the analysis of published material and the generation of new theoretical contributions and improvements to existing ones has been a concern shared by several authors over the last decade. Béchard and Grégoire (2005) highlight the main preoccupations in the field and develop a typology of them in entrepreneurship education. Pittaway and Cope (2007); Mars and Rios-Aguilar (2010); and Yusof and Jain (2010) develop different frameworks for entrepreneurship in higher education, based on the findings of their surveys. Laukkanen (2000); Fiet (2000b); Honig (2004); Boyle (2007); and Blenker et al. (2011) propose new approaches and models. Fiet (2000a); Shepherd (2004); and Haase and Lautenschlager (2011) propose new methods and pedagogies. Lobler (2006); Barbosa et al. (2008); Fayolle and Gailly (2008); Wollard (2010); Hjorth (2011); and Neck and Greene (2011) propose new programs and frameworks.

No qualifier articles were identified in this survey. Most builders are based on a well-defined, consistent theoretical background supporting and contextualizing the research (Béchard and Grégoire, 2005; Mars and Rios-Aguilar, 2010), while in some the theoretical background underpinning the new theory being built is not well defined but is easy to recognize (Pittaway and Cope, 2005; Yusof and Jain, 2010; Neck and Greene, 2011). A significant literature stream arises from the work by Fiet (2000a, 2000b). The more interesting contributions propose a theoretical framework and apply to a specific program, which is evaluated on the basis of the proposed framework (Laukkanen, 2000; Lobler, 2004; Barbosa et al. 2008). Table 6 summarizes the builders examined.

			Table 6
			Outline of the builders surveyed
Authors	**Year Published**	**Journal**	**Main findings**
Fiet	2000b	JBV	Appeals for educators to increase the theoretical content in their entrepreneurship courses and points several opportunities to build cumulative theory. A contingency approach for teaching entrepreneurship is proposed.
Fiet	2000a	JBV	Proposes a method to teach theory by establishing a student-approved system to enhance student motivation and participation in the acquisition of competencies.
Laukkanen	2000	ERD	Proposes a business-generating model of teaching, implying a shift of mindsets or paradigms towards the role of the university in generating business strategies.
Honig	2004	AMLE	Presents two alternative experiential models of teaching entrepreneurship: the Experiential Model of Entrepreneurship Education (using simulations and convergent group thinking), and the Contingency Model of Business Planning Education (assimilation of concepts, accommodation of divergent thinking).
Shepherd	2004	AMLE	Argues that failure is an important source of learning for entrepreneurs and proposes the application of a specific pedagogy in the classroom to teach students to manage their emotions when faced with failures.
Béchard & Grégoire	2005	AMLE	Proposes that the literature on entrepreneurship education is articulated around four major types of preoccupations: social and economic roles of entrepreneurship education; systematization of entrepreneurship education; content and methodologies; and the needs of individual students in structuring teaching interventions.
Lobler	2006	TASM	The constructivist approach and an out of school learning environment are used as a theoretical base for entrepreneurship education, deriving principles for the promotion of a self-governed learning process.
Boyle	2007	IHE	Proposes a new model of entrepreneurship education focusing on the development of the individual, more than the dissemination of knowledge. Instruments include entrepreneurial retreats for the development of entrepreneurial thinking, new curricula and individualized entrepreneurial prescriptions, apprenticeships and opportunity centers.
Pittaway & Cope	2007	ISBJ	Develops a framework for entrepreneurship education, identifying key areas for empirical research: general policy climate for entrepreneurship education; general enterprise infrastructure; and contextual factors.
Barbosa et al.	2008	JEC	Proposes an approach for the development of an educational program in entrepreneurship to help students develop their entrepreneurial cognition and risk taking, reducing the risks of failing and of missing good opportunities, and developing both the intuitive and the analytic sides of student's cognition.
Fayolle & Gailly	2008	JEIT	Proposes a framework with two levels (ontological and educational) for the development of a teaching model where five questions should be addressed: why (goals); for whom (audience); for which results (evaluation criteria); what (contents and theories); and how (methods).
Mars & Rios-Aguilar	2010	HE	A framework for strengthening the application of entrepreneurial models to higher education research is introduced, based on the theoretical constructs of entrepreneurship found in the economics and management literature, such as disruption, innovation and value creation.
Woollard	2010	HEE	Proposes a theoretical framework that sees university entrepreneurship as an organizational process within an entrepreneurial system described

			as an input-process-output model with feedback effects of process outputs and outcomes.
Yusof & Jain	2010	IEMJ	Proposes a framework for research into university-level entrepreneurship including entrepreneurship teaching, academic entrepreneurship, and technology transfer.
Blenker et al	2011	IHE	Identifies four paradigms of entrepreneurship teaching and proposes the emergence of a new paradigm: "everyday practice," related with the promotion of an entrepreneurial mindset. Argues that there is a logic progression between the existing paradigms and everyday practice.
Haase & Lautenschlager	2011	IEMJ	Identifies a "teachability dilemma" which emerges because while the importance of the entrepreneurial "know-how" is recognized, such know-how is also very difficult to teach because experience-based soft skills related to the entrepreneurship field are difficult to develop.
Hjorth	2011	ERD	An affect-based theory of entrepreneurial entrepreneurship education is developed in a model of provocation-based entrepreneurial entrepreneurship education (the E^3 model) which supports learning as a social creation process.
Neck & Greene	2011	JSBM	Argues that teaching entrepreneurship as a method that is teachable, learnable, but not predicted, requires practice and focus on a portfolio of techniques to practice entrepreneurship and encourage creating.

Expanders

The expander articles surveyed emphasize theories or frameworks (Fayolle et al. 2006; Kyro, 2008) or methods (DeTienne and Chandler, 2004; Graevenitz et al. 2010). All four expanders identified produce theory that is directly related to entrepreneurship education, except for Graevenitz et al. (2010), who focus on entrepreneurial intentions. All the articles compare their own theory with existing perspectives by applying it to a program and assessing its validity and consistency. Table 7 outlines the expanders.

Table 7 **Outline of the expanders surveyed**			
Authors	**Year Published**	**Journal**	**Main findings**
DeTienne & Chandler	2004	AMLE	Proposes a specific training intervention model based on generativity theory (SEEC: securing, expanding, exposing, and challenging) aimed at developing opportunity identification competences in the classroom.
Fayolle et al.	2006	JEIT	Develops a framework to assess and/or improve the design and execution of entrepreneurship education programs, linking characteristics of the program (setting and audience, type of program, objectives, contents, teaching and training methods, and approaches) with outcomes related with attitudes and intentions.
Kyro	2008	IJBG	Develops a framework that combines learning and teaching for fostering individual meta-competencies (meta-affection, meta-conation and meta-cognition). These three constructs of personality and intelligence interplay and relate with the teaching and risk learning processes.
Graevenitz et al.	2010	JEBO	Proposes and tests a model of learning in which entrepreneurship education generates signals to the students. Using this model it is shown that the course induces sorting, and that entrepreneurship education may not always lead to stronger entrepreneurial intentions.

CONTENT

The testers examined make no significant theoretical contributions and in general it is not possible to detect the presence of Whetten's building blocks of theory development. An exception is Liñán et al., (2011), who identify and relate the "what," "how" and "why" elements and explain their relationships.

In those articles classified as builders, three elements of theory development can be easily identified: "what," "how" and "why." "What" and "how" are related to the theoretical framework where concepts, constructs, variables and their relationships are described. "Why," which relates to the explanation of the theoretical assumptions (explaining the relationships and dynamics between constructs and their application to the entrepreneurship education field), is sometimes under-addressed (Shepherd, 2004; Boyle, 2007). The fourth element of theory development, which is related to testing – "who, where and when" – is usually not addressed in the builder category, although some articles may present a brief, informal, non-systematic evaluation of the programs (Laukkanen, 2000; Lobler, 2006; Barbosa et al., 2008).

The articles classified as expanders, including DeTienne and Chandler (2004); Fayolle et al., (2006); Kyro (2008); and Graevenitz et al., (2010) display consistent elements of theory-development: "what," "how," "why" and "who, where, when." When compared to builders, expanders contribute more significantly to theory since these articles assess the "what," "how" and "why" elements, analyzing temporal and contextual factors, testing the propositions of the theoretical model and thus increasing theory applicability. An analysis of theoretical contributions according to paradigms of theory-building paradigms reveals that a large majority of contributions are rooted in the functionalist and radical structuralist views. Table 8 summarizes testers, builders, and expanders according to the dominant theory-building paradigm.

Table 8 Paradigms of Theory-building		
Paradigm of theory-building	**Type of article**	**N° of articles**
Interpretivist	Builders	4
Radical Structuralist	Builders	14
Functionalist	Testers	16
Functionalist-Radical Structuralist Transition Zone	Testers	1
	Expanders	4

All testers are rooted in the functionalist paradigm, where the main goal is to test in order to predict and control, showing how the theory is refined, supported or disproved. There is, however, one tester (Liñán et al., 2011) which should be placed in the transition zone between functionalism and structuralism, due to the coexistence of testing and an aspiration to change reality and practices. These features are also displayed by all four expander articles, which are also classified in this transition zone, (DeTienne and Chandler, 2004; Fayolle et al., 2006; Kyro, 2008; Graevenitz et al., 2010).

Four articles classified as builders are founded on the interpretivist paradigm: Béchard and Grégoire (2005); Pittaway and Cope, (2007); Mars and Rios-Aguilar (2010); and Yusof and Jain (2010). In these articles, the main purpose is to describe and explain in order to diagnose and understand where new concepts and relationships emerge. All the other builders surveyed are rooted in the radical structuralist paradigm, as their main goal is to understand, explain, criticize and act, showing how practices should change.

CONCLUSION

This aim of this paper has been to review the literature on entrepreneurship education over the last decade (2000-2011), focusing in particular on theoretical contributions. The survey shows that theoretical contributions on entrepreneurship education have been increasing and improving in terms of scope and methodology, but there still seems to be a lack of articles that expand knowledge by simultaneously making new theoretical propositions and testing those propositions in new experimental settings. Also, theory-building and theory-testing are still rooted in single paradigms, limiting the generation of more complete and eclectic knowledge.

The present work contributes to the literature by providing an overview of the current state of the field, highlighting main trends and gaps. The application of a taxonomy based on the Business and Management literature to analyze theoretical contributions in the field of entrepreneurship education is original and can provide a means for evaluation of progress in the field over time.

Contribution

Taxonomy of Articles

Although all articles examined are deemed important for the advancement of the field, some have contributed more by going further than just describing the existing reality, by testing existing theory or developing new theories without experimentation. As Colquitt and Zapata-Phelan (2007) argue, theory-building and theory-testing can coexist in the same article, and those who succeed at both presenting a new theory and testing it are likely to make longer-lasting contributions.

More than half of the articles reviewed emphasize theory testing and/or theory development (therefore earning a classification as builders, testers or expanders), showing evidence that the appeal made by several authors (e.g. Whetten, 1989; Van de Ven, 1989; Fiet, 2000b; Rindova, 2008), for more theory has had some resonance in the field. Evolution over the last few years shows that reporter articles (including descriptive case studies) have not increased significantly in number, while testers and builders have. This finding is somewhat at odds with Colquitt and Zapata-Phelan (2007) who report an increase in expanders and a decrease in testers. Since these authors focused solely on articles in the AMJ, our findings seem to show that the literature at large has not – unlike the AMJ – emphasized expanders, and still seems to be more focused on testing existing theories or presenting new theoretical contributions without testing them.

In general, the field of entrepreneurship education does not seem to have evolved as much as would be expected over the 25 years since Ronstadt's (1985:49) diagnosis: "(…) The field is new; it is hard to defend; it has little conceptual substance because it is so young; anyone can kill

a new idea." And, perhaps because entrepreneurship education is still an evolving field (Chandler and Lyon, 2001; Busenitz et al., 2003) where paradigms are still lacking, this survey finds that: (i) there is a strong focus on the analysis of the "current state" of entrepreneurship education; (ii) most builder and expander articles are centered on the development of methods, programs and new theories or frameworks; and (iii) most tester articles are related to theories focusing on subjects other than entrepreneurship education, such as entrepreneurial intentions. One expects that, when the field is more consolidated and institutionalized, there will be a shift in the focus of the theory towards a greater refinement and a clearer emphasis on concepts and processes directly associated with entrepreneurship education.

Theory-building from case studies does not seem to be a common trend, even though this is an appropriate method for early stages of research in a field (Eisenhardt, 1989), like entrepreneurship education. None of the many articles surveyed that report case studies link results from a specific context with literature about other contexts, which compromises their conceptual elevation and generalization of data. Theory-building in entrepreneurship education is, therefore, founded on observations that go beyond specific cases.

Content

This makes theoretical frameworks especially important, as they need to contextualize the domain or subject of theory (Whetten's "what" and "how"). Assessment of articles classified as builders and expanders is positive from this point of view, as most articles do have a consistent, well defined framework. In the tester articles surveyed, a poor or inexistent theoretical framework usually means that the interpretation of patterns or discrepancies with reference to the theory being tested is also poor.

Theory generation in the field of entrepreneurship education is a concern shared by journals focusing on business and management and on education. In the particular case of management journals, the expansion of theory development is in line with Colquitt and Zapata-Phelan's (2007) prediction that theory-building would increase in management literature as the field became more mature. Where the substance of theoretical contributions is concerned, expander articles have the greatest potential to be influential with both academics and practitioners, and it can be argued that there is a shortage of such articles in recent literature. Whetten's four building blocks of theory development are better addressed in the four expander articles identified. By testing their theoretical propositions in real contexts, expanders can better address the key questions postulated by Bergh (2003): (i) in what way does the contribution revise or extend theory development? (ii) is the contribution going to be useful? (iii) will it change the way of thinking about the phenomenon?

A critical issue for the generation of more expander articles is the development of experimental evidence (Whetten's "who, where, when"). This survey supports Colquitt and Zapata-Phelan's (2007) findings that most articles developing new theory do not test their theoretical propositions in experimental settings. Theory applicability is therefore severely limited. Honig (2004) argues that entrepreneurship education seems to be "atheoretical" in the sense that empirical evidence supporting its theories and models is missing. While several authors call for more empirical testing of their own theories or approaches, they do not address this concern themselves. The present article argues that future work should focus on producing more tester articles, following three steps: (i) analyze the existing reality and identify gaps in recognized practice which can be addressed in a general manner; (ii) address these gaps by operationalizing

theoretical propositions that can be applied generally; and (iii) implement and test the theoretical prescriptions in an experimental setting that can provide an accurate impression of the applicability of the theory developed. To illustrate these three steps, an example is provided. The lack of uniformity in the programs offered is mentioned by Gorman at al. (1997) as a gap that should be addressed in future research. Based on the analysis and evaluation of different entrepreneurship education programs, theoretical propositions should be developed regarding the best strategies and practices to implement in the classroom. These strategies and practices should be implemented in the classroom and its impact further evaluated, and a follow-up should be made in order to assess the effectiveness of these measures.

With regard to the empirical testing of theoretical propositions, improvements can be observed when comparing the articles being surveyed here with those that are included in the 10-year literature review by Gorman et al., (1997). In particular, selection bias is more regularly addressed now, as some entrepreneurship education programs have become mandatory, and research has been conducted in those contexts. However, as pointed out above, the mandatory nature of entrepreneurship education can lead to unexpected results (such as a decrease in entrepreneurial intentions), as subjects develop more realistic expectations, becoming more aware that they are not well-suited for entrepreneurial activities. Still, this should not be seen as a negative effect of entrepreneurship education.

Paradigms

Notwithstanding the appeal made by Gioia and Pitre (1990) for a metaparadigm perspective in theory development, most articles concerned with theory in the field of entrepreneurship education remain based on a single paradigm. Almost all tester articles are firmly based on a functionalist paradigm, while builders are founded on the radical structuralist paradigm. Expander articles have a greater potential to straddle these two paradigms, adopting what may be called a multiparadigm, or transition approach, integrating elements of functionalism and radical structuralism. The lack of a true multidisciplinary, metaparadigm perspective restricts a more eclectic, comprehensive analysis of entrepreneurship education. At this stage of development of the field there is still a strong desire to test and change reality, proposing new practices, rather than changing ideologies and criticizing existing structures.

To summarize, it is possible to find logical patterns linking the contents and paradigms underpinning most articles, Expander articles typically, address all four questions posed by Whetten and are rooted in a multiparadigm, transition approach that integrates functionalism and radical structuralism by proposing changes to the accepted body of knowledge and testing these changes in an experimental setting. Builder articles are more limited in the sense that they address only three of Whetten's questions ("what," "why," and "how"), being rooted in the radical structuralist paradigm by proposing changes to the existing knowledge but not testing these changes. Most tester articles address only the "what" question, as they are founded on the functionalist paradigm by developing constructs and variables to test existing knowledge in new settings.

This survey suggests that the literature on entrepreneurship education is focused on what works in the classroom and what tools and models can be used to increase the quality of what can be delivered. As such, it is important to analyze the contribution of entrepreneurship education research towards classroom practices. There is not a consistent body of knowledge or a common framework in entrepreneurship education, which limits the recommendations of best practices for

entrepreneurship educators to adopt. Most articles present specific cases/programs with best practices that work in a specific context, but provide no evidence that these practices may be extended towards a universal approach. Indeed, there is no unequivocal, generalizable evidence on successful practices that might be applied in a widespread variety of contexts. Pedagogical approaches and methods are still, to a large extent, dependent on the objectives, setting, and audience. The best approach for practitioners is to examine the literature and pick out proven strategies and best practices that apply to their specific case. While the adoption of consensual guidelines in entrepreneurship education will probably remain a challenge over the next decade, there are important conclusions to be drawn. Table 9 summarizes the main insights identified in the literature.

Table 9
Main Insights into Best Practices for Entrepreneurship Educators
What emerges from (and for) the entrepreneurial classroom?
Best practices and strategies that entrepreneurship educators should promote: 1. Experiential learning, rather than the transmission of knowledge; 2. Diversity of educational experiences; 3. Learner's active participation and students-approved system to enhance student motivation in the learning process; 4. Multidisciplinary approaches; 5. Direct participation of experienced entrepreneurs in training programs; 6. Experience of failure in the learning process; 7. Risk, responsibility and opportunity identification training; 8. Individual meta competences; 9. Contingency and constructivist approaches; 10. The use of the internet/online social media; 11. A portfolio of techniques to practice entrepreneurship; 12. Adapt the programs to cultural context; 13. Entrepreneurial environment, mindsets and attitudes;

Limitations

This survey is not exempt from limitations. The methodological choices for the search led to a process of selection that might have left out some important contributions to the field of entrepreneurship education. While the coding scheme and categories of analysis chosen fit the purposes of the analysis, important issues may have been left behind. The deliberate choice to concentrate on a period covering roughly the last decade before 2012 means that some recent contributions may have escaped the analysis. It is believed, however, that the articles surveyed provide an accurate overview of the development of research in the field, its main gaps and achievements.

Implications For Further Research

In spite of these limitations there are also important opportunities for future research. Table 10 summarizes the main gaps identified, highlights their consequences, and proposes solutions for addressing those gaps, in order to increase the consistency of the body of knowledge. Based on previous analysis and discussion, several lines of inquiry emerge:

1. To use case studies to build theory; to link case study results with the literature on other contexts (avoiding focusing on context-specific experiences, increasing the generalization of results).

2. To undertake empirical studies testing existing theories and methodologies, and include experimental evidence in all theories or methodologies proposed.

3. To develop a metaparadigm approach to theory-building, involving researchers from different fields.

Table 10
Gaps, Problems, and Opportunities for Future Research

Gaps found	What if those gaps are not filled?	Future challenges or avenues for research
Poor theoretical frameworks.	Limited interpretation of patterns or discrepancies.	To characterize better the frameworks of the studies, defining concepts and their relationships.
Absence of theory-building from case studies; most case studies do not link their findings with other literature.	Fewer insights for the field; conceptual elevation and generalization of data will be conditioned.	To use case studies to build theory following Eisenhardt's (1989) stages; link the results of case studies with the literature on other contexts.
Sample selection bias.	Biased results and problems in the generalization of results.	To focus on compulsory entrepreneurship courses, or on purposeful samples.
Lack of experimental evidence on theories/methodologies proposed.	Theories and methodologies lacking practical validity.	To develop more experimental evidence confronting the new theories proposed and those that already exist in order to assess their validity.
The lack of longitudinal studies that derive causal attributions.	The analysis of causal attributions as modifications of behaviors or other changes occur is not possible.	To conduct longitudinal studies in the field of intentions, intentions-behaviors, and changes on both of them.
The lack of a metaparadigm perspective.	A reductionist vision of reality, instead of an eclectic and comprehensive one.	To analyze the same phenomenon under different paradigms, involving researchers from different fields.
Reduced uniformity in the programs offered.	Lack of consistency in the practice of entrepreneurship education.	Instead of creating whole new programs, use previous and already developed programs and build upon them, testing the effects of incremental changes.

The booming pursuit of entrepreneurship education over the last few decades has attracted a growing interest in entrepreneurship education research, leading to an increasingly rich field of study, although characterized by some inconsistency of the body of knowledge, which is reflected in the quality of theoretical contributions, and in the consistency of guidelines to adopt in the entrepreneurial classroom.

It is possible to conclude that theoretical contributions to entrepreneurship education have been increasing and improving, especially thanks to publication of greater numbers of tester and builder articles. New, different ideas have emerged, been articulated, organized, and connected, suggesting new directions for researchers (Rindova, 2008). However, there is still considerable scope for improvement, in particular through the development of more expander articles that make new theoretical propositions and test them propositions in new experimental settings. Theory-building and theory- testing are still rooted in single paradigms, limiting the generation of more complete, eclectic knowledge.

REFERENCES

Bager, T. (2011). The camp model for entrepreneurship teaching. *International Entrepreneurship Management Journal, 7*(2), 279-296.

Barbosa, S. D., J. Kickul & B. R. Smith (2008). The road less intended: integrating entrepreneurial cognition and risk in Entrepreneurship Education. *Journal of Enterprising Culture, 16*(4), 1-29.

Béchard, J.-P. & D. Grégoire (2005). Entrepreneurship education research revisited: The case of Higher Education. *Academy of Management Learning & Education, 4*(1), 22-43.

Bergh, D. D. (2003). From the editors. *Academy of Management Journal, 46*(2), 135-136.

Blenker, P., S. Korsgaard, H. Neergard & C. Thrane (2011). The questions we care about: paradigms and progression in entrepreneurship education. *Industry & Higher Education, 25*(6), 417-427.

Bonnet, H., J. Quist, D. Hoogwater, J. Spaans & C. Wehrmann (2006). Teaching sustainable entrepreneurship to engineering students: the case of Delft University of Technology. *European Journal of Engineering Education, 31*(2), 155-167.

Bono, J. E. & G. McNamara (2011). From the Editors: Publishing in AMJ-Part 2: Research design. *Academy of Management Journal, 54*(4), 657-660.

Boyle, T. J. (2007). A new model for entrepreneurship education: implications for Central and Eastern European Universities. *Industry & Higher Education, 21*(1), 9-19.

Burrell, G. & G. Morgan (1979). *Sociological Paradigms and Organizational Analysis: Elements of the Sociology of Corporate Life.* London: Heinemann.

Busenitz, L.W., G.P. West, D. Shepherd, T. Nelson, G. N. Chandler & A. Zacharakis (2003). Entrepreneurship research in emergence: Past trends and future directions. *Journal of Management, 29*(3), 285–308.

Carey, C. & H. Matlay (2011). Emergent issues in enterprise education: the educator's perspective. *Industry & Higher Education, 25*(6), 441-450.

Chandler, G. N. & D.W. Lyon (2001). Issues of research design and construct measurement in entrepreneurship research: The past decade. *Entrepreneurship Theory and Practice. 26*(4), 101-113.

Clarke, J. & S. Underwood (2011). Learning based on "entrepreneurial volunteering". Using enterprise education to explore social responsibility". *Industry & Higher Education, 25*(6), 461-467.

Colquitt, J. A. & C. P. Zapata-Phelan (2007). Trends in theory-building and theory-testing: a five-decade study of the Academy of Management Journal. *Academy of Management Journal*, *50*(6), 1281-1303.

Corley, K. G. & D. A. Gioia (2011). Building theory about theory-building: what constitutes a theoretical contribution. *Academy of Management Review, 36*(1), 12-32.

Coviello, N. E. & M. V. Jones (2004). Methodological issues in international entrepreneurship research. *Journal of Business Venturing, 19*(4), 485-508.

Dainow, R. (1986). Training and Education of Entrepreneurs: The Current State of the Literature. *Journal of Small Business and Entrepreneurship, 3*(4), 10–23.

DeTienne, D. R. & G. N. Chandler (2004). Opportunity identification and its role in the entrepreneurial classroom: A pedagogical approach and empirical test. *Academy of Management Learning & Education, 3*(3), 242-257.

Dubin, R. (1969). *Theory Building.* New York: The Free Press.

Dutta, D. K., J. Li, & M. Merenda (2011). Fostering entrepreneurship: impact of specialization and diversity in education. *International Entrepreneurship Management Journal, 7*(2), 163-179.

Edelman, L. F., T. S. Manolova & C. G. Brush (2008). Entrepreneurship Education: Correspondence between practices of nascent entrepreneurs and textbook prescriptions for success. *Academy of Management Learning & Education, 7*(1), 56-70.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review, 14*(4), 532-550.

Etzkowitz, H., A. Webster, C. Gebhardt & B. R. C. Terra (2000). The future of the university of the future: evolution of ivory tower to entrepreneurial paradigm. *Research Policy, 29*(2), 313-330.

Fayolle, A., B. Gailly & N. Lassas-Clerc, (2006). Assessing the impact of entrepreneurship education programmes: a new methodology. *Journal of European Industrial Training, 30*(9), 701-720.

Fayolle, A. & B. Gailly (2008). From craft to science: Teaching models and Learning processes in entrepreneurship education. *Journal of European Industrial Training, 32*(7), 569 - 593.

Fenton, M. & A. Barry (2011). The efficacy of entrepreneurship education. Perspectives of Irish graduate entrepreneurs. *Industry & Higher Education, 25*(6), 451-460.

Fiet, J. O. (2000a). The pedagogical side of entrepreneurship theory. *Journal of Business Venturing, 16*(2), 101-117.

Fiet, J. O. (2000b). The theoretical side of teaching entrepreneurship. *Journal of Business Venturing, 16*(1), 1-24.

Finkle, T. A. & D. Deeds (2001). Trends in the market for Entrepreneurship Faculty, 1989-1998. *Journal of Business Venturing, 16(6*), 613-630.

Finkle, T. A. (2010). Entrepreneurship education trends. *Research in Business and Economics Journal, 1*(35-53), 613-630.

Gartner, W. B. & K. H. Vesper (1994). Experiments in entrepreneurship education: Successes and failures. *Journal of Business Venturing, 9*(3), 179-187.

Giacomin, O., F. Janssen, M. Pruett, R. S. Shinnar, F. Llopis & B. Toney (2011). Entrepreneurial intentions, motivations and barriers: Differences among American, Asian and European students. *International Entrepreneurship Management Journal, 7*(2), 219-238.

Gioia, D. A. & E. Pitre (1990). Multiparadigm perspectives on theory building. *Academy of Management Review, 15*(4), 584-602.

Gorman, G., D. Hanlon & W. King (1997). Some research perspectives on entrepreneurship education, enterprise education and education for small business management: a ten year literature review. *International Small Business Journal, 15*(3), 56-77.

Graevenitz, G., D. Harhoff & R. Weber (2010). The effects of entrepreneurship education. *Journal of Economic Behavior & Organization,* 76, 90-112.

Haase, H. & A. Lautenschlager (2011). The "Teachability Dilemma" of entrepreneurship. *International Entrepreneurship Management Journal, 7*(2), 145-162.

Harkema, S. J. M. & H. Schout (2008). Incorporating student-centered learning in innovation and entrepreneurship education. *European Journal of Education, 43*(4), 513-526.

Heinonen, J., S-A. Poikkijoki & I. Vento-Vierikko (2007). Entrepreneurship for bioscience researchers: A case-study of an entrepreneurship programme. *Industry & Higher Education, 21*(1), 21-30.

Hills, G. (1988). Variations in university entrepreneurship education: an empirical study of an evolving field. *Journal of Business Venturing, 3*(2), 109-122.

Hjorth, D. (2011). On provocation, education and entrepreneurship. *Entrepreneurship & Regional Development, 23*(1, 2), 49-63.

Honig, B. (2004). Entrepreneurship education: Toward a model of contingency-based business planning. *Academy of Management Learning & Education, 3*(3), 258-273.

Hyclak, T. & S. Barakat (2010). Entrepreneurship education in an entrepreneurial community. *Industry & Higher Education, 24*(6), 475-486.

Ireland, R. D., C. R. Reutzel & J. W. Webb (2005). From the editors: Entrepreneurship Research in AMJ: What has been published, and what might the future hold? *Academy of Management Journal, 48*(4), 556-564.

Katz, J. A. (2003). The chronology and intellectual trajectory of American entrepreneurship education 1876-1999. *Journal of Business Venturing, 18*(2), 283-300.

Katz, J. A. & R. P. Green (1996). Academic resources for entrepreneurship education. *Simulation & Gaming, 27*(3), 365-374.

Kilduff, M. (2006). Editor's comments: Publishing theory. *Academy of Management Review, 31*(2), 252-255.

Kirby, D. A. & N. Ibrahim (2011). Entrepreneurship education and the creation of an enterprise culture: provisional results from an experiment in Egypt. *International Entrepreneurship Management Journal, 7*(2), 181-193.

Klandt, H. (2004). Entrepreneurship education and research in German-Speaking Europe. *Academy of Management Learning & Education, 3*(3), 293-301.

Klandt, H. & C. Volkmann (2006). Development and prospects of academic entrepreneurship education in Germany. *Higher Education in Europe, 31*(2), 195-208.

Klofsten, M. & D. Jones-Evans (2000). Comparing academic entrepreneurship in Europe - The case of Sweden and Ireland. *Small Business Economics, 14*(4), 299-309.

Kourilsky, M. L. & W. B. Walstad (2002). The early environment and schooling experiences of high-technology entrepreneurs: Insights for entrepreneurship education. *International Journal of Entrepreneurship Education, 1*(1), 1-20.

Kuhn, T. S. (1970). *The Structure of Scientific Revolutions.* Chicago: University Press.

Kuratko, D. F. (2005). The emergence of entrepreneurship education: Developments, trends and challenges. *Entrepreneurship Theory and Practice, 29*(5), 577-598.

Kyro, P. (2008). A theoretical framework for teaching and learning entrepreneurship. *International Journal of Business and Globalization, 2*(2), 39-55.

Lanero, A., J. L Vázquez, P. Gutiérrez & M. P. García (2011). The impact of entrepreneurship education in European universities: an intention-based approach analyzed in the Spanish area. *International Review of Public Nonprofit Marketing* 8, 111-130.

Laukkanen, M. (2000). Exploring alternative approaches in high-level entrepreneurship education: creating micro-mechanisms for endogenous regional growth. *Entrepreneurship & Regional Development, 12*(1), 25-47.

Lee, S. M., D. Chang & S-B. Lim (2005). Impact of Entrepreneurship Education: A Comparative Study of the U.S. and Korea. *International Entrepreneurship Management Journal, 1,* 27-43.

Lee, J. J. & R. A. Rhoads (2004). Faculty entrepreneurialism and the challenge to undergraduate education at research universities. *Research in Higher Education, 45*(7), 739-760.

Lena, L. & P.-K. Wong (2003). Attitude towards entrepreneurship education and new venture creation. *Journal of Enterprising Culture, 11*(4), 339-357.

Liñán, F., J. C. Rodríguez-Cohard & J. M. Rueda-Cantuche (2011). Factors affecting entrepreneurial intention levels: a role for education. *International Entrepreneurship Management Journal, 7*(2), 195-218.

Lobler, H. (2006). Learning Entrepreneurship from a Constructivist Perspective. *Technology Analysis & Strategic Management, 18*(1), 19-38.

Mars, M. M. & C. Rios-Aguilar (2010). Academic entrepreneurship (re)defined: significance and implications for the scholarship of higher education. *Higher Education, 59*(4), 441-460.

Miclea, M. (2006). Institutional approaches to entrepreneurialism: Reflections on the case of "Babes-Bolyai" University in Cluj-Napoca. *Higher Education in Europe, 31*(2), 105-115.

Neck, H. M. & P. G. Greene (2011). Entrepreneurship Education: Known worlds and new frontiers. *Journal of Small Business Management, 49*(1), 55-70.

Oosterbeek, H., M. Praag & A. Ijsselstein. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review, 54*(4), 442-454.

Papayannakis, L., I. Kastelli, D. Damigos & G. Mavrotas (2008). Fostering entrepreneurship education in engineering curricula in Greece. Experience and challenges for a Technical University. *European Journal of Engineering Education, 33*(2), 199-210.

Pfeffer, J. (1993). Barriers to the advance of organizational science: paradigm development as a dependent variable. *Academy of Management Review, 18*(4), 599-620.

Philpott, K., L. Dooley, C. O'Reilly & G. Lupton (2011). The entrepreneurial university: examining the underlying academic tensions. *Technovation, 31*(4), 161-170.

Pittaway, L. & J. Cope (2007). Entrepreneurship education. *International Small Business Journal, 25*(5), 479-510.

Powers, J. (2004). R&D Funding Sources and University Technology Transfer: What is Stimulating Universities to be more Entrepreneurial? *Research in Higher Education, 45*(1), 1–23.

Rasmussen, E. A. & R. Sorheim (2005). Action-based entrepreneurship education. *Technovation, 26*(2), 185-194.

Redford, D. & V. Trigo (2007). Entrepreneurship Education in Portugal and the United States: A Comparative Study. *Silicon Valley Review of Global Entrepreneurship Research, 3*(1), 19-36.

Rindova, V. (2008). Editor´s comments: Publishing theory when you are new to the game. *Academy of Management Review, 33*(2), 300-303.

Rodrigues, R. G., M. B. Raposo, J. M. Ferreira & A. Paço (2010). Entrepreneurship education and the propensity for business creation: testing a structural model. *International Journal of Entrepreneurship and Small Business, 9*(1), 58-73.

Ronstadt, R. (1985). The educated entrepreneurs: A new era of entrepreneurial education is beginning. *American Journal of Small Business, 10*(1), 7-23.

Sánchez, J. C. (2011). University training for entrepreneurial competencies: Its impact on intention of venture creation. *International Entrepreneurship Management Journal, 7*(2), 239-254.

Sexton, D. L. & N. B. Bowman (1984). Entrepreneurship Education: suggestions for increasing effectiveness. *Journal of Small Business Management, 22*(4), 18-25.

Shane, S. (2004). Encouraging university entrepreneurship? The effect of the Bayh-Dole Act on university patenting in the United States. *Journal of Business Venturing, 19*(1), 127–151.

Shepherd, D. A. (2004). Educating entrepreneurship students about emotion and learning from failure. *Academy of Management Learning & Education, 3*(3), 274-287.

Shinnar, R., M. Pruet & B. Toney (2009). Entrepreneurship education: attitudes across campus. *Journal of Education for Business,* (January/February 2009).

Solomon, G. (2007). An examination of entrepreneurship education in the United States. *Journal of Small Business and Enterprise Development, 14*(2), 168-182.

Stankovic, F. (2006). Entrepreneurialism at the University of Novi Sad. *Higher Education in Europe, 31*(2), 117-128.

Teixeira, A. A. C. (2010). Attitudes of higher education students to new venture creation. The relevance of competencies and contextual factors. *Industry & Higher Education, 24*(5), 1-19.

Van de Ven, A. H. (1989).Nothing is quite so practical as a good theory. *Academy of Management Review, 14*(4), 486-489.

Vesper, K. & W. B. Gartner (1997). Measuring progress in entrepreneurship education. *Journal of Business Venturing, 12*(5), 403-421.

Weick, K. E. (1995). What theory is not, theorizing is. *Administrative Science Quarterly*, *40*(3), 385-390.

Whetten, D. A. (1989). What constitutes a theoretical contribution? *Academy of Management Review, 14*(4), 490-495.

Woollard, D. (2010). Towards a theory of university entrepreneurship - Developing a theoretical model. *Industry & Higher Education, 24*(6), 413-427.

Yusof, M. & K. K. Jain (2010). Categories of university-level entrepreneurship: a literature survey. *International Entrepreneurship Management Journal, 6*(1), 81-96.

AN INSTITUTIONAL AND PEDAGOGICAL MODEL THAT FOSTERS ENTREPRENEURIAL MINDSET AMONG COLLEGE STUDENTS

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ABSTRACT

To suggest ways to design (institutional and pedagogical) environments using constructivist methods that produce students with entrepreneurial mindsets and skills, this study builds on previous research and examines the impact of an organizational and pedagogical approach adopted by The Evergreen State College (TESC), which is constructivist in nature. Using constructivist education theory to explore the TESC model, the author details key design features that can be adopted for entrepreneurship education. Interviews with faculty members reveal how TESC functions; alumni provide evidence of enterprising behavior. Three important design features emerge; team-teaching, no grades, and theme-oriented curricula. These results can help policy makers, business schools, and entrepreneurship professors understand an environmental model that supports the development of an entrepreneurial mindset among college students.

Key Terms: entrepreneurial education, constructivist education

INTRODUCTION

Entrepreneurship encompasses a vast spectrum of actors and stakeholders in a community, not just businesses (Gibb, 2002), and various initiatives call for embedding entrepreneurship into education curricula. For example, Florida (2010) suggests:

> Entrepreneurship should become the fourth R, right alongside reading, writing, and arithmetic. Kids need to learn more than just the abstract principles of economics—they should be taught how to form businesses, create business plans, and market their ideas. Education can no longer be confined to traditional academic subjects; students must learn how to create something of their own. (p. 4)

Simply offering "entrepreneurship courses" does not provide an appropriate measure of entrepreneurial education (Zhao, Seibert, & Hills, 2005); accumulation of entrepreneurship knowledge cannot make a person a successful entrepreneur because it requires both knowledge and a structure for organizing that knowledge. Focusing on delivering content is insufficient. It is also necessary to consider design, implementation, and assessment of entrepreneurial education. Thus, entrepreneurial education must involve more than creating a plan for a business that makes students successful. Success derives from what graduates do with knowledge—that is, entrepreneurial thinking and entrepreneurial education must go beyond content to teach students how to think entrepreneurially.

We need to assist students to develop an entrepreneurial mindset, but the question is how to do that. One option is the constructivist model of education, which applies directly to learning entrepreneurial thinking. This approach focuses on outcomes (changes) more than outputs (what

students know). The literature reports applied, hands-on class assignments help students think entrepreneurially and see themselves as entrepreneurs. Constructivist by nature, such practices are classroom focused. A central question for designing constructivist classrooms is: what organizational practices facilitate implementation of constructivist methods in the classroom?

In this study, we explore this question by examining two institutional and one pedagogical approach used by The Evergreen State College (TESC). TESC's design features are compared to five principles related to constructivist learning for entrepreneurship established by extant research: (1) focusing on relevant questions for students, (2) structuring learning around a theme, (3) seeking and valuing student viewpoints authentically, (4) aligning curricula with student theories, and (5) assessing student learning in a teaching context (Brooks & Brooks, 1999; Krueger, 2009). TESC's education approaches are explored as a single case study. Using constructivist education theory to explore TESC's model, the authors detail key design features that can be adopted in entrepreneurship education. Evidence of entrepreneurial thinking among TESC students is presented from four sources: 1) results from the general enterprising tendency test, 2) interviews with faculty members, 3) TESC archives, and 4) TESC entrepreneur alumni who provide examples of enterprising behavior.

We suggest environmental and pedagogical practices that can be adapted to entrepreneurship education to enhance development of the entrepreneurial mindset for students throughout the campus. These approaches provide students with insights into how to create their own pathway (that may lead them to become entrepreneurs or intrapreneurs), work with organizations, and set up and lead voluntary community projects are valuable.

CASE STUDY DEVELOPMENT

Background - The lead author spent five years teaching and learning at TESC. One situation that always puzzled him was that TESC is a liberal arts college, prompting some faculty to assert that business should not be part of its curriculum. Yet TESC had no problem developing entrepreneurial thinking; a great number of alumni became entrepreneurs with little to no formal business or entrepreneurial education. In a survey of the 2003 graduating class in summer and fall 2004, 14% of alumni were self-employed. In contrast, the U.S. 2009 annual average of self-employment rates for individuals with a bachelor's degree was only 6.7% unincorporated and 5.4% incorporated (Hipple, 2010). Why were entrepreneurship rates so high at TESC? Perhaps TESC graduates simply could not find jobs. However, a 2003 survey administered by TESC to students three years after graduation indicated 87% of respondents were in graduate school, or employed, self-employed, or both (compared to 74% national average). The response rate of respondents in graduate school was 23%.

Another possible answer is that TESC's institutional environment and pedagogy encourages entrepreneurship. Since its founding, TESC demonstrated an entrepreneurial mindset and gained a national reputation for breaking the unwritten rules of higher education; its model is opposite of traditional higher education structures. The model includes no grades, no majors, no courses, no faculty tenure, no departments, and no official requirements. This institutional environment and education model might assist students develop an entrepreneurial mindset, the proposition we test in this study. We focus on three TESC design features: 1) curricula development, 2) no grades, and 3) open inquiry. Expanded later, these independent variables align with constructivist education theory, and we propose three hypotheses centering on two types of antecedents—institutional and pedagogical—that foster an entrepreneurial mindset.

THEORETICAL DEVELOPMENT

Krueger (2009) calls for entrepreneurship researchers to move from descriptive research to better grounding in educational theory, and this study follows that suggestion. Constructive education theory has a long and distinguished body of literature and research (Brooks & Brooks, 1999). Although the first documented constructivist was Socrates, this discussion will not tread that far back. Instead, it highlights the works of a few contributors who shaped constructivist education sufficiently to explain the guiding principles of constructivism to evaluate the three independent variables mentioned above.

MAIN CONTRIBUTORS TO CONSTRUCTIVIST EDUCATION THEORY

Jean Piaget is one of the most influential proponents of constructivism. His research led him to conclude that "the growth of knowledge is the result of individual constructions made by the learner" (Brooks & Brooks, 1999, pp. 25). Entrepreneurs construct their own environments (Bouchhiki, 1993), meaning learners internalize knowledge through direct experiences aligned with how entrepreneurs learn: by doing. Many entrepreneur educators believe there is something special about what they do in the classroom (Fayolle & Servais, 2000). This position stems from the assumption that applied and hands-on assignments allow students to think entrepreneurially (Krueger, 2009).

Piaget (1950) suggests that in this process of doing, assimilation and accommodation occur, allowing learners to construct new knowledge. Assimilation prevails when a new experience aligns with the learner's internal interpretation of the experience. The learner incorporates a new experience into an existing framework without changing the framework. When a new experience contradicts the learner's internal framework, the accommodation process emerges and leads the learner to reframe the existing model to fit a new world vision. Failure leads to learning. Results of the learner's experiences challenge the assumption that the world operates in one way, indicating that the extant mental model no longer works. The learner accommodates the new experience and reframes the model by learning from the experiences of failure or others' failures. Similar to entrepreneurs, they learn from mistakes, and failure is inherent in the entrepreneurial process.

BEHAVIORIST VERSUS CONSTRUCTIVIST

There are several salient differences between the two major education approaches. The behaviorist approach focuses on "fact-based learning (including rote memorization, repetitive drilling and similar mechanisms) that focus on transferring content knowledge" (Krueger, 2009, p. 7).

Curricula are presented as parts to a whole and focus on basic skills. It is difficult for theteacher to deviate from a curriculum, and curricular activities rely on textbooks and workbooks. Assessment is mostly through testing, focusing on rewarding correct performance, and students primarily work alone (Brooks & Brooks, 1999). The constructivist approach suggests a teaching-learning environment, which encourages self-reflection, mobilization of individual cognitive representations, and integration of new learning within existing understanding of the student (Bodner, 1986). Unlike the behaviorist approach where the learner plays a passive, receptive role, learning responsibility lies with the learner (Glasersfeld, 1989), meaning entrepreneurship educators must focus attention on the learner. School structure controls opportunities for learning

(Books & Brooks, 1999). This case study provides a model that illustrates (Glasersfeld, 1989) institutional design features that help educators and administrators in business schools, and administrators at accreditation institutions for business schools see opportunities that constructivist pedagogies offer.

ENTREPRENEURSHIP EDUCATION AND CONSTRUCTIVIST EDUCATION

Krueger (2009) suggests that entrepreneurship education is inherently constructivist. Key elements of the educational theory of constructivism are experiential and action-learning approaches that reflect how humans learn complex, ill-structured knowledge. For example, "applied, hands-on nature of class assignments helps students to think entrepreneurially, to see themselves truly as entrepreneurs" (Krueger, 2009, p. 36), suggesting hands-on assignments help students change their mind about how they interpret phenomena around them. Reflecting on their experiences, students change how they think, an essential element of genuine education (Krueger, 2009). When designing, implementing, and assessing entrepreneurship education, it is necessary to be clear of what changes the designer is attempting to induce. In our case, we seek to develop an entrepreneurial mindset. Higdon (2005) defines people with an entrepreneurial mindset as those who don't think in the conventional linear way; instead, they excel in thinking at higher levels of complexity. They are constant learners who continually challenge assumptions, and recognize, seize and act upon opportunities by marshaling the resources to execute the opportunities in a holistic way.

Evidence supports a constructivist paradigm as a framework to explain the entrepreneurship process. Bouchhiki (1993) suggests structuration theory is an alternative representation of the entrepreneurial process, providing a major building block for the constructivist framework. Other elements found in the constructivist framework that are also found in the entrepreneurship literature include self-efficacy (Bandura, 1977), entrepreneurial intentions (Krueger, Reilly, & Carsrrud, 2000), opportunity perceptions (Krueger & Dickson, 1994), venture performance (Chandler & Jansen, 1992), self-directed learning (Guglielmino & Klatt, 1993) and intrinsic motivation (Brockhaus, 1987). As Krueger (2009) suggests, "if the entrepreneurship-friendly cognitive infrastructure is constructed, then it makes a lot of sense to emphasize learning that is consonant with the constructivist model. (p. 41)"

Entrepreneurship classroom methods reflect a constructivist model. Approaches found in entrepreneurship include problem-based learning (Krueger, 2009), living cases and shadowing (Krueger & Hamilton, 1996), and action learning (Leitch & Harrison, 1999). Krueger (2009) even argues that action learning is a manifestation of the constructivist model. How institutions can support a constructivist model of education is a question this paper explores.

CONSTRUCTIVIST BASE KEY PRINCIPLES

Brooks and Brooks (1999) suggest that key constructivist principles follow a learning cycle. First, a learner discovers an issue. Next, he/she identifies critical concepts that may explain the phenomenon. The learner then tests newly constructed knowledge by applying it to a real situation. Finally, the learning cycle repeats. Critics of constructivism suggest that as a pedagogical framework, it subordinates to the interest of the learner, but Brooks & Brooks (1999) argue that critics miss the point because the teacher helps students consider relevant topics; teachers are facilitators, consistent with constructivist pedagogy.

FACILITATORS NOT TEACHERS

Teachers must adapt to a new role as facilitator (Bauersfeld, 1995), often requiring completely different skill sets. This suggests that the responsibility of learning is not the sole responsibility of the teacher; the student is also an active agent of learning. The teacher's responsibility is to create an environment that facilitates students taking ownership of their education. Teachers need to move from giving didactic lectures that cover content to facilitating learners to achieve understanding of content. In the former scenario, the learner plays a passive role, and in the latter scenario, the learner plays an active role in the learning process. Emphasis turns from the instructor and content toward the learner (Gamoran, Secada, & Marrett, 1998). A teacher tells and a facilitator asks. A teacher lectures from the front and a facilitator supports from the back. A teacher gives answers according to curricula and a facilitator both provides guidelines and creates an environment for the learner to arrive at his/her own conclusions. A teacher largely provides a monologue and a facilitator engages in continuous dialogue with learners (Rhodes & Bellamy, 1999). A facilitator adapts quickly to a learning experience by taking the initiative to steer the learning experience to where the learners want to create value. Five guiding principles of constructivism are:

1. **Focusing on relevant questions for students** requires teachers to develop curricula that engage problems significant to students. The framework should stimulate learning, concentrating on concepts with which students have previous interest. This is not a limitation of the framework as critics suggest. The relevance does not have to be preexisting for students. "Not all students arrive at the classroom door interested in learning about verb constructs, motion and mechanics, biological cycles, or historical timelines, but most students can be helped to construct understanding of the importance of these topics. Relevance can emerge through teacher mediation" (Brooks & Brooks, 1999, p. 35). Interest can be created and stipulated (Bruner, 1986). TESC curricula development is theme-oriented. Themes ensure students develop their own questions because they are broad enough, which requires students to look at education in a multidisciplinary way.

2. **Structuring learning around a theme** means organizing curricula to explore problems within that theme. Instead of breaking problems into parts as does most traditional education, constructivist education approaches curricula development holistically. When curricular activities cluster around broad concepts, students can select unique problem-solving approaches and use them as springboards for construction of new understanding. Students become responsible for their learning and are more engaged (Brooks & Brooks, 1999).

   In contrast to the traditional education model, which focuses on separate, a curriculum is created in silos and delivered separately. Brooks and Brooks (2009) suggest "the fragmentation of the curriculum and the pressures of time have made intellectual inquiry so highly specialized that, by 7th grade, most curriculum are departmentalized and heavily laden with information to be memorized" (p. 41). Explained later, TESC offers a dynamic curriculum that focuses on solving problems, themes, and experiences in the world. For example, the faculty develops curricula by coordinating a thread (theme or problem and/or project), interesting in its own right and that cannot be explored adequately by any one discipline; it requires multidisciplinary faculty participation.

3. **Authentically seeking and valuing student viewpoints** emphasizes not only a need to

recognize students' viewpoints, but also addresses them. Students' viewpoints are opportunities to understand their reasoning and help them find and pursue passions. For example, in the first program I taught at TESC in 2006 called The American Dream: Blacks, Jews, and Hispanics, students not only provided diverse and rich responses (viewpoints) on what the "American Dream" is, but also provided diverse ways to attain it. One student did not want to own a business. Her dream was to help obese high school students, and in the process, she not only found her passion, but also learned how to fulfill it by becoming a physical education teacher. She designed her strategy to reach her dream become a physical education teacher. Listening to student viewpoints not only supports them in finding their passion, but also facilitates how to think strategically to attain goals. Each student's viewpoint provides an opportunity to personalize education because it is an instructional entry point (Brooks & Brooks, 1999). "Teachers who operate without awareness of their students' points of view often doom students to dull, irrelevant experiences, and even failure" (Brooks & Brooks, 1999, p. 60).

4. **Aligning curricula with students' theories** suggests learning is enhanced when curricula demand is accessible to students' cognitive, social, and emotional levels (Brooks & Brooks, 1999). Some kind of relationship must exist between the demands of a curriculum and students' theories brought to the curricular task. If theories are not addressed explicitly, most students find lessons bereft of meaning, regardless of how charismatic the teacher or attractive the materials. Many TESC students believe all businesses are evil, a supposition that must be addressed when developing curricula. I taught a course entitled The Ethical Entrepreneur in which I encouraged students to investigate and challenge their assumptions. The title itself challenged students' assumptions.

5. **Assessing student learning within the context of teaching** supports development of two key characteristics in entrepreneurs: creativity and risk taking, which need to be nurtured, encouraged, and supported. However, the behaviorist model focused on asking questions to students until they get the right answers. This approach conveys to students that there is one correct answer to each question posed by the teacher, and the challenge is to come up with that answer. This approach eliminates creativity and prevents students from taking risks; unless they figure out the right answer, they do not respond to the question. This principle requires an environment where students can take risks. Real-life problems are inherently interdisciplinary, and solving such problems requires creative thinking. Assessment that emphasizes rightness loses the ability to evoke creative thinking from students. Expanded on later, the TESC model uses a system of evaluation by portfolio at all levels: student, faculty, and program.

METHODOLOGY

The TESC education model is unique; it is inherently constructivist and, thus, entrepreneurial, though largely unknown to business schools, administrators, and instructors. It implies an ideal scenario for using a case study methodology.

Research Setting and Sample. This case study employs mixed methods with both quantitative and qualitative components. The quantitative component involves a survey administered to 96 undergraduate students in the Designing Green Futures program at TESC. The survey was based on GET-2. Mentioned previously, there exists no consensus on definitions for entrepreneurship

or entrepreneurs, nor is there agreement about traits that characterize an entrepreneur and their measures. Instruments used to measure entrepreneurial orientation (Covin & Slevin, 1989; Miles & Arnold, 1991; Morris and Paul, 1987) differ in complexity, reliability, and validity (Cromie, 2000). After analyzing many instruments, Cromie (2000) finds the Durham GET a useful instrument. Entrepreneurs and enterprising people perform varying tasks, but entrepreneurial and enterprising activities are highly similar, and the "psychological characteristics of entrepreneurs and enterprising people may be identical" (Caird, 1991, p. 137). The GET is easy to both administer and score, and is both comprehensive and accessible, though it needs further verification with regard to psychometric properties (Caird, 1991; Cromie & Callaghan, 1997; Cromie & O'Donoghue, 1992). Cromie (2000) recommends comparing GET scores with other behavioral assessments of entrepreneurial orientation to increase confidence in the predictive capability of the test. The test used in this study included 54 questions, half of which were positive and half of which were negative assessments of enterprising tendencies. The maximum score was 54 since answers indicating entrepreneurship earn one point each. Participants were informed that there were no right or wrong answers, and that the format was a forced-choice, agree-disagree scale. This format facilitates self-assessments in administration and statistical analysis (Caird, 1991).

The qualitative component involved interviews with three faculty members: a folklore teacher who had been teaching at TESC for 30 years, a historian who had been teaching at TESC for 15 years and who primarily taught core programs (i.e., to first-year students), and an English teacher who served as one of two rotating curriculum deans. These faculty members provided perspectives on the institutional and pedagogical components of TESC that help students develop entrepreneurial attributes. Finally, this case study used interviews with five entrepreneur alumni to gain perspectives on how the school developed entrepreneurial attributes. The TESC model is an embodiment of the constructivist paradigm; as Krueger (2009) argues, so is entrepreneurship education. Therefore, the TESC model has significant influences on developing an entrepreneurial mindset among students and across campus. In addition, data were collected from extant research, TESC archives, and TESC entrepreneur alumni who provided examples of enterprising behaviors.

THE EVERGREEN MODEL

Institutional Background

Founded in 1967, TESC, a liberal arts college, breaks the unwritten rules of higher education with regard to both its institutional and pedagogical models. The institutional model includes no grades, courses, faculty tenure, departments, or requirements. Curriculum development is unique, making it difficult to categorize it under an institutional or pedagogical model. The curriculum changes each year to respond to a constantly changing world. Faculty members frequently select new teaching partners, preventing stagnation and latency, and encouraging change, innovation, and professional participation. We chose to include the process of curriculum development under the institutional model because it requires institutional changes to implement the model. The following are the institutional elements in TESC's model that assist students to develop entrepreneurial mindsets: curriculum development process and no grades. Therefore:

H1: Curriculum development at TESC fosters an entrepreneurial mindset among students across campus regardless of major.

H2: No grades at TESC foster entrepreneurial mindsets among students across campus regardless of major.

CURRICULUM DEVELOPMENT PROCESS

At TESC, students do not take several classes during a semester; they select an academic program in which they learn how to explore a central idea or theme of interest to them. This environment facilitates student ownership of education that aligns with the first principle of constructivist education, which suggests that with curricular activities clustered around broad concepts, students select their own unique problem-solving approaches and use them as springboards for construction of new understanding (Brooks & Brooks, 1999; Krueger, 2009). Students have both the freedom and responsibility to create their own academic pathways, invent areas of study, and follow passions for learning wherever they lead. In contrast with traditional colleges that set required courses and give students a predetermined goal (e.g., earning a degree in business), the Evergreen model requires creativity.

Faculty members not only listen to student viewpoints, they also respond to them and behave interactively, facilitating a creative environment for students. This approach aligns with constructivist theory principles, particularly:

> Our range of creative options here as faculty and as deans is wide, and how that helps students I think is by modeling, I think that the faculty members who take risks mount a very attractive program that's not been done before, that's exciting, the students often ask how it came to be and first of all, they like it because they're having a good time in the program and they're learning something, but then they know here that these things come and go, that there isn't a 4 year catalog that they can refer to see what they're going to take in their senior year, so they're at the mercy of the faculty all the time. (Ransom, 2010)

Schrager (2010) argues:

> Some programs are grounded in vexing, expansive questions. As the topics are examined, new questions occur. Ideas prove their worth by illuminating matters at hand. Connections snap into place in each person's mind and thicken in the class's shared discourse. Faculty teaches the program because they want to learn about the subject, together. They put what they know in the service of what students need to know. Students quickly take hold of the inquiry for themselves. It is intellectual energies emerge from students' and faculty's common study.

Koppelman (2010) mentions modeling risk is an important teaching component at TESC. Describing curriculum development, she notes:

> I try to make that transparent to the students so they don't see that I am, just hauling out something I've done a hundred times before. They are seeing that the faculty are also taking risks and being creative and stumbling to learn things that they don't understand. So I think that the faculty gets to do that that it really does create that culture for students, it's not enough for us to create opportunities for students to do it, we have to do it, be willing to do it too. For example, it's so different to your 18 and you walk into a college for the first time and what the faculty tell you is you know I am working with these other two faculty in different disciplines and I am going to learn from them because I don't

know anything about business and I don't know much about folklore and so I am going to learn from my colleagues. They don't hear that at other colleges. What they hear is this is an American History 101 course and here's what you are going to get and here is how we'll know if you got it.

Seeking and valuing student viewpoints – TESC's curriculum development supports this constructivist, guiding principle in several ways. Ransom (2010) explains that students can request programs, and the college has a method by which students can suggest both programs they would like to have available and the teachers they would like to have teach them. He notes that increasingly, those suggestions appear similar to faculty plans. Schrager (2010) suggests:

> Some programs provide a strong context for students to define and develop their own work. The key is to enable them to do significant projects of their choosing, for which they are prepared by studies in class and guidance from faculty. The character of this work depends on the topics and range of the program inquiry.

Up to seven faculty members staff all programs, though four members emerged as an ideal number. The best teams are amiable prior to the program's conception, primarily through personal friendships or mutual intellectual pursuits. The idea for a curriculum may have arisen in a faculty seminar related to a previous program or retreat, which prompted brainstorming sections, both formal and informal (e.g., during lunch). Other colleagues looking for enjoyable programs begin to listen in and offer questions and suggestions leading to formation of a congenial faculty team (Jones, 1981).

No Grades

Another design feature stems from the system's rejection of grades. Faculty members and students write narrative evaluations. Rather than relying on grades, student evaluations provide a means of professional development for faculty:

> When a student tells me that I have, when I am lecturing that I have a habit with my hands that drives them crazy, that's distracting, well then I can pay attention to not do that anymore, so they are giving me feedback about my modeling or what's getting in the way of my delivery so that I can, so that my risk taking is more pure, I guess, it is not cluttered up with problems that they have with how I talk, problems that they have with how I dress or how, my mannerisms (Ransom, 2010).

Faculty evaluations of students inform students directly about how to proceed along a line of inquiry or professional path, such that faculty say things like:

> You seem to have very creative ideas in terms of needs that you see in the community, I think you should talk to Nelson Pizarro, professor of entrepreneurship, about working on entrepreneurship (Ransom, 2010).

Such suggestions enable faculty members to point students toward people who will help them find passion in an area they want to study.

Even without grades, students are accountable for their work because they earn credit only for work they perform. A student who signs up for a 16-credit program but who produces mediocre work, misses classes, and never participates in class might lose several credits and earn just 10 of 16 credits. Accordingly:

I think that's the main difference and it seems like a very small thing and gets a lot of people puzzled about it. People ask what do you mean you don't have grades, well, how will I know if a student is doing any good, you know whether very quickly whether people are doing any good because your focus is on the work itself, it's not on seeing whether a student's work is measureable by some predetermined standard (Koppelman, 2010).

As the constructivist-assessing principles suggest, the focus is not on getting the right answer, but on evaluating how a student's work evolves. This approach reinforces a student's drive to develop both creativity and risk taking. For first-year students, lack of grades often creates a culture of risk taking, as the following quote recognizes:

I've worked with freshmen so much, that's what I've taken on as the challenge of working with freshmen is to help them mature enough to be risk takers, I mean that's the mature thing to do, it's not the same kind of risk as a skateboard risk. Self confidence often comes with no living up to your expectations with family a couple of times or not doing as well as you want to do and having that pointed out to you, here's what good work would have looked like and then you try again and you do better next time and I think that's where the self-confidence comes from is being able to stumble and have that be a safe thing to do. You are not going to get a D that's going to follow you around for the rest of your life. You're going to get the equivalent of a D and you're going to feel really bad about it, you're going to get a talking to and next time you'll get a B-, an equivalent kind of thing. And so I think that's really important too, I mean people don't talk it that much as a good thing, I think, sort of an embarrassing thing, well yeah we don't have grades, we have evaluations and the evaluation is the great thing. But I think the great thing about not having grades is what that does for the culture of the class all throughout the quarter. It's not just that evaluations are better (Koppelman, 2010).

Evaluations create a culture of persistence, determination, and learning:

a bad grade it is right there in black and white and there's nothing you can do about that, but here you can keep approaching physics 4 or 5 times until you get it and nobody will know how many times you lost credit, they will just know you finally got it, so I think that helps students take more risks as well because they have a greater chance of succeeding here (Ransom, 2010).

The operating premise of constructivist teaching argues real inquiry is inherently interdisciplinary, and interdisciplinary problems are inherently broad and open ended (Brooks & Brooks, 1999.) Such problems rarely have one, easily accessible right answer. Rather than using assessments as indices of individual student knowledge, assessment and evaluation require student involvement (Krueger, 2009), as with TESC's model in which teachers not only evaluate students, but students evaluate teachers and programs. Evergreen does something special that aligns with constructivist guiding educational principles. It builds not only passion in students, but also a willingness to take risks. Students know they need to pursue desires, and that need is part of what marks the entrepreneurial spirit among Evergreen students:

We have not got the slightest idea what classes are going to be offered in 3 years, we have half of the classes for 2 years from now that we need, so we operate very different and transfer students pick that up very quickly and that's often why they are here, they

want a more entrepreneurial spirit, they want more involvement in their own education, so they can build learning contracts, internships, they can operate in different ways than students at other schools (Ransom, 2010).

The arguments above confirm Hypotheses 1 and 2 that suggest curriculum development and no grades help students develop an entrepreneurial mindset. It changes the way students think because it provides an environment that supports the five key principles of constructivist education. As Krueger (2009) suggests, the constructivist educational paradigm applies to entrepreneurial learning. Development of curricula, no grades, no requirements, and no departments align clearly with constructivist principles, suggesting TESC's institutional model is an important intervention that assists students to develop an entrepreneurial mindset across campus. The model fosters creativity because it provides freedom and responsibility to create academic pathways, invent areas of study, and follow passions, wherever they lead. Risk taking (Caird, 1991; Cunningham & Lischeron, 1991; Drucker, 1985) and a creative culture (Kirton, 1976; Solomon & Winslow, 1988) are not the only entrepreneurial attributes the institutional model assists to develop. Using evaluations instead of grades supports three important entrepreneurial attributes: need for achievement (Cromie, 2000; Hull, Bosley, & Udell, 1980; McClelland, Atkinson, Clark, & Lovell, 1953), need for autonomy (Collins & Moore, 1970; Cromie, 2000) and determination (Kuratko & Hodgetts, 1995).

PEDAGOGICAL MODEL

Used as a base for program development, open inquiry is an important component of Evergreen's pedagogical model. Programs replace courses and are coordinated, team-taught, and interdisciplinary with a central theme. We hypothesize:

> Hypotheses 3: Open inquiry fosters an entrepreneurial mindset among students across campus regardless of major.

The following illustrates faculty members' perceptions of how the pedagogical model assists development of an entrepreneurial mindset.

Open Inquiry means students shift from giving answers to formulating questions. This pedagogy facilitates adopting curricula to student theories. Krueger (2009, p. 40) argues curricula should follow student inquiries (i.e., their process of constructing knowledge), not instructors' processes. At the core of open inquiry is building skills for more challenging projects; it is about making choices concerning what one is going to do and not do. Evergreen prepares students to take advantage of TESC's model:

> We look at where students are in developing their work, some haven't found it yet, a significant number are still searching, and just to figure out what it is they want to learn. Once they figure this is what I really want to learn, this is my work, and I am going to learn it, that is the critical threshold, I think. Get over and that is when the place really becomes alive, fully alive to them, and there are a lot of students here I think who are there, they have discovered the stuff they really want to learn about and then that is what they…(Schrager, 2010).

The TESC model helps students find passion, and passion pays. Srully Blotnick, a columnist for Forbes magazine, conducted a study of business-school graduates over 20 years to examine what

determines success. Of 1,500 students who participated, 101 became millionaires. Of those, only one focused on making money. One hundred of the 101 millionaires followed passion first, which gave them the drive to excel during the time they needed to be successful. Ian Hanna '93 and Kirk Hanson '95 run Northwest Certified Forestry (NFC):

> Both Hanna and Hanson see their role as forest management innovators, something they honed at Evergreen. Hanna planned to be a chemist, but after joining the first temperate and tropical rainforest program led by faculty members Nalini Nadkarni and Jack Logino, he changed to ecological sciences (Quarandillo, 2009).

Use of open inquiry confirms Hypothesis 2. TESC's pedagogy helps students develop entrepreneurial attributes; it helps students find passion. Therefore, it is a complement to the other entrepreneurial attributes that the institutional model supports development.

EVIDENCE OF THE TESC MODEL IMPACT ON STUDENTS

GET - Quantitative Results

To test the effectiveness of the TESC model of institutional and pedagogical methods for assisting students in developing entrepreneurial attributes, this study applies the general enterprising tendency test (GET-2) developed at Durham University (Caird, 1991). The five enterprising characteristics this test measures include:

Need for achievement measures a person's need to strive to attain success (Cromie, 2000), and represents a way of life rather than a simple drive. High achievers take immediate responsibility for their tasks, display initiative, plan and control events, and desire concrete feedback concerning performance (McClelland et al., 1953). Some scholars argue that entrepreneurs have a higher drive to achieve than non-entrepreneurs (Begley & Boyd, 1986); others suggest there is little connection between high achievement and propensity to start a business (Hull et al., 1980). However, a need to achieve characterizes studies of entrepreneurs' high motivation (McClelland et al., 1953; Young, 1983). Answers to test questions measuring need for achievement include "I find it easy to relax on holiday and forget about work" and "I get up early, stay late or skip meals if I have a deadline for some work that needs to be done."

Internal Locus of Control, based on the theory of social learning (Caird, 1991), relates to high need for achievement and autonomy (McClelland, 1968; Scalan, 1979), and illustrates the extent to which a person feels in charge such that luck or fate do not determine what happens (Cromie, 2000). Some scholars argue that this locus depends on tasks and results. Positive results cause people to feel in control, and negative results cause a sense of lack of control (Chell, Haworth, & Brearley, 1991). Representative answers from the test include "I believe that what happens to me in life is determined mostly by other people" and "For me, getting what I want has little to do with luck."

Risk Taking. Entrepreneurs assess and calculate risk carefully, and are moderate rather than high risk-takers (Caird, 1991; Cunningham & Lischeron, 1991; Drucker, 1985; Timmons, 1989). Evidence exists that entrepreneurially-inclined people have significantly higher risk scores (Koh, 1996), yet a key element for entrepreneurial activities is risk avoidance (Miner, 1990). Researchers usually consider two factors when defining risky behaviors: how outsiders perceive the situation (Cromie, 2000) and a firm's stage of development (Mintzberg, 1979). Related questions included "I find it difficult to ask favors from other people" and "What we are used to is usually better than what is unfamiliar."

Creativity. Creative people think unconventionally, challenge existing assumptions, and exhibit flexibility and adaptability to problem solving (Kirton, 1976; Solomon & Winslow, 1988). Entrepreneurs tend to be creative (Kuratko & Hodgetts, 1995; Timmons, 1989; Whiting, 1988). Operationally, creativity is defined as a tendency to be imaginative, innovative, curious, and versatile (Caird, 1991), as the test's question indicate: "I like to have my life organized so that it runs smoothly and to plan" and "It is harder for me to adapt to change than keep to a routine." **Need for Autonomy.** Entrepreneurs want to be in control and do not function well in restricted environments (Cromie, 2000); they avoid constraints imposed by rules, procedures, and social norms (Collins & Moore, 1970). Cromie (1987) argues that need for autonomy is the principal motive to starting a business. Others suggest independence as a key attribute (Kuratko & Hodgetts, 1995). Relevant items included "Most people think that I am stubborn" and "When I am in a group, I am happy to let someone else take the lead." The GET was administered to 96 students, though only 87 returned completed tests. The breakdown of participants by class was 15 freshmen, 25 sophomores, 33 juniors, and 14 seniors.

Procedures A pilot test was designed to gather information from participants on measures of enterprising tendency. The primary focus was to determine whether TESC students are more enterprising than other occupational groups displayed in Table 1 (Cromie, 2000, p. 23), and whether TESC senior students are significantly more enterprising than other students at Evergreen. A t-test analysis was conducted to determine the probability of significance in mean differences between academic levels for measures of enterprising tendency.

Table 1. Means and standard deviations for group size (n) on components of the general enterprising tendency (GET) test

Group	Means and Standard Deviations	Need for Achievement (max= 12)	Need for Autonomy (max=6)	Creative Tendency (max=12)	Calculated Risk taking (max=12)	Internal Locus of control (max=12)	Enterprising Tendency (max=54)	n
Business owner /managers	Mean SD	9.92 1.56	4.14 1.38	8.77 1.88	8.75 2.00	9.51 1.68	41.04 5.44	73
Lectures and trainers	Mean SD	8.88 1.81	4.12 1.33	8.48 2.38	8.64 2.72	8.24 2.07	38.28 7.60	25
Part-time MBAs	Mean SD	9.49 1.58	3.35 1.51	7.86 2.12	8.08 2.54	9.19 1.96	37.86 6.76	101

Teachers	Mean SD	8.84 1.94	3.32 1.52	8.24 2.03	7.50 1.94	8.17 2.13	35.94 5.69	101
Managers	Mean SD	8.96 1.85	3.19 1.22	7.63 2.09	7.43 2.54	8.06 2.13	35.29 6.61	194
Civil servants	Mean SD	8.45 2.44	3.00 1.03	7.70 2.18	6.80 2.07	7.50 2.37	33.55 7.19	20
Nurses	Mean SD	8.52 1.54	2.85 1.30	7.97 1.85	6.61 1.95	7.76 2.21	33.33 4.48	33
Undergraduates	Mean SD	7.85 1.99	3.24 1.30	7.48 2.21	7.01 2.24	7.61 2.12	33.20 6.29	661
Clerical trainees	Mean SD	6.70 2.50	3.00 1.56	6.10 2.33	6.20 1.69	7.90 1.29	29.40 7.18	10

Source: Cromie (2000, p. 23)

Table 2. Means and standard deviations for TESC students' scores on measures of enterprising tendency

Group	Means and Standard Deviations	Need for Achievement (max=12)	Need for Autonomy (max=6)	Creative Tendency (max=12)	Calculated Risk taking (max=12)	Internal Locus of control (max=12)	Enterprising Tendency (max=54)	n
Freshmen	Mean SD	7.93 1.62	3.33 1.11	9.20 1.42	8.00 1.51	8.40 1.96	36.86 2.57	15
Sophomore	Mean SD	8.76 1.76	3.49 1.33	8.40 1.98	8.20 1.85	9.24 1.51	37.60 2.69	25
Junior	Mean SD	8.73 1.63	3.42 1.30	8.61 1.85	8.33 1.45	8.85 1.77	37.93 2.63	33
Senior	Mean SD	8.86 1.75	3.29 1.54	8.93 1.27	9.36 1.55	9.93 1.86	40.35 2.90	14
All Students	Mean SD	8.62 1.69	3.40 1.30	8.70 1.34	8.40 1.63	9.06 1.78	38.18 2.68	87

Table 3. Probabilities of significance for the difference between academic levels using t-test (expressed as p-values)

Comparison of senior TESC students with other TESC students at various academic levels (n=14)	Need for Achievement	Need for Autonomy	Creative Tendency	Calculated Risk Taking	Internal Locus of Control	Enterprising Tendency
Freshmen (n=15)	0.1517	0.9243	0.5934	0.0243	0.0404	
Sophomore (n=25)	0.8694	0.6812	0.3748	0.0550	0.2163	
Junior (n=33)	0.8075	0.7533	0.5561	0.3354	0.0658	

RESULTS

The null hypothesis states there is no difference between seniors and other students (freshmen, sophomores, and juniors) on all measures of the general enterprising tendency except on calculated risk and internal locus control (Table 3). For calculated risk between seniors and freshmen, the p-value was 0.0243 (significant), between seniors and sophomores, 0.0550 (not significant), and between seniors and juniors, 0.0354 (significant). For internal locus of control between seniors and freshmen, the p-value was 0.0404 (significant), between seniors and sophomores, 0.2163 (not significant), and between seniors and juniors, 0.0658 (not significant).

If a 5% probability of error is accepted, mean differences between seniors and freshmen, and sophomores and juniors in terms of general enterprising tendency are significant. Another important observation is that the means of all attributes among TESC students are above standards (see Table 1), except for need for autonomy. The mean for total enterprising score for TESC students is above scores in almost all the occupational groups displayed in Table 1 (Cromie, 2000, p. 23), except for lectures, trainers, business owners and managers. Cromie's (2000) scores were derived from studies by Caird (1991), Cromie and Callaghan, (1997), and Cromie and O'Donoghue (1992). They confirm that the GET test is comprehensive, accessible, easy to administer and score, and, although additional work is needed to verify its psychometric properties, these studies also have found that the GET has criterion and convergent validity, and good internal consistency. However, these results are not sufficient to determine that TESC students would behave as entrepreneurs just because they have entrepreneurial traits. As Cromie (2000) indicated, "personal attributes are important by not all-pervading determinants of behavior (p.25)." What is important is what students do with these personal attributes. That is the conversion of intentions into actions. Therefore, following are some samples of TESC alumni that illustrate their entrepreneurial behavior.

Alumni Entrepreneurs start many kinds of businesses such as green construction firms, organic restaurants, schools, import businesses, record labels, clothing companies, software company marketing, and biotechnology. Beyond businesses, Evergreen alumni apply their education unexpectedly, from growing gardens in prisons and understanding regional responses to disasters, to launching a community organization that boosts economic development in a small Vermont town. The following are a few examples that illustrate TESC students' enterprising behaviors after graduation:

Chris Baggott '83 established himself as a high-tech entrepreneur, an authority on online marketing, and voice for the Internet's power to democratize the business world. Baggott launched ExactTarget in 2000 in the wake of the dot-com bust with two associates and an initial investment of $200,000. Within six years, the business blossomed into a $3.2 million enterprise. ExactTarget's basic proposition of leveraging technology to improve business-customer relationships caught on quickly. Its direct client base rose to about 3,000 organizations, from small retailers and local businesses to giants such as Home Depot, Expedia.com, and Liberty Mutual. Today, the company is a global software service leader with more than 1000 employees spanning three continents (Baggott, 2009).

Jackie Heinricher '86 runs Boo-Shoot Gardens in Mt. Vernon, WA, a multimillion-dollar biotechnology company she started in her Anacortes barn in 1998. The company employs 55 scientists, horticulture specialists, and growers at peak times, and produces more than two million bamboo plants a year. The company launched the Plant-a-Boo crusade to curb global warming (Heinricher, 2009).

Young Harvill '76 has a long list of high-tech accomplishments. He participated in the upstarts of several influential Bay Area technology firms, including one of San Francisco's first multimedia companies, Paracomp, which Macromedia later acquired. He was the principal investigator on several patents. Harvill is a virtual reality (VR) pioneer. He co-created the DataGlove, an early VR device, and invented Swivel 3D, one of the first modelers for desktop computers in which a three-dimensional model is generated from a flat image. He co-developed the Director Player, the precursor of the Shockwave multimedia player. Harvill believes Evergreen made it possible for him to merge his interests in technology and the arts. "What's amazing about Evergreen is that it manages to have structure and essentially a will to teach that is very defined and very strong and yet not composed of artificial boundaries between things. I don't think I would have been able to be an arts student and do computer programming and self-paced work and also be on the arts staff and do holography anywhere else. It's not very likely. The arts really benefit from the technology." (Harvill, 2008)

Ian Hanna '93 learned to run a business the old-fashioned way, through trial and error. He founded Windfall Lumber, one of the first FSC-certified businesses in the northwest. "Evergreen teaches you how to learn on your own, so I started my own business and learned how to run it." (Hanna, 2009)

David Mozer '74 from Seattle, WA is founder and director of the International Bicycle Fund (www.ibike.org), which promotes worldwide sustainable bicycle transportation and cultural understanding. He founded and owns Ibike Tours (www.ibike.org/ibike), which markets and leads international biking tours.

In 2006, Andrew Senna'04 and Ben L. Robertson '03 saw a vacancy in the Pacific Northwest for the kind of music they play and now release, so they founded Aphonia Recordings, an Internet-based label and production company dealing nearly exclusively in digital downloads of contemporary experimental music.

These examples represent only a small percentage that illustrates the enterprising behaviors of TESC students; there are over five hundred alumni registered in the Alumni Entrepreneurs Association.

CONCLUSIONS

Access to technology, education, safe financial structure, and good physical structure are no longer sources for comparative advantage among countries and companies; it is how these resources are used, and requires entrepreneurial thinking to create a new model of comparative advantage. A need for educational models that support development of entrepreneurial attributes is imperative for the new model of comparative advantage. It is not only about opening new businesses, it is about how all resources—environmental, societal, and economical—are used in private, public, and non-profit organizations. Future employees, managers, owners, public administrators, and others must develop entrepreneurial attributes.

This paper illustrates how both the institutional and pedagogical models at Evergreen, based on constructivist methods, provide similar benefits to all the students. The college develops entrepreneurial attributes across campus. Abundant evidence demonstrates that Evergreen students go on and apply entrepreneurial mindsets whether or not they took business classes at Evergreen, and, similarly, whether or not they went to business graduate school. There exists much fluidity between what students study at Evergreen and what they do after college, and the students are prepared to choose their paths. The TESC educational model is inherently constructivist.

Nevertheless, the curriculum is challenging. Students are accustomed to a prescribed path, and most function—at least through the first quarter of their first programs—as if they were still taking separate courses and are in competition with peers; the familiar, primary purpose is to please teachers despite no requirements, majors, or grades to remind them of habits. Usually starting in the second quarter, students begin to base responses to books and each other's seminar contributions to a theme, and try to help rather than contend with each other because they discover that thematic references unfold and build more enjoyably that way.

TESC's model applies campus-wide, but it is not executed solely in a classroom or department. Teachers design constructivist classrooms because the institution supports them. Students are exposed constantly to this process so that entrepreneurial mindsets become intuitive. It becomes second nature for the students because they repeatedly practice it in so many ways. Entrepreneurship centers should be centers for experimentation for faculty, students, and communities, and should be a place where students and faculty feel safe to fail.

The best place to start applying TESC's model is in entrepreneurship courses. As an entrepreneurship professor, I often find myself teaching marketing, finance, and management in the same class. Thus, entrepreneurship courses provide the perfect environment for team teaching, where at least three teachers from marketing, finance and management teach together (i.e., select themes and plan a program for a full year, not just one semester.). This allows students to work on meaningful projects and observe application of the three disciplines operating simultaneously. Businesses are systems. Grading should be removed from entrepreneurship courses. What can an entrepreneurship student do with an A+ or a C? We need to challenge students, to ask them to take risks, and teach them to fail and learn from failure. A grade is a haven because outcomes are predetermined. We can use evaluations not only from the teacher when students present a portfolio of accomplishments (i.e., success and failures), but also

a self-evaluation of learning experiences and progress that occurred during a one-year program from students.

The arguments above require support not only from business and management schools, but also from accreditation organizations and faculty. As entrepreneurship faculty, we need to take risks; we need to move from delivering content to facilitating a process of helping students to develop an entrepreneurial mindset. The new model requires a paradigm shift; business schools and entrepreneurship educators must abandon familiar perspectives and practices and adopt new ones. As Krueger (2009) suggests, "While teachers may intend to assist students toward more expert thinking, they need to model the same learning and openness to cognitive change that they desire in students. In constructivistic classrooms, the teacher-student distinction is thus blurred mindfully; both are learners, both are teachers" (p. 38).

My experience as a TESC faculty member suggests that to learn the TESC model, it is necessary to experience it directly. This aligns with constructivist theory. This paper provides only a primer of TESC's model; direct experience is irreplaceable. At Evergreen, no written manual exists that teaches new faculty how to teach; it is an apprenticeship process. Programs at Evergreen have no more than one team member without experience in collaborative teaching. Experienced faculty members know they will perceive insecurities they did not know they had each time. (Jones, 1981) states:

The inexperienced faculty member, not being thus prepared, must be helped by the others to live through a period of professional and personal shock. Not the least of the frustrations, especially for an experienced teacher of courses, is the prescription against teaching his subject, in favor of learning how to represent it. Two other sources of shock are inevitable: (1) finding oneself totally responsible for the education of a group of students for a whole academic year, and 2) working under the constant scrutiny of professional peers. However sympathetic this scrutiny may be, it is trying on a beginner." (p. 54)

I do not suggest the TESC model is better than other approaches. Everything depends on purpose. If your purpose is to develop students' entrepreneurship mindset, then adaptation of TESC's design might help you achieve your purpose. Evergreen is no longer an educational experiment; it has been successful for over forty years. As entrepreneurship educators, we have a responsibility in contemporary times because we must educate future business leaders. In a society that is increasingly distrustful of business and with complex global problems that offer fertile ground for students and us to explore solutions in a safe environment where failure is the teacher, are you ready for a paradigm shift?

REFERENCES

Baggott, C. (2009, May). (A.M. Quarandillo, Interviewer).

Bandura, A. (1977). *Social learning theory.* Englewood Cliffs, NJ: Prentice-Hall.

Bauersfeld, H. (1995). The structuring of the structures: Development and function of mathematizing as a social practice. In L. Steffe & J. Gales (Eds.), *Constructivism in education* (pp. 137-158). Hillsdale, NJ: Lawrence Erlbaum Associates.

Begley, T., & Boyd, D. (1986). Psychological characteristics associated with entrepreneurial performance. In R. Ronstadt, J. Hornaday, R. Peterson, & K. Vesper (Eds.)*, Frontiers of entrepreneurship research* (pp. 146-165). Wellesley, MA: Babson College.

Bodner, G. (1986). Constructivism: A theory of knowledge. *Journal of Chemical Education, 63*, 873-878.

Bouchhiki, H. (1993). A constructivist framework for understanding entrepreneurial performance. *Organization Studies, 14*(4), 549-570.

Brockhaus, R. (1987). Entrepreneurial folklore. *Journal of Small Business Management, 25*(3), 1-6.

Brooks, J., & Brooks, M. (1999, September 30). In search of understanding: The case of constructivist classrooms. *Association for Supervision and Curriculum Development* . EBCOhost.

Bruner, J. (1986). *Actual minds, possible worlds*. Cambridge, MA: Harvard University Press.

Caird, S. (1991). Testing enterprising tendency in occupational groups. *British Journal of Management, 2*, 177-186.

Chandler, G., & Jansen, E. (1992). *The entrepreneurial personality: Concepts, cases, and categories*. London, UK: Routledge.

Chell, E., Haworth, J., & Brearley, S. (1991). The founder's self-assessed competence and venture performance. *Journal of Business Venturing, 7*(3), 223-236.

Collins, O., & Moore, D. (1970). *The organization makers*. New York, NY: Appleton-Century-Crofts.

Covin, J., & Slevin, D. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10*, 75-87.

Cromie, S., & Callaghan, I. (1997). Assessing enterprising attributes: The usefulness of the DUBS General Enterprising Tendency (GET) test. *Journal of Small Business and Enterprise Development , 4*, 65-72.

Cromie, S., & O'Donoghue, J. (1992). Assessing enterprising inclinations. *International Small Business Journal, 10*, 66-73.

Cromie, S. (1987). Motivations of aspiring male and female entrepreneurs. *Journal of Organizational Behavior , 8*, 251-261.

Cromie, S. (2000). Assessing entrepreneurial inclinations: Some approaches and empirical evidence. *European Journal of Work and Organizational Psychology, 9*(1), 7-30.

Cunningham, J., & Lischeron, J. (1991). Defining entrepreneurship. *Journal of Small Business Management, 29*, 45-61.

Drucker, P. (1985). *Innovation and entrepreneurship*. London, UK: Heinemann.

Fayolle, A., & Servais, I. (2000). *Exploratory study to access the impact of entrepreneurship programs on student entrepreneurial behaviors*. Paper presented at Babson Entrepreneurship Conference, Babson Park, Wellesly, MA.

Florida, R. (2010, August 12). *The Road Map to a High-Speed Recovery*. Retrieved from: http://www.tnr.com/article/economy/76961/richard-florida-reset-recovery-economy-future

Gamoran, A., Secada, W., & Marrett, A. (1998). The organizational context of teaching and learning: Changing theoretical perspectives. In M. Hallman (Ed.), *Handbook of sociology education* (pp. 37-63). New York: Kluver Academic/Plenum Press.

Gibb, A. (2002). In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning: Creative destruction, new values, new ways of doing things and new combinations of knowledge. *International Journal of Management Review , 4*(3), 233-269.

Guglielmino, P., & Klatt, L. (1993). *Entrepreneurs as self-directed learners*. Paper presented at ICSB World Conference, Las Vegas, NV.

Hanna, I. (2009, May). (A.M. Quarandillo, Interviewer).

Harvill, Y. (2008, May). (C. Shea, Interviewer).

Heinricher, J. (2009, May). (A.M. Quarandillo, Interviewer).

Higdon, L. I. (2005). Liberal education and the entrepreneurial mindset: A twenty-first century approach. *Liberal Education*, 34-41.

Hipple, F. (2010). *Self-employment in the United States, Bureau of Labor Statistics*. Retrieved from http://www.bls.gob/opub/mlr/2010/09/art2full.pdf

Hull, D., Bosley, J., & Udell, G. (1980). Renewing the hunt for the heffalump: Identifying potential entrepreneurs by personality characteristics. *Journal of Small Business, 18*, 11-18.

Jones, R. (1981). *Experiment at Evergreen*. Rochester, VT: Schenkman Publishing.

Kirton, M. (1976). Adaptors and innovators: A description and measure. *Journal of Applied Psychology, 61*, 622-629.

Koh, H. (1996). Testing hypotheses of entrepreneurial characteristics. *Journal of Managerial Psychology, 61*, 622-629.

Koppelman, N. (2010, September 10). (N. Pizarro, Interviewer).

Krueger, N. (2007). What lies beneath? The experimental essence of entrepreneurship thinking. *Theory and Practice, 31*(1), 123-138.

Krueger, N. (2009). The microfoundations of entrepreneurial learning and…education: The experiential essence of entrepreneurial education. In G. I. Page, L. Gatewood, & G. Shaver (Eds.), *University-wide entrepreneurship education* (pp. 35-59). Cheltenham, UK: Edward Elgar.

Krueger, N., & Hamilton, D. (1996). Constructivism and entrepreneurship education. In T. Monroy, J. Reichert, N., & F. Hoy (Eds.), *The art and science of entrepreneurship education* (pp. 11-21). Cambridge, MA: Ballinger.

Krueger, N., & Dickson, P. (1994). How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition. *Decision Science, 25*, 385-400.

Krueger, N., Reilly, M., & Carsrud, A. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing, 15*(5/6), 411-532.

Kuratko, N., & Hodgetts, R. (1995). *Entrepreneurship.* Fort Worth, TX: Dryden Press.

Leitch, C., & Harrison, R. (1999). A process model for entrepreneurship education and development. *International Journal of Entrepreneurship Behavior and Research, 5*(3), 83-89.

McClelland, D. (1968). *The achieving society* (2nd ed.). Princeton, NJ: Van Nostrand.

McClelland, D., Atkinson, J., Clark, R., & Lovell, E. (1953). *The achievement motive.* New York, NY: Appleton-Century-Crofts.

Miles, M., & Arnold, D. (1991). The relationship between marketing orientation and entrepreneurial orientation. *Entrepreneurship Theory and Practice, 15*, 49-65.

Miner, J. (1990). Entrepreneurs, high growth entrepreneurs, managers: Contrasting and overlapping motivational patterns. *Journal of Business Venturing, 7*(4), 103-113.

Mintzberg, H. (1979). *The structuring of organizations.* Englewood Cliffs, NJ: Prentice Hall.

Morris, M., & Paul, G. (1987). The relationship between entrepreneurship and marketing in establsihed firms. *Journal of Business Venturing, 2*, 247-259.

Piaget, J. (1950). *The psychology of intelligence.* New York, NY: Routledge.

Quarandillo, M. A. (2009, April). Raising some cane with Bamboo. *The Evergreen State College Magazine, 30*(2), 7.

Ransom, B. (2010, September 11). (N. Pizarro, Interviewer).

Rhodes, L. K., & Bellamy, G. T. (1999). Choices and consequences in the renewal of teacher education. *Journal of Teacher Education, 50*(1), 17-25

Schrager, S. (2010, September 15). (N. Pizarro, Interviewer).

Schram, J. C. (2006). *The entrepreneurial imperative: How America's economic miracle will reshape the world (and change Your life)*. New York: Harper Business.

Solomon, G., & Winslow, E. (1988). Towards a descriptive profile of the entrepreneur. *Journal of Creative Behavior, 22*, 162-171.

Timmons, J. (1989). *The entrepreneurial mind*. Andover, MA: Brick House Publishing.

von Glaserfeld, E. (1989). Cognition, construction of knowledge, and teaching. *Synthese, 80*, 121-140.

Whiting, B. (1988). Creativity and entrepreneurship: How do they relate? *Journal of Creative Behavior, 22*, 178-183.

Young, D. (1983). *If not for profit, for what? A behavioral theory of the non-profit sector based on entrepreneurship.* Lexington, MA: Lexington Books.

Zhao, H., Seibert, S., & Hills, G.(2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Journal of Applied Psychology, 90*, 1265-1272.

Involving the Entrepreneurial Role Model:
A Possible Development for Entrepreneurship Education

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ABSTRACT

This paper offers and discusses an alternative way to delivering entrepreneurship education to students in higher education institutions through the involvement of a role model(s) in entrepreneurship teaching and learning. A previous study with students in an Indonesian university showed that the role model is in position to give positive influence to their entrepreneurial motivation, and furthermore, the choice for a future career as an entrepreneur. As a further development, this paper outlines a model whereby the appropriate role of the dominant entrepreneurial role models (who are parents, entrepreneurs and teachers/lecturers) are integrated one with the other and can be used as a source of an entrepreneurial learning process. The lecturer can take on the major task as the facilitator to encourage students to seek the appropriate knowledge about entrepreneurship in this integration whilst the other two constructs can take on their major tasks to act as sources of informal entrepreneurial learning (through social and active learning). Entrepreneurs in particular, can act as a 'business father or mother' to whom students can talk and with whom they can establish a longer informal relationship.

This paper argues that whilst this model can be implemented successfully it is critical that a suitable and proper institutional setting -in terms of curriculum arrangement -alongside the availability of supporting facilities and infrastructures be arranged and addressed to support it.

Keywords: entrepreneurship education, entrepreneurial role models, institutional setting

INTRODUCTION

Entrepreneurship has become an economic panacea seen as both generating employment and economic prosperity in developed and developing countries (Kuratko, 2005; Matlay, 2006). The growing interest in entrepreneurship teaching and research (Jones and English, 2004) simultaneously increased the enthusiasm of students for taking part in an entrepreneurship course. They have become the most popular course in the USA for college and university students, followed by small business management and new venture creation (Solomon, 2007). Entrepreneurship is offered as a specific subject of education to be delivered as it is believed that education plays an important role in the process of entrepreneurial capacity (Hannon, 2006). This importance can be seen in the 2008 Global Entrepreneurship Monitor (GEM) which devoted their 2008 special topic to Entrepreneurship Education and Training.

Rae (2010) argued that universities and their provision of education and learning for entrepreneurship must respond to the new economic era and the subsequent global recession. To respond to this, entrepreneurship education should be prepared for all university students regardless of their majors in order to improve their competitive advantage, not only for themselves but also for the nations and societies in which they involved (Lee, Chang and Lim, 2005). Unfortunately, entrepreneurship is often delivered through a normative theory-based approach rather than the pragmatic approach that is more contextual, experiential and reflexive. So students are only equipped with knowledge *about* entrepreneurship to stand alongside their traditional business-management skills and knowledge (Taatila, 2010). Although scholars have developed and offered some contemporary ways for

entrepreneurship teaching and learning, they also have realized that several factors (such as teaching and learning facilities and infrastructures, social and cultural influences, and curriculum) matter equally much in entrepreneurship education (see the studies of Higgins and Mirza, 2012, Carver, et al., 1996, Souitaris et al., 2007, Aronsson, 2004, Fiet, 2000, Jones-Evans et al, 2000, Jack and Anderson, 1999, Gorman et al, 1997,). One thing in principle is that entrepreneurship education should be better schemed, and therefore, it needs a proper and suitable institutional setting to foster delivery.

This paper offers an alternative for delivering entrepreneurship as a part of the education for students in higher education institutions by arguing that the role model can be involved in entrepreneurship education – as it relates positively to students' entrepreneurial motivation and the choice of a future career as an entrepreneur.

THEORETICAL OVERVIEW

Despite the problem of a lack of consensus over the definition of entrepreneurship which has resulted in a lack of a suitable pedagogical paradigm for entrepreneurship education, some scholars have tried to define what is entrepreneurship education, for example, Heinonen and Poikkijoki (2005): "e*ntrepreneurship education is the activities aimed at developing enterprising or entrepreneurial people and increasing their understanding and knowledge about entrepreneurship and enterprise"*. Unfortunately, even this definition cannot resolve the question and debate about how entrepreneurship education should be carried out. In addition, Jones and Iredale (2010) also identified another problem that relates to entrepreneurship education. They identified the problem of terminology within the continuums of enterprise and entrepreneurship education by arguing that there should be a clear separation between 'entrepreneurship' education and 'enterprise' education as both of these display differences in their focus and objectives. In a research regarding the learning process in entrepreneurship education, Fayolle and Gailly (2007) have mapped the key dimensions of learning processes in entrepreneurship education and the alternative teaching models that can be chosen which are summarized in Table One. Combining these two approaches we conclude on the distinction between the entrepreneurship education and enterprise education continuum in Figure One.

Although Figure One has clearly demonstrates the distinction, one thing the scholars have in common is the principle that the entrepreneurship education should rely on the adequacy regarding the objectives, characteristics of the audience and the existence of the institutional context that can influence contents and the constraints of entrepreneurship education. The tension to be resolved should not be to find which terminology is the most suitable for use – but rather to explore and to focus on what are those suitable teaching and learning methods that will be effective in delivering the course(s), be it either entrepreneurship or enterprise education. Related to this, there does seem to be an informal understanding between scholars that the 'learning' approach which accommodates the formal and informal learning possibilities will be more successful in entrepreneurship education rather than the 'teaching' approach. Rae (1999) when considering a basic approach to entrepreneurship education and entrepreneurial learning for university students argued that the sources of entrepreneurial learning should be active, social and formal. He further proposed that there should be changes to the content of the courses from ordinary business skills-knowledge and understanding to the development of the students' entrepreneurial skills, attributes and behaviours. This is also supported by Gibb (1996) who said that the process of learning should also be shifted from the traditional learning processes into an "*entrepreneurial learning processes*". Thus, the challenge for entrepreneurship education is to establish, develop and maintain a system of learning (and assessment) that can add to the traditional ways of learning and developing its students with the skills, personality attributes and behavioural characteristic of the enterprising, or entrepreneurial, individual (Kirby, 2002).
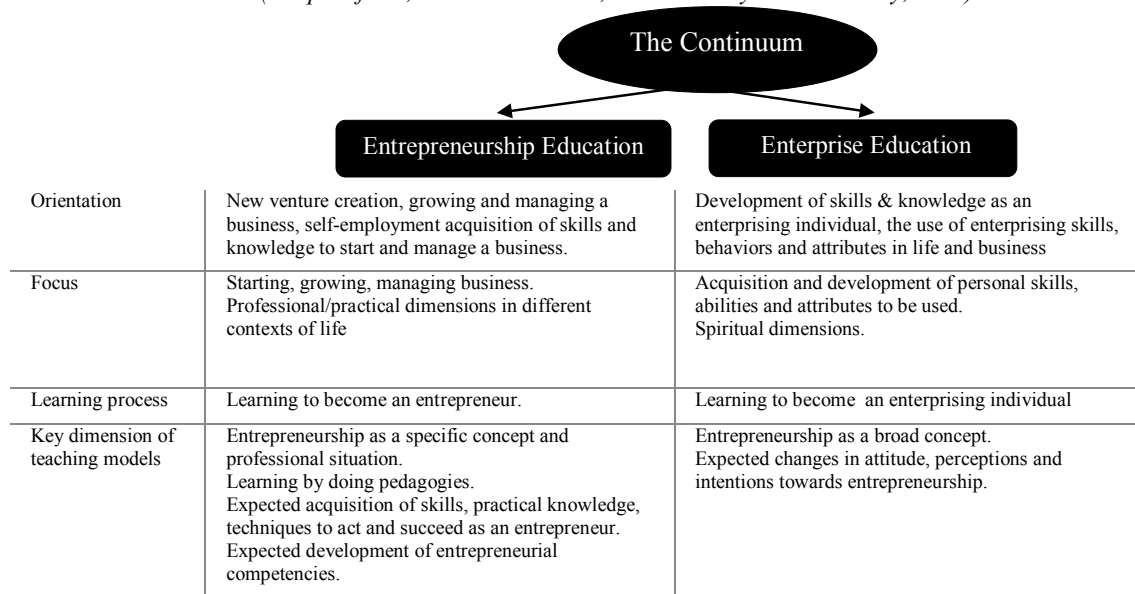
Table 1

Key Dimensions of the Learning Processes in Entrepreneurship Education *(Adapted from Fayolle and Gailly, 2007)*

Learning process	Key dimensions of the teaching model
Learning to become an enterprising individual	Entrepreneurship as a broad concept Focus on spiritual dimensions (know why and know when) Expected changes in attitude, perceptions and intention toward entrepreneurship Large diversity of audiences: students in business & non-business fields High importance of entrepreneurs as role models in the classroom
Learning to become an entrepreneur	Entrepreneurship as a specific concept and professional situation (independent entrepreneurship, corporate entrepreneurship) Focus on professional/practical dimensions (know what, know how, know who). Learning by doing pedagogies. Expected acquisition of skills, practical knowledge, techniques to act and succeed as an entrepreneur. Expected development of entrepreneurial competencies Main audiences: would-be entrepreneurs working or having a real and concrete entrepreneurial project
Learning to become an academic	Academic conception of entrepreneurship Focus on theoretical dimension Didactical educational model Discussion in the classroom of research issues Main audiences: PhD students, teachers and researchers Expected acquisition of theoretical and scientific knowledge

Figure 1

The Continuum of Entrepreneurship and Enterprise Education

(Adapted from; Jones and Iredale, 2010 and Fayolle and Gailly, 2008)

	Entrepreneurship Education	Enterprise Education
Orientation	New venture creation, growing and managing a business, self-employment acquisition of skills and knowledge to start and manage a business.	Development of skills & knowledge as an enterprising individual, the use of enterprising skills, behaviors and attributes in life and business
Focus	Starting, growing, managing business. Professional/practical dimensions in different contexts of life	Acquisition and development of personal skills, abilities and attributes to be used. Spiritual dimensions.
Learning process	Learning to become an entrepreneur.	Learning to become an enterprising individual
Key dimension of teaching models	Entrepreneurship as a specific concept and professional situation. Learning by doing pedagogies. Expected acquisition of skills, practical knowledge, techniques to act and succeed as an entrepreneur. Expected development of entrepreneurial competencies.	Entrepreneurship as a broad concept. Expected changes in attitude, perceptions and intentions towards entrepreneurship.

From the bundle of studies and research regarding entrepreneurship education amongst countries, Mwasalwiba (2010) summarised the general objectives of entrepreneurship education in various countries as comprising of: (a) increasing entrepreneurial spirit/culture/attitudes (34% amongst the recorded studies and research); (b) start-up and job creation (27%); (c) making a contribution to the society (24%); and, (d) stimulating entrepreneurial skills (15%). These objectives led to the possible choice of teaching methods, which can be categorized into traditional methods (comprising normal lectures) and innovative methods which are more action-based (Arasti, Falavarjani and Imanipour, 2012), or in another terminology, passive and active methods (Mwasalwiba, 2010). To name some detail teaching and learning methods in entrepreneurship, Pittaway and Cope (2007) through a Systematic Literature Review identified: the use of the classic approach (Benson, 1992); action learning (Leitch and Harrison, 1999); new venture simulations (Clouse, 1990; Kelmar, 1992);

technology based simulations (Low, Venkataraman and Srivatsan, 1994; Hindle, 2002); the development of actual ventures (Haines, 1988); skill based courses (Ullijn, Duill and Robertson, 2004); video role plays (Robertson and Collins, 2003); experiential learning (Sexton and Upton, 1987; Daly, 2001); and mentoring (Stewart and Knowles, 2003). Lourenco and Jones (2006) further strengthen that mixture and collaboration of traditional approaches (lectures and seminars) by discussing transmissive methodologies (Sterling, 2001:36) associated with the transfer of information through more enterprising and interactive approaches (company visits, in-depth discussions with real entrepreneurs, activities) which use transformative methodologies – so engaging learners in constructing and owning their learning – and so possibly providing the best learning style for nascent entrepreneurs. Arasti, Falavarjani and Imanipour (2012) found that case study and projects, (either group or individual), problem solving and a project for establishing new venture creation are the most appropriate methods for engaging students in entrepreneurship. Furthermore, reflecting on interactive approaches which use transformative methodologies, Kuckertz (2013) emphasized two possible prominent learning methodologies that may raise the entrepreneurial attitudes of students. They are firstly: the exposure of students in class to specific role models such as successful entrepreneurs (Aronsson, 2004, Souitaris et. al., 2007 and Carver, et. al., 2010). Related to the choice of role model entrepreneurs for students, Kuckertz (2011) further suggested that they are better to be: (a) younger entrepreneurs who are two or three years ahead of the student, and (b) those to whom students can easily relate. Secondly, project based learning (Gorman, et al., 1997) and learning by doing (Fiet, 2000), for instance, the involvement of students in actual start-ups or student consulting to entrepreneurs. As a possible further development in entrepreneurship education, Higgins and Mirza (2012) for example, suggested that entrepreneurial education should consider a more reflexive practice-oriented education agenda and approach that involve self-conception of what does it mean to be an entrepreneur.

THE CONSTRUCT OF ROLE MODELS, ENTREPRENEURIAL MOTIVATION AND A FUTURE CAREER AS AN ENTREPRENEUR

The concept of the entrepreneurial role model introduced by Gibson (2004) defined the role model, identified the dimensional approach of the role model, discussed characteristics that differentiate a role model from a mentor model or a behavioural model; and the reason why an individual is appointed to become a role model by other individuals. The definition of the role model as suggested by Gibson (2004) is *"a cognitive construction based on the attributes of people in social roles an individual perceives to be similar to him or herself to some extent and desires to increase perceived similarity by emulating those attributes"*
. However, Gibson (2004) did not further clarify the impact and relationship between the existence of role models and individuals, especially to individuals' entrepreneurial motivation and their possible future career to become an entrepreneur. The rationale and relationship between the construct of role model, entrepreneurial motivation (in particular students in higher education institutions) and possible future career as an entrepreneur was introduced by Rahman (2013). He identified several possible constructs of role model and found that some role models, indeed, have a positive relationship to entrepreneurial motivation and the future career choice to become an entrepreneur. This is shown in Table Two. In all matters, parents and entrepreneurs are the perfect people on whom the students can rely on for their future career and entrepreneurial motivation. The constructs of siblings, uncles/aunties and friends are in a moderate position to influence the future career of the student (meaning that siblings, uncles-aunties and friends can only give insights on entrepreneurial career but they have no 'personality power' to encourage the students to take any further actions into an entrepreneurial career). This circumstance has further led to the fact that these three constructs of the role model have no significant correlation to student entrepreneurial motivation. The '*ambiguous*' position is shown by the teacher/lecturer as a construct of role model. On the one hand, the students think their teacher/lecturer is one of the people who can influence their future career but on the contrary, they think their teacher/lecturer have no correlation to their entrepreneurial motivation. This indicates one thing: reputation of the teachers/lecturers and their formal interrelationship with the

students can only give insights to the future career of the students but not markedly influence their entrepreneurial motivation.

THE INVOLVEMENT OF ROLE MODELS
IN ENTREPRENEURSHIP EDUCATION

The previous study by Rahman and Day (2012) implied that there is a possibility to use the role model construct in the social environment of an individual. Strengthening entrepreneurial motivation will further lead to strengthening the traits and personality of aspirant entrepreneurs.

Table 2

The Influence of the Construct of Role Models to Student Future Career Choice and Their Relationship to Student Entrepreneurial Motivation

No	Possible Degree of Influence for Future Career	Construct of role models according to their proximity to students						Not Known Personally
		Very Close		Close				
		Parents	Siblings	Uncles / Aunties	Friends	Boyfriends / Girlfriends	Teachers / Lecturers	Successful Entrepreneurs
1	Positive	√					√	√
2	Moderate		√	√	√			
3	Negative					√		

| No	Correlation to Entrepreneurial Motivation	Construct of role models according to their proximity to students						Not Known Personally
		Very Close		Close				
		Parents	Siblings	Uncles / Aunties	Friends	Boyfriends / Girlfriends	Teachers / Lecturers	Successful Entrepreneurs
1	Positive	√						√
2	No correlation		√	√	√	√	√	

Consequently, the use of role model constructs in strengthening traits and personality of the aspirant entrepreneur should also be better *schemed* in suitable arrangements either in formal or informal ways. In a formal way, this will relate to the involvement of the role model construct in entrepreneurship education (teaching & learning, training, workshops and seminars), whilst in an informal way this relates to the consideration of the social culture in which norms, values and wisdoms are taking place. As argued by Kirby (2002), the challenge of entrepreneurship education is to develop a system of learning (and assessment) that complements the traditional ways of learning and developing students with the skills, attributes and behaviours characteristic of the enterprising or entrepreneurial individual. Edwards and Muir, (2004) further strengthened Kirby (2002). Therefore, an arrangement and possible scheme to involve and integrate roles of dominant entrepreneurial role models consisting of: (1) parents, (2) entrepreneurs, and (3) lecturers in entrepreneurship education can be identified. The roles can be seen as a possible *specific task* that can be carried out by each role model. Using *individual approaches* as the consideration, the integration of roles of the dominant role models with students can be viewed in the following figure.

Figure Two shows that students are positioned in the centre of integration between the three dominant role models and they can take benefits from this integration. Tasks that should be done by each of the dominant role model are categorized into two categories: (1) *major tasks* and (2) *minor tasks*. The lecturer in this integration is in an important position as a *facilitator* who can facilitate the involvement of the two other dominant role models (parents and entrepreneurs). They may have a major task to encourage students to seek the appropriate knowledge in entrepreneurship and to become aware of entrepreneurship as a possible choice for their future career, and further, identifying and appointing possible and suitable role models who can share their experience in the classroom and establish a longer informal communication and interaction with students. As Aronsson, (2004), the role of educators is to foster entrepreneurial attitudes of their students, and so is less about changing

them directly, but rather increasing awareness of entrepreneurship as an alternative career choice and creating an environment that can foster entrepreneurial behaviour. As a general qualification, the lecturer is better being a person who engages in business and management practice, or at least, who is aware of it. Most importantly, the lecturer needs to show and express a willingness to explore new frameworks of knowledge transfer and development. The major task of entrepreneurs is to expose the real world scenarios of becoming an entrepreneur, offer continuous practical assistance and advice and be ready to be a '*business' father or mother'* with whom students can establish a longer and an informal relationship.

The entrepreneur is appointed by the students as their role model through their recognising and considering that they have a solid reputation as an entrepreneur and possibly, charisma. Therefore, it becomes important that this entrepreneur would be better to be an educationally empathetic person; still relatively young; has had the business since establishment; and has a strong commitment to give their time and share their experience to guide the student. It is hoped that parents who are entrepreneurs get involved in this model as they are the most influential role model for students. The major task of parents can be related to developing and improving student awareness regarding entrepreneurship as a possible future career, to give insights about other work and jobs (apart from just being an employee) and to support the choice of the future career by students. As students appointed parents as their role model based on the reason of charisma, it would be important for them to offer an informal approach (communication and interaction) and in a longer timeframe to raise student awareness. Parents should be wise in their counsel and communicate and interact with students with respect for their plans for their future life. Therefore, parents who can act as friends would be needed in this task.

Figure 2
Role Integration of Dominant Entrepreneurial Role Models in
Entrepreneurship Education
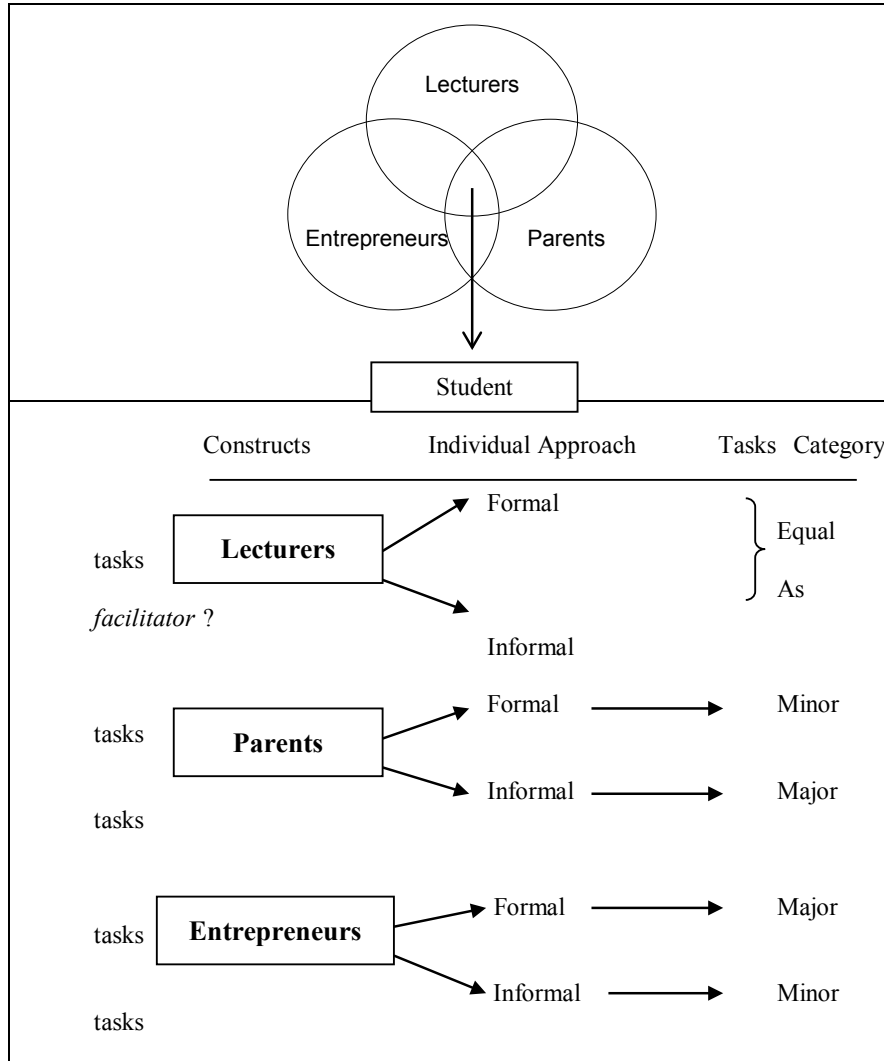
Interesting issues are raised for managing role models within the classroom. We have to manage a complex selection of role models; some of them will exert a physical and contemporary influence, (the guest entrepreneur). Others will have played a role in an environment outside of the classroom and their influence may be both now and in the past, for example, parents. So the educator needs to not only draw upon contemporary and previous influences but also to manage a range of internal and external influences whilst taking into account their relative impact on the student. Of course, an entrepreneurship (education) orientation has already made common the bringing of entrepreneurs into the classroom, however this is usually only for a limited and contained period of time. This paper implies that there should be more frequent interaction between students and entrepreneurs in the classroom. Such will allow the creation of the *closure mechanism* between students and entrepreneurs, whereby students will adopt and appoint entrepreneurs as their role model. There should also be a tripartite and close interpersonal relationship between teachers/lecturers-parents-entrepreneurs in guiding those students who have entrepreneurial projects, interests and motivation. Close cooperation between universities and actors (role models) would be a sensible route to choose, including actors outside of the traditional classroom network both in reach and time. If parents are a large pre-university influence then should we reach out to them, and incorporate them, prior to their children attending university?

CONCLUSION

As our previous study, we found that students react positively towards the existence of role models for their entrepreneurial motivation and their future career to become an entrepreneur. We found that the constructs of parents, entrepreneur and teacher/lecturer are the most likely persons who can influence their entrepreneurial motivation and a future career in entrepreneurship. We believe that this could be used as an alternative way in entrepreneurship education and an associated entrepreneurial learning process by arguing that the involvement of role models will also be effective in entrepreneurship education. We offer a model where the role of dominant entrepreneurial role models is integrated in entrepreneurship education for students in higher education institutions – in which every role model has its own specific major and minor tasks. However, arrangements should be made for a proper, and suitable, institutional framework and setting to support its implementation, particularly in terms of curriculum arrangement alongside the availability of supporting facilities and infrastructures be arranged and addressed to support it.

REFERENCES

Arasti, Z., Falavarjani, M.K., Imanipour, N. (2012). A Study of Teaching Methods in Entrepreneurship Education for Graduate Students. *Higher Education Studies*, *2*(1),1-10.

Aronsson, M. (2004). Education matters - but does Entrepreneurship Education? An Interview with David Birch. *Academy of Management Learning and Education 3*(3), 289-292.

Benson, G.L. (1992). Teaching Entrepreneurship through the Classics. *Journal of Applied Business Research, 8*(4), 135–40.

Carver, C.A., Howard R. A., Lavelle, E. (1996). Enhancing Student Learning by Incorporating Student Learning Styles into Adaptive Hypermedia. Paper presented at EDMEDIA 96 - World Conference on Educational Multimedia and Hypermedia, Boston, MA.

Clouse, V.G.H. (1990). A Controlled Experiment Relating Entrepreneurial Education to Students' Start-up Decisions. *Journal of Small Business Management, 28*(2), 45–53.

Daly, S. (2001). Student-operated Internet Businesses: True Experiential Learning in Entrepreneurship and Retail Management. *Journal of Marketing Education, 23*(3), 204–15.

Fayolle, A., & Gailly, B. (2008). From Craft to Science: Teaching Models and Learning Processes in Entrepreneurship Education. *Journal of European Industrial Training*, *32*(7), 569-593

Fiet, J. (2001). The Theoretical Side of Teaching Entrepreneurship. *Journal of Business Venturing 16*(1), 1–24.

Gibb, A. (1996). Entrepreneurship and Small Business Management: Can We Afford to Neglect Them in the Twenty First Century Business School? *British Journal of Management. 7*, 309-321.

Gibson, D.E. (2004). Role Models in Career Development: New Directions for Theory and Research. *Journal of Vocational Behaviour, 65*, 134-156.

Gorman, G., Hanlon, D., King, W. (1997). Some Research Perspectives on Entrepreneurship Education, Enterprise Education and Education for Small Business Management: A Ten Year Literature Review. *International Small Business Journal, 15*(3), 56–78.

Hannon, P. (2006). Teaching Pigeons to Dance: Sense and Meaning in Entrepreneurship Education. *Education + Training, 48*(5), 296-308.

Haines, G. H., Jr (1988). The Ombudsman: Teaching Entrepreneurship. *Interfaces, 18*(5): 23–30.

Heinonen, J., & Poikkijoki, S.A. (2006). An Entrepreneurial Directed Approach to Entrepreneurship Education: Mission impossible? *Journal of Management Development*, *25*(1), 80–94.

Higgins, D., & Mirza, M. (2012). Considering Practice: A Contemporary Theoretical Position towards Social Learning in the Small Firm. *The Irish Journal of Management*, *31*(2), 1-17.

Hindle, K. (2002). A Grounded Theory for Teaching Entrepreneurship using Simulation Games. *Simulation & Gaming, 33*(2), 236–41.

Jack, S.L., & Anderson, A.R (1999). Entrepreneurship Education within the Enterprise Culture: Producing Reflective Practitioners. *International Journal of Entrepreneurial Behaviour and Research*, *5*(3), 159-176.

Jones, C., & English, J. (2004). A Contemporary Approach to Entrepreneurship Education. *Education + Training*, *46*(8/9), 416-423.

Jones, B., & Iredale, N. (2010). Enterprise Education as Pedagogy. *Education + Training*, *52*(1) 7-19.

Jones-Evans, D., Williams, W., Deacon, J. (2000). Developing Entrepreneurial Graduates: An Action Learning Approach. *Education + Training*, *42*(4/5), 289-298.

Kelmar, J. H. (1992). Business Plans for Teaching Entrepreneurial Behaviour. *Education + Training 34*(1), 30–42.

Kirby, D. A. (Ed.). (2002). *Entrepreneurship*. Maidenhead, UK: McGraw-Hill.

Kuckertz, A. (2013). Entrepreneurship Education - Status Quo and Prospective Developments. *Journal of Entrepreneurship Education, 16,* 59-71.

Kuratko, D.F. (2005). The Emergence of Entrepreneurship Education. *Entrepreneurship Theory and Practice, 29*(5), 577-598.

Lee, S., Chang, D., Lim, S. (2005). Impact of Entrepreneurship Education: A Comparative Study of the U.S. and Korea. *International Entrepreneurship and Management Journal, 1*(1), 27-43.

Leitch, C., & Harrison, R. (1999). A Process Model for Entrepreneurship Education and Development. *International Journal of Entrepreneurial Behaviour & Research, 5*(3), 83–109.

Lourenco, F., & Jones, O. (2006). Developing Entrepreneurship Education: Comparing Traditional and Alternative Teaching Approaches. *International Journal of Entrepreneurship Education, 4*, 111-140.

Low, M., Venkataraman, S., Srivatsan, V. (1994). Developing an Entrepreneurship Game for Teaching and Research. *Simulation & Gaming, 25*(3), 383–401.

Matlay, H. (2006). Entrepreneurship Education: More Questions than Answers. *Education + Training, 48*(5), 293-305.

Mwasalwiba, E.S. (2010). Entrepreneurship Education: A Review of its Objectives, Teaching Methods and Impact Indicators. *Education + Training, 52*(1), 20-47.

Pittaway, L., & Cope, J. (2007). Entrepreneurship Education: A Systematic Review of the Evidence. *International Small Business Journal, 25*(5), 470-510.

Rae, D. (2010). Universities and Enterprise Education: Responding to the Challenges of the New Era. *Journal of Small Business and Enterprise Development, 17*(4), 591-605.

Rahman, H. (2013). The Influence of the Entrepreneurial Role Model on The Influence Of Entrepreneurial Role Models On Entrepreneurial Motivation (A Study of Indonesian Undergraduate Students at the Faculty of Economics of Andalas University in Padang - Indonesia). Dissertation submitted to the University of Huddersfield for PhD Degree.

Rahman, H., Day, J. (2012, June). Who is Your Role Model? The Relationship between Role Models and Students Entrepreneurial Motivation, Paper presented at *International Council for Small Business (ICSB) 2012 - World Conference*, Massey University, Wellington, New Zealand.

Robertson, M., & Collins, A. (2003). Developing Entrepreneurship in West Yorkshire: West Yorkshire Universities' Partnership and Business Start-Up@Leeds Met. *Education + Training 45*(6), 303–21.

Sexton, D. L., & Upton, N. B. (1987). Evaluation of an Innovative Approach to Teaching Entrepreneurship. *Journal of Small Business Management, 25*(1): 35–43.

Solomon, G. (2007). An Examination of Entrepreneurship Education in the United States. *Journal of Small Business and Enterprise Development, 14*(2), 168-182.

Souitaris, V., Zerbinati, S., Al-Laham, A. (2007). Do Entrepreneurship Programmes Raise Entrepreneurial Intention of Science and Engineering Students? The Effect of Learning, Inspiration and Resources. *Journal of Business Venturing, 22*, 566-591.

Sterling, S. (2001), *Sustainable Education: Re-visioning Learning and Change*, UK: Green Books.

Stewart, J., & Knowles, V. (2000). Graduate Recruitment and Selection Practices in Small Businesses. *Career Development International, 5*(1), 2–3.

Ulijn, J., Duill, M., Robertson, S. (2004). Teaching Business Plan Negotiation: Fostering Entrepreneurship among Business and Engineering Students. *Business Communication Quarterly, 67*(1), 41–57.

Taatila, V.P. (2010). Learning Entrepreneurship in Higher Education. *Education + Training, 52*(1), 48-61.

ENTREPRENEURIAL EDUCATION: USING "THE CHALLENGE" IN THEORY AND PRACTICE

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ABSTRACT

Because of the complex nature of entrepreneurship and the wide range of knowledge, behaviors, and motivations involved in the entrepreneurial processes, experiential education has emerged as the foundation pedagogy for developing entrepreneurs. It has become critical to provide theory backed models and principles as a foundation for the pedagogy. This paper explores the foundations and structure of attitude theories and goes on to provide a model for the application of attitude theory in experiential education within the context of entrepreneurship education. The application of theory is illustrated through an in-class entrepreneurship simulation referred to as "The Challenge."

INTRODUCTION

I hear and I forget
I see and I remember
I do and I understand
--Confucius

The concept of entrepreneurship has been around us for a long time, yet, entrepreneurship education is a relatively recent addition to university curriculum.

Indeed, the entrepreneurship concept has recently been a major focus in Higher Education Institutions (HEI) all over the world. In the US and UK, entrepreneurship classes were increasingly offered to students as part of their undergraduate and graduate choice in curriculum (Jack & Anderson, 1999; Morris, Kuratko, & Schindehutte, 2001; Klappa, 2004). Entrepreneurship majors have been available in US HEIs since the early 1980s (Hills, 1988). Morris et al. (2001) found that the number of business school in the US providing classes in entrepreneurship or new venture creation has grown from roughly 25 in 1980 to over 700 by 2000. Bennett (2006) also reports a major growth in master's level provisions of entrepreneurship programs. Many universities now offer entire undergraduate, graduate and even doctoral degrees in entrepreneurship or "business enterprise" (Adcroft, Wills, & Dhaliwal, 2004). However, that increase in offering was not without some developmental issues. For instance, Sexton and Bowman (1984) complained that "the content of a typical entrepreneurship course varies according to the teacher's personal preferences as to definition and scope". Furthermore, Gorman and Hanlon's (1997) literature review of entrepreneurship education noted very little uniformity among the courses offered, which was confirmed by Shane and Venkataraman (2000), who found wide variation in course content. They advance that the reason for such variety is rooted in the absence of a clear consensus on the definition of entrepreneurship and the lack of generally accepted paradigms or cohesive theoretical

frameworks in the entrepreneurship education area. Another possible reason for the variety can be rooted in Carland, Hoy, Boulton, and Carland (1984): they proposed that while there is considerable overlap between entrepreneurs and small business owners, there is still some fundamentals differences between the concepts. Hence, if entrepreneurs and small business owners have some differences, it implies that they would have different educational need, which would result in the differences in classes offered.

Nevertheless, some advances have been made in entrepreneurship education and tools have been developed to enhance the teaching of entrepreneurship. Since the 1980s two major schools of thought in entrepreneurship education emerged: skills-based approach and attitude-based approach (Bennett, 2006).

The first approach is based on the skills set needed for entrepreneurs. Skills-based programs seek to teach students the mechanics of running their own business. They tend to be "highly structured, consensus-oriented and unstressful" (Sexton & Bowman, 1984, p. 21.) and usually involve instruction on how to raise finances, how to choose one's location, taxation, employment, legal requirements, entry level book-keeping, and other basic instructions. Teaching methods usually include case studies, lectures, and assigned reading intended to develop the student's critical judgment and capacity to digest, understand, and analyze information (Collinson & Quinn, 2002; Davis et al., 2002; Ladzani & Van Vuuren, 2002). Assessment and coursework typically comprises written reports and the development of a business plan (Hills, 1988). Courses of this nature are said to be popular because enrollees frequently desire practical, highly specific, and "hands on" information about small business management issues (Collinson & Quinn; Ladzani & Van Vuuren).

Hills' (1988) survey of entrepreneurship education programs in US universities found that instruction in small business management processes was the primary activity of most courses. An important justification for a university deciding to run this kind of program is the substantial body of evidence that exists suggesting that new businesses rarely fail because their owners lack innovation, self-confidence, imagination, etc.; but mainly in consequence of their owners' ignorance of management, marketing, finance, budgetary control, employee recruitment, and other aspects of personnel administration (Hambrick & D'Aveni, 1988; Jansen & Van Wees, 1994; Davies et al., 2002, Ibrahim & Soufani, 2002; Peterman & Kennedy, 2003; Keogh & Gallaway, 2004). According to the skills-based approach, entrepreneurs are "born" entrepreneurs, and entrepreneurship education should help entrepreneurs in supporting skills like marketing and management.

The second approach described by Bennett (2006) is an attitude development approach. That attitude development approach emerged from criticism of the skills-based approach. Some scholars view the skills-based approach as "passive", "mechanistic", and in contrast "with the reality of the entrepreneur operating with intuition and limited information under acute time pressure" (Henderson & Robertson, 1999, p. 238). Rather than focusing on a "best practice" way, critics suggest that entrepreneurial education should try to "inculcate the necessary attitudes, values, and psychological sets" of the successful entrepreneur (Curran & Stanworth, 1989, p. 13), and develop appropriate personal attributes such as innovativeness, the willingness to take risks, to fail and start afresh, creativity, and determination and self-direction (Garavan & O'Cinneide, 1994; Jansen & Van Wees, 1994; Hynes, 1996; Engelen, 2002; Gibb, 2002; Deamer & Earle, 2004).

As a result, and because of the complex nature of entrepreneurship and the wide range of knowledge, behaviors, and motivations involved in the entrepreneurial processes, experiential

education has emerged as the foundation pedagogy for developing entrepreneurs. The following table summarizes the differences between the two approaches developed above.

Table 1: Characteristics of Skills-Based and Attitude-Based Entrepreneurship Education

	Skills-Based Approach	Attitude-Based Approach
Philosophy	Entrepreneurs are Born with Critical Characteristics	Individuals Develop Entrepreneurial Characteristics Through Experience
Knowledge Orientation	Business Based Content (facts and concepts)	Business Processes and Content
Locus of Instruction	Teacher Centered	Student Centered
Pedagogy	Case Studies, Lectures, and Assigned Reading	Experiential and Engaged Learning
Objective	Identify and Analyze Critical Information, Understand Concepts	Identify and Analyze Critical Information, Apply Concepts
Unit of Analysis	Firm and Firm Performance	Individual and Individual Differences
Learning Focus	Practical, Highly Specific Information on Business Formation and Management	Practical, Hands-On Experience on Identifying, Evaluating, and Executing Business Opportunities

Because some would criticize experiential education as lacking rigor, it has become critical to provide theory backed models and principles as a foundation for the pedagogy. As we explore and develop better theories and models, our application in education will become more rigorous and effective in helping students become more entrepreneurial. Our educational programs will become more rigorous because we will understand why and how education and experience influence entrepreneurial propensities, and they will become more effective because we will understand how to structure activities to influence the desired outcomes.

Due to the complexity involved in entrepreneurial activities, developing entrepreneurs in an academic setting requires an equally complex set of activities to facilitate the acquisition and understanding of the requisite entrepreneurial abilities (Robinson & Malach 2004). Teaching entrepreneurship, then, requires a multi-dimensional and cross-disciplinary approach with an emphasis on dynamic processes that will exposes students to the complexity of entrepreneurial activities in such a way that their actions can be examined and understood relative to the context of their own entrepreneurial development. Drummond (2012), for instance, linked Team Based Learning and critical thinking skills to effective entrepreneurship education. Also, experiential education takes many forms (Gibb, 2002) including but not limited to:

- Case analysis and writing
- In-class and out of class exercises
- Simulations

- Projects
- Interviews
- Business plan writing
- Consulting / SBA cases / Service Learning

Experiential education provides a range of activities for teaching complex concepts and activities. This paper explores a theory base for the development of effective experiential educational for entrepreneurship, it then goes on to describe the implementation of that theory base through the use of "The Challenge," an in-class exercise successfully implemented in entrepreneurship education across multiple institutions for over 25 years for various audiences ranging from high school students to MBA students.

The foundations for good pedagogical models are good theories and the foundations for good theories are the paradigmatic assumptions upon which they are built. If the foundational assumptions are inconsistent with the desired pedagogical outcome, the model will also be inconsistent and the results will fall short of expectations.

The intended outcome of experiential entrepreneurship education should move beyond students' understanding of concepts, principles and practices to a shift in students' mindset toward being more entrepreneurial. Mindset is defined as:

A set of attitudes held by an individual that influences or predisposes them to interact (perceive and behave, act and react) with the world in consistent ways. It is synonymous with intentions, inclinations, a frame of mind, an approach, or an outlook. (Robinsons, 2010)

A entrepreneurial mindset is one that facilitates the identification, evaluation and execution of business opportunities (Shane & Venkataraman, 2000).

FOUNDATIONAL ASSUMPTIONS

Robinson (1996) noted that social science theorizing about the nature of personal characteristics has focused on the dynamic interactive relationship between an individual and the environment. Mitchell and James, (1989) describe this relationship as:

A new view that stresses the important attributes of people, their contexts, and their interactions. First the person is seen as fitting into an environment. Second, both the person and the environment change over time. Third, changes in the person can cause changes in the environment and changes in the environment can cause changes in people. Fourth, people are both active and reactive with respect to these changes. Fifth, people's views of their past and future influence whether they are active or reactive and how much or how little they change. Thus, what emerges is a human who is active psychologically and behaviorally, interacting in a dynamic way with a changing environment. For the person, there is both stability and change, there is [pro]active and reactive behavior, [and] there are abilities and acquired skills that merge. (p. 147)

This view of a dynamic interaction between a person and their environment has strong implications for education and training where the objective is to go beyond rote learning. With a dynamic paradigm, learning becomes a process whereby knowledge and understanding[1] are created through the transformation of experience with a realistic environment (Robinson and

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[1] Defined as a quality of knowing going beyond cognitions such as facts, concepts, beliefs and principles to include connation and affect.

Malach, 2004). In education this is best achieved through actual performance of tasks relevant to the learning objectives (Specht & Sandlin, 1991).

THE THEORY BASE

The theory base that forms the best foundation for the concept of mindset is the tri-partite attitude theory. Attitudes are defined as a predisposition to respond in a generally favorable or unfavorable manner with respect to the "object" of the attitude (Ajzen, 1982; Huefner, 1991; Kristensen, Pedersen, & Williams, 2001; Robinson, Stimpson, Huffner, & Hunt, 1991; Rosenberg & Hovland, 1960; Shaver, 1987). Attitude is a dynamic construct, changing over time and acquired through experience. The "object" could be as concrete as a specific individual or business, or as abstract as a way of interacting in the business world. With regard to entrepreneurship, Robinson, Stimpson, Huffner, and Hunt (1991) demonstrated that a constellation of attitudes effectively differentiates between those who start businesses and those who do not. The embodiment of this framework is the Entrepreneurial Attitude Orientation (EAO) developed by Robinson (1987) as part of his doctoral dissertation. It is the most widely used and cited attitude measure in the field (Robinson, 2010).

A tri-partite attitude model holds that people interact with and learn from their environment in three distinct but related ways: affective, cognitive and conative[2]. This model of attitude uses all three types of interaction in combination as three interrelated aspects of attitude (Allport, 1935; Breckler, 1983, 1984; Carlson, 1985 &1994; Gibb, 2002; Katz & Stotland, 1959; Kothandapani, 1971; Kristensen, Pedersen, & Williams, 2001; Ostrom, 1969; Robinson, 1987; Rosenberg & Hovland, 1960; Shaver, 1987). Thus, attitudes are a combination of all three elements interacting with the perceived environment as well as with each other (Allport; Bar-Tal, 1992; Brecklet, 1984; Gibb; Kristensen, et al.; McGuire, 1969; Smith, 1947; Verplanken, Hofstee, & Janssen, 1998). The affective component consists of positive or negative feelings toward the object. The cognitive component consists of the beliefs and thoughts an individual has about an attitude object. The conative or behavioral component consists of intentions, predispositions or inclination to behave in a given way toward the attitude object. Thus one can see the significant correspondence between the concept of mindset and the tri-partite model of attitudes.

ATTITUDE CHANGE AND EDUCATION

Attitude theory and models of attitude change conceptualize the acquisition of understanding as a shift in the way an individual perceives and interacts with the world around them. This shift usually includes not only the cognitive aspects of the person-environment relationship but the conative and affective aspects as well. In short, attitude theory offers a framework for understanding the ways in which people are affected by experiential learning activities (Robinson & Malach 2004, Robinson 1996).

Attitudes focus one's affect, cognitions and conations on real or conceptual objects in an individuals' environment. Attitudes need not be balanced with affect, cognitions, and conations having roughly equal influence, however, as attitudes become more balanced between the three

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[2] The aspect of mental life having to do with purposive behavior, including desiring, resolving, and striving (Webster's College Dictionary, 1991)

components, they become more focused and the strength of the attitude behavior increases (Robinson et. al. 1991).

Traditional education with a strong emphasis on rote learning emphasizes almost entirely on the cognitive aspect of attitudes. With experiential education models it is assumed that the more balance between the three aspects attitudes (our interaction with the environment) the more "reliable" the learning will be. Crosby (1995) indicated that the assumptions underlying experiential education are more reliable than those underlying traditional theories of education in that "Students educated according to these assumptions are better prepared to deal with the world than are students educated according to traditional epistemologies" (pp. 4-5).
Applying this approach to education provides a foundation for experiential learning that encompasses not only the cognitive elements of traditional educational programs, but also includes affective and conative elements in the learning process. Learning can then be viewed as a process of attitude change or acquisition with cognitive, affective and conative elements all influenced to some degree.

For example, traditional education learning has consisted primarily of classroom experiences in which an instructor either delivers a lecture or discusses a case. This process focuses primarily on the cognitive aspects of business, such as the acquisition of knowledge and beliefs about the subject at hand, with little thought given to the affective and conative aspects of the business experience. Although the cognitive and analytical aspects of business are important for success in most ventures, they lack emotional anxiety, excitement, and action imperative that emerges from the dynamic tension existing in the "practice" of business or more precisely entrepreneurship (Robinson & Malach 2004).

Viewed through the lens of attitude theory, education using the "practice" of business, focusing on a balance between affect, cognition, and conation should result in better retention, understanding, and application of the material being learned. Indeed, Specht and Sandlin (1991) and McMullan and Boberg (1991) have demonstrated that as pedagogy moves away from traditional teaching to more experience-based methods, the long-term retention of material, the understanding of concepts, and the application of knowledge are enhanced. Concepts take on a greater sense of reality, which creates a more relevant context for knowledge within the individual.

EXPERIENTIAL EDUCATION

When a task is performed it is referred to as experience. In experiential education we often model the behavior of the actual task with the expectation that the cognitive and affective aspects of the experience will emerge along with the behavior. In other words, if we have students execute a simulation, they will experience the behaviors, cognitions, and emotions emerging from the situation in a dynamic and reciprocal manner. At times their previous experience, along with attendant thoughts, beliefs, and feelings, will influence their behaviors in the new situation, and at times their behavior in the moment will elicit new thoughts, feelings and behaviors.

The fundamental assumptions of experiential education apply to many types of activities. "Reliable" learning will emerge from the experience depending on the extent to which activities are consistent with the dynamic person-environment interaction critical to achieving a balance between affective, cognitive and conative responses. Bringing experiential education into a concrete form requires a shift in the way learners interact with their environment. This shift

should go beyond merely interacting in an environment. Joplin (1995) states that the process must include reflection. She provides a five-step model for how this interaction may be structured for maximum effect. These include:

1. Focus.   This consists of presenting the task and isolating the attention of the learner for concentration, preparing the individual for the challenging action that is to follow.
2. Action.   This stage places the learner in a stressful situation where he is unable to avoid the problem presented, often in an unfamiliar environment requiring new skills or the use of new knowledge. Actions may be physical, mental, emotional, spiritual or any combination of several actions. Actions are student centered requiring a sustained effort in observing, sorting, ordering, analyzing, behaving, emoting, struggling, and in general interacting with the environment and the presented problem.
3. Support.   Support provides security and protection for the learner giving them the confidence to try new things and stretch themselves in risky situations.
4. Feedback.   Feedback provides information about the students' performance relative to the task and gives some guidance for future actions.
5. Debrief.   Here the learning is recognized, articulated and evaluated. The teacher is responsible for seeing that the actions previously taken do not drift along unquestioned, unrealized, unintegrated, or unorganized.

THE PRACTICE OF EXPERIENTIAL EDUCATION

Experiential learning activities in general are designed to teach complex principles through the use of structured behavioral activities (Dutton & Stumpf, 1991; Thatcher, 1990).   It is through these activities that the person-environment relationship with respect to affect, cognitions and conations can be established or changed for a particular individual and a particular set of complex principles.

The following are elements that enhance the effectiveness of attitude change and thus are elements of good experiential education:

1. A balance of content and process. An examination of process is fundamental to experiential learning. How we solve the problem is as important as the solution in the learning process (Chapman, et al., 1995; Joplin, 1995).
2. Student rather than teacher based. The teacher will create safe working boundaries and then get out of the way, placing the responsibility for learning squarely on the student (Joplin, 1995).
3. Personal not impersonal in nature. The learner as a perceiving, thinking, feeling and behaving human being is placed under stress to perform in a specific situation. Individuals must be engaged in the process to bring all their faculties to bear on the problem. It must become personally relevant to them (Joplin, 1995).
4. Holistic rather than reductionist. Complex environmental situations facilitate learning the complexity of relationships in real world settings. Solutions must take into account the rich diversity present in realistic environmental situations. The whole is in reality greater than the sum of the parts (Chapman, et al., 1995: Joplin, 1995).
5. Creates an emotional investment. Any experiential learning model, which does not recognize the importance of emotional investment, diminishes its potential effectiveness for the learner. The processes need to engage the learner to a point where what is being

experienced strikes a critical central chord within the learner (Chapman, et al., 1995; Joplin, 1995).

6. Reflection and self-examination. Experience without reflection and examination is only interaction and not education. Learners must reflect on the processes and examine their reactions to the situation and their actions (Chapman, et al., 1995).

7. Moving outside one's comfort zone. Experiential learning often stretches the learner beyond their normal range of cognitive, conative, and affective responses. This enables them to examine their normal responses and learn new patterns of responding to situations (Chapman, et al., 1995).

In summary, experiential education is an approach to learning whereby knowledge and understanding are acquired through a complex set of interactions between a thinking, feeling, and behaving being and a complex environment. Through this interaction relationships and theories can be explored and examined to create new insights into the practice of any specific field.

In the field of entrepreneurship, there is a significant body of emerging research linking experiential education to positive changes in students' entrepreneurial mindset (Elmuti, Khoury, and Omran, 2012; Lane, Hunt, and Farris, 2011; Sullivan, 2011; Tam, 2009; Tam, Hansen, Blomstrom, & Robinson, 2009; Harris, Gibson, & Taylor, 2007/2008; Rasheed & Rasheed, 2003; Souitaris, Zerbinati, & Al-Laham, 2007). This research demonstrates that experiential education and entrepreneurship education in particular, in addition to teaching concepts, principles and practices, has a significant effect on the entrepreneurial mindset of the students. Tam's (2009) research demonstrated that:

Students became more entrepreneurial through the confidence gained from the real-world relevant content material and the application focus of the curriculum. The mix of having practice-oriented instructors capable of blending practice with theory, frequent exposure to reputable, practitioner guest-speakers with expertise in topical areas, learn by doing through hands-on projects in collaborative teams are contributory factors. (p. 3)

This paper will now explore a specific application of experiential entrepreneurship education in the form of an in-class exercise. This exercise is used as an example of how the principles of experiential education can be applied in a classroom setting, and provides a basic outline for an exercise that may be used to teach complex principles that are difficult to teach through traditional methods.

THE CHALLENGE

Experiential learning activities are designed to teach complex principles through the use of structured behavioral activities (Dutton & Stumpf, 1991; Thatcher, 1990). The Challenge, as an experiential learning activity, involves structured scenarios within which the participants enact unstructured roles. Learning takes place through the examination of interactions between (a) The scenario and the roles adopted by the individuals, (b) the different roles adopted by the individuals in the activity, and (c) the roles adopted by the participants and their normal mode of behavior.

The scenarios involve a strong problem-solving component, yet it is not the solution to the problem that is critical to the learning (there are multiple solutions to any scenario), but the examination of the processes involved in arriving at the solutions.

The Challenge was adapted for entrepreneurship education from part of a larger set of experiential learning activities. It has also been used for over 20 years in entrepreneurship and has been integrated into both classroom and public seminar settings with participants ranging from high school students to postgraduate students and educators.

A simulation is a simplified situation that contains enough similarities with reality to elicit real-world responses from the participants (Keys & Wolfe, 1990). The Challenge, although it is not couched in a business scenario, can be related to the entrepreneurial process. First, the participants are part of a venture, an undertaking involving risk and uncertainty. The scenario goes on to introduce key variables consistent with an entrepreneurial situation, such as:

- A superordinate goal or mission to be accomplished
- Limited resources that may change based on factors within and external to the group
- An uncertain outcome including the possibility of failure
- An ambiguous situation where the procedures are not set but must be developed by the group
- Multiple options in terms of strategies and tactics in accomplishing the task
- Emotional involvement and commitment to reach the objective
- An action imperative where group members take action often without understanding the situation.

In short, The Challenge closely resembles a new venture along several dimensions that can be controlled by a facilitator. This is the essence of a business simulation. Other similarities between the exercise and new venture development may be drawn out in the debriefing session at the conclusion of the actual exercise.

The following description of The Challenge activity is only a cognitive representation of the activity and cannot fully convey the affective and behavioral complexity of the situation. The only way to fully appreciate the execution and learning is to participate in the activity. This description is intended as a way of reinforcing and guiding practitioners who wish to use the exercise.

THE SCENARIO

The members of the group should imagine that they have been caught in the Soviet Union and have arranged to escape from the "gulag" in which they have been held. They have hired or bribed a guard to help them get back to their own country. Their last obstacle is a very sophisticated electronic minefield. The minefield is constructed with sensors so that if one person touches any part of the ground within the field, that person and anyone else on the field or in the near vicinity is killed (failure).

To accomplish this seemingly impossible task, the guide has provided the group with a number of anti-mines disguised as rocks, blocks or other flat unstable objects that are capable of sustaining 200 to 500 pounds of pressure, and can be easily picked up, carried, and tossed very short distances without breaking, chipping, or cracking. Rocks are often used as anti-mines, but if they are unavailable, scrap lumber of about one half square foot, cut at odd angles, may be used. Individuals can place the anti-mines on the field and stand on them without triggering the mines. Several people may share one anti-mine. However, if anyone falls or steps off the anti-mine, he or she is immediately blown up—along with the entire group—and will have to return to the starting line to begin again. The group should start with two or three fewer anti-mines than the total number of people participating in the exercise.

Three specific rules must be stressed. First, because the group is trying to get across the minefield without being detected, it must do so in total silence; that is, no talking, laughing, or even whispering. Group members can communicate as long as it is not written or oral. Second, no one may cross over the finish line until everyone is on an anti-mine in the minefield; that is, out of the starting area. If one person crosses the finish line while another is still in the starting area, it completes a circuit that blows everyone up and the whole group starts over again. Finally, there are to be no sacrifices or martyrs; everyone must exit the minefield.

THE MINEFIELD

The minefield to which the group is taken is described to the participants as an area of unlimited width and variable length; in truth, it is usually an open area at least 50 yards long and 10 yards wide, ideally with grass (or carpet if indoors). At the onset, the field should be a minimum of 10 to 15 feet longer than the group could stretch if everyone in the group stood, arms spread, finger tip to finger tip, lengthwise on the field. The perception of the group should be that this is an impossible distance to cross given the resources available. The length of the field may change at any time during the activity, with the leader determining the length at any particular moment. A visible marker should be placed at both ends of the field to identify the beginning and end for the participants (see Figure 2).

Ideally, the activity should take place outside on a lawn or grassy area with access to rocks or other objects. It may also be conducted indoors in a large hallway or gymnasium. The leader should be creative in building environmental factors such as sidewalks, ditches, landscaping, buildings, hallways, and so on, into the scenario.

THE LEADER

The guide has the freedom to roam across the minefield without detonating the field. The leader may also: (a) add or remove anti-mines from the group for their use (only the anti-mines he or she gives to the group may be used), (b) move the end of the minefield closer to or further from the group, (c) catch people talking or touching the ground and send them back to the start, or (d) forgive those who step off the anti-mine by not sending them back (this option should not be used except when there are extreme time constraints).

The group is usually rewarded (e.g., adding an anti-mine or shortening the field) when it is working together well and progressing toward the goal. It may lose an anti-mine; find the field lengthened; or get blown up when group members talk, laugh, make individual rather than group efforts, or in general are not working together and helping each other. The addition or removal of one anti-mine may seem insignificant, but after the group has been struggling for an hour or more and has become highly involved, one anti-mine can be extremely meaningful.

These are the basic rules of the minefield activity. As facilitators gain experience and confidence, they tend to add personal refinements to optimize the experience for the participants. Some refinements include leaving the anti-mines on the field when the group must start over and imposing additional time constraints.

THE CHALLENGE AS APPLIED TO ENGAGED LEARNING

The Challenge is engaged learning in that it teaches complex principles through the use of structured behavioral activities (Dutton & Stumpf, 1991; Thatcher, 1990). Within the scenario of The Challenge, participants explore new roles and relationships that influence their person-environment relationships with respect to cognitions, conations, and affect. These relationships can be established or changed for a particular individual and a particular set of complex principles. The following section presents the elements that enhance the effectiveness of attitude change and thus are elements of good experiential education as they relate to The Challenge.

1. A balance of content and process. While the focus is on the processes involved in crossing the minefield, the participants are encouraged to examine the process by looking for the symbols involved in the activity and relating them to the process of opportunity identification, evaluation and execution.

2. Student rather than teacher based. The leader (teacher) sets the parameters and enforces the rules and allows the students to develop their own strategies and tactics. The teacher may take a more active role through selective reinforcement and punishment to encourage more productive behavior.

3. Personal not impersonal in nature. The minefield is a stressful situation in which the participants perform unspecified tactics to accomplish specific objectives. It is personal. They must be engaged in the situation or it becomes obvious very quickly that the group will not succeed.

4. Holistic rather than reductionistic. The minefield is a relatively complex situation in which students can explore ideas and strategies. Participants must think on the go, try multiple tactics and constantly adjust their actions to accomplish their objective. It not only involves micro adjustments of individual and group behavior but it also requires a macro perspective, thinking in holistic terms to cross the minefield successfully.

5. Creates an emotional investment. Participants must be engaged or invested physically, emotionally and mentally. Their emotional investment is obvious by their reaction when they fail, and they will fail, as well as when the last person comes off the minefield.

6. Reflection and self-examination. There must be a debriefing session following the activity in which participants share the experience from their multiple perspectives. In sharing, insights are gained that participants might not have gained otherwise. This discussion can be deep and rich in terms of the content and application of principles that may have been abstract concepts up to that point in time.

7. Moving outside one's comfort zone: It is not easy. It requires focused and concentrated effort to complete the task. It can be very stressful. Often, individual liabilities, particularly physical liabilities become obvious to both the individual and the group and both must learn to compensate for those liabilities. This is particularly true of balance.

CONCLUSION

This paper has provided a conceptual and theoretical framework for understanding experiential education as a rigorous experience-based program of entrepreneurship education. Rigorous means that the educational pedagogy will maintain a high level of excellence in the (a) design of effective experiential activities, (b) effective execution of existing activities, and (c) defense of the use of experiential pedagogy from a theoretical and methodological standpoint

against traditional educational approaches. Entrepreneurship education need to develop such rigor in its pedagogy as entrepreneurship education is perceived as a major determinant of entrepreneurial success. By increasing rigor in entrepreneurial education, we should be able to increase entrepreneurial success as defined by the number of startup created and regional economic and employment growth linked to entrepreneurial activities. Also, by providing a rigorous framework, it will help in convincing other educators and their department head, deans or accrediting bodies that entrepreneurial education is worthy of support. Also, by providing a framework that can be used by other educators, we can hope that it will be used by our colleagues and that it will help students embrace their inner entrepreneurial mindset.

This paper represents a first step in linking experiential education to the entrepreneurial mindset. Additional empirical research needs to be done to further demonstrate the linkage. The area of experiential entrepreneurship education is still at a relatively early stage of conceptual development. Further research in this area should include categorizing the types of experiential education and the degree to which they engage a student's affective, cognitive and conative interactions with the environment and enhances their entrepreneurial mindset. This research provides insight into how and why experiential education influences learning in general and the entrepreneurial mindset in particular.

REFERENCES

Adcroft, A., Wills, A., and Dhaliwal, S., (2004), "Missing the point? Management education and entrepreneurship", *Management Decision*, 42 (3), 512-521

Ajzen, I. (1982). On behaving in accordance with one's attitudes. In M.P. Zanna, E. T. Higgins, & C. P. Herman (Eds.), Consistency in social behavior: The Ontario symposium (Vol. 2, pp. 131-146). Hillsdale, NJ: Lawrence Erlbaum.

Allport, G. W. (1935). Attitudes. In C. Murchison (Ed.), Handbook of social psychology (pp. 709-884). Worcester, MA: Clark University.

Bar-Tal, Y., (1992). The effect of the experience with attitude object on the relationships among cognitive and affective components of attitude and behavioral intentions. Psychological Record, 42(1), 131-40.

Bennett, R., (2006), "Business lecturers' perceptions of the nature of entrepreneurship", *International Journal of Entrepreneurial Behavior & Research*, 12 (3), 165-188.

Breckler, S. J. (1983). Validation of affect, behavior, and cognition as distinct components of attitude (Vol. 44(11B), 3569): Dissertation Abstracts International.

Brecklet, S. J. (1984). Empirical validation of affect, behavior, and cognition as distinct components of attitude. Journal of Personality and Social Psychology, 47, 1191-1205.

Carland, J.W., Hoy, F., Boulton, W.R., and Carland, J.C. (1984). Differentiating Entrrepreneurs from Small Business Owners: A Conceptualization. Academy of Management Review, 9(2), 354-359.

Carlson, S. D. (1985). Consistency of attitude components: A new proposal for an old problem. . Dissertation Abstracts International, 46(09B), 3261.

Carlson, S. D. (1994). Entrepreneurship education for the multiple cognitive-developmental levels of third graders: Differential impacts of three experience-based programs. . Los Angeles: University of California.

Chapman, S., McPhee, P., and Proudman, B., (1995). What is Experiential Education, in K. Warren, M. Sakofs, J. S. Hunt, Jr., (eds.), The Theory of Experiential Education. Kendall/Hunt Publishing Company, Dubeque Iowa.

Collinson, E., and Quinn, L., (2002), "The impact of collaboration between industry and academia on SME growth", *Journal of Marketing Management*, 18 (3/4), 415-435.

Curran, J., and Stanworth, J., (1989), "Eductaion and training for enterprise: some problems of classification, evaluation, policy and research", *International Small Business Journal*, 7 (2), 11-22.

Crosby, A., (1995). A Critical Look: The Philosophical Foundations of Experiential Education. in K. Warren, M. Sakofs, J. S. Hunt, Jr., (eds.), The Theory of Experiential Education. Kendall/Hunt Publishing Company, Dubeque Iowa.

Davies, J., Hides, M., and Powell, J., (2002), " Defining the development needs of entrepreneurs of SMEs", *Education + Training*, 44 (8/9), 406-413.

Deamer, I., and Earle, L., (2004), "Searching for entrepreneurship", *Industrial and Commercial Training*, 36 (3), 99-103.

Dutton, J. E., & Stumpf, S. A. (1991). Using behavioral simulations to study strategic processes. Simulation & Gaming, 22, 149-173.

Drummond, C. K., (2012), "Team-Based Learning to Enhance Critical Thinking Skills in Entrepreneurship Education" Journal of Entrepreneurship Education, 15

Elmuti,D.; Khoury, G.; and Omran, O. (2012). "Does Entrepreneurship Education Have a Role in Developing Entrepreneurial Skills and Ventures' Effectiveness?" Journal of Entrepreneurship Education, 15

Engelen, E. (2002), "How innovative are Dutch immigrant entrepreneurs? Constructing a framework of assessment", *International Journal of Entrepreneurial Behavior & Research*, 8 (1/2), 69-92.

Garavan, T., and O'Cinneide, B., (1994) "Entrepreneurship and education training programmes: a review and evaluation – part 1", *Journal of European Industrial Training*, 18 (8), 3-12.

Gibb, A. (2002). In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning creative destruction, new values, new ways of doing things and new combination of knowledge. . International Journal of Management Reviews, 4(3), 233-269.

Gorman, G., Hanlon, D. and King, W., (1997), "Some research perspectives on entrepreneurship education, enterprise education and education for small business management: a ten-year literature review", *International Small Business Journal*, 15 (3), 56-77.

Hambrick, D., and D'Averi, R., (1988), "Large corporate failure as downwards spirals", *Administrative Science Quarterly*, 33 (1), 1-33.

Harris, M. L., Gibson, S. G., & Taylor, S. R. (2007/2008). Examing the impact of small business institute participation on entrepreneurial attitudes Journal of Small Business Strategy, 18(2).

Hills, G., (1988), "Variations in university entrepreneurship education: an empirical study of an evolving field", *Journal of Business Venturing*, 3 (2), 109-122

Henderson, R., and Robertson, M., (1999), "Who wants to be an entrepreneur? Young adult attitudes to entrepreneurship as a career", *Education + Training*, 41 (5), 236-245.

Huefner, J. (1991). Affect-cognition-conation consistency and the attitude-behavior relationship. (Vol. PH.D.). Provo Utah: Brigham Young University.

Hynes, B., (1996), "Entrepreneurship education and training: introducing entrepreneurship into non-business disciplines", *Journal of European Industrial Training*, 20 (8), 10-17.

Ibrahim, A., and Soufani, K., (2002), "Entrepreneurship education and training in Canada: a critical assessment", *Education + training*, 44 (8/9), 421-430.

Jack, S.L., and Anderson, A.R. (1999), "Entrepreneurship education within the enterprise culture: producing reflective practitioners", *International Journal of Entrepreneurial Behavior & Research*, 5 (3), 110-125

Jansen, P., and Van Wees, L. (1994), "Conditions for internal entrepreneurship", *Journal of Management Development*, 13 (9), 34-51.

Joplin, L., (1995). On Defining Experiential Education, , in K. Warren, M. Sakofs, J. S. Hunt, Jr., (eds.), The Theory of Experiential Education. Kendall/Hunt Publishing Company, Dubeque Iowa.

Katz, D., & Stotland, E. (1959). A preliminary statement to a theory of attitude structure and change. In S. Koch (Ed.), Psychology: A study of a science (Vol. 3, pp. 423-475). New York: The Free Press.

Keogh, W., and Gallaway, L., (2004), "Teaching enterprise in vocational disciplines: reflecting on positive experience", *Management Decision*, 42 (3/4), 531-542.

Keys, B., & Wolfe, J. (1990). The role of management games and simulations in education research. Journal of Management, 16, 307-336.

Klappa, R., (2004), "Government goals and entrepreneurship education", *Education + Training*, 46 (3), 127-138

Kothandapani, V. (1971). Validation of feeling, belief, and intention to act as three components of attitude and their contribution to prediction of contraceptive behavior. . Journal of Personality and Social Psychology, 19, 321 - 333

Kristensen, K. B., Pedersen, D. M., & Williams, R. N., (2001). Profiling religious maturity: The relationship of religious attitude components to religious orientations. Journal for the Scientific Study of Religion, 40(1), 75-87.

Ladzani, W., and Van Vuuren, J., (2002), "Entrepreneurship training for emerging SMEs in South Africa", *Journal of Small Business Management*, 40 (2), 154-162.

Lane, P.; Hunt, J.; and Farris, J. (2011). "Innovative Teaching to Engage and Challenge Twenty-first Century Entrepreneurship Students: an Interdisciplinary Approach", Journal of Entrepreneurship Education, 14

McGuire,, W. J. (1969). The nature of attitudes and attitude change. In G. Lindzy & E. Aronson (Eds.), The handbook of social psychology (2nd ed., pp. 136-314). Reading, MA: Addison-Wesley

McMullan, C. A., & Boberg, A. L. (1991). The relative effectiveness of projects in teaching entrepreneurship. Journal of Small Business and Entrepreneurship, 9, 14-24.

Mitchell, T. R., & James, L. R. (1989). Conclusions and future directions. Academy of Management Review [Special issue], 14, 401-408

Morris, M., Kuratko, D. and Schindehutte, M. (2001), "Towards integration: understanding integration through frameworks", *International Journal of Entrepreneurship and Innovation*, 2 (1), 35-49

Ostrom, T. M. (1969). The relationship between the affective, behavioral, and cognitive components of attitude. . Journal of Experimental Social Psychology, 5, 12 - 30.

Peterman, N., and Kennedy, J., (2003), "Enterprise education: influencing students' perceptions of entrepreneurship", *Entrepreneurship Theory and Practice*, 28 (2), 129-145.

Rasheed, H. S., & Rasheed, B. Y. (2003). Developing entrepreneurial characteristics in minority Youth: The effects of education and enterprise experience. International Research in the Business Disciplines, *4*, 261-277.

Robinson, P. B. (1987). Prediction of Entrepreneurship Based on an Attitude Consistency Model. Unpublished Doctoral Dissertation, Brigham Young Univeriwty Provo.

Robinson, P. B., (1996). The MINEFIELD exercise: `The challenge' in entrepreneurship education. Simulation & Gaming, Vol. 27 (3), p. 350, - 165

Robinson, P. B., (2010). Engaged Learning and the Entrepreneurial Mindset, Presented at the Utah Academy of Science, Arts, and Letters annual meeting, St. George, Ut

Robinson, P. B. and Malach, S. (2004). Multi-Disciplinary Entrepreneurship Clinic: Experiential Education In Theory and Practice. Journal of Small Business and Entrepreneurship, Vol. 17(4), pp 317 – 332

Robinson, P. B., Stimpson, D. V., Huffner, J. C., & Hunt, H. K. (1991). An attitude approach to the prediction of entrepreneurship. Entrepreneurship: Theory and Practice, 15(4), 13-31.

Rosenberg, M. J, & Hovland, C. I. (1960). Cognitive, affective and behavioral components of attitudes. In M. J. Rosenberg, C. I. Hovland, W. J. McGuire, R. P. Abelson, & J. W. Brehm (Eds.), Attitude organization and change: An analysis of consistency among attitude components. New Haven, CT: Yale University Press.

Sexton, D., and Bowman, N., (1984) "Entrepreneurship education: Suggestions for increasing effectiveness", *Journal of small business management*, 22 (2), 18-25.

Shane, S., & Venkataraman, S. (2000). The promise of entrepreneurship as a field of research. Academy of Management Review, 25, 217 - 226.

Shaver, K. G. (1987). Principles of social psychology. Cambridge, MA: Winthrop.

Souitaris, v., Zerbinati, S., & Al-Laham, A. (2007). Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. Journal of Business Venturing.

Smith, M. B. (1947). The personal setting of public opinion: A study of attitudes toward Russia. Public Opinion Quarterly, 11, 507-523.

Specht, L. B., & Sandlin, P. K. (1991). The differential effects of experiential learning activities and traditional lecture classes in accounting. Simulation & Gaming, 22, 196-210.

Sullivan. D.M., (2011). "Egg-drop Exercise Revisited: An In-class Entrepreneurship Exercise" Journal of Entrepreneurship Education, 14, 49-73

Tam, H. (2009). How and to what extent does entrepreneurship education make students more entrepreneurial? A California case of the Technology Management Program. Santa Barbara: University of California, Santa Barbara.

Tam, H., Hansen, G., Blomstrom, S., & Robinson, P. B. (2009, June 14 - 17). Entrepreneurship Program Assessment by Student Outcome. Paper presented at the Proceedings of the American Society for Engineering Education 116th Annual Conference & Exposition, Austin, TX.

Thatcher, D.C. (1990). Promoting learning through games and simulations. Simulation & Gaming, 21, 262-273.

Verplanken, B., Hofstee, G., & Janssen,H, J., (1998). Accessibility of affective versus cognitive components of attitude. European Journal of Social Psychology, 28, 23-35.

TEACHING CREATIVITY, TEAM WORK AND OTHER SOFT SKILLS FOR ENTREPRENEURSHIP

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ABSTRACT

Skills such as the ability to be creative, think critically, recognize opportunities and work effectively in teams are highly important to entrepreneurs. These "soft" skills are as important to entrepreneurship as "hard" skills, but can be challenging to teach and learn. This study presents the results of surveys conducted at the beginning and end of a two-week intensive entrepreneurship course emphasizing hands-on activities and self-analysis. Rather than on writing a business plan, students examined their own entrepreneurial orientation and focused on developing soft skills such as creativity and team work. Business, law and engineering majors from three countries participated in the course, providing diversity in the class. The course culminated in the presentation of product ideas to a group of community leaders.

INTRODUCTION

Entrepreneurial orientation for individuals is often thought of as a three-legged stool consisting of creativity/innovation, risk-taking and proactiveness (Bolton & Lane, 2012). These characteristics represent skills that are more challenging to teach and learn than more concrete knowledge areas such as accounting and finance. Given that over half of young people (ages 18-34) would like to start their own businesses, helping students develop these skills is an important endeavor (Kauffman Foundation, 2011). Training in relevant topics can improve students' skills as well as increase their motivation to start a business (Barr, Baker, Markham & Kingson, 2009).

The interdisciplinary, international and interactive (emphasizing hands-on activities) program described in this study was not intended to turn all students into entrepreneurs. Similar to Barr and associates (2009), the instructor's goal was simply to open the minds of students to their potential to become entrepreneurs. In fact, students who determined that entrepreneurship was not for them were considered successful as this self-analysis would prevent them from pursuing a failing course of action. Von Graevenitz, Harhoff and Weber (2009) contend that helping students discover that entrepreneurship is not for them is as valuable as helping students find that they are high in entrepreneurial orientation. Soft skills such as the ability to be creative, recognize opportunities, network effectively and work well in teams are very important to entrepreneurs. As Hamidi and associates (2008, p. 306) state, "There are both theoretical and practical reasons to move beyond the focus on business planning to a focus on other activities that can be key ingredients of future entrepreneurship programs." This study reports the results of pre- and post-tests conducted before and after an intensive two-week program focusing on the development of these soft skills important for entrepreneurship.

ELEMENTS OF ENTREPRENEURIAL ORIENTATION

Topic-based courses frequently focus on narrow fields such as accounting, finance, marketing, etc. These skills are indeed useful, but soft skills are also highly important in organizations of all sizes. Critical thinking, networking, negotiating, team work and creativity skills are valuable and must be practiced in order to develop them. Bolton and Lane (2012) found that innovativeness, proactiveness and a willingness to take risks are strongly related to the intent to become an entrepreneur. In addition to these, other characteristics that have been associated with entrepreneurial orientation include competitive aggressiveness, autonomy and the ability to network (Covin & Slevin, 1989; Fillis & Rentschler, 2010; Hamidi, Wennberg & Bergland, 2008; Lumpkin & Dess, 1996; Miller, 1983; Rauch, Wiklund, Lumpkin & Frese, 2009; Tarabishy, Solomon, Fernald & Saghkin, 2005; Ward, 2004). High scores in creativity in particular have been found to be positively related to entrepreneurial intentions (Hamidi, et al., 2008).

Innovation, putting a new idea into practice, finds its roots in creativity, which involves coming up with new ideas and novel solutions (Amabile, 1997; Govindarajan, 2010; Gurteen, 1998; Ko & Butler, 2007). Creativity also includes building upon and improving current ideas to improve (Couger, 1995; Kuratko, Goldsby & Hornsby, 2012). Creative ideas frequently develop from seemingly unrelated facts and ideas put together in new ways (Couger, 1995; Ko & Butler, 2007; 2006; Robinson & Stubberud, 2012, 2013). To provide students with a variety of new and different information, this program gave students the chance to work with people from other fields. Engineering students were introduced to business concepts, and business and law students learned about alternative energy. This, along with a general emphasis on sustainability, provided the "planet" component of the "people, planet, profit" framework.

Diverse social networks can also provide unrelated information that can lead to new ideas. Strong and diverse social networks contribute to creativity as other people provide information and ideas or cooperate in the development of innovative products and processes (Harryson, 2008; Ko & Butler, 2007; Perry-Smith, 2006; Robinson & Stubberud, 2011; Rosa, Qualls & Fuentas, 2008). Students participated in most activities in teams that were randomly chosen on the first day. In addition to several special guests who worked with the students, people from the campus and community also visited the student project presentations. One particular guest, the manager of a local incubator, emphasized his role in helping new business owners establish contacts, "Maybe you can't get an appointment or don't know who go to, but I can pick up the phone and make the call, and because they know me, I can make the initial contact for you."

According to Anderson (1994, p. 80), "You can't *make* creativity happen, you can only *allow* it to happen." This requires a stimulating yet safe environment in which people are allowed to take risks. Risk-taking is related to creativity in that it is a risk to express and develop a new idea. There is no guarantee that others will like an idea for a new product or that it will be viable. To gain practice in taking the risk of being creative, student teams engaged in a two-week competition in which numerous idea presentations and two final project presentations earned points for each activity. These points were not related to the final grade. The course was graded pass/fail based on active participation in all events, allowing students to take more risks than they might if they were worried about earning high letter grades. Student teams voted for each other (not themselves) in the competition rather than having the instructor act as judge. In this way, students could also take the risk of sharing ideas with the instructor, who acted as a facilitator

and coach. This overall system was a form of play and provided a stimulating and engaging environment in which students could take risks and creativity could flow (Rentschler, 2010; Ko & Butler, 2007; Mainemelis & Ronson, 2006; Robinson, 2012).

It also takes creativity to recognize the potential in an opportunity (Ko & Butler, 2007). Once an opportunity is recognized, it takes proactiveness to actually act upon an idea rather than to simply think about it. Some of the "games" consisted of creating useful products out of discarded items (mostly provided by the instructor, but any found trash could be used), and presenting their final product ideas to campus staff and local business people (the Rotary club). Students created prototypes of their products or posters that explained their services and the campus staff and business people voted for their favorite projects. Other games, such as the egg-toss and egg-drop, were more "fun" but allowed for the development of strategic risk-taking and innovation.

Training in topics related to entrepreneurship can increase the skills and abilities necessary for starting a business as well as the motivation to do so (Barr et al., 2009). The following section presents the data from pre- and post-tests conducted in conjunction with an intensive two-week summer program in entrepreneurship. The program did not teach students to write a business plan. Instead, it focused on helping students develop soft skills related to entrepreneurial orientation.

METHODOLOGY AND RESULTS

The intensive two-week summer program included 23 Norwegian students from business and law fields at 2 different campus of a Norwegian university, 2 engineering students from an American university (which hosted the program) and 1 engineering student from a French university. Most of the Norwegian students freely admitted at the beginning of the course that they knew little about entrepreneurship and had given little consideration to starting their own businesses. They had chosen this program primarily because of the embedded travel to the United States. As such, these students represented typical students rather than students who excitedly self-select into an entrepreneurship program. Only the Norwegian students (20 females and 3 males) are included in this study. They represented business, law and "law and leadership" majors. At least 5 of them were non-traditional students who were older than the traditional aged students.

In pre-tests and post-tests, the students rated their own skill levels on a scale of 1 to 5, where 5=excellent, 4= very good, 3=good, 2= fair and 1= poor. As such, these were subjective measures based on the students' own perceptions of their skills and may or may not correspond to objective reality. Students were asked to write the month and day of their birthday or another memorable day on each survey so the pre-tests and post-tests could be matched. The ratings shown in Table 1 have been rounded to the nearest tenth of a point. The order in which the skills are presented is based on the absolute difference between the pre-tests and post-tests rounded to the nearest one hundredth of a point, with the greatest differences shown at the top of the table.

Table 1 PRE-TEST AND POST-TEST SKILL RATINGS				
Skill	Pre-test	Post-test	T	P<
To understand what it takes to start one's own business	2.4	3.7	5.99	.001*
To communicate orally in English	2.8	3.8	4.55	.001*
To design something novel and innovative	2.5	3.3	3.95	.001*
To think creatively	2.9	3.7	3.65	.001*
To understand concepts about alternative (i.e. solar) energy	2.9	3.7	3.36	.003*
To start a business, if desired	2.3	3.1	3.60	.002*
To communicate in written English	3.0	3.7	3.94	.001*
To understand concepts regarding sustainability in business	3.0	3.7	4.83	.001*
To market a product	2.8	3.5	3.05	.006*
To plan a strategy and act on it	3.0	3.7	5.85	.001*
To understand the basic concepts of social entrepreneurship	2.9	3.5	2.61	.016*
To ask questions and think critically	3.2	3.8	2.66	.015*
To network with other people who can give you the help you need	3.6	4.1	3.76	.001*
To recognize a good opportunity	2.9	3.4	3.14	.005*
To take calculated risks	2.9	3.3	1.97	.062
To negotiate with others for a solution that is good for both sides	3.3	3.7	2.24	.036*
To solve an unstructured problem	3.3	3.6	2.03	.056
To motivate others to work together	3.7	3.6	0.25	.803
To understand how to manage inventory	3.3	3.2	0.51	.613
To work effectively in a team	4.0	3.9	1.23	.231

Paired t-tests were performed on the data. An initial glance at Table 1 reveals there were statistically significant differences (at the .036 level or less) in the pre-test and post-test ratings for 15 of the 20 skills. The two lowest rated skills in the pre-test were "to understand what it takes to start one's own business" and "to start a business, if desired." The difference between these two items is that the former deals with the basic concepts about what is necessary to start a business, including personal skills and characteristics, whereas the latter pertains to how to actually put ideas into action. This program focused primarily on uncovering individual entrepreneurial orientation and developing personal soft skills such as creativity and team work. The essentials of writing a business plan were only touched upon given that the next course would go into more depth. Considering the goals of the program, it is appropriate and unsurprising that "to understand what it takes to start one's own business" increased by 1.3 while "to start a business, if desired" rose by only 0.8 of a point. "To market a product" and "to plan a strategy and act on it" both rose by 0.7 of a point (statistically significant increases). The improvement in these two skills may have contributed to students' perceptions that they could start a business if they wished. These ratings suggest that the specific activities involving marketing and strategic planning were effective in increasing students' skills in these areas.

Only the two American students (whose surveys are not included in this study) spoke English as their native language. English was the primary language for communication during class and social events, but Norwegian and French were also used daily to give all students a chance to improve their skills in a foreign language. Engaging in lessons and activities with non-Norwegians was apparently beneficial for the students from Norway since "to communicate orally in English" ratings rose a full point between the pre- and post-tests, and "to communicate in written English" rose by 0.7.

This program was not intended to teach students everything they need to know to start a business. It took a step back from that and focused on uncovering and developing personal entrepreneurial orientation as identified by creativity and innovation, risk-taking and proactiveness. The program placed a great deal of emphasis on creativity because past experience had shown that most Norwegian students do not view themselves as creative (Robinson & Stubberud, 2012, 2013). Many activities were used each day to give students a chance to take the risk to be creative in a low-stakes environment. The interdisciplinary and international aspects of the program were expected to provide some diversity that would become fertile ground for germinating ideas. While "to design something novel and innovative" only rated 3.3 in the post-tests, this represented a 0.8 increase from the 2.5 pre-test ratings. "To think creatively" had started at 2.9 and rose to 3.7 at the end of the program. These results indicate that students' perceptions of their abilities to be creative and design innovative products increased significantly over two weeks. "To ask questions and think critically" increased by 0.6 points, which was a statistically significant amount, but a somewhat related skill "to solve an unstructured problem" rose by only 0.3 between pre-tests and post-tests. The latter skill represents the use of critical thinking mixed with creativity, both of which can be challenging to teach and to learn.

Past experience also suggested that many (but not all) students would be moderately risk-averse. The ratings for "to take calculated risks" rose from 2.9 to 3.3, but this was not a statistically significant increase. Students were not pushed to simply take risks for the sake of taking risks, but to consider the pros and cons of taking calculated risks. It was noted that students discussed their own risk-taking orientation with their teammates very often as part of the teamwork needed to work effectively together. With only 3 men in the group, it was not possible to determine if women or men had higher ratings for risk taking. "To recognize a good opportunity" also started at 2.9, but ended at 3.4 (a statistically significant increase), only slightly higher than the risk taking item. As with other pairs, these two skills may represent a knowledge area (recognize an opportunity) and an action area (take a risk).

Almost all activities during the program were team-based, with most students remaining in their randomly assigned teams for the entire two weeks. This experience of learning to work with new people may have influenced students' perceptions of their interpersonal skills. The top rated skill in the post-test was "to network with other people who can give you the help you need," which rose significantly from 3.6 to 4.1. "To work effectively in a team," which was the top rated skill in the pre-test, actually decreased from 4.0 to 3.9, but this was not statistically significant. Part of working effectively in a team would be negotiating with others for a solution that is good for everyone involved. Negotiating is often thought of in a buyer-seller context, but negotiating is important in any relationship in which there is the potential for conflict and the need for agreement, such as when working on team projects. The same might be said for motivating team members. It is possible that "to motivate others to work together" and "to work effectively on a team" were thought of as skills needed to work with people in one's own organization. Networking and negotiating might have been thought of as skills necessary for dealing with people outside one's group. These two skills increased significantly between the pre- and post-tests, suggesting students increased their perceived ability to work with "outsiders." Given that motivation and team work skills both decreased (but not at statistically significant levels), students may also have reflected upon challenges they faced in dealing with people from different majors, countries or campuses.

The theme of the program was based on the triple bottom line: people, planet, profit (Elkington, 1997). The concepts related to these topics, particularly the first two, tended to be more knowledge oriented rather than falling into the soft skill category. Social entrepreneurship was introduced as an element of "people" in this framework. The post-test ratings were significantly higher (0.6) than in the pre-test. Alternative energy sources and sustainability in general fell under the "planet" category. This worked particularly well given the interdisciplinary nature of the program. The engineering professor who worked with the students on two afternoons was the highest rated guest in post-program student evaluations. Ratings for "to understanding concepts about alternative energy" and "to understanding concepts regarding sustainability" increased by 0.8 and 0.7 respectively. These topics resonated with some students in particular, as will be discussed in a following section. One of the final projects presented to local business leaders proposed a social entrepreneurship project, while the other involved a device powered by solar energy.

Most of the students who participated in this program did not have any interest in entrepreneurship when they signed up for the course. To determine if there were any differences in ratings between those who did and did not end the course feeling that entrepreneurship was a possible path for them to take in the future, students were divided into two groups based on high and low intent to start a business. Entrepreneurial intent was measured by four items based on Cooper and Lucas (2006). Participants were asked to indicate their level of agreement with these statements using a Likert scale (1=strongly disagree to 5=strongly agree). The total sum was divided by four to obtain a mean entrepreneurial intent rating. Those with a mean rating of 3.75 or higher were categorized as high intent. This created one group of 11 (low intent) and one group of 12 (high intent).

Table 2 shows the results of t-tests comparing the pre-test and post-test ratings between the two groups. Except for "to recognize a good opportunity," only the skills with statistically significant differences (p<.05) are shown. To recognize a good opportunity" is included because it was the only pre-test skill to show a difference in ratings based on high and low entrepreneurial intent. Those in the high intent group had an average pre-test rating of 3.2, compared to 2.6 for the low intent group. This suggests that those who completed the course with high entrepreneurial intent had entered it feeling that they were good (3) at recognizing opportunities. There was not, however, a significant difference in the post-test ratings, in which the high intent group's mean rating was 3.5 and the low intent group's was 3.3. Both groups increased their perceived skills to some degree, but the low intent group improved more (0.7 vs. 0.3 increase), making them similar to the high intent group. Not surprisingly, the high intent group rated themselves higher in "to start a business, if desired." The ratings for this skill were not different in the pre-test ratings, suggesting those in the high intent group increased their confidence in their skills during the program.

Table 2 SKILL RATING DIFFERENCES BY ENTREPRENEURIAL INTENT				
Skill	High intent	Low intent	t	P<
To design something novel and innovative (post-test)	3.8	2.8	3.65	.001
To think creatively (post-test)	4.2	3.2	4.15	.001
To understand concepts about alternative (i.e. solar) energy (post-test)	4.1	3.3	2.95	.008
To start a business, if desired (post-test)	3.8	3.4	2.60	.017
To market a product (post-test)	4.0	3.0	2.75	.012
To ask questions and think critically (post-test)	4.1	3.5	2.50	.021
To recognize a good opportunity – (Pre-test)	3.2	2.6	2.30	.032
- (Post-test)	3.5	3.3	0.93	.362
To motivate others to work together (post-test)	4.1	3.1	3.17	.005
To work effectively in a team (post-test)	4.2	3.6	2.18	.041

"To think creatively" and "to design something novel and innovative" are quite similar skills. For each one, the high intent group scored a whole point higher than the low intent group (post-test). This is logical given that creativity/innovation is an element of entrepreneurial orientation. There was not, however, a statistically significant in difference in "to take calculated risks," (3.1 for the low intent group and 3.6 for the high intent group) which is another element of entrepreneurial orientation.

In the overall pre-test/post-test ratings shown in Table 1, "to motivate others to work together" and "to work effectively in a team" did not show significant differences. While the overall post-test rating for team work was 3.9, the high intent group rated it 4.2, showing these people felt they could work well with others. Similarly, the overall post-test rating for motivating others was 3.6, whereas the high intent group scored 4.1 While interpersonal skills have not usually been associated with entrepreneurial orientation, these skills would be vital in starting and growing a business with a team rather than individually.

In addition to thinking creatively, the high intent group also rated themselves higher in critical thinking, marketing and understanding alternative energy concepts. None of the Norwegians included in this study were engineers, but those who wish to become entrepreneurs in the future may have found this new technical area to be rich in opportunities. Two of the final projects presented to the Rotary club included solar powered devices. One of those groups included an engineer, but the other group did not.

When the cut-off point for the high entrepreneurial intent group was changed to 4.0 (up from 3.75) this very high intent group included 9 participants and the low intent group had 13. As shown in Table 3, four differences remained, all in post-test ratings. Not surprisingly, the rating for "to start a business, if desired" was 1.2 points higher in the very high intent group than in the lower intent group. The 3.9 rating was, however, lower than the 4.3 ratings for the other skills, which included the two interpersonal skills regarding motivation and teamwork. Thinking creatively again showed a relationship with entrepreneurial intent as those in this high intent group had ratings 1.2 points higher than those in the other group.

Table 3 SKILL RATING DIFFERENCES BY THOSE WITH VERY HIGH ENTREPRENEURIAL INTENT				
Skill	Very high intent	Lower intent	t	P<
To think creatively (post-test)	4.3	3.1	2.45	.023
To start a business, if desired (post-test)	3.9	2.7	4.04	.001
To motivate others to work together (post-test)	4.3	3.1	4.10	.001
To work effectively in a team (post-test)	4.3	3.7	2.08	.001

To test if the differences in the post-test ratings were related to differences in learning, the post-test survey included a question in which participants used a Likert scale to rate their degree of agreement (5=strongly agree, 1=strongly disagree) with the statement "I have improved my knowledge and skills in this area." The overall results are presented in Table 4. T-tests conducted to compare the means for those with high/low entrepreneurial intent and very high/lower intent showed no statistically significant differences (p<.05) between the ratings for the very high and lower intent groups. Those with high intent (average intent score=3.75 or higher) had higher ratings for how much they had learned about alternative energy and how much they had improved their written English skills. The rating for alternative energy among the high intent group was 4.7, compared to 3.8 for the low intent group (t=2.90, p<.009). The rating for written English was 4.1 for the high intent group and 3.3 for the low intent group (t=2.50, p<.023).

Table 4 RATINGS FOR PERCEIVED DEGREE OF LEARNING	
Skill	Rating
To understand what it takes to start one's own business	4.0
To communicate orally in English	4.2
To design something novel and innovative	4.2
To think creatively	4.4
To understand concepts about alternative (i.e. solar) energy	4.2
To start a business, if desired	3.7
To communicate in written English	3.6
To understand concepts regarding sustainability in business	4.0
To market a product	4.1
To plan a strategy and act on it	3.9
To understand the basic concepts of social entrepreneurship	4.0
To ask questions and think critically	3.9
To network with other people who can give you the help you need	4.2
To recognize a good opportunity	3.7
To take calculated risks	3.8
To negotiate with others for a solution that is good for both sides	4.1
To solve an unstructured problem	3.7
To motivate others to work together	4.0
To understand how to manage inventory	3.8
To work effectively in a team	4.3

The previously mentioned interpersonal skills, creative and thinking skills and business related skills were learned equally (according to student perception) across the groups. These were among the highest rated skills for degree of learning. "To think creatively" was the highest rated skill (4.4), followed by "to design something new and innovative" (4.2) and "to communicate orally in English" (4.2). Communicating in written English (3.6) received the lowest rating for learning. This is logical given that few written assignments were completed, but students spoke to each other and the instructor (as well as employees of local stores and restaurants) in English throughout the day. However, as noted earlier, the high intent group rated their learning level of written English skills significantly higher than did the low intent group.

As stated before, the purpose of this program was to open students' minds to the idea of entrepreneurship, rather than to teach them to write business plans. This likely explains why "to understand what it takes to start one's own business" rated 4.0 for learning, while "to start a business, if desired" rated only 3.7. "To recognize a good opportunity" also rated 3.7. This was the sole skill that showed a pre-test and post-test difference between those with high and low entrepreneurial intent (shown in Table 2). The mean difference between the learning ratings by those in the high (3.9) and low (3.6) intent groups were not found to be statistically significant ($t=1.83$, $p<.082$).

Taken together, these results show that both those who did and did not consider entrepreneurship a desirable career path were able to learn about entrepreneurship while they practiced and developed relevant soft skills. Some skills, such as communicating in English, did not specifically relate to entrepreneurship, but are nonetheless useful skills in the global environment. These findings also show that the students felt they had learned something, even if their skill ratings did not change significantly. This was, in fact, one reason for including the learning section on the post-test survey.

CONCLUSIONS

The results of this study suggest that soft skills such as thinking in a creative way, thinking critically, networking and working in teams can be improved through a program such as the one described here. In the pre-tests, half of the 20 items were rated between fair (2) and good (3), but none were under 3 in the post-tests. Fifteen skills showed statistically significant increases between the pre- and post-tests, and two of the five that did not increase significantly started at 4.0 and 3.9, showing that students already felt they had very good skills. All skills showed ratings for learning that were near 4 (agree) out of 5 (strongly agree).

The abilities to be creative and to network both increased significantly over the course of the program. Being as creative ideas often come from the juxtaposition of seemingly unrelated elements, and that larger social networks tend to provide more diverse types of information, the ability to network could logically contribute to the ability to think creatively and act innovatively. People with strong networks are also more likely to be able to obtain resources they need if they decide to start businesses (Birley, 1985; Farr-Wharton & Brunetto, 2007; Gulati, Nohria & Zaheer, 2000; Hoang & Antoncic, 2003; Robinson & Stubberud, 2009; Taylor & Thorpe, 2004).

Play has been advocated as being helpful in creativity and risk taking (Fillis & Rentschler, 2010; Ko & Butler, 2007; Mainemelis & Ronson, 2006). This program was built around a system of games in which student teams competed against each other throughout the two weeks, ending with a medal ceremony on the last day. Some activities overtly involved risk-

taking, such as knowledge quizzes in which teams could choose to be conservative and win a pre-determined number of points for each correct answer or take a risk and earn a variable number of points (double or nothing, roll of the dice, etc.). Such games involving uncertainty and risk taking have been shown to have positive benefits for student learning and engagement (Howard-Jones & Demetriou, 2009; Howard-Jones, 2010; Robinson, 2012). Although the ratings for risk taking did not increase significantly, those for thinking creatively increased among all students, especially those with very high entrepreneurial intent. This is encouraging given the importance of creativity to entrepreneurs.

It has been suggested earlier (Schmidt, Soper & Facca, 2012) and seems to be confirmed here that a supportive environment in which students can take risks and work on their soft skills is useful in education. The diversity of students in this program, including different nationalities and majors as well as different topics such as alternative energy and sustainability seem to have provided an environment in which students were able to develop their abilities to be creative, design novel and innovative products, network and negotiate. In addition, the overall game competition structure is likely to have made the experience more fun, leading to a less threatening but more engaging environment for learning.

REFERENCES

Amabile, T. M. (1997). Entrepreneurial creativity through motivational synergy. *Journal of Creative Behavior, 31(1)*, p. 18-26.

Anderson, J. V. (1994). Creativity and play: A systematic approach to managing innovation. *Business Horizons, March-April*, p. 80-85.

Avlontis, G.J. & Salavou, H.E. (2007). Entreprenuerial orientation of SMEs, product innovativeness and performance. *Journal of Business Resaerch, 60(5)*, 566-575.

Barr, S. H., Baker T., Markham, S.K. & Kingson, A. I. (2009). Bridging the valley of death: Lessons learned from 14 years of commercialization of technology education. *Academy of Management Learning & Education, 8(3)*, 370-388.

Birley, S. (1985). The role of networks in the entrepreneurial process. *Journal of Business Venturing,* 3(1), 107-117.

Bolton, D. L. & Lane, M. D. (2012). Individual entrepreneurial orientation: Development of a measurement instrument. *Education + Training, 54(2)*, 219-233.

Boocock, G., Frank, R. & Warren, L. (2009). Technology-based entrepreneurship education: Meeting educational and business objectives. *Entrepreneurship and Innovation, 10(1),* 43-53.

Boyles, T. (2012). 21st century knowledge, skills, and abilities and entrepreneurial competencies: A model for undergraduate enterprise education. *Journal of Entrepreneurship Education, 15*, 41-55.

Cato, M.S., Arthur, L., Keenoy, T. & Smith. (2008). Entrepreneurial energy: Associative entrepreneurship in the renewable energy sector in Wales. *International Journal of Entrepreneurial Behaviour and Research*, 14 (5), 313-29.

Cooper, S. Y. & Lucas, W. A. (2006). Enhancing self-efficacy for entrepreneurship and innovation: An educational approach. *Regional Frontiers of Entrepreneurship 2006,* 667-683.

Couger, J. D. (1995). *Creative problem solving and opportunity finding.* Danvers, MA: Boyd & Fraser Publishing.

Covin, J. & Slevin, D. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal, 10,* 75-87. doi: 10.1002/smj.4250100107.

Dangelico, R. M. & Pujari, D. (2010). Mainstreaming green product innovation: Why and how companies integrate environmental sustainability. *Journal of Business Ethics*, 95, 471-486.

Day, G. S. & Schoemaker, P. J. H. (2011). Innovating in uncertain markets: 10 lessons for green technologies. *MIT Sloan Management Review,* 52(4), 37-45.

De Graaff, E. & Ravesteijn, W. (2001). Training complete engineers: Global enterprise and engineering education. *European Journal of Engineering Education, 26(4)*, 419-427.

Deakins, D. & Freel, M. (1998). Entrepreneurial learning and the growth process in SMEs. *The Learning Organization, 5(3)*, 144-155.

Elia, G., Margherita, A., Secundo, G. & Moustaghfir, K. (2011). An "activation" process for entrepreneurial engineering education: The model and application. *Journal of Enterprising Culture, 19(2),* 147-168.

Elkington, J. (1997). *Cannibals with Forks: The Triple Bottom Line of 21st Century Business.* Oxford: Capstone.

Farr-Wharton, R. & Y. Brunetto. (2007). Women entrepreneurs, opportunity recognition and government-sponsored business networks: A social capital perspective. *Women in Management Review, 22*(3), 187-207.

Fillis, I. & R. Rentschler. (2010). The role of creativity in entrepreneurship. *Journal of Enterprising Culture,* 18(1), 49-81.

Frank, A. I. (2007). Entrepreneurship and enterprise skills: A missing element of planning education? Planning. *Practice and Research, 22(4),* 635-648.

Gielnik, M. M., Frese, M., Graf, J. M. & Kampschulte, A. (2012). Creativity in the opportunity identification process and the moderating effect of diversity of information. *Journal of Business Venturing, 27*, 559-576.

Gibb, A. (1997). *Enterprising culture: Its meaning and implications for education and training,* Bradford: MCB University Press.

Govindarajan, V. (2010). Innovation is Not Creativity. August 3, 2010. http://blogs.hbr.org/govindarajan/2010/08/innovation-is-not-creativity.html

Gulati R., N. Nohria, & A. Zaheer. (2000). Strategic networks. *Strategic Management Journal,* 21(3), 203–215.

Gurteen, D. (1998). Knowledge, creativity and innovation. *Journal of Knowledge Management, 2(1),* 5-13.

Hamidi, D. Y., Wennberg, K., & Bergland, H. (2008). Creativity in entrepreneurship education. *Journal of Small Business and Enterprise Development*, 15(2), 304-320.

Harryson, S. J. (2008). Entrepreneurship through relationships: Navigating from creativity to commercialization. *R & D Management, 38(3),* 290-310.

Hart, S. L. (1992). An integrative framework for strategy-making processes. *Academy of Management Review, 17*, 327-351.

Hofstede, G. (2012). What about Norway? Retrieved 26 February 2012 from http://geert-hofstede.com/norway.html

Hoang, H., & B. Antoncic. (2003). Network-based research in entrepreneurship: A critical review. *Journal of Business Venturing, 18*, 165-187

Howard-Jones, P. A. (2010). *The teacher's handbook of twig: Minds, brains and teaching with immersive gaiming.* Retrieved 27 December 2012 from www.lulu.com.

Howard-Jones, P. A. & Demetriou, S. (2009). Uncertainty and engagement with learning games. *Instructional Science, 37,* 519-536.

Johan, W. & Dean, S. (2003). Examining the entrepreneurial attitudes of US business students. *Education + Training, 50(7),* 568-81.

Jones, C. & English, J. (2004). A contemporary approach to entrepreneurship education. *Education + Training, 46(8/9)*, 416-324.

Jones-Evans, D., Williams, W. & Deacon, J. (2000). Developing entrepreneurial graduates: An action-learning approach. *Education + Training, 42(4/5),* 282-288.

Kauffman Foundation. (2011). An Entrepreneurial Generation of 18- to 34-Year-Olds Wants to Start Companies When Economy Rebounds, According to New Poll. November 10, 2011. http://www.kauffman.org/newsroom/millennials-want-to-start-companies-when-economy-rebounds-poll-says.aspx

Keough, P. D. & Polonsky, M. J. (1998). Environmental commitment: A basis for environmental entrepreneurship? *Journal of Organizational Change Management,* 11(1), 38-49.

Kijkuit, B. and J. van den Ende. (2007). The organisational life of an idea: Integrating social network, creativity and decision making perspectives. *Journal of Management Studies, 44(6),* 863-882.

Kirkwood, J. & Walton, S. (2010). What motivates ecopreneurs to start businesses? *International Journal of Entrepreneurial Behavior & Research*, 16(3), 204-228.

Ko, S. & J. E. Butler. (2006). Prior knowledge, bisociative mode of thinking and entrepreneurial opportunity identification. *Journal of Entrepreneurship and Small Business, 3(1)*, 3-16.

Ko, S. & J. E. Butler. (2007). Creativity: A key link to entrepreneurial behavior. *Business Horizons, 50,* 365-372.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice Hall.

Kuratko, D. F., Goldsby, M.G., & Hornsby, J.S. (2012). *Innovation acceleration: Transforming organizational thinking*. Upper Saddle River, NJ: Pearson.

Li, H., Zhang, Y. & Chan, T.S. (2005). Entrepreneurial strategy making and performance in China's new technology ventures: The contingency effect of environments and firm competences. *Journal of High Technology Management Research, 16*, 37-57.

Linnanen, L. (2002). An insider's experiences with environmental entrepreneurship. *Greener Management International,* 38 (Summer), 71-80.

Lumpkin, G. T. & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *The Academy of Management Review, 21(1),* 135-72.

Mainemalis, C. & S. Ronson. (2006). Ideas are born in fields of play: Towards a theory of play and creativity in organizational settings. *Research in Organizational Behavior, 27,* 81-131.

Mangan, K.S. (2004, May 28). Entrepreneurs in every department. *Chronicle of Higher Education, 50,* A10-A11.

Miller, D. (1983). The correlates of entrepreneurship in three types of firms. *Management Science, 29*(7), 770-791. Doi: 10.1287/mnsc.29.7.770.

Minniti, M. & Bygrave, W. (2011). A dynamic model of entrepreneurial learning. *Entrepreneurship Theory & Practice, 23(4),* 41-52.

Moreno, A. & Casillas, J. (2008). Entrepreneurial orientation and growth of SMEs: A causal model. *Entrepreneurship Theory and Practice, 32(3)*, 507-528.

Rasmussen, E. & Sørheim, R. (2006). Action-based entrepreneurship education. *Technovation, 26(2)*, 185-194.

Rauch, A., Wiklund, J., Lumpkin, G. T. & Frese, M. (2009). Entrepreneurial orientation and business performance: An assessment of past research and suggestions for the future. *Entrepreneurship Theory and Practice, 33(3),* 761-87.

Robinson, S. (2012). Taking a Chance: Introducing Uncertainty into Learning *Games. Proceedings of the Academy of Educational Leadership,* October, 21-26.

Robinson, S. & Stubberud, H.A. (2009). Sources of advice in entrepreneurship: Gender differences in business owners' social networks. *International Journal of Entrepreneurship, 13,* 83-101.

Robinson, S. & Stubberud, H.A. (2011). Sources of Information and Cooperation for Innovation in Norway. *Journal of International Business Research, 10(2),* 79-90.

Robinson, S. & Stubberud, H.A. (2012) Entrepreneurship Summer Camp: Increasing Entrepreneurial Orientation. *Proceedings of the 2012 Las Vegas International Academic Conference.*

Robinson, S. & Stubberud, H.A. (2013) Entrepreneurial Orientation and Intention. *Proceedings of the Academy of Entrepreneurship*, April 2013, New Orleans, 51-56.

Rodrigues, R. G. & Raposo, M. (2011). Entrepreneurial orientation, human resources information management, and firm performance in SMEs. *Canadian Journal of Administrative Sciences, 28*, 143-153.

Rosa, J. A., W. J. Qualls & C. Fuentas. (2008). Involving mind, body and friends: Management that engenders creativity. *Journal of Business Research, 61*, 631-639.

Schmidt, J. J., Soper, J. C. & Facca, T. M. (2012) Creativity in the entrepreneurship classroom. *Journal of Entrepreneurship Education*, 15, 123-131.

Shinnar, R., Pruett, M. & Toney, B. (2009). Entrepreneurship education: Attitudes across campus. *Journal of Education for Business, January/February*, 151-158.

Stam, W. & Elfring, T. (2008). Entrepreneurial orientation and new venture performance: The moderating role of intra- and extra-industry social capital. *Academy of Management Journal, 51,* 97-111.

Tang, J., Tang, Z., Marino, L., Zhang, Y. & Li, Q. (2008). Exploring an inverted U-shape relationship between entrepreneurial orientation and performance in Chinese ventures. *Entrepreneurship Theory and Practice, 32(1),* 219-239.

Tarabishy, A., Solomon, G., Fernald, L., & Saghkin, M. (2005). The entrepreneurial leader's impact on the organization's performance in dynamic markets. *Journal of Private Equity, (*Fall), 20-29.

Taylor, D.W. & Thorpe, R. (2004). Entrepreneurial learning: A process of co-participation. *Journal of Small Business and Enterprise Development,* 11(2), 203-211.

von Graevenitz, G., D. Harhoff & R. Weber. (2009). The effects of entrepreneurship education. *Journal of Economic Behavior & Organization, 7*6, 90-112.

Ward, T. (2004). Cognition, Creativity, and Entrepreneurship. *Journal of Business Venturing,* 19, 173-188.

ON THE VARIABILITY AND RISK OF EVALUATING THE COMMERCIAL POTENTIAL OF TECHNOLOGIES: AN ENTREPRENEURSHIP COURSE EVALUATING REAL INVENTIONS FOR COMMERCIAL POTENTIAL

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ABSTRACT

This paper presents the results of a course offered at a Midwestern university. The course involved having students evaluate the commercial potential of inventions disclosed to the university. The aim of the course was to identify and select the most promising inventions for inclusion in an internship designed to create business plans and ultimately commercialize the technologies for profit. The results show the inherent risk involved in using a gated approach to evaluating and selecting technologies for commercialization. Consequences technology commercialization programs are discussed.

INTRODUCTION

With millions of dollars of research undertaken each year, many colleges and universities have researchers who develop innovative new products with commercial potential. Over time, many universities have implemented technology commercialization programs (also often referred to as technology transfer offices) designed to convert these inventions into money-making ventures that generate funds for the university and the researcher who developed them. The Association of University Technology Managers (AUTM) reports that between 1996 and 2007, university patent licensing had an impact of $187 billion dollars on the gross domestic product of the U.S., and 279,000 new jobs (AUTM, 2010). Over the past thirty years, university technology transfer programs have also led to the creation of more than 6,000 new companies (AUTM, 2010).

One of the key problems facing technology commercialization programs is how to evaluate the commercial potential of an invention or technology disclosure. With limited resources and often far more technologies disclosed by inventors that for which there are resources to commercialize, university technology transfer offices must find a way to evaluate the commercial potential of a given invention so that scarce resources can be efficiently allocated.

This paper looks at the process of evaluating technologies at a Midwestern university in a technology commercialization program. The central purpose of this paper is to examine the effectiveness of two different techniques used to ensure accurate measurement of technologies: the use of multiple raters and the use of multiple ratings. The remainder of the paper is divided into four sections. In the Theory and Hypotheses section, we describe the evaluation process and develop two hypotheses that we used to guide us in the development of the program. In the Data and Methods section, we describe the data collected and the methods used to evaluate the

technologies and test our hypotheses. The results of this hypothesis tests are present in the Results section, and in the Discussion section, we discuss the implications of our findings for the evaluation of the commercial potential of technologies, and we discuss the benefits obtained by student and inventor participation in the program.

THEORY AND HYPOTHESES

Technologies As Opportunities

A widely accepted theory of entrepreneurship today describes entrepreneurship as the nexus between an individual and an opportunity (Shane and Venkataraman, 2000; Shane, 2003). Although the process of starting and running a business is fairly well explored at this point, far less is known about the processes leading up to the formation of a new firm. One of those required processes is for an entrepreneur to determine which opportunity to exploit through the formation of a new firm, a phenomenon referred to as opportunity recognition and exploitation (Ardichvili, et al, 2003; Choi & Shepherd, 2004). Potential entrepreneurs often consider many different opportunities before choosing one and moving ahead with forming a new firm. As a would-be entrepreneur, an important consideration is how to evaluate and select those opportunities that have the highest chances of success (Human et al, 2004). Institutions such as universities and other organizations also face these same choices.

In the case of university technology transfer offices (henceforth, TTOs), these opportunities present themselves in the form of technology disclosures. A technology disclosure contains details about the technology, including specifications, perhaps a prototype, and associated literature, such as scientific papers outlining the creation and use of the product. Many technology disclosures have little or no commercial potential. For technologies with commercial potential, these present an economic opportunity for the university. The two most common methods of exploiting these opportunities are licensing and the establishment of a new firm. In the former case, the technology is licensed to an existing firm, which then works to exploit the opportunity presented by the technology (O'Connor & Rice, 2001).

Most commonly, technologies with commercial potential are licensed by TTOs to outside companies. The Association of University Technology Managers tracks statistics on the commercialization of technologies by universities and reported that in 2009, 596 companies were formed around university-developed technologies, but there were 5,328 licensing deals (AUTM, 2009), which means that licensing is roughly nine times more commonly undertaken as a means of commercializing technologies.

Although universities can reap economic and other benefits from successfully commercializing a technology, not all technology disclosures are created equal. Some technologies may have no commercial potential at all, while other technologies may need further development before they can be commercialized. For example, in a study of 62 university TTOs by Jensen and Thursby (2001), only 31% of technology disclosures were licensed. When presented with a technology disclosure, a TTO must be able to evaluate its commercial potential in order to determine whether or not to commit further resources to commercialize the technology. Commercializing a technology can be quite expensive, including the associated costs of prototyping, marketing, and obtaining patents and trademarks. Being able to effectively evaluate technologies can help assure the effective use of limited university resources. At the same time, when evaluating technologies, TTOs do not want to inadvertently eliminate

technologies that may have true commercial potential. In other words, we want to reduce measurement error so that we maximize the number of true positives, while at the same time minimizing the number of false negatives when deciding which technologies should be pushed forward for commercialization.

Multiple Ratings To Reduce Errors

Two techniques often employed to reduce measurement errors are: multiple raters and repeated measures. Using multiple raters is actually a specific form of repeated measures where a given construct is measured by more than one person (Stevens, 1996). By having multiple raters evaluate a given construct, it is possible to reduce measurement error by combining the results of all raters and obtaining a more reliable measure than can be achieved with only a single rater (Stevens, 1996; Barcikowski & Robey, 1984), as well as increasing the statistical power of the test in question (Minke, 1997). This multiple rater technique is widely used in human resources as a means of assuring fair and accurate evaluations of employees, and is a key feature 360-degree feedback (London & Beatty, 1993; Nowack, 2009). In the case of evaluating the commercial potential of a given technology, we may be able to avoid false positives and false negatives by having more than one person evaluate the technology.

In the case of multiple people rating the same construct over time, learning and familiarity with subject matter should lead to more agreement over time as the raters gain experience with their task (Murphy & Wright, 1984) and learn how to make finer distinctions between different categories (Rosch et al, 1976; Johnson et al, 1981). This should be particularly true when the raters are able to share their ratings with each other. A study of group members' reactions to differing opinions found that individuals with outlying opinions tended to be denigrated by other members, and individuals who advocated for consensus tended to be viewed positively (Kruglanski & Webster, 1991). In the case of multiple raters evaluating the same technology multiple times, we expect these various forces to combine such that the variability of ratings to decline over time, leading to our first hypothesis:

H1:   *Interrater agreement of technology evaluations will increase from Round 1 to Round 2.*

The literature of group decision making has had mixed results as it relates to determining the overall impact of information sharing in the case of teams and information sharing (Gigone & Hastie, 1993). Despite the studies outlined in the preceding section, there are few empirical studies that show empirical improvement in the overall quality of the decision made (Gigone & Hastie, 1993). One apparent cause for this lack of improvement in decision making is that groups tend to pool shared information and not to share unique information that might lead to a superior decision (Stasser & Titus, 1985; Stasser & Titus, 1987). In the process of sharing ratings, raters are able to compare their judgments against those of other judges, because the ratings represent pooled information. However, the sharing of idiosyncratic information about individual technologies that may improve the accuracy of a given technology is less likely because this is not pooled information. Without the sharing of this idiosyncratic information, raters should have little incentive to make drastic changes in their overall ratings of a technology. So, although we expect to find in Hypothesis 1 that the ratings will converge on a consensus, we do not expect material changes in the relative rankings of the technologies, since little idiosyncratic information will be shared, leading to Hypothesis 2, below.

H2:   The relative rankings of technologies will remain stable from Round 1 to Round 2.

DATA AND METHODS

The instrument used to evaluate the technology was adapted a standardized technology evaluation template adapted from work by Professor Pat Dickson at Georgia Institute of Technology and Jeffrey Timmons (Timmons and Spinelli, 2003), students evaluated the technologies for their commercial potential. The instrument contains 40 items and 5 dimensions. Each item in the instrument has five levels, so the overall score from a technology could range from a minimum of 40 to a maximum of 200. The dimensions of the instrument included Market Potential (8 items; $\alpha = 0.72$), Technology Potential (6 items; $\alpha = 0.41$), Existing Competition (10 items; $\alpha = 0.71$), Potential Value (9 items; $\alpha = 0.84$), and Venture Development (7 items; $\alpha = 0.64$). Variations of the instrument had been used previously to evaluate technologies. For the purposes of this paper, we have focused on the aggregate score of the instrument, which should reflect the overall commercial potential of the technology.

The technologies represent a wide array of disciplines and were at various stages of development. All of the technologies were developed by both faculty and student inventors from across the campus. Later, in the Discussion section of the paper, we will talk about the tremendous benefits that both inventors and students derived from participation in the program. The inventions ranged from finite element analysis software (a technology often used to predict heat and wear properties of tools), to a new high-speed camera technology, to friction stir welding (a low-temperature technology wherein metals are joined together by actually stirring the two pieces together where they meet).

The data was collected in a summer course that had 21 students and 12 technologies to be evaluated. 19 of the students were in the MBA program, while two others were seniors at the undergraduate level. There were two rounds of evaluations, with the ultimate goal of identifying the top five technologies, which would then be passed on to a group of student interns who would set about writing business plans to commercialize the technologies as part of a paid internship funded through a Coleman Foundation grant. It should be noted that commercialization could include both the formation of a new firm or the licensing of a technology to an existing firm. For the first round, each student was randomly assigned two technologies to evaluate. Although students were expected to do their own evaluation, they were encouraged to be collaborative in sharing data sources and other information in order to facilitate evaluations that were as deep and rich as possible.

After the first round, the results of the technologies were tabulated and the students were broken into five separate groups. At that point, all groups had access to all of the research and ratings done by all of the other students. The groups were not randomly assigned, but rather chosen so as to ensure a multi-disciplinary group that included, among other things, skills in financial analysis.

Under ideal conditions, interrater agreement is best measured in a tightly-controlled experiment with randomized assignments and stable groups of equal size. There are a variety of formulae designed to measure interrater agreement, including measures developed by Cohen (1960) for two raters; Fleiss (Fleiss) for many raters; and within-group agreement of raters of a single target (James et al, 1993). Unfortunately, none of these traditional measures of interrater agreement is appropriate for our study. Instead, we tested Hypothesis 1 by comparing the standard deviations of Round 1 ratings with those of Round 2 and doing an F-test to determine if

there was a significant difference in the variances of the two rounds. Hypothesis 2 was tested by comparing means of the technology rankings.

RESULTS

Table 1 (below) shows the results of our test of Hypothesis 1. We predicted that the combination of multiple ratings, combined with increased familiarity of technologies, would lead to increased agreement among the ratings of technologies as we moved from Round 1 to Round 2. If such a phenomenon were to occur, we could feel more confident not only in our general ratings in the technologies, but also in our selection of the technologies that would be pushed forward for commercialization. As the two right-hand columns of Table 1 show, Hypothesis 1 was not supported and was in fact contradicted for six of the twelve technologies, indicating that the variability of ratings did not decrease when technologies were evaluated a second time.

Table 1 – Results of our test of Hypothesis 1. Each of twelve technologies was rated multiple times in two rounds of evaluation. Each time, the instrument used for evaluation was the same. The right-hand column shows that of the 11 technologies for which we obtained a standard deviation, only 5 had a lower standard deviation and 6 had a higher standard deviation in Round 2. Of the three changes in variance that reached significance in our F-tests, two of the three were actually increases in variance. Hypothesis 1 was not supported, and in some cases contradicted.

Technology	Evaluation Round	N	Minimum	Maximum	Mean	Std. Dev'n	Change in Std. Dev'n?	F-test of significance (p-value)
1	1	3	100.00	131.00	117.00	15.716	Decrease	13.72 (0.188)
	2	2	106.00	112.00	109.00	4.243		
2	1	3	136.00	139.00	137.33	1.528	Increase	0.023 (0.023)
	2	2	119.00	133.00	126.00	9.899		
3	1	12	110.00	157.00	131.42	17.804	Decrease	1.40 (0.489)
	2	3	134.00	164.00	149.67	15.044		
4	1	2	109.00	111.00	110.00	1.414	N/A	N/A
	2	1	159.00	159.00	159.00	N/A		
5	1	3	119.00	128.00	123.00	4.583	Increase	0.067 (0.061)
	2	2	102.00	127.00	114.50	17.678		
6	1	2	143.00	151.00	147.00	5.657	Increase	0.444 (0.374)
	2	2	108.00	120.00	114.00	8.485		
7	1	3	127.00	175.00	144.67	26.388	Decrease	1392.67 (0.019)
	2	2	154.00	155.00	154.50	.707		
8	1	3	86.00	155.00	115.00	35.791	Decrease	1.684 (0.478)
	2	2	96.00	135.00	115.50	27.577		
9	1	3	131.00	152.00	142.33	10.599	Increase	0.308 (0.213)
	2	2	132.00	159.00	145.50	19.092		
10	1	3	123.00	133.00	126.67	5.508	Increase	0.029 (0.027)
	2	2	118.00	164.00	141.00	32.527		
11	1	3	99.00	136.00	116.00	18.682	Decrease	27.92 (0.132)
	2	2	117.00	122.00	119.50	3.536		
12	1	2	145.00	164.00	154.50	13.435	Increase	0.571 (0.471)
	2	3	121.00	156.00	136.67	17.786		

Table 2 (below) shows the results of our tests of Hypothesis 2. We predicted that the rankings of the various technologies would remain stable from one round to the next, but this hypothesis was strongly contradicted. Of the 36 different sets of rankings, fully one third of technologies moved up or down 4 or more places in the rankings. In a surprising five cases, technologies changed ranks by 8 or more places! These fluctuations in rankings occurred regardless of whether we used the minimum, maximum, or mean scores of each technology's ratings to determine rankings.

Table 2 – Results of our test of Hypothesis 2. Each of twelve technologies was rated multiple times in two rounds of evaluation. Each time, the instrument used for evaluation was the same. The table contains rankings of each technology for each of two rounds of evaluation. To further highlight the variability of rankings, we ranked technologies based on their minimum, maximum, and mean scores. Hypothesis 2 predicted that rankings would remain stable from one round to the next, but this was strongly contradicted. Of the 36 difference sets of rankings, there were only four that stayed the same from one round to the next, and fully one third of technologies changed rankings by four or more spots.

| Technology	Round	Rank of Minimum	Change in Rank	Rank of Maximum	Change in Rank	Rank of Mean	Change in Rank
1	1	10	0	10	-2	9	-3
	2	10		12		12	
2	1	3	-3	7	-1	5	-2
	2	6		8		7	
3	1	8	+5	3	+2	6	+3
	2	3		1		3	
4	1	9	+8	12	+9	12	+11
	2	1		3		1	
5	1	7	-4	11	+2	8	-2
	2	11		9		10	
6	1	2	-7	6	-5	2	-9
	2	9		11		11	
7	1	5	+3	1	-5	3	+1
	2	2		6		2	
8	1	12	0	4	-3	11	+2
	2	12		7		9	
9	1	4	0	5	+2	4	0
	2	4		3		4	
10	1	6	-1	9	+8	7	+2
	2	7		1		5	
11	1	11	+3	8	-2	10	+2
	2	8		10		8	
12	1	1	-4	2	-3	1	-5
	2	5		5		6	

DISCUSSION

In the Results section above, both of our hypotheses were contradicted, indicating that two rounds of evaluation by multiple raters did not become more reliable after a second round of testing (Hypothesis 1) and did not remain consistent from one round to the next or appear to converge on a consensus (Hypothesis 2). Why these results occurred is unclear, especially given that the raters, technologies, and the instrument were the same from one round to the next.

One possible explanation for the variability and lack of inter-rater agreement is that these students were evaluating technologies for the first time, at least in the first round of ratings. In one case of a large change in the rankings, the technology in question dropped near the bottom of the group because of the discovery of a fatal flaw. Perhaps with time and experience, these students would start to deliver more reliable ratings of new technologies.

Implications For The Evaluation Of Technologies

In addition to the results presented, Figure 1 (below) demonstrates visually just how challenging it is to draw conclusions about the commercial viability of technologies in our study. Despite the fact that our hypotheses were contradicted, we think that our results have important implications for all organizations that evaluate technologies for their commercial potential and further development. Although the students were highly motivated and were given intensive and identical training on the technologies and the evaluation instrument, their ratings were highly variable and changed drastically from one round to the next. Ultimately, we do not know what the true commercial potential is of these technologies is, as this value will be revealed in the years to come as the technologies are further developed. It will be interesting in the coming years to compare the ratings of the technologies with the ultimate value generated by the technologies.

We believe that the variability of ratings could be improved through more extensive training and experience. This group of technologies was the first ever evaluated by the technology commercialization program at this university. The goal is to create a self-sustaining program where some of the most talented students from one year end up staying with the program to evaluate technologies and provide further training and mentorship as new students enter the program each year.

Figure 1 – Graph displaying the variability of ratings of commerical potential for the study's twelve technologies
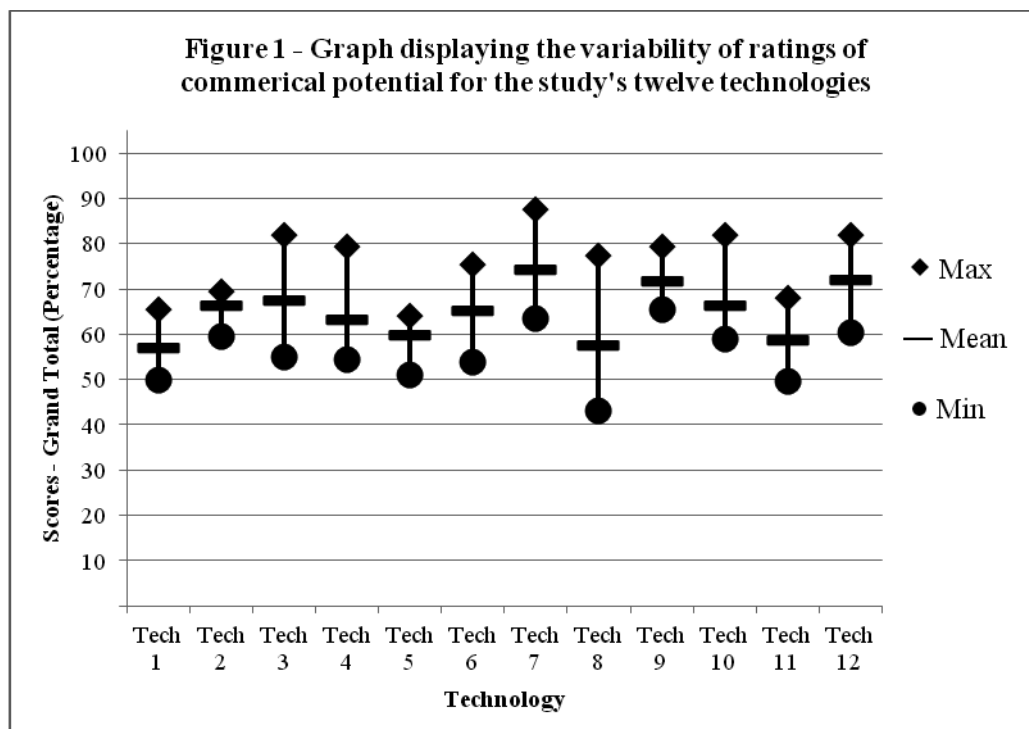
Inventor, Student, And Faculty Learning Experiences

Although the paper to this point has focused on the measurement side of technology evaluation, the benefits of the program went far beyond the evaluation of the technologies. There were three different groups participating in the program that benefited immensely from their involvement: the students in the program, the inventors that supplied the technology disclosures, and the faculty teaching the course.

All of the inventions evaluated were developed across campus by faculty, students, and graduate students. None of the inventors were from the business school so, for most, this was their first time viewing the technology from a commercial as opposed to a scientific point of view. Since the program was the first of its kind for the university, the inventors were extremely enthusiastic to see their inventions being evaluated and pushed closer to commercialization. Initially, we had asked the inventors for minimal involvement in the program, so as not to interrupt their work. For most inventors, though, the excitement of the program had them giving students tours of their lab, having formal meetings, and communicating via phone and email when students had questions about the technology they were evaluating.

At the end of the course, students presented commercialization plans for the most promising technologies, and many of the inventors, as well as senior university officials attended the presentations. Perhaps most exciting of all, when word spread about the success of the program, dozens of new technologies were submitted for possible commercialization. In fact, far more technology disclosures were submitted in the months following the start of the program than had been disclosed in the entire time the school had been collecting disclosures prior to the establishment of this program.

The course in which these evaluations took place was held in the summer. Consensus among the students was that this was by far the most work they had ever done for a course, but also found it the most rewarding. During the program, students got to meet personally with inventors, venture capitalists, entrepreneurs, as well as experts in intellectual property law. The students seemed to take real ownership of their assigned technologies, in part because the technologies were actual inventions that could lead to tremendous opportunities, not only for themselves, but for the inventor, and for the university. The top twelve students in the class were granted a $3,000 stipend to begin the process of commercializing the technologies, which undoubtedly contributed their dedication to the course. Although the results of the technology evaluations were somewhat mixed, students learned a tremendous amount about such things as determining market size, the management of intellectual property, and the importance of the assembly of an entrepreneurial team in order to push technologies forward to the market.

From a faculty standpoint, this course was team-taught by two faculty members. The course was a tremendous amount of work, but was also arguably the most rewarding course that either faculty member had taught. The coordination and timing of inventors, lining up of guest speakers, and balancing concerns about confidentiality and patentability made full use of both faculty members' time. It is hoped that the process can be streamlined over the years so that a single faculty member can balance all of the demands of the course. The potential to generate new jobs and interesting educational opportunities for students attracted considerable support from both university administration and the business community. As such, the faculty members were able to build ties across campus with other departments and build a stronger relationship between the university and the surrounding business community. Because the program generated so much interest from other inventors and the business community as a whole, the larger plan is

to run the course multiple times per year and develop a self-sustaining office that can quickly and effectively evaluate new technologies as they are disclosed. The goal is to have the students who enroll in the course act not only as a source of evaluative power, but more importantly, that some of them will go on to become staff members in the technology commercialization office, or perhaps even become part of an entrepreneurial team that decides to create a startup firm based on one or more technologies introduced in the program.

The Cautionary Tale Of Measurement Error

The variability of the results suggests a very large probability of both false negatives and false positives when evaluating technologies. Assuming that some percentage of these technologies is truly valuable from a commercial standpoint and some other percentage are not valuable, the initial evaluation of commercial potential was highly unreliable. Depending on an organization's priorities, this suggests two possible strategies for handling new technologies. Firms most concerned with maximizing the chances of identifying commercial potential should consider further analysis of as many technologies as possible so as not to accidentally kill a viable technology. On the other hand, firms with limited resources where success is the primary goal and there is very limited ability to develop new technologies, it seems that these firms should perhaps look to include other methods of evaluation to supplement the one used here, since the results presented here are too variable with which to make any strong conclusions about any one of the technologies studied.

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REFERENCES

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Ardichvili, A., R. Cardozo & S. Ray (2003). A theory of entrepreneurial opportunity identification and development. *Journal of Business Venturing,*18(1), 105-123.

Association of University Technology Managers. (2010). *The Better World Report: The Positive Impact of Academic Innovations on Quality of Life.* Deerfield, IL: AUTM. Accessed electronically on 10/24/2011: www.betterworldproject.org/AUTM2010BWR.pdf.

Association of University Technology Managers. (2010). *AUTM U.S. Licensing Activity Survey: FY2009.* Deerfield, IL: AUTM. Accessed electronically on 10/29/2011: http://www.autm.net/FY_2009_Licensing_Activity_Survey/5879.htm.

Barcikowski, R.S. & R.R. Robey (1984). Decisions in single group repeated measures analysis: Statistical tests and three computer packages. *The American Statistician*, 38, 148-150.Choi, Y., & Shepherd, D. A. (2004). Entrepreneurs' Decisions to Exploit Opportunities. Journal of Management, 30(3), 377-395.

Cohen, J. (1960). A coefficient for agreement for nominal scales. *Education and Psychological Measurement*, 20, 37–46.

Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. *Psychological Bulletin*. 76(5), 378–382.

Gigone, D. & R. Hastie (1993). The common knowledge effect: Information sharing and group judgment. *Journal of Personality and Social Psychology*, 65(5), 959-974.

Human S.E., T. Clark, M.S. Baucus & A.C. Eustis. (2004). Idea or prime opportunity? A framework for evaluating business ideas for new and small ventures. *Journal of Small Business Strategy*, 15(1), 61-79.

James, L. R., R. G. Demaree & G. Wolf (1993). r_{wg} : An assessment of within-group interrater agreement. *Journal of Applied Psychology*, 78(2), 306-309.

Jensen, R. & M. Thursby (2001). Proofs and Prototypes for Sale: The Licensing of University Inventions. *American Economic Review*, 91(1), 240–259.

Johnson, P. E., A. S. Duran, E. Hassebrock, J. Moller, M. Prietula, P.J. Feltovich & D.B. Swanson (1981). Expertise and error in diagnostic reasoning. *Cognitive Science*, 5, 235-283.

Kruglanski, A.W. & D.M. Webster (1991). Group members' reactions to opinion deviates and conformists at varying degrees of proximity to decision deadline and of environmental noise. *Journal of Personality and Social Psychology*, 61(2), 212-225.

London, M. & R.W. Beatty (1993). 360-Degree Feedback as a Competitive Advantage. *Human Resource Management*, 32(2), 353-372.

Minke, A. (1997). *Conducting Repeated Measures Analyses: Experimental Design Considerations*. Published by Ericae.net. Accessed electronically on 10/29/2011: http://ericae.net/ft/tamu/Rm.htm.

Murphy, G. L. & J.C. Wright (1984). Changes in conceptual structure with expertise: Differences between real-world experts and novices. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 10(1), 144-155.

Nowack, K.M. (2009). Leveraging multirater feedback to facilitate successful behavioral change. *Consulting Psychology Journal: Practice and Research*, 61(4), 280-297.

O'Connor, G. & M.P. Rice (2001). Opportunity Recognition and Breakthrough Innovation in Large Established Firms. California Management Review, 43(2), 95-116.

Shane, S. (2003). *A General Theory of Entrepreneurship: The Individual-Opportunity Nexus*. Boston, MA: Edward Elgar.

Rosch, E., C.B. Mervis, W.D. Gray, D.M. Johnson & P. Boyes-Braem (1976). Basic objects in natural categories. *Cognitive Psychology*, 8, 382-439.

Shane, S. & S. Venkataraman (2000). The promise of entrepreneurship as a field of research. *Academy of Management Review,* 25(1): , 217-226.

Stasser, G. & W. Titus (1985). Pooling of unshared information in group decision making: Biased information sampling during discussion. *Journal of Personality and Social Psychology*, 48, 1467–1478.

Stasser, G. & W. Titus (1987). Effects of information load and percentage of shared information on the dissemination of unshared information during group discussion. *Journal of Personality and Social Psychology*, 53, 81–93.

Stevens, J. (1996). *Applied multivariate statistics for the social sciences* (3rd ed.). Hillsdale, NJ: Erlbaum.

Timmons, J.A. & S. Spinelli (2003). *New Venture Creation: Entrepreneurship for the 21st Century*. Boston, MA: McGraw-Hill/Irwin.

MARKET DEMAND ANALYSIS
ON BUSINESS SUPPORT TRAINING
FOR THE MSME SECTOR IN JAMAICA

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ABSTRACT

Business support training is crucial for bolstering performance of Jamaican MSMEs; and consequently, a demand analysis of training needs is required for a targeted determination of training demanded by this market. Moreover, the training/firm-size literature has presented a few studies that have diagnosed training needs of this group, albeit to a very limited extent. Nowhere to be found however, within the related literature, is a demand analysis of training needs of this sector or a comparative assessment of training demanded by firm-size. This study has addressed this gap; and argues that training demanded by this very important sector must be met if Jamaican MSMEs are to deliver on the herculean tasks of economic growth, employment generation and poverty alleviation. Utilizing telephone survey and final sample of 200 Jamaican firms, the study found that customer service, managing your business for success and marketing your business were the top three courses demanded by the MSME market. More detailed findings revealed that, in all instances, where demand for training was delineated by firm-size, micro firms had less demand for training courses than small and medium. Implications for training providers, limitations and opportunities for further research are also discussed.

INTRODUCTION

The Global Entrepreneurship Monitor Jamaica 2010 Report noted that in 2008, 26% of Jamaican with potential to do business indicated that fear of failure would prevent them from starting any such venture. This proportion declined to 24% in 2009 but again increased to 33% in 2010. It is believed that, business support training is necessary for bolstering entrepreneurial confidence and for developing the human capital required for success of firms (Waddoups, 2011). Despite recognizing the importance of business support training to firm's success, many MSME owner/managers do not access training courses largely because of constraints with their time, financial constraints, along with perceived lack of relevance of these courses to the needs of the business (de Vries & Dana, 2009).

Research has shown that business failures among younger firm are associated with deficiencies in managerial knowledge and financial management capabilities; while in older firms, these failures are attributed to inability to adapt to changes in the business environment (Thornhill & Amit, 2003). Moreover, "firms are at greater risk of failure when they are young and small" (p. 497).

The relationship between a skilled workforce, increased competitiveness and sustainable growth is fully established in the small business literature (Lee & McGuiggan, 2008). However, much of the previous research in this area has focused on reasons for failure among MSMEs (Edmister, 1972; Gaskill, et. al 1993; Thornhill & Amit, 2003); and so, little is known about the training behavior of very small firms (Waddoups, 2011) or the business support training that is demanded by the MSME sector for mitigating failure. Waddoups asserts that " training behavior differs in very small firms compared to their larger counterparts", and consequently, "research using [incomplete data] will fail to fully capture

the economy's training experience, and thus, will not observe a potential source of training deficit that may exist" (p.391).

The purpose of this study is twofold: first, to determine market demand for training by the Jamaican MSMEs; and second, to ascertain differences, if any, between firm-size and training demanded. In carrying out this undertaken, a focus group was initially conducted for a preliminary identification of training courses that are needed by the sector (Table 1).

**Table 1: MSME Business Training Needs
generated through Focus Group Discussions**

Management of Financial Records	Putting your Business Online
Costing and Pricing	Managing your Business for Success
Getting a Boost in your Business	Financial Statement Analysis
Taxation	Product Development
Marketing your Business	Cash Flow Management
Growing your Business	Customer Service

This was followed by a telephone survey where data was collected for computing market demand along with differences between micro, small and medium firms on training demanded. Notably, training needs in this study were captured through focus group backed by survey question on 'intention to do course'. However, in determining training demanded by the market, the analysis was taken a step further where training needs identified were matched against the dollar value that the market is 'willing to pay' for the courses. See section on Methodology for more details on determining market demand.

Capabilities Required By The MSME Sector

Small business failure is largely attributed to two main factors; namely, managerial and planning functions and working capital management (Gaskill, et. al 1993). Further, "inadequate knowledge of pricing strategy" and "ineffective advertising/promotional strategy" were found to be the most dominant attribute of the first factor; while "inadequate financial accounting record keeping" was seen as central to the second (p.25). In addition, analysing and forecasting cash flows, doing business online and pricing of goods and services were recognised among the top competencies required by owner/managers of small and medium entities (Lee & McGuiggan, 2008). Similarly, de Vries (2004) reported cash-flow management, compliance, managerial inexperience and limited marketing capability as the chief bugbear of the MSME. On other areas of capabilities required within the sector, Allee and Yohn (2009) highlighted the importance of financial statement analysis to small firms and concluded that audited financial statements benefited firms through greater access to credit and effectively done accrual based statements are associated with lower cost of credit.

Following on their 2008 findings, Lee and McGuiggan (2009) studied 32 indicators of owner-managers' perceptions on types of skills and knowledge needed by small businesses personnel; and found that marketing related competencies namely, marketing research, store promotions, advertising, knowledge on positioning of firm, loyalty program management and cross selling skills were identified among the top 10 skill-sets required by these entities. Based on the foregoing literature along with preliminary identification of business training needs uncovered through focus group, this study will first address: RQ1: What are the training courses demanded by the MSME sector?

Firm Size And Differences In Training Behavior

An IDB (2006) study on MSMEs in Jamaica found a positive relationship between size of enterprise and education level of owner-managers; thus indicating that larger firm are outfitted with better trained managers. Similarly, a number of studies have found a positive correlation between the likelihood of training and firm-size (Green et al. 1999; Lynch & Black, 1998; Waddoups, 2011); and it has been shown that much less training occurs in firms with fewer than 10 employees (Waddoups, 2011). Further, within industries, the size of business is influential in demand for training and consequently no single approach to training is ideal with industries of differing requirements and needs (Gray & Lawless, 2000). Based on the firm-size/training dynamics explored in the literature therefore, this study will seek to address the follow-up question:

RQ2: Is training demanded different among micro, small and medium firms?

Methodology

The methodology for determining demand for business training among MSMEs[1] in Jamaica is discussed in three stages: First, a focus group was conducted for identifying training needs among participants. The decision to use focus groups for the preliminary identification of training needs was based on the notion that focus groups would provide a better alternative than the MSME literature since Jamaica's recent classification of MSMEs is country specific (MSME and Entrepreneurship Policy,13th draft, 2012); and the MSME literature tends to be confounding, as, in the main, it treats with MSMEs in the collective, when there are so many different definitions of micro, small and medium entities used by multilateral agencies and departments both within and across countries. See Smith and Deslandes (in press). Further, the sample for the focus group was drawn from the 2013 Jamaica RedBook[2]telephone directory with 12 individuals participating in the sessions; four informants from each of the three groups. These individuals were either business owners, managers of MSMEs or representatives who were in leadership positions within these entities. Business training needs arising from the manuscript of the focus group were analysed for convergence on training required; and 12 courses considered relevant across all three entity types were identified and used as items for a survey instrument that was developed in the second phase of this undertaking. This survey instrument is constituted by demographics, industry type (agriculture, manufacturing, construction, etc.), entity type (micro, small and medium) and other general attributes related to the entity and respondent.

Second, a telephone mode of administration was used for conducting the survey. This method of triangulation was chosen for following up on the focus group as survey allows for generalizing and more wide-scale assessment on focus group findings. The 2013 Jamaica Online Yellow Pages was adopted as the sample frame. This frame constitutes the wide cross-section of businesses across all 14 parishes in Jamaica; and a representative sample of over 600 firms, stratified by industry type and parish was drawn from the frame. Further, the entity type designated as micro, small and medium was determined during the administration of the survey based on a classification question on number of employees within the entity; and a brief scripted description of each course was read to respondents so as to allow for informed choices. Notably, the scripted description is aimed at addressing the gap in the literature where most of the studies in this area "do not observe the substance of training

[1] In this study the MSME is defined in accordance with the Jamaican MSME & Entrepreneurship Draft Policy of 2012; where micro firms consist of ≤ 5 employees, small: 6-20 and medium: 21-50.

[2]The Red Book utilized comprised three of the 14 parishes in Jamaica (Kingston, St. Andrew and St. Catherine); and the sample selected was representative although not including MSMEs from all parishes.

courses" (Waddoups, 2011, p. 391). The final sample consisted of 200 firms that were distributed as follows: micro (39%), small (44%) and medium (18%). These firms were also spread across industry types with real estate & professional services (25%), wholesale & retail trade (16%), transportation & communication (16%) and manufacturing (15%). The large majority of respondents surveyed (78%) were either owners or managers, with the remaining (22%) being supervisors or individuals who were in senior positions with the company. These respondents were evenly divided across gender: male (50%) and female (50%); with a total of 80% reporting tertiary education as the last level of attainment: 17% with secondary/high school education; and less than 4% with primary education as the final level.

Third, the analysis of the survey data was undertaken with SPSS version 16. In order to determine market demand for business training, descriptive statistics were generated for distributing the likelihood of taking these courses captured by 5-point Likert scales; and labelled from 'definitely do it' thru 'definitely not do it'. The maximum 5-points on the scale (definitely do it) was treated as a proxy for *indicative demand* and was juxtaposed by amount willing to pay, per person, per day, for deriving market demand. In addition*,* parametric testing via One-Way Anova was used to determine significant difference between means in relation to the three categories of firm types. This was followed up with the Post Hoc test using Scheffe for determining the magnitude of the differences in market demand for business training based on firm size.

Results

The results from analysis of the survey data indicate that customer service (46.7%), managing your business for success (27.5%) and marketing your business (26.9%) are the top three courses demanded by the MSME sector. Each of these courses is demanded at approximately US$50 per person, per day, for a 3-day course. In contrast, getting a boost in your business (8.6%), costing and pricing (10.3%) and financial statement analysis (10.4%) are least demanded. Notably, the lowest demanded course; getting a boost in your business is demanded at approximately US$10 per person, per day for a 3-day course; while the other lower demanded courses, namely, costing and pricing and financial statement analysis are each demanded at approximately US$50 per person, per day, for a 3-day course (Table 2).

Table 2: Market Demand for Business Training Courses

Courses	Definitely do it (%)	Probably do it (%)	Uncertain to do it (%)	Probably not do it (%)	Definitely not do it (%)	Quantity Demand (# of firms)[3]	Pay/Person/ Day mean; mode; median (3- day course) [J$[4]]
Management of Financial Records	14.1	27.6	7.6	16.5	34.1	7,050	3083;1500;2500
Costing and Pricing	10.3	19.6	9.2	20.1	40.8	5,150	4350;5000;5000
Getting a Boost in your Business	8.6	12.4	3.2	21.6	54.1	4,300	1000;1000;1000
Taxation	15.7	25.8	3.9	20.8	33.7	7,850	3974;5000;4000
Marketing your Business	26.9	32.1	5.1	12.8	23.1	13,450	4198;5000;4500
Growing your Business	25.5	35.0	6.4	14.0	19.1	12,750	4229;5000;4000
Putting your Business Online	22.6	17.3	7.7	14.3	38.1	11,300	4251;5000;3500
Managing your Business for Success	27.5	24.6	5.4	18.0	24.6	13,750	4496;5000;5000
Financial Statement Analysis	10.4	23.7	3.5	18.5	43.9	5,200	4933;5000;5000
Product Development	13.3	20.8	2.9	17.9	45.1	6,650	4073;5000;4000
Cash Flow Management	20.6	21.2	4.7	15.3	38.2	10,300	4149;5000;3300
Customer Service	46.7	16.4	2.6	13.2	21.1	23,350	4904;5000;5000

Courses in costing and pricing, getting a boost in your business, putting your business online, managing your business for success and customer service were less demanded by micro firms than their small and medium counterparts. However, there were no significant differences between firm types on demand for courses such as management of financial records, taxation, marketing your business, product development and cash flow management. Similarly, there was no evidence to suggest that market demand for business training courses was any different between medium and small firms (Table 3).

[3]The popular estimate is that there are approximately 50,000 MSMEs in Jamaica
[4]Exchange Rate: US$1 to J$100

Table 3: Market Demand for Training by Firm Type

Courses	Min	Max	ANOVA Results Micro (MI), Small (SM), Medium (ME)
Management of Financial Records	1	5	$F_{(2,167)}$ =3.191; p =. 044; eta squared=.04; n/s between means on Post Hoc
Costing and Pricing	1	5	$F_{(2,181)}$ =4.09; p =. 018; eta squared= .04; MI:[M=2.01, SD=1.316]; SM:[M=2.61, SD=1.455]; ME:[M=2.67, SD=1.539] MI < SM*; (*p<.05)
Getting a Boost in your Business	1	5	$F_{(2,182)}$ =7.119; p =. 001; eta squared= .07; MI:[M=1.60, SD=1.083]; SM:[M=2.11, SD=1.331]; ME:[M=2.61, SD=1.713] MI <ME*; (*p<.05)
Taxation	1	5	n/s
Marketing your Business	1	5	n/s
Growing your Business	1	5	n/s
Putting your Business Online	1	5	$F_{(2,165)}$ =4.182; p =. 017; eta squared= .05; MI:[M=2.28, SD=1.565]; SM:[M=2.97, SD=1.6181]; ME:[M=3.10, SD=1.676] MI <SM*; (*p<.05)
Managing your Business for Success	1	5	$F_{(2,164)}$ =3.550; p =. 031; eta squared= .04; MI:[M=2.78, SD=1.608]; SM:[M=3.49, SD=1.432]; ME:[M=3.07, SD=1.741] MI < SM*; (*p<.05)
Financial Statement Analysis	1	5	$F_{(2,170)}$ =3.781; p =. 025; eta squared=.04; n/s between means on Post Hoc
Product Development	1	5	n/s
Cash Flow Management	1	5	n/s
Customer Service	1	5	$F_{(2,149)}$ =7.831; p =. 001; eta squared= .10; MI:[M=3.00, SD=1.780]; SM:[M=3.82, SD=1.479]; ME:[M=4.31, SD=1.225] MI < SM* & MI < ME*; (*p<.05)

Discussion

A thorough search of the training/firm-size literature has uncovered very few studies that have diagnose training needs of the MSME sector; and those that have done so, have focused largely on small and medium entities. Nowhere to be found, prior to this undertaking, has there been a comprehensive and empirical assessment of training demanded by a representative sample of MSMEs; or has there been any such comparison on training demanded by firm-size. Indeed, this is required as with the important role that the MSMEs continue to play, a targeted approach to training is necessary for bolstering performance of this sector. Consequently, this study has addressed this gap; and found the top three courses demanded by the MSME market in Jamaica were customer service, managing your business for success and marketing your business. In contrast, getting a boost in your business, costing and pricing and financial statement analysis were least demanded among 12 courses identified. Of note is that courses in customer service were demanded by almost one half of the MSME firms while marketing and managing your business for success were each demanded equally by approximately 27% of the market.

This inordinately high level of customer service training demanded by Jamaican firms is indicative of a growing trend of dissatisfied customers where smaller firms, in particular, do not spend on customer service due to dwindling cash flows. Owner/managers within these entities however, while may not be able to afford the reengineering of firms for improving customer service are more than willing to pay for courses in this area as need for customer service competence within the firms is becoming more tangible with the fiercely competitive marketplace.

Consistent with expectation (de Vries, 2004; Gaskill, et. al 1993; Lee & McGuiggan, 2009) is the very high demand among MSMEs in Jamaica for training in marketing. This can be explained by difficulties expressed by owner/managers to maintain sales in a climate characterized by shrinking disposable income; and so there is great need for marketing competencies which can somewhat be facilitated through these courses; even though this may not be enough. However, owner/managers have indicated that there are no funds available to carry-out the much needed advertising and promotion campaigns; and so business support training in marketing is seen as a consolation.

Managing your business for success which was also found to be highly demanded, is a course described to participants as having a management consultative component, where each firm would be individually diagnosed on its management problems; and solutions prescribed for providing that proverbial *shot in the arm* for improving business. The high magnitude of this demand is believed to be due to the consultation that would be provided to these firms for the price of a training course; as consultancy charges are prohibitive within the sector; and so this would be interpreted as value for money. Further, although the Government provides highly subsidized management and business support for MSMEs through its agencies, the records have shown that larger-type MSMEs do not access these facilities; perhaps because of the stigma associated where these agencies are for start-ups and do not have the capabilities required for handling the problems of larger firms. In substantiating this point on lack of access of Government agencies by larger MSMEs, the findings of this study showed that small firms (6-20 employees) would significantly demand courses in managing your business for success much more than would micro firms.

Other courses, such as costing and pricing and financial statement analysis generated low levels of demand, contrary to expectation. See Lee and McGuiggan (2008) and Allee and Yohn (2009). Reasons for these findings are clearly not obvious. However, it is believed that these courses may be viewed as a bit academic by the targeted participants, many of whom would have already taken them at university (80% respondents reported tertiary education as the last level of attainment); and so there was nothing new or thought provoking about these courses; as costing and pricing was described to include topics such as costing methods, breakeven analysis and pricing of services; while financial statement analysis would provide coverage on the financial tools and methods for evaluating firm's performance.

The findings revealed that for some courses (such as customer service, managing your business for success and putting your business online) demand was delineated by firm-size; while for others (such as marketing your business, taxation and cash flow management) there were no differences between the size of firm and the number of courses demanded. Further, it must be highlighted that in all instances where there were differences between the size of firm and the number of course demanded, micro firms recorded less demand than the other two firm types. The demand/firm-size dynamics on these latter findings would require qualitative assessment for in-depth understanding and explanation. However, the finding related to the lowest demand recorded by micro firms compared with its counterparts, across all courses, is very likely an issue of lack of funding which has become a bugbear, particularly among the micro business firm.

Although the study design is robust and constitutes a representative sample of MSMEs that spans the gamut of Jamaica, hence providing generalizable findings, the modus operandi of telephone survey is limiting, not only with over- and under reporting that characterises surveys but also in terms of the scripted and succinct descriptions of courses that were articulated via the survey, leaving questions as to whether more in-depth descriptions would lead to different findings.

Conclusion

The training/ firm-size literature is void in its treatment of business support training required by the MSME sector; and while there may be few studies that have attempted to identify training needs of this sector, the literature search has revealed that there are little or no scholarly work, before this undertaking, that has determined the support training demanded by this group. Indeed, the identification of training needs which has previously been done, albeit to a limited extent, cannot be equated with a study of this magnitude where a fulsome analysis of training demanded was undertaken from a sample, suitably representative of the MSME market. Further, previous studies on training needs assessment in this area, seem to lack rigor and could arguably be viewed as a *wish list*, while demand derived (i.e. taking the analysis a step further), as in the case of this project, tantamount to a scientific determination of 'intention to take courses' augmented by 'willingness to pay' for the intended offering.

The top three courses demanded namely, customer service, marketing your business and managing your business for success provide a *quick-win* for MSME training providers. These providers should respond to this demand and develop these and related courses at present value US$50 per person per course for 3-day courses. In addition, micro firms, despite registering very low demand for courses, should not be ignored owing to the important role that they continue to play in Jamaica's development. In this case, the Government should provide these offerings through its agencies and subsidizing courses for increasing *take-up*. Further research, particularly within developing economies, both similar and different to Jamaica, should replicate this project, utilizing the business support courses identified in this study as a starting point towards generalizing and providing wider applicability of the study's findings.

REFERENCE

Allee, K. D., & Yohn, T. L. (2009). The demand for financial statements in an unregulated environment: An examination of the production and use of financial statements by privately held small businesses. *The Accounting Review, 84*(1), 1-25.

Boodraj, G., Skeete, V., Bowen, M., & Reid, O. (2010). Global Entrepreneurship Monitor 2010 Jamaica Report

de Vries, H. (2004). Debtor and creditor practices of Canterbury SMEs. *The New Zealand Journal of Applied Business*, 3(1), 13-24.

de Vries, H., & Dana, T. (2009). Business training needs for small to medium size enterprise: An exploratory paper on current directions. *New Zealand Journal of Applied Business Research*, 7(1), 67-74.

Edmister, R. O. (1972). An empirical test of financial ratio analysis for small business failure prediction. *Journal of Financial and Quantitative Analysis*, 1477-1493.

Gaskill, L. R., Van Auken, H. E., & Manning, R. A. (1993). A factor analytic study of the perceived causes of small business failure. *Journal of Small Business Management*, 18-31.

Gray, C., & Lawless, N. (2000). Innovations in the distance development of SME management skills. *European Journal of Open, Distance and E-Learning*, 1-18.

Green, F., Machin, S., & Wilkinson, D. (1999). Trade unions and training practices in British workplace. *Industrial Labor Relations Review, 52* (2), 179-195.

Inter-American Development Bank. (2006). Informal Sector in Jamaica. IDB: New York.

Lee, G., & McGuiggan, R. (2008). Understanding small- and medium-sized firms' financial skill needs. *Journal of International Finance and Economics*, 8(3), 93-103.

Lee, G., & McGuiggan, R. (2009). Small business training needs, preferred channels, and barriers. *Journal of Academy of Business and Economics*, *9*(2), 103-114.

Lynch, L., Black, S. E. (1998). Beyond the incidence of employer-provided training. *Industrial Labor Relations Review*, *52* (1), 64-81.

MSME & Entrepreneurship Policy 2012 (13th Draft), Ministry of Industry, Investment and Commerce, Jamaica.

Smith, T., & Deslandes, D. (in press). Disaggregating Jamaica's Micro, Small and Medium Firms on Challenges Faced for Better Policy Development and Planning. *Academy of Entrepreneurship Journal.*

Thornhill, S., & Amit, R. (2003). Learning about failures: Bankruptcy, firm age and the resource-based view. *Organization Science*, *14*(5), 497-509.

Waddoups, C. J. (2011). Firm size and work-related training: New evidence on incidence, intensity, and training type from Australia. *Journal of Labor Research*, *32*, 390-413.

GAME-BASED ENTREPRENEURSHIP EDUCATION: IDENTIFYING ENTERPRISING PERSONALITY, MOTIVATION AND INTENTIONS AMONGST ENGINEERING STUDENTS

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ABSTRACT

The authors present the background and results of an explorative evaluation of the use Serious Games (SG) in a Master's level course in entrepreneurship at TU Delft in the Netherlands. The main questions concern the extent to which the use of SGs contributes to entrepreneurship (or learning related to entrepreneurship), as well as the factors that determine its contributions. In 2012, three different SGs were played, involving 28 international MSc students who registered for a one-year specialisation track in 'Entrepreneurship'. This article presents the research model, the quasi-experimental design of the evaluation, the evaluation instruments and the results. The authors conclude that personality traits, motivation and previous gaming experience might significantly influence the perceived effects on entrepreneurship after the training, although the actual game-play does not. These results contribute to the discussion regarding the use of serious games for entrepreneurship, given the possibility that SGs have a pedagogical bias towards game-savvy, motivated, high-achieving males.

Keywords: Evaluation; game-based learning; serious gaming; simulation gaming; entrepreneurship; business games higher education.

INTRODUCTION

'Entrepreneurship' is generally considered a significant factor in the competitive race amongst regions, states and continents (Ács & Szerb, 2007, 2012; Covin & Miles, 1999; Stone & Ranchhod, 2006). The obvious reason that national and EU policymakers have placed such strong emphasis on the promotion of 'entrepreneurship' is that the overall level of 'competitiveness' has been waning in large parts of Europe since the early 21st century, as compared to the BRIC countries (Brazil, Russia, India, and China) or even Singapore (Grimm, 2009; OECD, 2009; Stone & Ranchhod, 2006; The Gallup Organization, 2009; Volkmann, Tokarski & Grünhagen, 2010). The low level and slow pace in which the fruits of Science, Technology and Engineering (STE) are finding their way to the market is particularly problematic. The proportion of students of STE has been showing a steady declining trend in most European countries. Furthermore, the valorisation of STE through patents, start-ups, spin-off and private funding of fundamental and applied research and related activities is lagging significantly behind the US. This has had many undesirable effects with regard to the realisation

of employment, prosperity, innovation and other socio-economic values. In short, the entrepreneurial spirit in Europe is in need of encouragement. One way to provide such encouragement is through the provision of entrepreneurship education in schools and universities (Commission of the European Community, 2006, 2008; European House of Entrepreneurs, 2012; NIRAS consultants, FORA, & ECON, 2008; Rizza & Amorim, 2010; Volkmann et al., 2011).

EVALUATING ENTREPRENEURSHIP EDUCATION

The complicated nature of 'entrepreneurship' and the relative utility of 'entrepreneurship education' has been widely addressed in the literature (Brazeal & Herbert, 1999; Fayolle & Kyrö, 2008; Gartner, Shaver, Gatewood & Katz, 1994; Henry, Hill & Leitch, 2005a, 2005b; Holmgren et al., 2004; Kirby, 2004; Kuratko, 2005; Lautenschläger & Haase, 2011; Matlay, 2006; Wilson & Stokes, 2006). Many scholars have argued that entrepreneurship is a *personality trait* − a combination of personality and talent that can be cultivated and trained, but not easily acquired (Müller & Gappisch, 2005; Roberts, 1989; Stormer, Kline & Goldenberg, 1999). The literature can obviously be contradicted by exceptions, as with highly successful but atypical personalities characterised by a stubborn, uncompromising and anti-social nature. In other words, *authenticity* and *luck* play a role as well. A *cultivating context*, in which entrepreneurs are encouraged and rewarded (and not discouraged), is another contributing factor. This applies to the immediate *social-cultural context* (e.g. the family, the clan), which can influence the entrepreneurial activities of women, immigrants or other groups, as well as to the wider *political-economic context*, with regard to regulations, policies and tax regimes (Ács, Audretsch & Strom, 2009).

Most entrepreneurs would argue that entrepreneurship cannot be learnt from books or attending lectures, but only acquired in practice, by doing and by learning from mistakes (Gstraunthaler & Hendry, 2011; Nab, Pilot, Brinkkemper & Berge, 2010; Vincett & Farlow, 2008). On the other hand, entrepreneurship requires a wide range of skills, with excellence in a few. In the 21st century, most skills and forms of excellence are discovered, acquired, cultivated or legitimized in and through formal education and training. In addition, institutions, laws and regulations require entrepreneurs to possess certain basic qualifications before registering or operating their own companies or practicing their professions. Education in entrepreneurship is therefore commonly associated with education in other areas, including business, management, economics, finance and leadership.

For some, entrepreneurship education is merely the 'sum of all business and management courses'. There is certainly no shortage of MBA schools in Europe or the US. The overarching or underlying questions regarding whether and why an individual should become an entrepreneur and what entrepreneurship implies are more difficult to address (Kirby, 2004; Lautenschläger & Haase, 2011). Business managers are not necessarily entrepreneurs (or, as some would argue, 'they are not, by definition'). On the other hand, some civil servants or academics are highly 'entrepreneurial' without ever enjoying the private financial gains associated with entrepreneurship.

From the outset of their careers, MBAs become encapsulated in vested corporate interests, norms and practices. This commonly expels the urge to be different, to compete with corporate establishment and to accept the risk of failure. It is therefore believed that entrepreneurship starts young, and that it should be cultivated early (Cheung & Kong, 2010; Kourilsky & Walstad, 2002). Attracted by the possibilities offered by the internet and social

media – which require little initial investment other than time – generations of students in secondary schools (< 18 years of age) and universities (between 18 and 25) have started their own businesses, in the form of online shops, web services, social media applications, games and similar initiatives. The success stories (e.g. Facebook, Twitter, Instagram) are tantalising to many adolescents and policymakers. It is tempting to link 21st century entrepreneurship to 21st century topics in order to address the generation that has grown up with the internet, social software and digital games.

It has been debated whether formal entrepreneurship education actually does or could have a positive impact on actual entrepreneurial behaviour and success (Lautenschläger & Haase, 2011; Peña, Morghan, Riggieri, Shipp & Atta, 2010; Pittaway & Cope, 2007; von Graevenitz, Harhoff & Weber, 2010). The literature contains many assessments of the impact of entrepreneurship educational programs on actual entrepreneurship (e.g. Cox, Mueller, & Moss, 2002; Duval-Couetil, Reed-Rhoads, & Haghighi, 2010; Fayolle & Kyrö, 2008; Peterman & Kennedy, 2003; Pittaway & Cope, 2007; Pittaway, Freeman, Enterprise, & Edwards, 2012; Vesper & Gartner, 1997).

In the 21st century, entrepreneurship education is impossible without first deconstructing what it is or what it should be (Brazeal & Herbert, 1999; Bygrave & Hofer, 1991; Gartner et al., 1994). In short, 'entrepreneurship' refers to the following seven interconnected dimensions:

1. *Social-political-cultural value*, which emphasises core capitalist (in the general sense, as opposed to the political ideology) values, including free market, growth, innovation, creativity, prosperity, competition, private property and utility.
2. *Institutions:* The local-global organisations, laws, regulations, cultures and societal values that confirm, enable and enforce entrepreneurial values (e.g. tax regimes or the prestige of entrepreneurs in society)
3. *Personality traits:* The characteristics (values, attitudes and beliefs) that make actors adhere to entrepreneurial values and prone to show enterprising behaviour (e.g. risk-taking, need for achievement).
4. *Competency set:* Skills and knowledge that allow actors to realise entrepreneurial values (e.g. social and professional skills, talent for design, creativity).
5. *Set of behaviours (or behavioural intentions):* Actions or behaviours (e.g. writing business plans, conducting market analysis, acquiring capital) through which actors can realise entrepreneurial values
6. *Development process:* The ongoing learning process through which values, traits, competencies and behaviours (e.g. tolerance for frustration, learning from experiences, abstraction) are acquired, trained and perfected.
7. *Outcomes:* Results or effects of having realised entrepreneurial values, at least to some extent (e.g. enjoying the revenues after having started a business).

For decades, the preferred methods for teaching entrepreneurship have been targeted towards the experiential and authentic learning styles (Lane, 2011; Nab et al., 2010), largely in the following forms:

1. *Case studies:* Students work on case studies from past, present or future (Sijde, Ridder, Blaauw & Diensberg, 2008).
2. *Simulated business:* Students set up and manage a company within a simulated safe market, largely separated from the real world (Hindle, 2002).
3. *Incubators (or ore-incubators):* Students can experiment with applying their own personalities and competencies within a low-investment, low-risk, supported and synergetic environment.
4. *Real business:* Students set up and manage a company in the real world (Kuehn, Grider & Sell, 2009; von Graevenitz et al., 2010).

5. *Coaching programmes:* Experienced, senior entrepreneurs provide practical advice and support to young starting entrepreneurs.
6. *Simulation-games, serious games (SG):* A form of experiential, authentic learning that is particularly suitable for formal education and training in which students are challenged to compete with others (Bulander, 2010; Feldman, 1995; Hindle, 2002; Huebscher & Sciences, 2010; Katz, Gundry, Low & Starr, 1994; Kriz & Aucher, 2005; Panoutsopoulos, Lykourentzou & Sampson, 2011).

RESEARCH CONTEXT AND QUESTION

Research Context

Whether the Net generation (Bekebrede, Warmelink, & Mayer, 2011) produces a different kind, even more successful, entrepreneurs remains to be seen (Kato, n.d.). It does however provide a strong context for promoting game-based entrepreneurship education: an authentic, experiential didactic that seems particularly appealing to the (younger) Net-generation! In this context therefore, we focus on the efficacy of *serious games* (SG) to promote and teach entrepreneurship (Neck & Greene, 2011).

Simulation-gaming (Duke, 1974) or serious games (Abt, 1970) (both abbreviated as SG below) have been a commonly applied didactic method for teaching entrepreneurship at least since the 1990s (Katz et al., 1994). The pervasiveness of digital entertainment games has recently spurred the development and application of serious games for learning, reflecting an increase in digital games designed to teach management, business and entrepreneurship. Several serious games focusing on entrepreneurship have emerged on the learning market. Examples include *Hot Shot Business* ("Hot Shot Business," n.d.), *TopSim* ("Topsim," n.d.) and *the Enterprise game* ("The Enterprise Game," n.d.), as well as numerous business and management games in specific areas. Serious games thus amount to the combination of 21st century entrepreneurship, 21st century skills and the internet generation. Although it is tempting to consider (or even strongly advocate) serious games as a 'method 2.0' for promoting and teaching entrepreneurship, there is actually very little experience or proof that they work in the right direction. Distinctions amongst games, types of uses and users are probably necessary.

The project 'Stimulating Entrepreneurship through Serious Games (eSG, 2011-2013) is being conducted within the Erasmus Lifelong Learning (LLL) programme (Fostering Excellence and Innovation in Higher Education, FEXI) (Bellotti et al., 2012). The partners in this project are the University of Genoa (Dep. of Electronics and Biophysical Engineering, DIBE, Italy), the Italian National Research Council (CNR, ITD, Milan), the Delft University of Technology (Faculty of Technology, Policy and Management and Delft Centre for Entrepreneurship; TU Delft, the Netherlands), and ESADE Business School (Barcelona, Spain). The overall objective of the project is to develop, use and assess game-based entrepreneurship training and education, with emphasis on higher education (specifically in the area of engineering). The first year of the project is a test or pilot phase in which various games, methods and approaches are tried and assessed. The second year involves a systematic, comparative study conducted in the three partner organisations. The objective of the first-year eSG pilot project was to test the various games and develop methods to evaluate their efficacy within the partner organisations.

Research Question

Based upon the above problem analysis, how effective are serious games for teaching entrepreneurship, in particular among the so-called net-generation (Bekebrede et al., 2011)? The research question for the study is:

To what extent does the use of SGs contribute to entrepreneurship (or to learning related to entrepreneurship), and which factors determine its contributions?

The Delft Case

The Delft pilot was carried out as part of the *Entrepreneurship Annotation Week* (EAW), a bi-annual course week for Master's students aspiring to earn the Masters Annotation in Entrepreneurship in addition to their own Masters programmes. Our target group thus comprised these students from various disciplinary backgrounds. The goal of the programme was to introduce the students into the dilemmas, aspects and examples of entrepreneurship. The programme design, which built upon previous experience, consisted of three full days, during which six half-day activities were offered. In the section below, we provide some background information on TU Delft, its existing programmes in entrepreneurship education and a detailed description of the EAW programme.

Delft University of Technology (TU Delft) is the largest of three Dutch technical universities. It is located in the western part of the Netherlands, with around 17 thousand students divided over eight engineering faculties. The university has many ties with major industries and corporations in various sectors (e.g. oil and gas, maritime, construction, water, life sciences). Education, research and design are strongly oriented towards applicability. In the last decade, TU Delft has intensified its strategy with regard to valorisation and entrepreneurship.

During the period 2005-2008, a Valorisation Centre (for spin offs, patents), the Delft Centre for Entrepreneurship (DCE, for entrepreneurship education) and YES! Delft (an incubator and coaching programme for high tech start-ups) were established. The DCE coordinates and provides courses in various aspects of entrepreneurship at the Bachelor's level (as a minor), the Master's level (through the Entrepreneurship Annotation programme) and the PhD level (as part of the TU Delft Graduate School). In the Entrepreneurship Annotation programme, students can create their own entrepreneurship education tracks, which are appended to their regular engineering degrees upon completion. Students are expected to support and request approval for their course selections. Students may select from the following courses:

1. *New Product Technology:* Transforming technology into business, creative facilitation and project-value engineering.
2. *Existing Companies:* Design challenge, writing a business plan, corporate entrepreneurship, corporate social responsibility, leading and managing people, advanced project management, e-business, technology and strategy.
3. *New Ventures:* High-tech start-ups, starting new ventures, research-based business opportunities, research-based business planning, and research-based business ventures.
4. *Global:* Innovation management, economics of innovation, short/long entrepreneurial international internship, patent law and patent policy, communication, policy and strategy, leading strategic design, economics of infrastructures, strategic management, economic foundations.
5. *Marketing & Finance:* New product commercialisation, high-tech marketing, science marketing, business marketing for engineers, corporate finance.

6. *Sustainability & Environment:* Product-service systems, sustainable business game, strategic and sustainable design, sustainability in transportation engineering.
7. *Consumers:* Consumer behavior.

The *Entrepreneurship Annotation Week* (EAW) is an intensive mandatory, three-day course that serves as a meeting point for students who have been accepted into the Master Annotation in Entrepreneurship (MAE) programme. The MAE provides students in various stages of their Master's degree programme with a set of tools with which they can improve their entrepreneurial skills, along with the opportunity to increase their own awareness and share experiences and knowledge. The MAE can be taken only as a supplement to one of the Master's degree programmes offered by TU Delft. The EAW aims to introduce activities that complement the university's existing course offerings and networking events in the field of entrepreneurship. The main objectives are as follows:

1. To provide practical tools that can help students enhance their entrepreneurial skills, particularly in the fields of team and project management, creativity, problem solving and presentation skills
2. To allow students to experience the culture and working environment of start-ups and to learn from their challenges
3. To promote the sharing and dissemination of knowledge amongst fellow students
4. To raise self-awareness by creating a sounding board for students to reflect on their motivations, ambitions and objectives as potential entrepreneurs
5. To encourage students to develop their entrepreneurial plans further

In previous years, the five-day EAW programme consisted of many lectures, visits and cases. In response to the Erasmus eSG project, the 2012 EAW programme was significantly transformed into a three-day, game-based entrepreneurship training revolving around three different SGs:

1. *TeamUp* (TU Delft, 2010): a 3D-digital, multi-player (4 pp.) game about team communication and leadership. The game was built by the TU Delft game lab using the Unreal Development Kit (UDK). A team of four players (impersonal avatars wearing red, green, yellow or blue sweaters) has become stranded on a tropical island filled with Mayan ruins (a high-quality 3D game world). The four players must communicate and self-organise (e.g. pick up cues, establish a language, arrange leadership, coordinate actions) – in order to move their avatars to the other side of the island, while solving a series of collaborative puzzles as quickly as possible and with few mistakes. Figures 1 and 2 provide an impression of a TeamUp player screen and EAW students playing the game. A video is available at: www.seriousgaming.tudelft.nl.
2. *Slogan* (Duke, 1981): a non-digital, management game about change, markets, communication, management for higher education and professional training. This is a classic game in which players form four departments within a company that designs, produces, markets and sells 'slogans' as its main product. One department cuts out letters from newspapers and magazines, subsequent departments produce words and sentences, while the fourth department tries to optimise market value. The players can self-organise in order to become more efficient. A facilitator plays the role of the 'market' by rating the value of the slogans based on criteria (quality, quantity) that are unclear to the players. The players may ask only closed questions in order to discover what the market wants. The game is particularly effective when played with many players and two or more companies operating in parallel. Figures 3 and 4 provide an impression of EAW students playing the game.
3. *SimVenture* (Venture Simulations Ltd., n.d.): a single-player, computer-based, strategy game on business ventures. One player (or a small group of players sharing a computer) can take any of a wide range of actions to set up a virtual business and make it a success. The game comes with a tutorial video, and it can be played at varying levels of complexity, ranging from easy to advanced. A licence is required, and it is necessary to install the software. Although the 2D player interfaces are functional,

they may appear somewhat outdated. Figures 5 and 6 provide an impression of SimVenture screens and EAW students playing the game.

Figure 1 TeamUp screen

Figure 2 TeamUp play

Figure 3 Slogan material

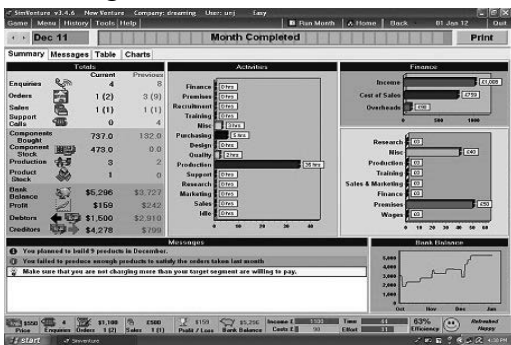Figure 4 Slogan play

Figure 5 SimVenture Screen

Figure 6 SimVenture play

Students applied for the EAW course by writing an essay. Not all students who showed an interest in participating in the EAW submitted essays, and not all students who submitted essays were selected. Intrinsic motivation was therefore high. Motivation was further stimulated by the highly multi-disciplinary and international character of the group.

DAY	PART	TOPIC	MEANS	WHAT
Table 1 **CONDENSED VERSION OF THE EAW PROGRAMME**				
Tue. 19 June 2012	Morning	Introduction EAW	Case	
	Afternoon	Serious Game 1	TeamUp General Enterprising Test (GET)	Team communication, self-organisation, leadership, self-insight
Wed. 20 June 2012	Morning	Visit SG game company		
	Afternoon	Serious Game 2	Slogan	Self-organisation, Change, Market sensitivity, Leadership
Thurs. 21 June 2012	Morning	Visit incubator		
	Afternoon	Serious game 3	SimVenture	Competition, system skills, business, marketing

The study design discussed in the next section consists of a conceptual model, hypotheses, quasi experimental design and data gathering.

STUDY DESIGN

Serious Games For Entrepreneurship

(Serious) games are relevant for entrepreneurship in four different, but interrelated ways:

1. as *socio-economic phenomenon*, i.e. the impact of (serious) game industry, game culture, business models etc. on entrepreneurship (Kato, n.d.).
2. as a *didactic method*: i.e. the design, use and implementation of SG to educate entrepreneurship (Bellotti et al., 2012).
3. as *object of study*: i.e. assessment of the learning efficacy of SG in general and entrepreneurship in particular (Mayer et al., 2013).
4. as *quasi experiment* c.q. *data collection*: i.e. the use of SG as environment to observe and collect data on entrepreneurship, personality, behavior etc.

Research Model

The three games piloted in the Delft EAW training sessions were evaluated as systematically and uniformly as possible. The project proceeded from a research model for the comparative evaluation of game-based learning (see Figure 7; for a detailed discussion, see Mayer, Warmelink, & Bekebrede, 2013; Mayer, 2012; Mayer, Bekebrede, et al., 2013). This model is an outcome of a research project conducted at TU Delft, which involved several hundred SG sessions in the Netherlands and in which 12 different SGs were evaluated between 2004 and 2012. The complete dataset includes information on 2600 respondents from institutions of higher education and from employing organisations (I. Mayer et al., 2013).

Figure 7: Model for comparative game-based learning
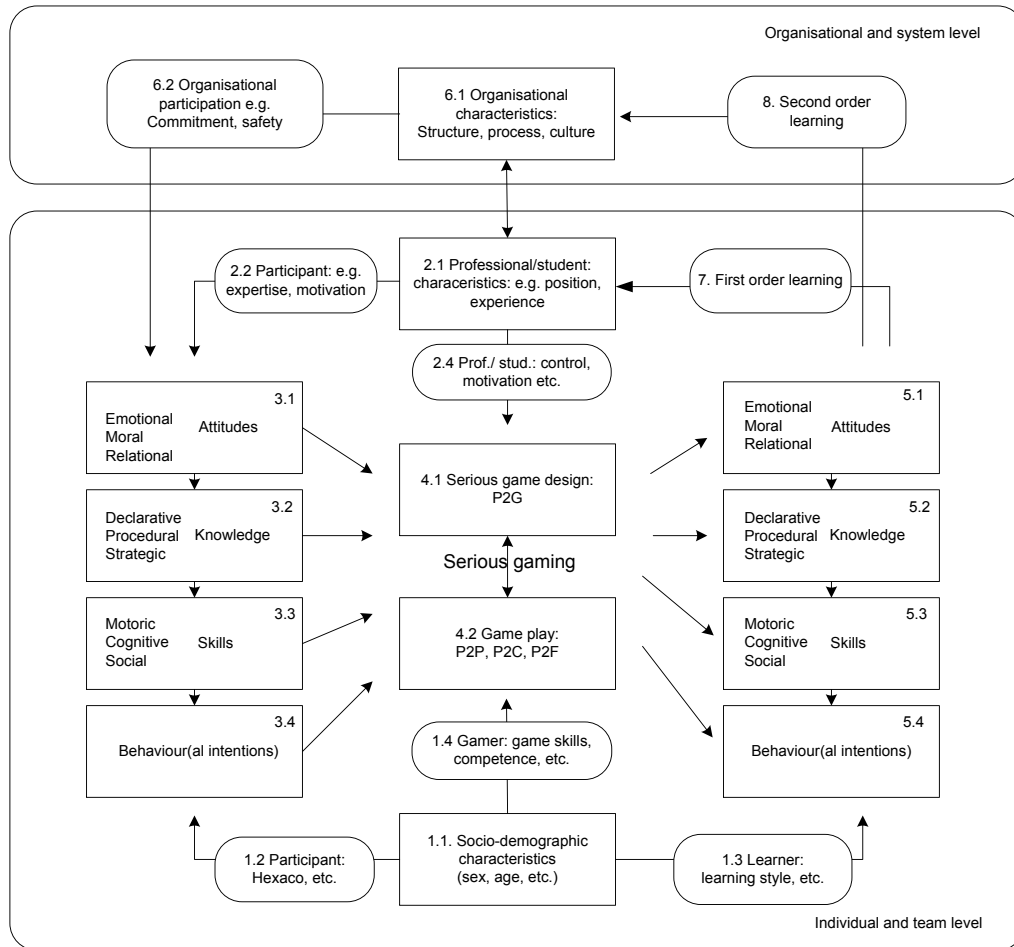
Hypotheses

Based upon the research question and conceptual model above we delineate the quantitative part of the research to the following hypotheses.

H1   Students with more computer-game experience will attribute a stronger effect to the game-based training than will students with less computer-game experience.

H2:   Students with a more enterprising personality will attribute a stronger effect to the game-based training than will students who are less enterprising.

H3:   Students who are more intrinsically motivated to participate in the EAW course will attribute a stronger effect to the game-based training than will students who are less intrinsically motivated.

H 4:   Students who experience better game-play will attribute a stronger effect to the game-based training than will students who experience lower-quality game-play.

DATA GATHERING

The research model was operationalised for the eSG course (see Table 2). Data were gathered before, during and after the SG sessions, in a quasi-experimental fashion. For each of the three games, we administered pre-game and post-game questionnaires, combined with personal and video observations and in-game results (e.g. scores). Discussions amongst students and between students and facilitators formed an important source of information, albeit difficult to objectify. We have summarised these discussions in a number of qualitative observations.

Table 2 — QUASI-EXPERIMENTAL DESIGN, DATA GATEHERING AND OPERATIONALISATION			
PRE GAME	IN-GAME	POST-GAME	POST COURSE
Socio-dem. char. (e.g. sex, age, nationality)	TeamUp: score Slogan: n.a. SimVenture: scores	Game-play experience	Self-perceived effects on entrepreneurial competence, intentions, need for learning and efficacy.
Student char. (type of education, performance)		Satisfaction: game design, facilitator, computer interaction, game play	
Game experience			
Motivation			
General Enterprising Test (GET)			
Team role			
Personality			

Pre-Game Data

We used a set of items and scales that had been validated in the full database of 2600 respondents: socio-demographic background characteristics (sex, age, and nationality), overall student performance (below-above average), as well as frequency of playing digital games, team roles, personality and motivation. For the specific context of this study, we added the 51-item General Enterprising Test (GET 3) (Cromie & Callaghan, 1997; "General measure of Enterprising Tendency v2 - GET2," n.d.; Stormer et al., 1999).

In-Game Data

In TeamUp, in-game performance is measured as the time needed to complete the game (10-60 minutes). No game scores were kept for Slogan (4 hours), since the game is non-digital and the group was divided into two 14-player companies. For SimVenture, in-game scores were saved for 12 teams, each consisting of two or three players, but the data could not be retrieved, due to technical malfunction.

Post-Game Data

After each game session, players completed a questionnaire containing items and scales about the game experience, along with an evaluation of game design, facilitation, computer interaction and game play.

Post-Course Data

At the end of the course (after having played the three games), students completed a questionnaire containing items about the perceived effects of the game-based training on entrepreneurial competence, intentions, need for learning and efficacy.

SOCIO-DEMOGRAPHIC CHARACTERISTICS

For unknown reasons, one student participated in the course only half-heartedly, missed most of the sessions and did not complete the questionnaires. The other students (27) played all of the games with enthusiasm and completed all five of the questionnaires. Table 3 provides an overview of the students in the course. Most of the students were male. Nine were Dutch, and the rest were from a wide variety of countries. One of the students was pursuing a Bachelor's degree, and another was pursuing a PhD; the rest were enrolled in Master's degree programmes from six different engineering faculties at TU Delft. Around half of the students hardly ever played digital entertainment games. On average, the students ranked themselves above average, although two considered themselves below (or well below) average as students.

RESPONDENTS	Absolute	%		OVERALL EDUCATIONAL ACHIEVEMENT	M = 3.9; Sd = .95 (Sd)	
				Table 3 **SOCIO-DEMOGRAPHIC CHARACTERISTICS OF THE RESPONDENTS**		
N =	27			1. Well below average	1	3.7%
Sex				2. Below Average	1	3.7%
Male	23	85.2%		3. Average	5	18.5%
Female	4	14.8%		4. Above average	14	51.9%
				5. Well above average	6	22.2%
NATIONALITY						
Belarusian	1	3.7%		FREQ. PLAYING COMPUTER GAMES	M = 2.6; Sd = .93	
Chilean	1	3.7%		1. Never	2	7.4%
Dutch	9	33.3%		2. A couple of times a year	12	44.4%
German	2	7.4%		3. Monthly	9	33.3%
Greek	2	7.4%		4. Weekly	3	11.1%
Indian	1	3.7%		5. Daily	1	3.7%
Lithuanian	1	3.7%				
Nigerian	1	3.7%		FACULTY		
Norwegian	1	3.7%		Technology, Policy, Management	2	7.4%
Sri Lankan	1	3.7%		Civil Engineering	4	14.8%
American	2	7.4%		Industrial Design	8	29.6%
				Aerospace Engineering	4	14.8%
LEVEL				AS	7	25.9%
Bachelor	1	3.7%		Architecture	1	3.7%
Master	25	92.6%				
PhD	1	3.7%				

QUALITATIVE OBSERVATIONS FROM THE GAME PLAY

The following qualitative and reflective observations are derived from our experiences with the three games in the EAW programme.

Efficient Learning

Overall, the incorporation of the three games in the EAW course was experienced as very positive by the two responsible instructors, the three game facilitators and the 28 students. For the instructors, the games considerably increased efficiency in terms of time and resources, reducing a five-day course to three days. According to the instructors, these efficiency gains were accompanied by a general perception that the learning satisfaction and student engagement, as well as the interactions amongst and with the students were equivalent to or greater than the levels observed in previous years.

Combining The Social With The Digital

We deliberately chose to combine three different types of games, which were to be played in the classroom (and thus not distributed in an asynchronous fashion), in order to allow the instructors/facilitators as much opportunity as possible to engage in personal discussion and

interaction with the students. Much of the specialised knowledge needed in order to start a new high-tech company would be provided after the EAW course, through the courses in the annotation track. Because the EAW course was intended to spark the individual and joint learning process on entrepreneurship, it needed to be a social, interactive process. In addition, we wanted to witness and guide the students' response to the various types and modes of games (e.g. digital/non-digital, single-player/multi-player).

Professional And Varied Facilitation

The three games were facilitated by three different, experienced facilitators. In addition to increasing the efficiency of the games, this strategy added an important element of credibility to the games and the debriefing. For example, the Slogan game was moderated by a part-time TU Delft staff member who also holds a high-ranking position in a global consultancy firm. This eliminated the possibility that the students would perceive the game as child's play. Some students appeared somewhat frustrated that they had not been able to perform better in the Slogan game. The students needed professional reassurance that, although Slogan might look simple, it actually is not and that we had observed even worse performance by business professionals who had more experience. It is important to note, however, that a considerable number of TU Delft staff members have experience with designing and facilitating SGs, thus making it easier to select games and recruit facilitators. We are aware that this might be more difficult elsewhere.

Discussing Complexity

The games allowed the course to focus on matters other than factual knowledge or instrumentation relating to 'how to start your own business'. Inexplicitly, it focussed more on the underlying values, attitudes, personalities and competencies of the students – as individuals and as a group. The games provided an 'excuse' for discussions on how things really work in the world of business, outside the walls of the university. In general, the academic performance of the students appeared to be above average. They were quite likely to become excellent engineers. Nevertheless, they had acquired hardly any experience with the limitations of their intellect and analytical tools (e.g. cost-benefit analysis, optimisation in spreadsheets). A considerable portion of the post-game discussions with the students concerned the limitations and boundaries of decision-making in the games, as well as in the real world. For example, information is incomplete and ambiguous, business partners sometimes do not live up to their promises or contracts, stakeholders deploy strategic behaviour, targets move and people tend to jump to conclusions without asking questions.

Staying On Edge

In the Netherlands, instruction in higher education usually follows a pattern of two 45-minute lectures, with occasional group work. Like most other forms of authentic and experiential learning, SGs do not fit easily into such schedules. It is difficult to adapt the existing schedules to accommodate SGs. The EAW programme was one of the few exceptions in which the schedule had already been determined in a boot-camp fashion. It was therefore relatively easy to fit the games into this context. Nevertheless, students are hardly ever exposed to intensive forms of

education and training (e.g. boot camp). For this reason, students may have needed time to become accustomed to it and to be able to stay 'on edge' for a longer period.

Handling Feedback

Likewise, students have little exposure to situations in which an instructor-trainer observes them while they are performing and provides immediate personal feedback. Debriefing questions and discussions (e.g. 'What did you do?' 'Why?' 'What happened?' 'Could you have done it differently/better?' 'What does this imply for the real world?') could make anybody – inexperienced students, as well as seasoned professionals – feel awkward or uncomfortable. In contrast to students, however, professionals have acquired repertoires for handling and appreciating feedback. The use of SG is thus quite valuable in training situations, as it offers a way of learning how to 'get used to it', 'accept it as valuable' within a relatively safe environment.

Coping With Frustration

Serious games tap into other kinds of 'being smart' than those to which students are accustomed. For this reason, students may experience failure, or at least 'room for improvement'. This is a different kind of frustration than that associated with failing an examination. Feelings of frustration can trigger resistance (e.g. the belief that it could not be done anyway, that the game is not like reality or that the game facilitator has deliberately put the student on the wrong track) Students may argue that things are much clearer in reality. They could reason that, if they were to start their own businesses, they would have full and unambiguous information, which they did not perceive to be present in the game. The game actually contained much more information, which the students ignored for whatever reason. In real-world settings, such information is even more ambiguous and easy to ignore. These are important take-home lessons. Students need considerable time and they must make repeated mistakes before they are able to see the underlying patterns and begin to find ways to improve. The almost overwhelming complexity and ambiguity of the games can cause feelings of personal failure, which can be difficult to accept. After the games, the students expressed both minor and major emotions, directed towards themselves, as well as towards the other players, the game and the instructor. The mistakes that the students had made (at least the most common ones) were obviously not personal failures. We had observed them before, and we had even made many of them ourselves.

Reverse Engineering

On average, engineering students are skilled in technical analyses and the use of computers. Serious games tend to trigger the analytical skills of smarter students. In other words, many students approach such games as an 'engineering puzzle'. In order to solve it and win the game, they start engaging in 'reverse engineering', sometimes by making their own excel sheets or calculation models. Failure to achieve a high score is explained in terms of having received insufficient time or inadequate tools for processing all of the information in the game. It is obviously very seldom, however, that complex, socio-technical problems can be solved with reverse engineering. Looking for, asking for and finding the only piece of information that truly

matters and sometimes relying upon intuition are just as important as the most sophisticated business report will ever be.

Experiencing Ones…

TeamUp was the first game in the series. The participants apparently experienced it largely as an engaging entertainment game. The game was played in its 3.0 prototype version, in which the feedback functions (e.g. scoring) were largely inoperative and reduced to 'playing time'. The teams differed greatly in their performance with regard to game-play, frustration, conflicts and outcome. For two or three groups, the game seemed relatively easy to play. These teams managed to run through the challenges without much reflection, finishing within 10 minutes and then playing it repeatedly, just for fun. For the other groups, the game was more difficult and frustrating, taking up to an hour to finish. The TeamUp game has many layers and elements for discussion. Perhaps because of its entertaining character and because it was the first game, it proved quite difficult to have the students reflect about the underlying strategies during the debriefing. In the groups that took longer and struggled, some frustrations and questions about communication, information and other matters began to emerge. This clearly returned on the second day during the Slogan game.

…Experiencing Twice…

The non-digital game, Slogan, was played for one full afternoon on the second day. Two companies competed against each other to produce slogans that could be sold on the market. The objective was obviously to produce the best-selling slogans amidst changing demand and consumer needs. The slogans and the KPIs of the companies were posted on the wall of the room. Students were very internally oriented, focussing primarily on the tasks of their own departments, with some attention to coordination with other departments but hardly any on the 'market' or their 'competitors'. As experienced in the previous games, the students found it difficult to ask good questions (of the market, the client, colleagues or themselves). In a final attempt to improve the performance of his department, one manager made a disastrous 'all or nothing' decision without internal communication. His team members did not realise what he had done until the debriefing. Even after the debriefing, the team continued a fierce discussion about their group's performance and how such things go (or should go) in real business contexts.

…And Bringing It All Together.

The SimVenture game inherently simulates a complex socio-technical system, with self-reinforcing or self-mitigating feedback mechanisms, delays, dependencies and similar processes. The students acquire a 'big picture' overview of the knowledge and decision fields, actions, indicators, stakeholders, interests and indicators that are involved in setting up a business venture. We arranged SimVenture as a competition, with vouchers awarded to the winners. Moreover, we told the students that it would be difficult to play the game or win without watching the video tutorials at home. The pressure of classroom competition at the end of the course generated an engaging atmosphere. At the start of the debriefing, students were very eager to know who had won the game. Students were assigned to work together in pairs or groups of three, thus allowing us to follow their arguments and discussions. The students referred to some

of the issues that had arisen in the previous games. They also considered the game extremely rich, and they did not feel that they had played it to the fullest depth possible. Remarkably, most teams did not discuss how to monitor their scores during the game. We had deliberately chosen an indicator that could not be found easily to represent the team's score. It could be that the richness of the game overwhelmed the teams, leading them to choose an erratic 'survival' strategy instead of goal-directed behaviour focused on obtaining a high score. We also noted that several teams had not understood that they would need to hire personnel in order to calculate some important financial figures that were used in comparing the team's performance. When they were told about this fact, the teams did not see this as a fault in the game; instead, they expressed even more appreciation for the game because it included such features. The students suggested playing the game longer, more often or on multiple occasions.

QUANTITATIVE ANALYSIS

Sex

Female students reported playing significantly fewer computer games than male students did (t = 2.1; sig = .05). Male and female students did not differ significantly in their GET scoring or motivation. Female students agreed much less strongly that the course had made them want to acquire more information or skills with regard to starting their own businesses (t = 4.0; sig = 0.0).

Digital Game Experience

About 15 % of the students reported playing computer games weekly or daily, and many had little experience with digital games. Even in the observations, we noticed that game-savvy players and teams had an advantage. In the final analysis, we found that previous computer game experience had a significant mediating effect (see below).

Educational Achievement

The background variable 'Educational Achievement' had no significant correlations with the majority of the constructs in our model. This variable did, however, correlate significantly with post-course 'Self-Efficacy' (Pearson r =.51; 0.01). In short, students who had indicated that they generally achieve above-average scores before the course reported higher self-efficacy in entrepreneurship after the course.

ENTREPRENEURSHIP, PERSONALITY AND MOTIVATION

GET

The General Enterprising Tests (GET) is one of the few tests that specifically attempt to measure traits associated with the 'enterprising' personality. It has been used (particularly in the 1990s) for a variety of research purposes (e.g. to compare students to entrepreneurs or to predict entrepreneurial achievement). The results of these studies have been reported in a few academic publications. Unfortunately, the reliability and validity of the GET test is questionable. Stormer

and Kline report that the five factors included in the GET test (see Table 4) have low construct reliability (Cronbach α) and external validity (i.e. predicting entrepreneurial success) (Stormer et al., 1999). The reliability of the total GET score, however, is high enough for exploratory research (Cronbach α = .7). For lack of alternatives, we decided to use the total GET score as a general indicator of the entrepreneurial traits of the EAW students. Table 4 presents the results of the GET test in the Delft case study, including the reliability factors reported in the study by Stormer and Kline and the study conducted within the EAW programme.

GENERAL ENTREPRISING TEST	Min	Max	Mean	Sd	Cronbach α (Stormer & Kline)	Cronbach α (EAW study)	Number of Items
Table 4 GENERAL ENTREPRISING TEST (GET)							
Autonomy	2.0	6.0	3.7	1.1	.14	0	6
Creativity	4.0	12.0	9.2	2.1	.34	.67	12
Drive and Determination	7.0	12.0	9.6	1.3	.46	0	12
Need for Achievement	6.0	11.0	9.1	1.6	.23	.28	12
Risk Taking	6.0	12.0	10.0	1.9	.48	.59	12
Total GET score	30	47	41.9	5	.70	.69	54

Personality And Team Role

Administering a full personality test (Ashton & Lee, 2009; Cox et al., 2002; de Vries, de Vries & Feij, 2009) and team-role test within the context of the EAW course was considered 'too much to ask' of the students. To balance the imperfections of the GET with another indication of 'personality', we administered a short self-assessment, personality and team-role test consisting of 14 bipolar items along a seven-point response scale (1-7):

1. Analytical-Creative
2. Traditional-Innovative
3. Orderly-Chaotic
4. Perfectionist-Pragmatic
5. Spontaneous-Cautious
6. Modest-Assertive
7. Stressful-Relaxed
8. Competitive – Cooperative
9. Hierarchical – Egalitarian
10. Performance-oriented - Relation-oriented
11. Specialist – Generalist
12. Enterprising – Wait and see
13. Conflict-oriented – Consensus-oriented
14. Systematic – Intuitive

Cluster analysis of 26 students with valid responses led us to identify two groups of student-players based on seven discriminating items (see Figure 8):

1. *Creative, relation-oriented engineers:* A group of 20 students describing themselves as more creative, innovative, chaotic, egalitarian, relation-oriented and generalist (see Figure 8, Group 1)

2. *Analytical, performance-oriented engineers:* A group of five students describing themselves as more analytical, orderly, hierarchical, performance-oriented, specialised and systematic (see Figure 8, Group 2)

Figure 8: Cluster analysis of personality/team role
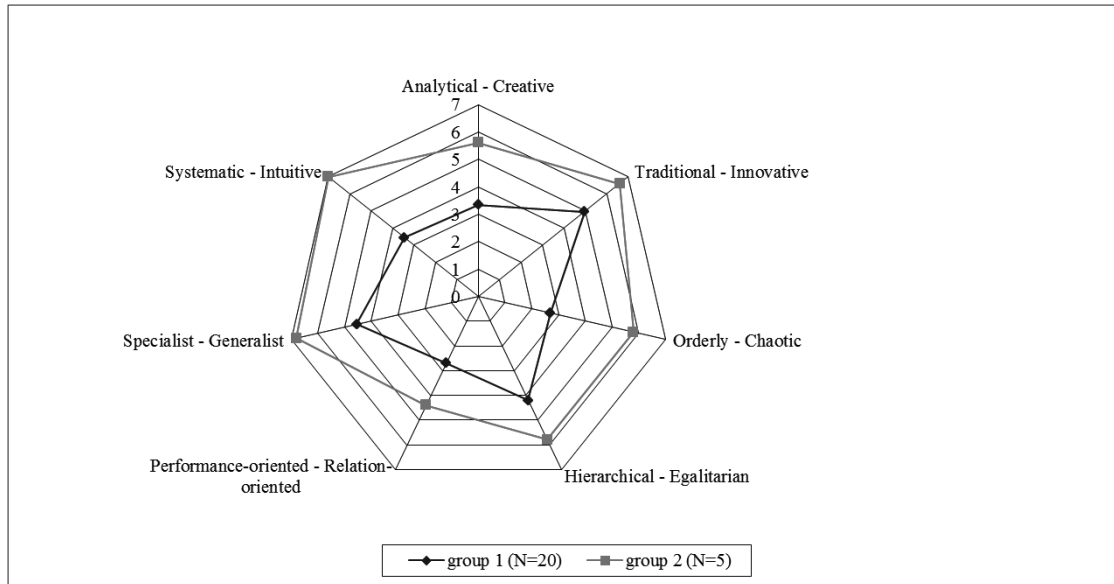
We calculated a factor item for each of the respondents on the seven-item personality/team scale [PERSONALITY factor, Cronbach α = .82).

Motivation

In order to measure the students' motivation for participating in the game-based entrepreneurship training, we administered the Situational Motivation Scale (SIMS) questionnaire (Guay, Vallerand & Blanchard, 2000). Table 6 provides information for the four constructs included in this scale: Intrinsic Motivation, Identified Regulation, External Regulation and Amotivation.

Table 5
SITUATIONAL MOTIVATIONAL SCALE (SIMS)

	Mean	Sd	Min	Max	Cronbach α
Intrinsic motivation	4.5	1.3	1.8	6.8	0.9
Identified regulation	4.9	1.2	2.3	7.0	0.7
External regulation	4.0	1.7	1.0	6.8	0.8
Amotivation	3.0	1.4	1.0	7.0	0.8

Cluster analysis of motivation reveals significant differences between two groups of students. One group (13 students) scored significantly higher on Identified Regulation (4.2; sig = 0.01) and Intrinsic Motivation (t = 3.8; sig = 0.01), while the other group scored significantly higher on Amotivation (t = - 4.5; sig = 0.01) and External Regulation (-7.2; sig = 0.01). We

coded these students as Group 1 (Intrinsic Motivation group; n = 13) and Group 2 (Amotivation group; n = 13; see Figure 9).

Figure 9: Cluster Analysis Motivation
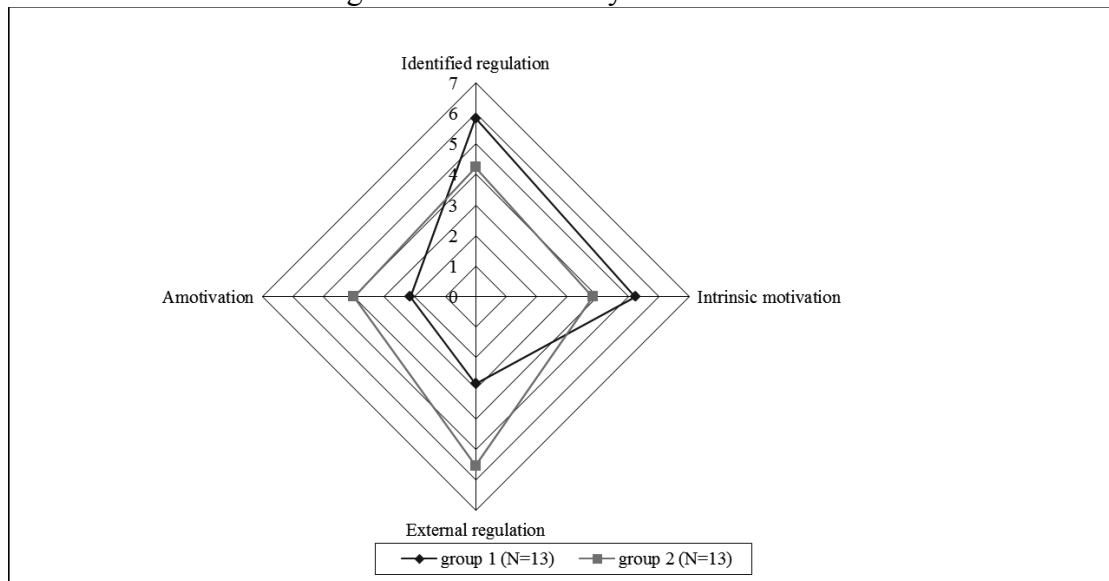
GAME-PLAY

Figure 10 provides the profiles of the three games with regard to the game-playing experience, based on seven game-play items (Cronbach α = .81). In line with our qualitative observations, the most digital of the three games, TeamUp, was experienced as more engaging, relaxing, encouraging, harmonious, controlled and safe than the other two games, but also as easier (1 ≤ t ≥ 6, sig = .01; see also Table 6). The analogue game, Slogan, was perceived as more chaotic (t = 2.3; sig = .01), frustrating (t = 5; sig = .01) and stressful (t = 4.1; sig = .01) than the other two games (1 ≤ t ≥ 6, sig = .01; see Table 6). SimVenture was perceived as the most challenging (e.g. compared to Slogan t = 2.9; sig = .01; see Table 6). In general, the feedback from the students seems to support our qualitative observations. The students felt:

1. Somewhat under challenged, but quite engaged with TeamUp
2. Somewhat confused and frustrated with Slogan
3. Quite challenged by the richness and complexity of SimVenture

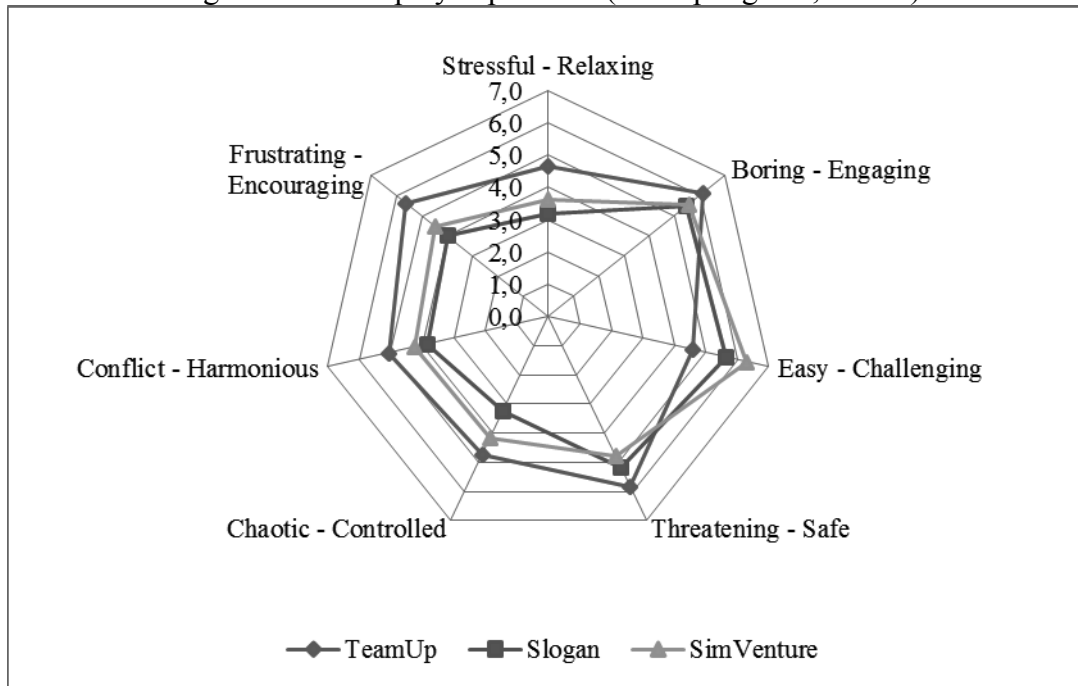Figure 10 Game-play experience (mean per game; n = 27)

Table 6 GAME EXPERIENCE SCALE (scale 1-7)												
GAME	TEAMUP				SLOGAN				SIMVENTURE			
	mean	sdv	min	max	mean	sdv	min	max	mean	sdv	min	max
Stressful - Relaxing	4.6	1.2	3.0	7.0	3.2	1.4	1.0	6.0	3.6	1.5	2.0	7.0
Boring - Engaging	6.1	0.8	4.0	7.0	5.5	1.3	2.0	7.0	5.5	1.7	1.0	7.0
Easy - Challenging	4.6	1.4	2.0	7.0	5.7	1.0	3.0	7.0	6.3	0.6	5.0	7.0
Threatening - Safe	5.9	1.5	1.0	7.0	5.2	1.6	1.0	7.0	4.8	1.6	2.0	7.0
Chaotic - Controlled	4.7	1.3	2.0	7.0	3.3	1.6	1.0	7.0	4.2	1.7	1.0	7.0
Conflict - Harmonious	5.1	1.2	3.0	7.0	3.9	1.3	1.0	6.0	4.2	1.5	1.0	7.0
Frustrating - Encouraging	5.6	1.1	3.0	7.0	4.0	1.5	1.0	7.0	4.5	1.7	1.0	7.0

Cluster analysis identified two groups of about equal size that differed significantly in their game-playing experiences, particularly with regard to six items concerning the SimVenture game ($2.5 \leq t \geq 6.5$; sig = .01). Figure 11 provides the profiles of the game-playing experiences of the two groups with SimVenture:

1. Harmonious, controlled and encouraged.
2. Contentious, chaotic and frustrated.

Figure 11 SimVenture: Different experiences in game play
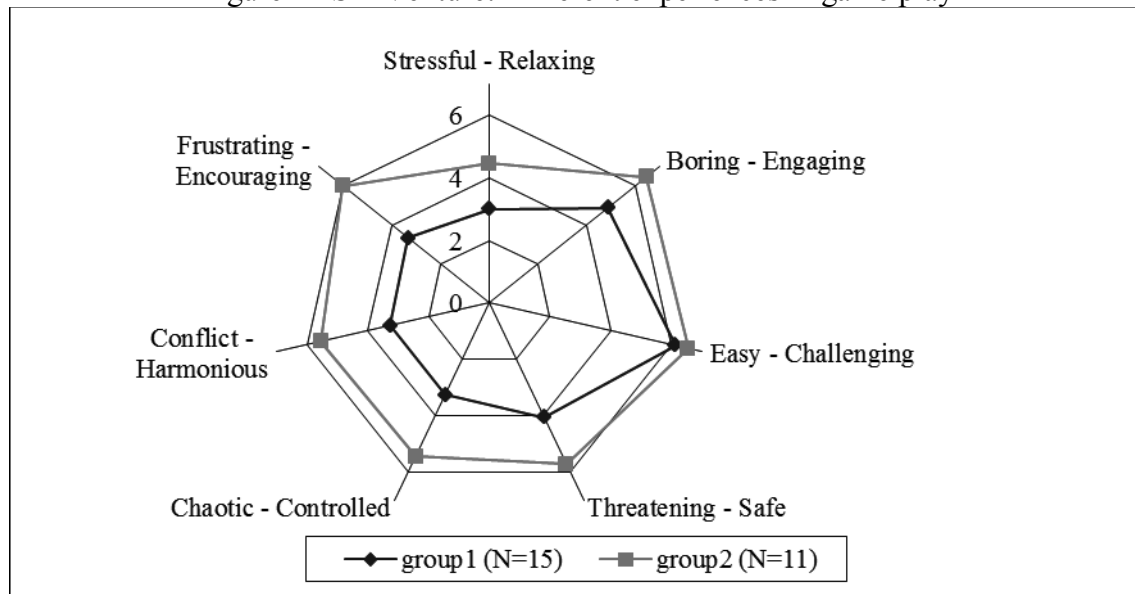

LEARNING EFFECTIVENESS

We presented the students with several questions in order to establish the effect of the game-based training on the following:

1. Self-confidence in starting a business
2. Intention to start a business
3. Need for additional learning and training
4. Self-efficacy in starting a business

Cluster analysis reveals two groups of students that differed significantly only with regard to the statement that the game-based training had contributed to their intention to start their own businesses (see Figure 12). The groups did not differ with regard to their self-confidence to become an entrepreneur, their need for additional knowledge and skills or their self-efficacy. The student groups can be classified as follows:

1. A group of 14 students who had strong (or stronger) intentions to start their own businesses (as a result of taking the course)
2. A group of 12 students who did not have strong (or stronger) intentions to start their own businesses (as a result of taking the course)

Figure 12 Intention to start a business
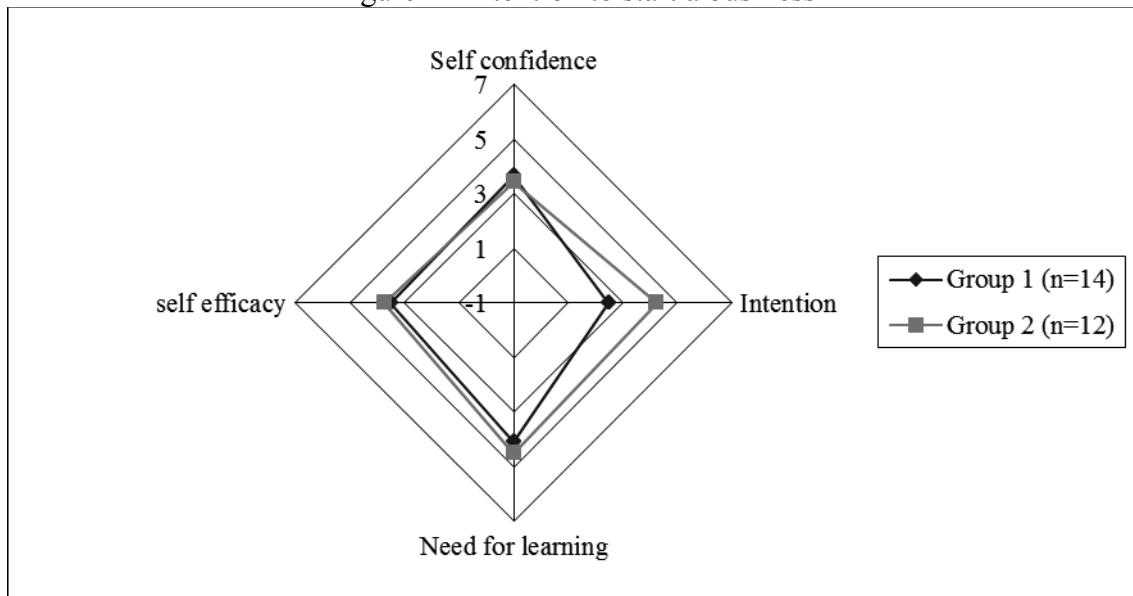
FINDINGS

Despite the relatively low number of students, we calculated correlations (Pearson r) between the above constructs, in order to identify factors in the game-based training that affected entrepreneurship. Figure 13 provides a summary of the significant moderate to strong correlations (sig = ≤ .01).

Figure 13 Structural Model of the Game-Based Training
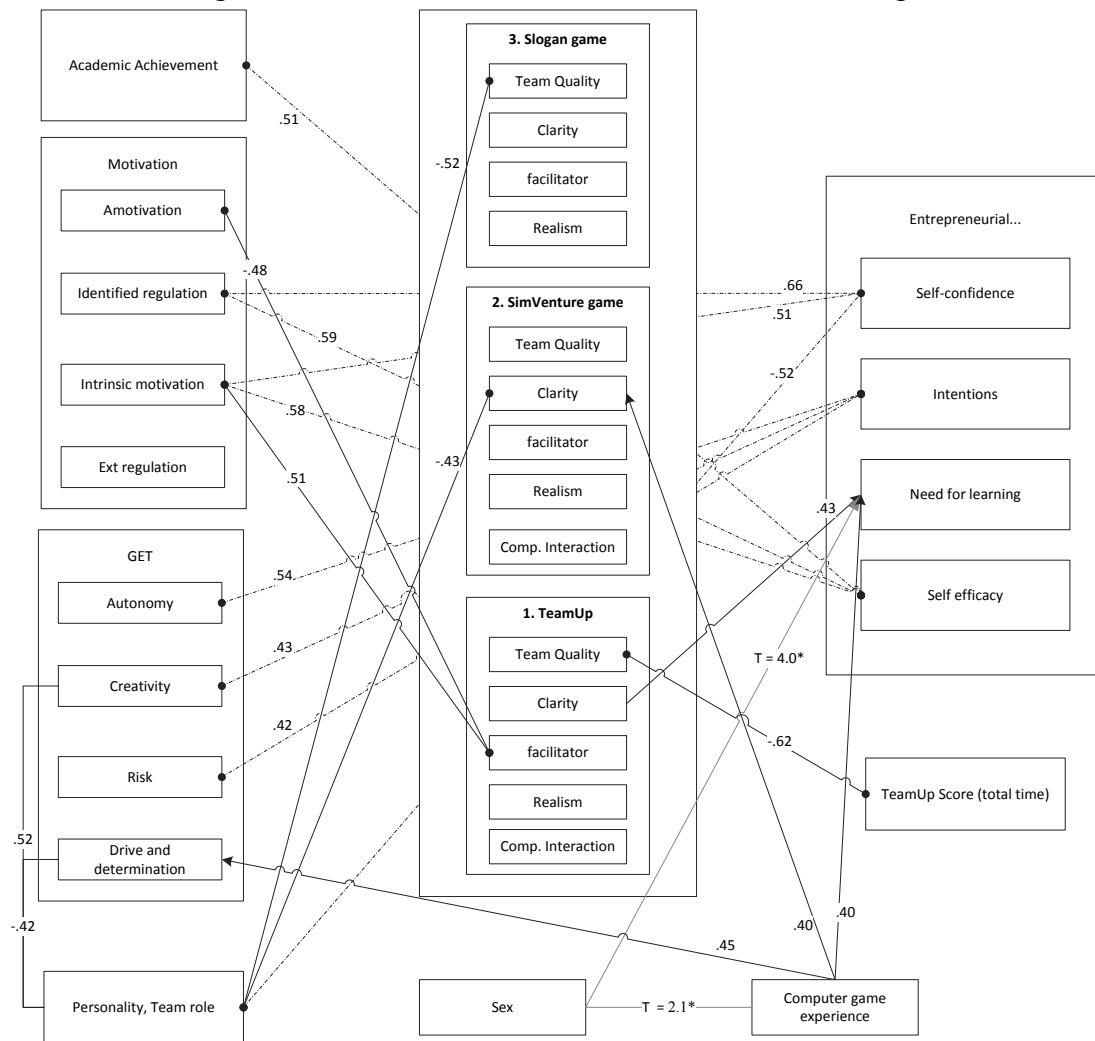
H1   *Students with more computer-game experience will attribute a stronger effect to the game-based training than will students with less computer-game experience.*

As shown in Figure 13, the results reveal moderate, significant correlations between Computer-game Experience (and Sex), GET Drive and GET Determination, as well as with the clarity of SimVenture and the need to learn more about entrepreneurship. Although we cannot definitively accept or reject Hypothesis 1, the results lead us to postulate that serious games (e.g. SimVenture) may 'work' better for experienced male, computer gamers.

H2:   *Students with a more enterprising personality will attribute a stronger effect to the game-based training than will students who are less enterprising.*

As shown in Figure 13, the results reveal moderate, significant correlations between Entrepreneurial Intentions and GET Autonomy, GET Creativity, GET Risk-taking and Personality Factor. The hypothesis is accepted. We cannot assume, however, that this effect was influenced by the game-play included in the course.

H3:   Students who are more intrinsically motivated to participate in the EAW course will attribute a stronger effect to the game-based training than will students who are less intrinsically motivated.

As shown in Figure 13, the results reveal moderate, significant correlations between Identified Regulation, Intrinsic Motivation, Entrepreneurial Self-confidence and Self-efficacy. The hypothesis can be partly accepted. As before, however, we cannot assume that this effect was influenced by the game-play included in the course. We only found that motivation mediated the response to the facilitator in TeamUp. It may have also had a mediating effect on the need for further learning and training.

H 4:   Students who experience better game-play will attribute a stronger effect to the game-based training than will students who experience lower-quality game-play.

As shown in Figure 13, the results reveal very few significant correlations between the three games and Entrepreneurial Self-confidence, Intentions, Need for Learning and Self-efficacy. There are only a few significant correlations with Need for learning. Hypothesis 3 should be rejected.

CONCLUSION

To what extent does the use of SGs contribute to entrepreneurship (or to learning related to entrepreneurship), and which factors determine its contributions?

First, we are aware of the many assumptions that we needed to make, as well as the limitations of this study. The weaknesses include the limited dataset, which was collected within a single course, within a single institution, from three games, with a limited set of constructs. The research is part of the Erasmus eSG project, however, in which the partner institutions Genoa and Esade have piloted other aspects of evaluation, using partly overlapping games. The next step in the project will involve a systematic and comparative evaluation amongst the different institutions, using comparative methods and instruments.

Nevertheless, the qualitative observations and cluster analysis indicate that students may be categorised into different clusters that are characterised by different responses to the game-based entrepreneurship training (i.e. ranging from *engagement* in to *frustration* with variation amongst the three games). The correlation analysis indicates that background variables (e.g. ex-ante *Motivation* and *Enterprising Personality* traits have significant and moderate effects on *entrepreneurial competence, intentions, need for learning* and *efficacy*. The actual game play, however, did not seem to influence the effects. This raises questions concerning which relevant aspects of entrepreneurship the three serious games actually influenced, besides general engagement and enjoyment.

One of the most striking points for discussion and further research has to do with the observed and measured *structural differences* amongst various types of students (e.g. their motivation to be interested in entrepreneurship or entrepreneurship education). A related question is to what extend social media and digital game play influence personality traits, learning styles and thereby (in)directly also entrepreneurship and entrepreneurship education.

Instead of assuming that entrepreneurs and entrepreneurial students differ from non-entrepreneurs according to a defined set of personality traits, there is reason to believe that there are different types of entrepreneurs and entrepreneurial students in general (Andersson, Curley &

Formica, 2010; Müller & Gappisch, 2005; Tang, Tang & Lohrke, 2007). Examples include *nascent entrepreneurs*, *creative artists*, *generalists* and *analysts*.

We believe that this has marked consequences for how university education can encourage entrepreneurship and success in engineering universities. For *nascent entrepreneurs*, engineering universities should provide curricular flexibility in order to reduce the likelihood of dropping out. For the *creative artists* amongst the engineers, universities should emphasise managerial skills, *generalists* could be helped to develop cross disciplinary visions and to connect people, ideas and resources, analysts to develop the ability to cope with ambiguity and irrationality. Such an approach to teaching entrepreneurship targeted towards typologies of engineering students has consequences for the use of didactic methods – particularly with regard to the use of SGs, as they are increasingly being propagated as a remedy for all (Neck & Greene, 2011).

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REFERENCES

Abt, C. (1970). *Serious games*. New York: Viking Press.

Ács, Z. J., Audretsch, D. B., & Strom, R. J. (Eds.). (2009). Entrepreneurship, Growth, and Public Policy. Cambridge University Press.

Ács, Z. J., & Szerb, L. (2007). The Global Entrepreneurship Index (GEINDEX). *Foundations and Trends in Entrepreneurship*, *5*(5), 341–435. doi:10.1561/0300000027

Ács, Z. J., & Szerb, L. (2012). *The 2012 Global Entrepreneurship and Development Index (GEDI): Perspectives from the Americas* (pp. 1–9). Washington D.C. USA.

Andersson, T., Curley, M. G., & Formica, P. (2010). *Knowledge-Driven Entrepreneurship; The Key to Social and Economic Transformation* (pp. 131–152). New York, NY: Springer New York. doi:10.1007/978-1-4419-1188-9

Ashton, M. C., & Lee, K. (2009). The HEXACO-60: a short measure of the major dimensions of personality. *Journal of Personality Assessment*, *91*(4), 340–345. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/20017063

Bekebrede, G., Warmelink, H. J. G., & Mayer, I. S. (2011). Reviewing the Need for Gaming in Education to Accommodate the Net Generation. *Computers & Education*, *57*(2), 1521–1529. doi:10.1016/j.compedu.2011.02.010

Bellotti, F., Berta, R., De Gloria, A., Lavagnino, E., Ott, M., Dagnino, F., Romero, M., et al. (2012). Designing a Course for Stimulating Entrepreneurship in Higher Education through Serious Games. In A. De Gloria (Ed.), *Proceedings VS-Games 2012*. Genoa, Italy: Elsevier.

Brazeal, D. V, & Herbert, T. T. (1999). The Genesis of Entrepreneurship. *Entrepreneurship: Theory and Practice*, *23*(3), 29–45. Retrieved from http://ezproxy.umuc.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=2311217&loginpage=Login.asp&site=ehost-live&scope=site

Bulander, R. (2010). A Conceptual Framework of Serious games for Higher Education. Conceptual Framework of the Game INNOV8 to Train Students in Business Process Modelling. *eBusiness ICEB Proceedings of the 2010 International Conference on* (pp. 1–6). IEEE. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=5740458

Bygrave, W. D., & Hofer, C. W. (1991). Theorizing about Entrepreneurship. *Entrepreneurship: Theory and Practice*, *16*(2), 13–22. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:Theorizing+about+Entrepreneurship#0

Cheung, C., & Kong, H. (2010). Running a Small Business by Students in a Secondary School: Its Impact on Learning about Entrepreneurship. *Journal of Entrepreneurship Education*, *13*, 45–63. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=55009450&site=ehost-live&scope=site

Commission of the European Community Implementing the Community Lisbon Programme: Fostering entrepreneurial mindsets through education and learning (2006). Retrieved from http://eur-lex.europa.eu/Notice.do?mode=dbl&lang=en&ihmlang=en&lng1=en,nl&lng2=cs,da,de,el,en,es,et,fi,fr,hu,it,lt,lv,mt,nl,pl,pt,sk,sl,sv,&val=421980:cs&page=

Commission of the European Community. (2008). *Entrepreneurship in Higher Education, especially in Non-Business Studies. Final Report of the Expert Group.* (p. 68). Belgium, Brussels.

Covin, J. G., & Miles, M. P. (1999). Corporate Entrepreneurship and the Pursuit of Competitive Advantage. *Entrepreneurship: Theory and Practice*, *23*(3), 47–63. Retrieved from http://www.questia.com/googleScholar.qst?docId=5002332704

Cox, L. W., Mueller, S. L., & Moss, S. E. (2002). The Impact of Entrepreneurship Education on Entrepreneurial Self-Efficacy. *International Journal of Entrepreneurship Education*, *1*(2), 229–245. Retrieved from http://search.proquest.com/docview/194014998?accountid=13828

Cromie, S., & Callaghan, I. (1997). Assessing Enterprising Attributes - The Usefulness of Caird's General Enterprising Tendency (GET) Test. *Journal of Small Business and Enterprise Development*, *4*(2), 65–71. doi:10.1108/eb020981

De Vries, R. E., De Vries, A., & Feij, J. A. (2009). Sensation seeking, risk-taking, and the HEXACO model of personality. *Personality and Individual Differences*, *47*(6), 536–540. doi:10.1016/j.paid.2009.05.029

Duke, R. D. (1974). *Gaming: The future's language* (1st ed., p. 223). New York: Sage Publications.

Duke, R. D. (1981). Slogan. *(Webpage)*. (Simulation game for team training), Simulation Experience. Retrieved August 10, 2012, from http://www.simxp.com/en/simulations-games/slogan/

Duval-Couetil, N., Reed-Rhoads, T., & Haghighi, S. (2010). Development of an Assessment Instrument to Examine Outcomes of Entrepreneurship Education on Engineering Students. *2010 IEEE Frontiers in Education Conference (FIE)* (pp. T4D–1–T4D–6). IEEE. doi:10.1109/FIE.2010.5673411

European House of Entrepreneurs. (2012). *Survey of Entrepreneurship in Education in Europe.* (p. 66). Brussels, Belgium.

Fayolle, A., & Kyrö, P. (2008). *The Dynamics between Entrepreneurship, Environment and Education*. (A. Fayolle & P. Kyrö, Eds.)*European research in entrepreneurship* (pp. xvi, 308). Edward Elgar. Retrieved from http://books.google.co.uk/books?id=G5Yg_V6tjwIC&dq="The+Dynamics+between+Entrepreneurship,+Environment+and+Education"&hl=es&source=gbs_navlinks_s

Feldman, H. D. (1995). Computer-Based Simulation Games: A Viable Educational Technique for Entrepreneurship Classes? *Simulation & Gaming*, *26*(3), 346–360. doi:10.1177/1046878195263006

Gartner, W. B., Shaver, K. G., Gatewood, E., & Katz, J. A. (1994). Finding the Entrepreneur in Entrepreneurship. *Entrepreneurship: Theory and Practice*, *18*(3), 5–9. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=9410195199&loginpage=Login.asp&site=ehost-live

General measure of Enterprising Tendency v2 - GET2. (n.d.). Retrieved June 15, 2012, from http://get2test.net/enterprise/index.htm

Grimm, H. (2009). Creating an Entrepreneurial Economy: The Role of Public Policy. In Z. Acs, D. B. Audretsch, & R. Strom (Eds.), *Entrepreneurship Growth and Public Policy* (pp. 299–318). Cambridge University Press. Retrieved from http://w2.vu.edu.au/library/EBookSearch/files/EBL.pdf

Gstraunthaler, T., & Hendry, S. (2011). Entrepreneurial and Accounting Education through Action-Based learning: The Genesis Project. *Journal of Entrepreneurship Education*, *14*(2006), 125–147. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=64876462&site=ehost-live&scope=site

Guay, F., Vallerand, R. J., & Blanchard, C. (2000). On the Assessment of Situational Intrinsic and Extrinsic Motivation: The Situational Motivation Scale (SIMS). *Motivation and Emotion*, *24*(3), 175–213.

Henry, C., Hill, F., & Leitch, C. (2005a). Entrepreneurship education and training: can entrepreneurship be taught? Part II. *Education + Training*, *47*(3), 158–169. doi:10.1108/00400910510592211

Henry, C., Hill, F., & Leitch, C. (2005b). Entrepreneurship Education and Training: Can Entrepreneurship be Taught? Part I. *Education + Training*, *47*(2), 98–111. doi:10.1108/00400910510586524

Hindle, K. (2002). A Grounded Theory for Teaching Entrepreneurship Using Simulation Games. *Simulation & Gaming*, *33*(2), 236–241. doi:10.1177/1046878102332012

Holmgren, C., From, J., Olofsson, A., Karlsson, H., Snyder, K., & Sundtröm, U. (2004). Entrepreneurship Education: Salvation or Damnation? *International Journal of Entrepreneurship*, *8*(10999264), 55–71. Retrieved from http://search.proquest.com/docview/214040841?accountid=27240

Hot Shot Business. (n.d.).*(Webpage)*. (Serious business game), Disney Interactive. Retrieved November 15, 2012, from http://disney.go.com/hotshot/hsb3/

Huebscher, J. (2010). Effects of Entrepreneurship Simulation Game Seminars on Entrepreneurs ' and Students ' Learning. *Journal of Small Business and Entrepreneurship*, *4*(4), 543–554.

Kato, P. M. (n.d.). "How Great Entrepreneurs Think about Founding a Serious Game Company". Retrieved June 6, 2013, from http://pamkato.com/2012/03/16/how-great-entrepreneurs-think-about-founding-a-serious-game-company/

Katz, J. A., Gundry, L., Low, M., & Starr, J. (1994). Guest Editorial: Simulation and Experiential Learning in Entrepreneurship Education. *Simulation & Gaming*, *25*(3), 335–337. doi:10.1177/1046878194253002

Kirby, D. A. (2004). Entrepreneurship Education: can Business Schools meet the Challenge? *Education + Training*, *46*(8/9), 510–519. doi:10.1108/00400910410569632

Kourilsky, M., & Walstad, W. (2002). The Early Environment and Schooling Experiences of High-Technology Entrepreneurs: Insights for Entrepreneurship Education. *International Journal of Entrepreneurship Education*, *1*(1), 1–20.

Kriz, W. C., & Aucher, E. (2005). Evaluation of the Start up Simulation in Entrepreneurship Education. *ISAGA Conference* (p. 15). Atlanta, Georgia.

Kuehn, K. W., Grider, D., & Sell, R. (2009). New Venture Assessment: Moving Beyond Business Plans in Introductory Entrepreneurship Courses. *Journal of Entrepreneurship Education*, *12*, 67. Retrieved from http://search.ebscohost.com/login.aspx?direct=true&db=bth&AN=47962299&site=ehost-live&scope=site

Kuratko, D. (2005). The Emergence of Entrepreneurship Education: Development, Trends, and Challenges. *Entrepreneurship Theory and Practice*, 577–597. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1540-6520.2005.00099.x/full

Lane, P. (2011). Innovative Teaching to Engage and Challenge Twenty-first Century Entrepreneurship Students. *Journal of Entrepreneurship Education*, *14*(2008), 105–123.

Lautenschläger, A., & Haase, H. (2011). The Myth of Entrepreneurship Education: Seven Arguments against Teaching Business. *Journal of Entrepreneurship Education*, *14*, 147–162. Retrieved from http://www.readperiodicals.com/201101/2435240381.html#b

Matlay, H. (2006). Researching entrepreneurship and education: Part 2: what is entrepreneurship education and does it matter? *Education + Training*, *48*(8/9), 704–718. doi:10.1108/00400910610710119

Mayer, I., Bekebrede, G., Harteveld, C., Warmelink, H., Zhou, Q., Van Ruijven, T., Lo, J., et al. (2013). The research and evaluation of serious games: Toward a comprehensive methodology. *British Journal of Educational Technology*, n/a–n/a. doi:10.1111/bjet.12067

Mayer, I. S. (2012). Towards a Comprehensive Methodology for the Research and Evaluation of Serious Games. *Proceedings VS-Games 2012* (Vol. 15, pp. 1–15). Genoa, Italy: Procedia Computer Science 00 (2012) 000–000. doi:10.1016/j.procs.2012.10.075

Mayer, I. S., Warmelink, H. J. G., & Bekebrede, G. (2013). Learning in a game-based virtual environment: a comparative evaluation in higher education. *European Journal of Engineering Education*, *38*(1), 85–106. doi:10.1080/03043797.2012.742872

Müller, G. F., & Gappisch, C. (2005). Personality Types of Entrepreneurs. *Psychological Reports*, *96*(3 Pt 1), 737–746. Retrieved from http://www.amsciepub.com/doi/pdf/10.2466/pr0.96.3.737-746

Nab, J., Pilot, A., Brinkkemper, S., & Berge, H. Ten. (2010). Authentic competence-based learning in university education in entrepreneurship. *International Journal of Entrepreneurship and Small Business*, *9*(1), 20. doi:10.1504/IJESB.2010.029502

Neck, H. M., & Greene, P. G. (2011). Entrepreneurship Education : Known Worlds. *Journal of Small Business Management*, *49*(1), 55–70.

NIRAS consultants, FORA, & ECON. (2008). *Survey of Entrepreneurship in Higher Education in Europe* (p. 210).

OECD. (2009). *Measuring Entrepreneurship: A Collection of Indicators*. (Oecd Statistics Directorate, Ed.)*Entrepreneurship* (Vol. 21, pp. 213–236). OECD. doi:10.1080/08985620802261559

Panoutsopoulos, H., Lykourentzou, M.-A., & Sampson, D. G. (2011). Business Simulation Games as Digital Tools for Supporting School Entrepreneurship Education. *2011 IEEE 11th International Conference on Advanced Learning Technologies* (pp. 155–156). IEEE. Retrieved from http://ieeexplore.ieee.org/lpdocs/epic03/wrapper.htm?arnumber=5992290

Peña, V., Morghan, T., Riggieri, A., Shipp, S., & Van Atta, R. (2010). *A Survey of Entrepreneurship Education Initiatives*. Washington D.C. USA.

Peterman, N. E., & Kennedy, J. (2003). Enterprise Education: Influencing Students' Perceptions of Entrepreneurship. *Entrepreneurship Theory and Practice*, *28*(2), 129–144. doi:10.1046/j.1540-6520.2003.00035.x

Pittaway, L., & Cope, J. (2007). Entrepreneurship Education: A Systematic Review of the Evidence. *International Small Business Journal*, *25*(5), 479–510. doi:10.1177/0266242607080656

Pittaway, L., Freeman, W. A., Enterprise, F., & Edwards, C. (2012). Assessment: Examining Practice in Entrepreneurship Education. *Education*.

Rizza, C., & Amorim, C. (2010). *Directions in Entrepreneurship Education (EE) in Europe* (pp. 517–538).

Roberts, E. B. (1989). The Personality and Motivations of Technological Entrepreneurs. *Journal of Engineering and Technology Management*, *6*(1), 5–23. doi:10.1016/0923-4748(89)90012-X

Scherpereel, C. M. (2005). Changing mental models: Business simulation exercises. *Simulation & Gaming*, *36*(3), 388–403. doi:10.1177/1046878104270005

Sijde, P. van der, Ridder, A., Blaauw, G., & Diensberg, C. (2008). *Teaching Entrepreneurship; Cases for Education and Training*. (P. Sijde, A. Ridder, G. Blaauw, & C. Diensberg, Eds.)*Teaching Entrepreneurship* (pp. 99–107). Heidelberg: Physica-Verlag HD. Retrieved from http://www.springerlink.com/content/u753218472045509/

Stone, H. B. J., & Ranchhod, A. (2006). Competitive advantage of a nation in the global arena : a quantitative advancement to Porter ' s diamond applied to the UK , USA and BRIC nations. *Strategic Change*, *294*(6), 283–294. doi:10.1002/jsc

Stormer, F. A., Kline, T., & Goldenberg, S. (1999). Measuring entrepreneurship with the General Enterprise Tendency (GET) Test: criterion-related validity and reliability. *Human Systems Management*, *18*(1), 47. Retrieved from http://web.ebscohost.com/ehost/pdfviewer/pdfviewer?sid=63b61d8f-6032-4396-a0b5-af00e44aad47@sessionmgr112&vid=3&hid=122

Tang, J., Tang, Z., & Lohrke, F. T. (2007). Developing an entrepreneurial typology: the roles of entrepreneurial alertness and attributional style. *International Entrepreneurship and Management Journal*, *4*(3), 273–294. doi:10.1007/s11365-007-0041-4

The Enterprise Game. (n.d.).*(Webpage)*. (Serious management and business game), PIXELearning. Retrieved from http://www.pixelearning.com/services-the-enterprise-game.shtml

The Gallup Organization. (2009). *Entrepreneurship in the EU and beyond; A Survey in the EU, EFTA Countries, Croatia, Turkey, the US, Japan, South Korea and China*.

Topsim. (n.d.).*(Webpage)*. (Serious management and business game), Tata Interactive. Retrieved from http://www.tatainteractive.de/de/startseite.html

Venture Simulations Ltd. (n.d.). SimVenture. *(Webpage)*. (serious business game), South Newlands, Selby Road, Riccall, York YO19 6QR England: Venture Simulations Ltd. Retrieved August 10, 2012, from http://www.simventure.co.uk/

Vesper, K. H., & Gartner, W. R. (1997). Measuring Progress in Entrepreneurship Education. *Journal of Business venturing*, *26*, 403–421. Retrieved from http://www.sciencedirect.com/science/article/pii/S0883902697000098

Vincett, P. S., & Farlow, S. (2008). "Start-a-Business": An Experiment in Education Through Entrepreneurship. *Journal of Small Business and Enterprise Development*, *15*(2), 274–288. doi:10.1108/14626000810871673

Volkmann, C. K., Tokarski, K. O., & Grünhagen, M. (2010). *Entrepreneurship in a European Perspective*. *Entrepreneurship in a European Perspective* (pp. 1–66). Wiesbaden: Gabler. doi:10.1007/978-3-8349-8752-5

Volkmann, C. K., Wilson, K. E., Mariotti, S., Rabuzzi, D., Vyakarnam, S., & Sepulveda, A. (2011). *Educating the Next Wave of Entrepreneurs Unlocking Entrepreneurial Capabilities to Meet the Global Challenges of the 21st Century*. *Education* (p. 40). SSRN. Retrieved from http://www.weforum.org/pdf/GEI/2009/Entrepreneurship_Education_Report.pdf

Von Graevenitz, G., Harhoff, D., & Weber, R. (2010). The effects of entrepreneurship education. *Journal of Economic Behavior & Organization*, *76*(1), 90–112. doi:10.1016/j.jebo.2010.02.015

Wilson, N. C., & Stokes, D. (2006). Entrepreneurship Education: the Road Less Travelled. *International Journal of Entrepreneurship and Innovation Management*. National Council for Graduate Entrepreneurship (NCGE). Retrieved from http://eprints.kingston.ac.uk/2325/