Entrepreneurial Mindset and the University Curriculum

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Until recently, most American university management programs focused on the development of students for work in corporate settings with little focus on entrepreneurial skills. The need for graduates with an entrepreneurial mindset has grown. A framework for developing students campus-wide with an entrepreneurial mindset across the management education curriculum is proposed. First, foundational theories and concepts are introduced to students. Next, they learn, practice and reflect on skills necessary for entrepreneurship. Student entrepreneurial mindset is further developed through business plan and case competitions. Finally, students apply the concepts and theories via student-run companies housed within business, science, engineering and technology incubators.

INTRODUCTION

Mindset

Countries such as those of the former Soviet Union, Sub Sahara Africa, South America and formerly oppressed minorities in the Unites States of America appear to be frozen in time with regards to entrepreneurship. Each of these communities has received American aid with little to show for it. The reason is that little attention has been paid to the debilitating mindset that remained after their segregation from a modernizing world. This is despite the fact that many universities have introduced entrepreneurship education to raise the capabilities of practicing managers. This paper presents a management education design for engineers and managers who have only a paucity of entrepreneurial family background and experience. To reconstruct confidence, evidence is shown that capitalism, democracy and rule of law constitute a joint indicator for economic success and pathway to understanding the rationale and benefits of entrepreneurship. Then, support is provided through the integration of curricula, faculty research and invention mining, munificent incubators, community, and angel investment of financial and human capital. The objective is to raise the rate of entrepreneurship and business formation, gross domestic product, and the size of the world's economy for the benefit of all.

Pedagogy

Entrepreneurship is the process of starting a business, typically a startup company offering an innovative product, process or service. This pedagogical paper is designed to have a positive impact on any community that lacks a tradition of formal business activity. Ridley and Davis (2009) and Ridley, McKinley-Floyd and Davis (2008) proposed concepts that laid out strategies for entrepreneurship education and community transformation. Some of their strategies have already been implemented. Elements of entrepreneurship were added to a course while converting the method of teaching to live case study. Unlike traditional static paper case study, live case study involves multiple student visits to existing companies to gather data and information. Under the guidance of the professor, students construct a company supply chain, including random numbers, and create computer color graphics animated simulations of the supply chain. Not only do the students gain hands on experiential research and learning, they consider all elements of the data, including randomness and distribution. They are forced to review all of their quantitative prerequisite courses on statistics, operations research, calculus, accounting and finance, and learn to apply the principles of queuing theory, goodness of fit and other hypothesis testing. The end products are simulated pro-forma cash flow and income statements, and a balance sheet. There is no assuming away randomness by way of simple averaging. This is critical to arriving at correct answers when queues and asymmetric distributions are involved. The evidence of achievement is the several student intellectual contributions in conference presentations and proceedings publications (see Ridley, et., al. 2011, Brown, et., al. 2011, Abrams, et., al. 2011, Crafton, et., al. 2011, Ridley, Corner, et., al. 2012, Ridley, Foree, et., al. 2012, Ridley, Bryan, et., al. 2012).

There exist opportunities for more institutions to link entrepreneurship education to the creation of business enterprises that transform communities and bring wealth accumulation and economic viability to the individuals and communities in which these businesses operate (Mugge 2005). The basis of university and college entrepreneurship programs is that entrepreneurship is the single most important factor in determining whether a region or community achieves its full potential (Mugge 2005). Practicing entrepreneurs support entrepreneurial education and research (Zeitham and Rice 1987). Successful economic and technological models of regional development such as the Silicon Valley in Northern California, the Route 128 Corridor in Massachusetts, and the Research Triangle in North Carolina are clustered around universities. The establishment of an entrepreneurial culture and rapid development of technology-based clusters are two very important accomplishments that will serve as defining measures of a community's competitive advantage in a contemporary economy (National Governors Association 2004). U.S. News (2015) uses entrepreneurship to rate schools of business. Still, many universities lag behind in entrepreneurship course offerings. This is especially true of those that serve students from communities that lack a tradition of formal private business activity. Examples include formally oppressed minorities in the United States of America (USA) and former communist soviet countries like Russia and those constituting the Commonwealth of Independent States (CIS). While it is true that minority businesses in the USA grew 45.4 percent between 1997 and 2002, ninety percent had no employees (Harris, Edmunds and Chen, 2011).

Organization

The remainder of the paper is organized as follows. We begin with a review of the related literature. Prior research on mindset focused on factors that impact entrepreneurial intentions and self-efficacy, which if understood might enhance entrepreneurial activity and success. This paper focuses on the implication of extreme paucity of entrepreneurship in family background, leading to confusion about the factors governing economic success and perpetual avoidance of entrepreneurship. Next, we introduce an index that reflects the degree of capitalism, democracy, and rule of law (CDR index) that we assert is the main driver of global economic success. We offer CDR as prolegomena to thinking about entrepreneurship. The purpose is to counter a debilitating mindset and insurmountable obstacle that can stymie all other efforts to raise entrepreneurial intentions, self-efficacy and competence via entrepreneurship education and environmental munificence. This index is offered as a pathway to motivation and foundation for the pursuit of entrepreneurship activities at the university. The references

to ancient scientists and inventors, their year of birth and death, and their need to overcome difficulties despite their genius, are intended to inspire students. Next, we introduce the concept of an Interdisciplinary Entrepreneurship Center (IEC). The paper proposes one framework scenario in which it might impact the institutional mindset. In that framework the IEC executes specific tactics via all relevant college and institutional activities as well as community sources of support and benefits. Concluding remarks include suggestions for further research.

RELATED LITERATURE

The interest in entrepreneurship seems constantly to be escalating. Berglund and Holmgren (2006) suggested that entrepreneurship has disseminated from an industrial sphere to other spheres such as the public, academic, private and the educational. In the academic sphere, a growing number of colleges and universities throughout the world now offer courses and programs in entrepreneurship (Gartner and Vesper 1994) within their business or engineering programs both at the undergraduate and graduate levels. Entrepreneurship programs are among the fastest growing initiatives in modern colleges and universities (Laud, Betts and Basu, 2015; Mattare, 2010). Harrington and Maysami (2015) articulate the role that entrepreneurially engaged regional universities may have in improving their communities. While considerable research and writing has been done with regard to the number of colleges and universities that now teach courses or that have such programs, little has been done with regard to what specific courses are taught and what a model curriculum might include in creating an entrepreneurial mindset.

Ede, Panigrahi, and Calcich (1998) indicated that the surging interest of many business schools in entrepreneurship education has been to the delight of the pro-entrepreneurship public, government, and the media, and there does not seem to be any documented research on attitudes and feelings of business students toward the entrepreneurship emphasis in the curriculum. The authors further suggested that business educators need to go beyond introducing entrepreneurship into the curriculum to fitting this curriculum to the needs of their present and prospective students. Hatten and Ruhland (1995) suggested that identifying and nurturing potential entrepreneurs throughout the education process could produce more successful entrepreneurs. Ede, et. al. (1998) indicated that their research pointed to the need for entrepreneurial interaction and mentoring in all aspects of the entrepreneurship curriculum. It cannot be left to experiences outside of course work.

Kussmaul, et. al. (2006) and several other researchers indicated that many institutions offer curricula that utilize interdisciplinary courses, where business and engineering students work together to gain an understanding of each other's disciplines. The authors further suggested that this approach enables students to enhance their understanding of entrepreneurial ventures and their ability to work with peers from other disciplines to see a project through to fruition. In recent years, there has been a strong interest in entrepreneurship from students outside of business and engineering (Farris, Levenburg, and Lane 2004) and future entrepreneurs will include significant numbers of students from non-business disciplines (D'Intino, et. al. 2010).

Bilen, et. al. (2005) suggested that their institution has been successful in creating an institutional entrepreneurial mindset that build students' life skills so they can succeed within innovative, product-focused, and cross-disciplinary teams. The authors further suggested that the broad goals of their school's program are to provide students with multiple exposures to what it means to have an entrepreneurial mindset and to facilitate the development of both the passion and the ambiguity-management skills needed for new product or venture creation.

Fayolle and Gaily (2015) discussed the relationship between entrepreneurship education and a mindset of entrepreneurial intensions. We will revisit this below as we construct a course design for students with no entrepreneurship family background. Whereas research like Jang (2013) focuses on the role of individual student education on long term future entrepreneurship success (and are not conclusive), we focus on student and community transformation to correct an historical absence that might impact negatively on entrepreneurial intentions and outcomes for a whole class of students. Ilouga and Mouloungni (2014) argue that personal dynamics and psychological mechanisms are what matter, far

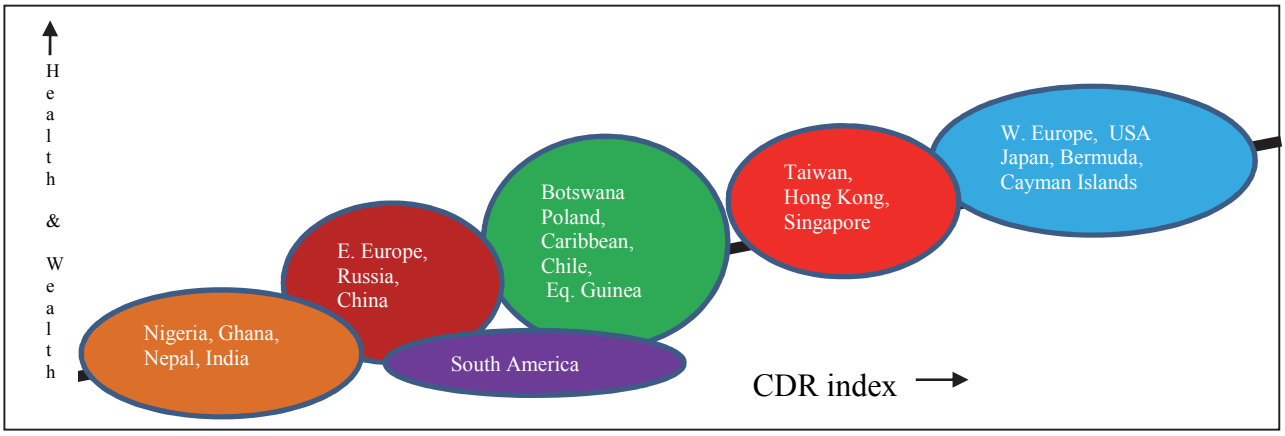
more than economic and environmental constraints. Haus et. al. (2013) and Schlaegel and Keonig (2014) discussed the indirect effects of distal variables such as entrepreneurial traits, personality traits, entrepreneurial exposure and education.

CDR INDEX

The purpose of a business incubator is to provide a home where a new company gets its start. But, it can also be a bonafide institution where capital can find investment opportunities. Therefore, it may be wise to recall the purpose of the company itself. We recall from Ridley and Davis (2009) that this great invention that impacted the lives of more people than any other is the instrument of capitalism (Smith 1776, 2007). Before that (circa: the turn of 19th century and the industrial revolution), with the exception of feudal lords and beneficiaries of the 17th century Amsterdam stock exchange, the Dutch East India Company, and certain skilled artisans, all people were poor. Capitalism is the mechanism for capital formation. In addition, shareholders demand democracy and the rule of law. Nothing can be more motivational than recognizing the vast wealth that this mechanism has created (Micklethwait and Wooldridge 2003). To illustrate this, consider a CDR index = f(C,D,R), that combines the degrees of capitalism (C), democracy (D) and rule of law (R) practiced in a country. Figure 1 illustrates the approximate relationship between wealth and health, and the CDR index. Health and wealth are shown to increase with CDR. Although no formal measure exists for the CDR index proposed here, the broad relationship depicted in Figure 1 is indisputable today. Therefore, we present it here as sufficient evidence of its existence. It is a critical component of entrepreneurial education which if not understood, can stymie all other efforts. Despite evidence to the contrary, it is easy to mistakenly conclude that economic development is attributable to natural resources, not CDR.

Concerns are often expressed regarding the rapaciousness of capitalism, and its unsuitability for civilized conduct when compared to its socialist counterpart. Of course, we are not proposing capitalism in the absence of democracy and the rule of law. For, in isolation, capitalism is as subject to abuse as any other tool or instrument. A surgeon's knife can save life, but in the wrong hands it is an efficient killer. The upshot of all this is that the relationship in Figure 1 is independent of the visible characteristics of the people in a country. As counterintuitive as it may seem to a certain mindset, the primary factors are not natural resources. Whereas natural resources can exacerbate the social ill effects of little or no democracy and injustice due to little or no rule of law (Norman, 2009; Frankel, 2012), conomic success is dependent on the institution of policy to adopt and engineer a high CDR index.

FIGURE 1
HEALTH & WEALTH VS CDR INDEX



Aside from a few tiny oil rich principalities and micro nations, USA, Western Europe and oil free Japan are prominent economic world leaders. However, notice how Botswana, Poland, Chile and Equatorial Guinea were able to break quickly away from their geographic neighbors once they adopted

CDR policies. Bermuda and Cayman Islands, themselves small, are greater long standing beneficiaries of CDR than otherwise similar Caribbean islands. China has not made the switch to CDR and they are where they are. A mere accusation that Russia entered Ukraine counter to rule of law, and despite being awash in oil and gas, their post-communist economic growth collapsed once again.

While the USA shares the top position with some European countries, were it not for the American policy "Give me your tired, your poor, your huddled masses yearning to breathe free, the wretched refuse of your teeming shore. Send these, the homeless, tempest-tost to me, I lift my lamp beside the golden door! (Lazarus 1883)," US GDP per capita would be even greater, earlier. Furthermore, it is simply amazing what immigrants have been able to accomplish as they travel from low CDR territories to the high CDR of the USA.

INTERDISCIPLINARY ENTREPRENEURSHIP CENTER

In this paper we examine the potential impact on mindset of entrepreneurship through a campus wide IEC. One of the theories of the company is that it can outlive its creators. However, for this to occur, it demands maximal transparency provided by the rule of law. Like the company, if the IEC is to outlive its creators, full transparency is an operational imperative.

The Mission

We explain below why the IEC must be an independent institution on the university campus. In like manner, it must also have a unique mission. A suitable mission for the IEC might be stated as follows: To promote interdisciplinary entrepreneurship education across all colleges and schools of the university, with special attention given to the expansion of the pool of entrepreneurs by changing the mindsets of underrepresented communities and governments to enable their cooperative participation and to employ the principles of capitalism, democracy and the rule of law to expand and lift their minds to see over the obstacles that might otherwise defeat them.

Impact on institutional mindset

Some members of society have no examples of entrepreneurs within their families and community. They cannot imagine the inner workings of business. They are not part of any meaningful conversation on business planning or day to day business operations. There is a poor dad but no rich dad (Kiyosaki 2011). They see a restaurant as a place to eat, not a place where business is being conducted. It may seem strange that a person can work and earn at one place of business, make purchases at another, and yet, not be able to decode the inner workings of either business. But, it is no stranger than illiterate persons living amongst people who read newspapers every day, and seeing signs that are all around them, yet themselves never learning to read. *Cogito ergo sum* in reverse.

Fayolle and Gailly (2015) showed that the positive effects of an entrepreneurship education program are all the more marked when previous entrepreneurial exposure has been weak or inexistent. Close relatives have been found to be positive role models (Mathews and Moser 1995, 1996; Scott and Twomey 1988; Shapero and Sokol 1982). This is consistent with the proposed framework that an entrepreneurship course should give special attention to the thought process of students who have no business ownership in their family background.

If the members of a community are historically oppressed, then the further back they look into their family history, the less likely they are to find an entrepreneur. Real life examples of this occurred in the communist countries of Eastern Europe, Russia and oppressed minorities in the USA. Both sets of people were forcibly segregated from the modernizing world. Even after the oppressive forces are lifted, there is almost a total inability to compete with existing business owners. The likely outcome is the noble practice of getting an education and finding a job. Not entrepreneurship.

Further to the above discussion of the CDR index, we recognize that wealth derives from ownership of the means of production. Technology as a means of production is an intellectual outcome. Therefore,

wealth creation is an indirect product of the imagination of the mind and study by the mind. "Since new developments are the products of a creative mind, we must therefore stimulate and encourage that type of mind in every way possible (Carver 1864-1943)." This is distinctly different from the mere transfer of wealth through invasion, colonization, enslavement and theft. When the members of a deprived community own no means of production, they are almost absent of wealth. Furthermore, their poor economic condition is persistent. The least among them may even experience what is often referred to as a cycle of poverty. Any transfer of wealth through welfare systems is soon returned to its owner via consumption, plus labor value added, minus unproductive government agency employee payments. And, the wealth gap increases. The days are long but the decades are short and no progress has been made. More time will not cure this.

The only way for formerly oppressed communities to compete in business and acquire means of production is through extensive introspection, and academic and experiential entrepreneurship education via an institution such as the IEC. The IEC might take its guidance from scientist George Washington Carver: "Education is the key to unlock the golden door of freedom." "Where there is no vision, there is no hope." "There is no short cut to achievement." "Life requires thorough preparation - veneer isn't worth anything." "How far you go in life depends on your being tender with the young, compassionate with the aged, sympathetic with the striving and tolerant of the weak and strong. Because someday in your life you will have been all of these." (Carver 1864-1943). Teaching entrepreneurship is about encouraging students to dream big, then showing them how to act on those dreams.

Encouragement and development amongst the formerly oppressed that are underrepresented in business, is a good investment that the mainstream should welcome. For, if anywhere, somebody produces products at a lower price with the same quality or produces better quality at the same price, the total economic pie must increase for all to benefit.

Fayolle and Gailly (2015) also showed significant counter effects of the entrepreneurship education program on those participants who had been exposed to entrepreneurship. A realistic entrepreneurship course must point out the fact of high failure rate by business startups (Gerber, 2001). Initially, those facts, being alarming, might very well temper enthusiasm on the part of students who by virtue of prior exposure to entrepreneurship, can appreciate what is being presented. This suggests that an entrepreneurship course should provide a good understanding of the CDR effect, explain the common misconceptions and mistakes that may easily be avoided, as well as provide for interdisciplinary collegiality and experiential learning opportunities, and analytical and computer simulation methodology that raises risk management skills and builds confidence. Even then, students may need access to incubators, angel investors, and future venture capital. These are consistent with the proposed framework that follows. Indeed, they are the motivation.

Student clubs

Alexander Bell's (1847-1922) telephone invention was acknowledged as fascinating. However, many people thought it was a shame that nobody would have any use for it. After all, the telegraph was already in use (Morse 1791-1872, Edison 1847-1931). Telegrams were typed and delivered. Why would anybody want to hear a message and have to remember what was said? Even Bell considered his invention an intrusion on his real work as a scientist and refused to have a telephone in his study. Well, as they say, the rest is history.

J. P. Morgan invested in Edison's electricity. In response, his father said "I'm disappointed in you…. This is this stuff of carnivals and fairs,…., you have been taken."

It was fascinating to watch Motorola's Marty Cooper make the first wireless brick cell phone call on 6th Avenue in New York City, on April 3, 1973 (Shiels 2007). However, initially, the crowd gathered there could not understand why they should leave the land phone already installed in their apartment and enter the streets of New York City to make a phone call. Why not just call from the apartment with the phone already owned? The quiet and comfort of the apartment confused and trumped the notion of mobility. Today, young people get their first apartment without a land line. Mobility is all that they know. This led Marty Cooper to formulate the Law of Spectral Efficiency, otherwise known as Cooper's Law.

The Law states that the maximum number of voice conversations or equivalent data transactions that can be conducted in all of the useful radio spectrum over a given area doubles every 30 months. "Marty is the most influential person no one has ever heard of," says Robert McDowell, a commissioner with the Federal Communications Commission, America's telecoms regulator.

The point is that inventions are often considered irrelevant by the many persons who do not see their applications. Indeed, many of the applications will not have been invented as yet. For that reason, entrepreneurship can be very lonely. Entrepreneurial type students need solace. Where better for them to find that than in an entrepreneurs club. They need to be among likeminded students. A genius is the one most like himself (Monk 1917-1982). Student clubs can contribute constructively to a sense of family away from home. Similarly, the student entrepreneurs club can help organize and run summer entrepreneurship camps for high school seniors. The exposure to entrepreneurship is invaluable. Moreover exposure to the university campus will pay large dividends in future freshman recruiting.

Like the IEC, student clubs are independent. They function under the rules of the host university. But, they are of necessity developmental, albeit under the advice of faculty. Students must be allowed to make decisions. They must learn and practice intra and inter networking, learn and practice the conduct of meetings, Robert's rules of order (Zimmerman 2005), how to take minutes that record agreed on assignments of responsibility, and measure and monitor task completions. Students must make the election to pursue the scientific method and approach: Measure what is measurable, and make measureable what is not so (Galilei 1564-1642). Faculties come and go, but widespread student and alumni involvement is the only way to build tradition and achieve longevity for the IEC. Student IEC academic curricula, research and management activities are discussed below.

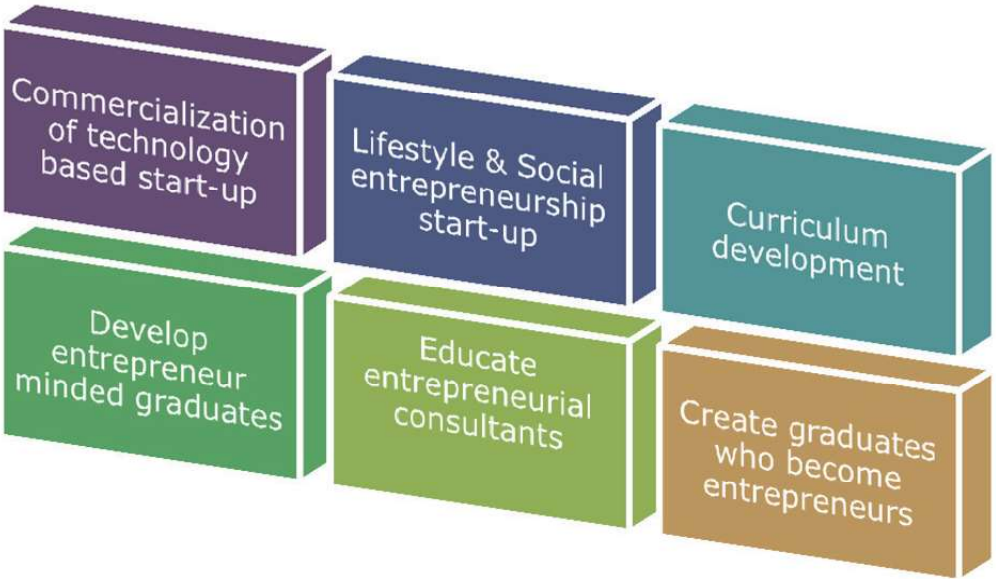
Interdisciplinary Entrepreneurship course

The ultimate objective of the IEC is the creation of new business start-up based on the commercialization of technology, and lifestyle and social entrepreneurship. It is always possible to obtain these objectives on a one off basis or on a short term basis. Great early American inventors did it entirely on inspired vision (Bell 1847-1922; Carver 1864-1943; Edison 1847-1931; Morse 1791-1872). However, to create a sustainable long term effort and raise the rate of entrepreneurial success, a targeted curriculum in entrepreneurship education must be developed.

Sometimes it is the people who no one imagines anything of, who do the things that no one can imagine! See screen playwright (Moore 2014) "the imitation game" on Alan Turing's crypt-analytical disambiguation of the Nazi German enigma cyphers. Only a few sui generis people invent, most people are required to implement. To be helpful they need to have the requisite mindset. Intrapreneurship is the practice of entrepreneurship within large organizations. It may include corporate ventures in which subsidiary organizations are spun off. Intrapreneurial leaders must take risks and exercise initiative, taking advantage of market opportunities by planning, organizing, and employing resources, to innovate new or improve existing products.

Hemmasi and Hoelscher (2005) found that unlike other students, only those with high nascent entrepreneurial inclinations are comparable to actual practitioners. Holmgren, et. al. (2005) found that entrepreneurship is located within the entrepreneur (see also, Sherman, 2005). Still, we propose that all business students need to become supportive of entrepreneurship as they assimilate into the wider community. For these reasons, an entrepreneurship curriculum must, inter-alia, educate three types of graduates, as shown in Figure 2. It must develop entrepreneurially minded graduates. These are the majority of graduates who go to work in various fields of endeavor, various professions, and various employments. For example bank employees and officers need to be entrepreneur friendly and adaptable to change. An entrepreneurship program must educate entrepreneurial consultants. These are typically "A" students who remember all the theories, methodologies, strategies, rules, and regulations. Of course, an entrepreneurship program must create graduates who become entrepreneurs. These are the small minority that generate path breaking ideas and are willing to take the risks that are required to create new enterprise. Often, these are solid "C" students. Shrader and Finkle (2015) found that students who had been entrepreneurs scored significantly lower on college entrance exams and grade point average.

FIGURE 2
ENTREPRENEURSHIP EDUCATIONAL OBJECTIVES



Course Description

Consider a course constructed from the topics in Table 1. This course provides a framework for developing students campus-wide, including freshmen through senior level, with an entrepreneurial mindset across the management education curriculum. Special attention is paid to the thought process of those who have no business ownership in their family background. Indeed, it is the reason for early freshman introduction. First, students are introduced to the foundational theories and concepts of entrepreneurship in the core topics. They are given the opportunity to learn, practice and reflect on skills necessary for entrepreneurship. The student entrepreneurial mindset can be assessed and further developed through internal mock business plans and external business case competitions. Next, students are provided with opportunities to apply the concepts and theories via co-curricular activities such as student-run companies that are housed within business, science, engineering and technology incubators. Finally, this course will enhance student preparation for a senior level entrepreneurship course where they will prepare a full business plan based on real data. The wide breadth of academic disciplines represented suggests that the course be team taught. Unlike many university courses that use textbooks, this course utilizes published research papers and professional books.

TABLE 1
INTERDISCIPLINARY ENTREPRENEURSHIP COURSE

Topic	Academic Discipline	Objective Impact on Mindset (development of skills, abilities, and experiences)
Developing an entrepreneurial mindset	Business: macro economics, entrepreneurship, management	Students learn the role of CDR; the role of the entrepreneur in the U. S. economy and countries around the world; to analyze forces behind entrepreneurship; the role of globalization (Kao and Mao 2011); to evaluate their potential as an entrepreneur; to push the envelope and profit from the lessons of failure.
Parliamentary procedures Types of business Taxation Intellectual property rights Business financing Personal financial management Estate planning	Business: law, finance	Students learn the legal requirements for shareholder meetings, voting and recording; types of business and how they are taxed; the principles of copyrights, trademarks and patents; about credit financing & rating; about wills & trusts.
Designing a competitive business model	Business: entrepreneurship, management	Students learn to differentiate between competing business models; to analyze how strategic management affects small business; to compare the characteristics of basic strategies and when to use them; the concept of competitive advantage and ways to create a competitive advantage.
Business ethics	Business: law, entrepreneurship, management	Students learn the legal framework for small business; to research, study and understand laws that apply to entrepreneurship and small businesses.
Building a new venture team	Business: entrepreneurship, management	Students learn to identify the building blocks of a new-venture team; to construct a "skills profile" to identify skills needed for the successful operation of a new-venture team; to observe team dynamics and learn how to manage task, process, and relationship conflicts; to learn techniques for assessing new venture financial liability.
E-commerce and the entrepreneur	Engineering, computer science, entrepreneurship, marketing, advertising, mass communication, creative writing, art	Students learn factors that an entrepreneur should consider before entering e-commerce; business and marketing strategies for promoting an e-commerce business; to design and develop an e-commerce website for posting content, blogs, messages on Facebook, Twitter and other social networks to promote a business; how to track website results; how to protect customer privacy.

TABLE 1
INTERDISCIPLINARY ENTREPRENEURSHIP COURSE….continued

Design	Engineering, science and technology, art, marketing, mass communication	Students learn various design forms, elements, traits of elements and their relationships; the process of design, design analysis, and creative problem-solving; to think visually; optimal design principles; the difference between the commodity and the process of a business.
Franchising and the entrepreneur	Business: law, entrepreneurship, management	Students learn to contrast and compare types of franchising; to evaluate the advantages and disadvantages of buying a franchise; the legal framework and laws covering franchise purchases; how to franchise a successful business; the major trends in franchising.
Buying an existing business	Business: law, entrepreneurship, management	Students learn to evaluate the advantages and disadvantages of buying an existing business; steps of evaluation of an existing business; the negotiation process and how to structure the deal.
Pricing strategies	Business: Micro economics	Students learn to analyze relationships between pricing, image, competition, and value; effective pricing techniques for introducing new and existing products/services.
Managing cash flow	Business: finance, accounting	Students learn the importance of cash management in small operations; the fundamental principles of managing accounts receivable, accounts payable, and inventory; to differentiate between cash and profits; how to create a cash budget.
Sources of financing: equity and debt	Business: finance, accounting	Students learn to evaluate the differences between equity capital and debt capital; the advantages and disadvantages of equity and debt financing; to analyze sources of each type of capital available for an entrepreneur.
Global aspects of international entrepreneurship	Supply chain management	Students learn why entrepreneurs pursue opportunities around the world; the main strategies that a small business can use for going global; the major barriers to international trade and their impact on the global community; how to write a plan for a profitable export program.
Reading list	All disciplines	Students read research papers and professional books (not academic textbooks).
Vocabulary: List of common business terms	All disciplines	Students build a working vocabulary of business terms that enable them to understand documents and literature on business and entrepreneurship.

In addition to the topics in Table 1, students must spend some time in one of the incubators (described in the next section) to receive some part of 4 credit hours. See Liao (2008), Jaber, Marle and Jankovic (2015), Danilovic and Browning (2007), and Mick and Linder (2005) for some discussion on the planning and programming of interdisciplinary teams and activities. Students may work on company or entrepreneur sponsored ideas to assess opportunities and validate ideas, develop and demonstrate pretotypes and prototypes, identify target markets, and create business plans. Planned activities must take students out of their departmental silos frequently enough to have lunch with students from other colleges and departments. Students must learn the difference between entrepreneurship and business management, and how to transition from entrepreneurial innovation to startup business management activities such as selling, phone answering, order acquisition, order processing, order fulfilment, payroll, services, and income tax returns, etc.

Space does not permit a complete analysis of all the topics in Table 1. Also, many of the topics listed are established standards. Their impact on knowledge and skill is well known. They are only listed here to suggest their impact on mindset. To illustrate mindset impact analysis, consider for example the first row. The impact of CDR was discussed earlier in the paper and is unique to this framework. So, consider now the impact of failure. The very nature of entrepreneurship is embodied in pushing the envelope. This implies a raised level of risk of failure. A refusal to risk failure implies a guaranteed pass for competitors. A failure does not have to be due to lack of due diligence. It may simply be due to an element of uncontrollable randomness associated with any business environment. The best that the entrepreneur can do is to learn as much as possible from failures. The second row is concerned with issues that might easily be overlooked by an inexperienced student run company. Many of the subtopics are not standard in a business curriculum. Yet, they are critical to entrepreneurship. For example, personal financial management is not a standard topic. But, a prospective student entrepreneur will not be eligible for business loan financing if their personal credit is unworthy. Personal financial management is as concerned with mindset as it is with knowledge and skills. Regarding the last two rows, the focus on professional books instead of academic textbooks is not a standard. In the standard, not only is it possible, it is quite likely that a business student will graduate with no real factual knowledge of the origins, history, development, status and leadership of major American corporations (Ridley and Davis 2009). A vocabulary list will enable meaningful access to the assigned reading.

Not all elements of success can be reduced to a scientific method. As much as we would like entrepreneurship to be formulaic, no two incubators are the same. As a result, their related problems are by definition episodic. They are nuanced and ambiguous. Students should recognize that many bad practices are known to lead only to bad outcomes, while good practices, although not guaranteed, can lead to good outcomes. Therefore, it is critical that students learn to develop the best of practices, with no chance of classroom texting and browsing since multitasking while learning is humanly impossible (Beland and Murphy 2015, Rosen 2013). Delayed gratification (Mischel and Ebbesen 1970), time management and the development of good personal study habits is required.

The opportunity to obtain a minor in entrepreneurship can be considered.

Organizational structure

There are two possibilities of interest for establishing the organizational structure of the IEC. Each has its pros and cons for success. In one possible scenario (see Figure 3), an entrepreneurship grant is given to an academic unit, college, department or institute in the university. All activities are centered within that unit. This structure is relatively easy to manage. So is the assignment of responsibilities and monitoring of accountability. The physical facilities can belong to the academic unit. One such example of an academic unit is the business school. This appears to be reasonable since entrepreneurship has so much to do with business. Classes can be designed for business majors, and non-majors can be allowed to take them. However, while the results can be excellent, there might be little or no impact on the rest of the university.

FIGURE 3
PERIPHERAL RELATIONSHIP: EXCELLENT RESULTS WITH A HOLLOW VICTORY AND NO STUDENT, FACULTY OR UNIVERSITY DEVELOPMENT

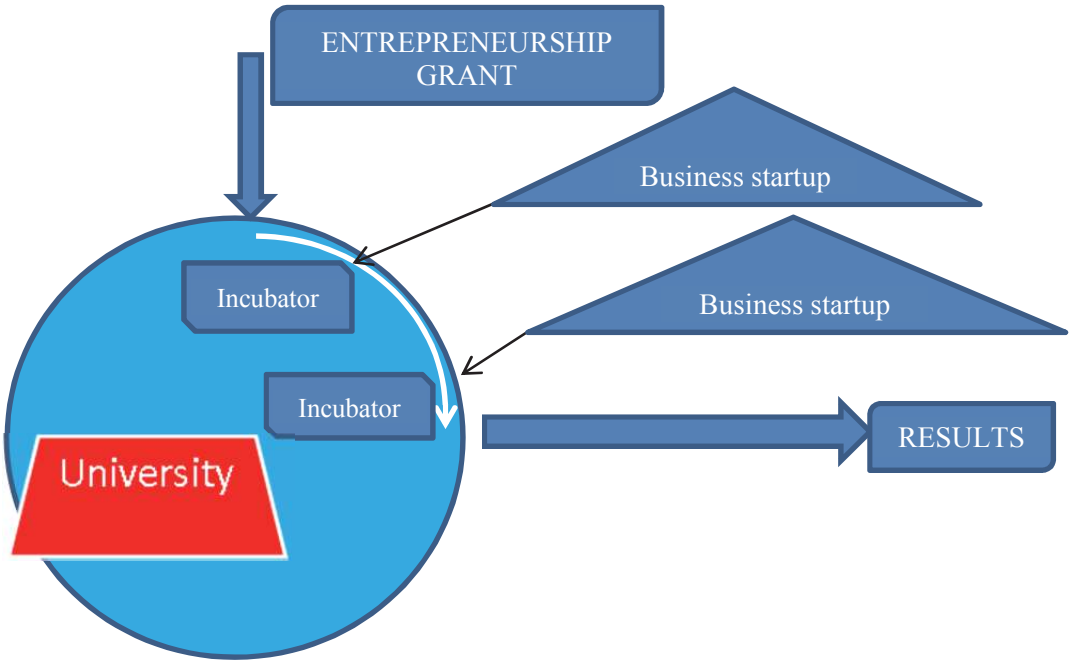
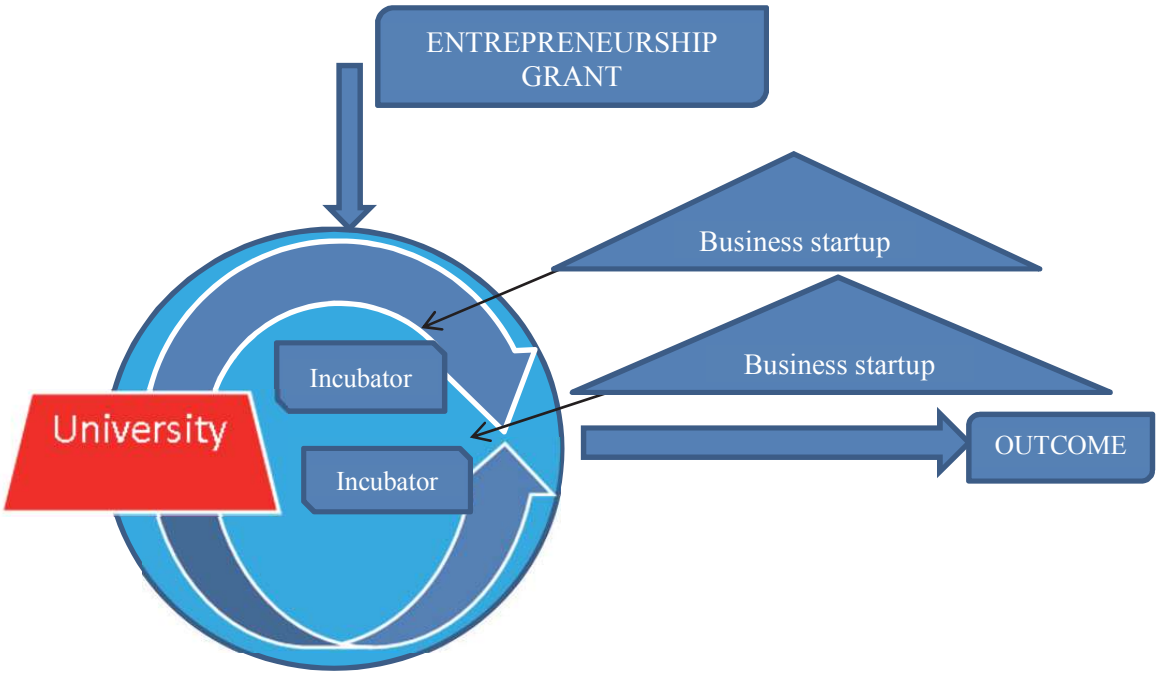


FIGURE 4
INTEGRATED RELATIONSHIP: EXCELLENT OUTCOMES. VICTORY FOR STUDENT, FACULTY OR UNIVERSITY DEVELOPMENT THROUGH CAMPUS WIDE INVOLVEMENT, EDUCATION, COURSE WORK, INSTITUTIONAL MEMORY

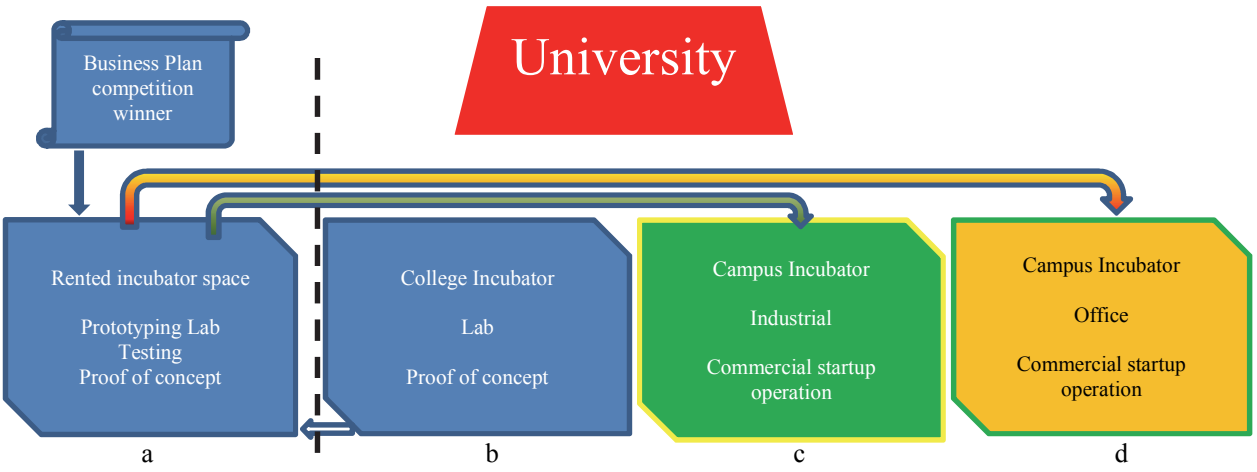


The preferred alternative is an integrated scenario (see Figure 4). An entrepreneurship grant is given to the university for integration campus wide, and community development. The managing unit is a separate IEC, independent of all colleges, schools, departments and institutes. The IEC is designed and directed to serve all university constituents equally. Non business entrepreneurs are identified in the professional schools such as law and medicine, engineering, science and technology. Technology, lifestyle and social entrepreneurship can grow out of various alliances on campus. The results are equally excellent outcomes, but greater in scope than the peripheral relationship, and with a lasting impact on the university and the community. In case there is resource limitation at the time of startup of the IEC, it may be necessary to locate it in a university college. At such time as it grows into a sustainable unit, direct college management can be adjourned *sine die*, and a new and independent center opened. If for any reason, due to reorganization, it turns out to be impractical, it can be return to the college.

Incubators

There are different types of incubator depending on the stage of development of the business idea. Some technology based ideas require prototyping, testing and proof of concept. Large inventions derive from small discoveries (Ashton 2015). An incubator of that type is shown in Figure 5a. Such an incubator may be special purpose in design, but unrelated to university education. For example, Domi Station and Making Awesome, adjacent neighbors in Tallahassee, Fl. provide business coaching and rapid prototyping CNC/CAD/3D machines for making electronic circuit boards and device containers, respectively. Those elements of the process are vocational in nature, not academic. Renting space there may be the best option. Some technology based ideas require development in a university science laboratory, such as those used to teach and conduct university physics, chemistry and pharmacology research. An incubator of that type is shown in Figure 5b. Although specialized, great expertise and a doctor of philosophy are required. An idea leaving this incubator may still be theoretical and benefit from time in incubator 5a. Ideas that leave incubators 5a and or 5b as working devices then go to the industrial (5c) or office (5d) commercial startup incubator.

FIGURE 5
INCUBATOR TYPES



Entrepreneur's Day

Prior to the preparation of business plans, the university is engaged in a number of entrepreneurship activities. Those are academic activities. But, the university must have an annual event related to the entrepreneurs themselves (Figure 6). It is a day for the application of entrepreneurship by the campus entrepreneurs. Consider for example, university entrepreneur's day. On that day there are a number of activities. One activity is a business plan competition. A business plan forces the students to think through and understand their business. It can also be used to seek financing. The competition creates a winning business that receives a first prize cash award, recognition, and an opportunity to enter a commercial startup operation incubator for one year (Figure 7). At the time of the business plan competition the participants must sell their ideas. An end of semester competition date will maximize the time for students to prepare their business plans. And, a published deadline has a wonderful way of concentrating the mind.

One year after exiting the incubator, or on an even multiple of years thereafter, the business can apply to enter the Shark Tank style venture capital forum, where on entrepreneur's day they must sell their income statement and balance sheet to venture capital investors (Figure 8). Their idea may have been impressive on the day when they won the business plan competition, but the venture capital investors will want to know how well their idea was implemented and how well it was received by customers.

Integration

In addition to being cash poor, we are concerned with technology based entrepreneurship where larger investment and knowhow is required than for lifestyle and social entrepreneurship. The IEC objective is to positively impact the university and the related community. An integrated approach starts with multidisciplinary student teams brainstorming and mining faculty research for commercial ideas (see schematic diagram in Figure 7). This activity can be greatly enhanced with help from student members of the entrepreneurs club. There should also be physical and electronic notice boards for faculty to display ideas and inventions.

In addition to the interdisciplinary entrepreneurship course discussed earlier, extra-curricular student activity can increase student wisdom when enjoined by experienced business people from the external community. For example, the Economic Club of Florida (ECF) is a one stop shop for potential advisors and angel investors. Student members of the ECF can learn from the speakers who address the ECF monthly luncheons. This can be a live term paper source of information for courses that they are taking in business, economics, journalism, government, etc. Tallahassee Technology Alliance (TalTech) can be a source for students taking information technology courses. The Institute of Electrical and Electronic Engineers is a source for science and engineering students, and so on. Of these external organizations, the ECF is one of particularly great interest for networking because they comprise many bankers and investors. Members of ECF can speak at student club meetings, especially on the topic of business plan writing. They are a readily available source of angel investors. Other sources of investment are family, friends and alumni angel investors, venture capital, crowd funding and grantors.

FIGURE 6
BUSINESS PLAN COMPETITION AND SHARK TANK STYLE FORUM ACTIVITY TIME LINE LEADING TO ENTREPRENEUR'S DAY

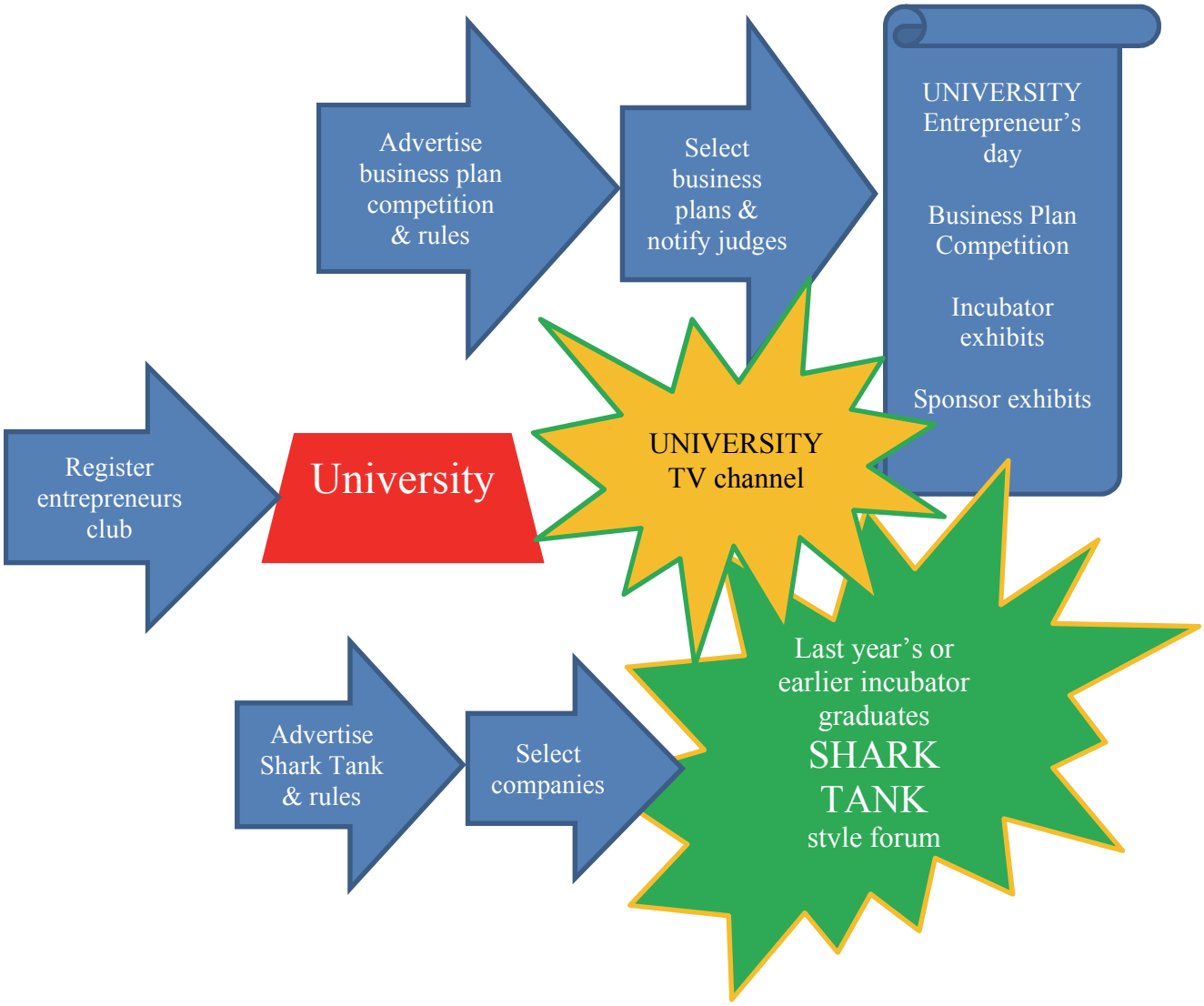
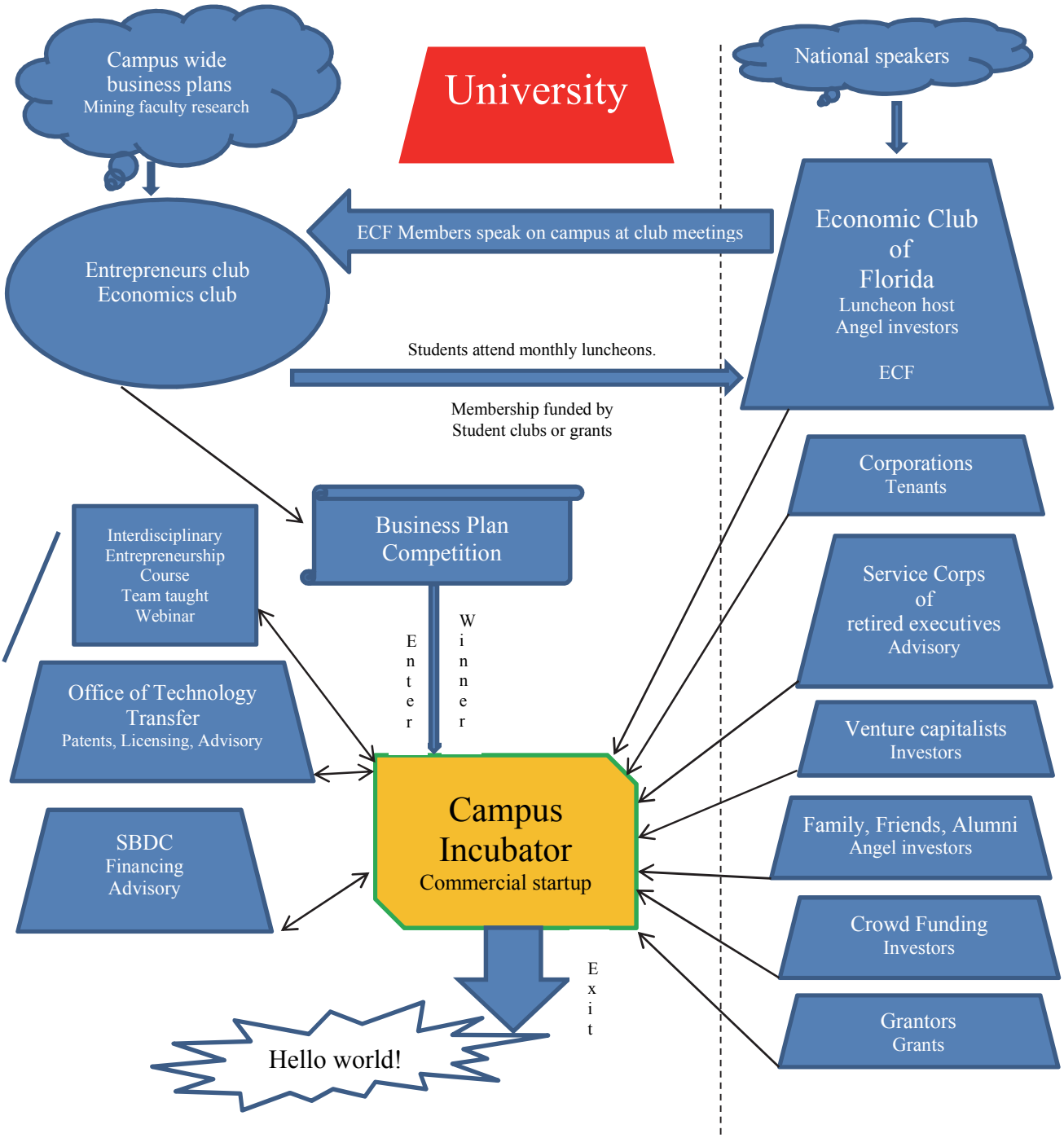


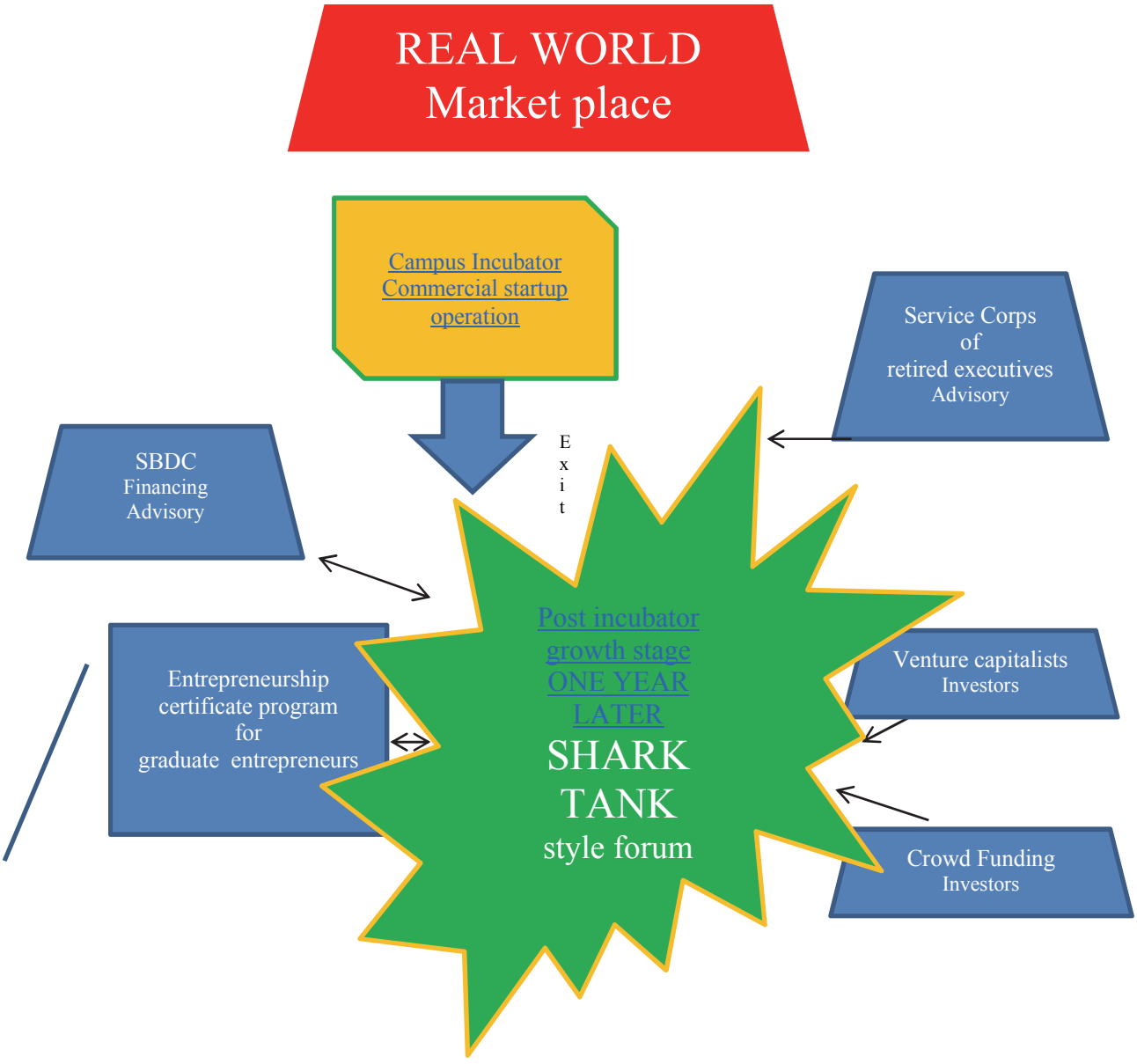
FIGURE 7
INTEGRATED ENTREPRENEURIALLY MUNIFICENT INCUBATOR SUPPORT MECHANISM, EDUCATIONAL DEVELOPMENT & COMMUNITY TRANSFORMATION SCHEMATIC



We know from Gladwell (2008) and Ridley and Davis (2009) that professional competence requires 10,000 hours of dedicated experience. That is, the equivalent of forty hours per week for five years. By definition, students will not have this experience. This poses an insurmountable problem. Barahona, Cruz and Escudero (2006) found that graduates are more likely to be entrepreneurs if their education was complemented with business and travel experience. Still, only some of this experience can be obtained through corporate internships. Therefore, the remaining lack of experience must be supplemented by placing an experienced angel investor on the startup management team or advisory board, as needed.

The Small Business Development Center (SBDC) and the Service Corp of Retired Executives (SCORE) are sources of advice on business plan writing, financial planning and loan acquisition. The university Office of Technology Transfer is available to assist with intellectual property acquisition such as copyrighting, patenting, and licensing.

FIGURE 8
SECOND STAGE POST INCUBATOR INVESTMENT BASED ON INCOME STATEMENT AND BALANCE SHEET



Executive education

If there is one constant throughout the vicissitudes of time, it is change. Technology is continuously evolving, demanding the periodic renewal and upgrading of skills. To that end, entrepreneurs who have attained an undergraduate degree and who have been practicing in the real world business for two or more years can benefit from executive education. They and other business leaders can study for a graduate certificate in entrepreneurship (Figure 8).

CONCLUDING REMARKS

The static case study method of teaching has been employed for many years. A logical replacement, better for creating an entrepreneurial mindset, is technology based dynamic live case study with color graphics animated computer simulation. The success of this was demonstrated by the seven student publications involving twenty five students in just two semesters referenced in this paper. Students can create key elements of a case, collect the related data, analyze them and develop comprehensive pro forma technical and economic evaluations, cash flow and income statements, and balance sheets. These are required to understand the business and to apply for financing. When obtained by computer simulation, these documents are more realistic. Live case study provides some experiential learning and real life contact with real business operations. That notwithstanding, the creation of startup business by students presents the insurmountable problem of student professional inexperience. This demands the presence of an experienced angel investor on the startup management team, or advisory team, as needed.

Entrepreneurship involves risk. Education, research, development, best practices and application of the scientific approach can reduce risk. There will be some favorable and unfavorable outcomes. Complete risk avoidance is easily attainable by simply doing nothing at all. Except that that is not entrepreneurship. Doing nothing produces no outcomes, neither good nor bad. Experienced people know not to try anything new. Students know that they should try everything new. A meeting of these two mindsets might produce the requisite synergy. Computer simulation is not an optimization tool. It is a method for developing and evaluating realistic alternatives, including risk classification, and selection of a best case scenario. Chance favors those who are prepared. So, it is not about being right. It is about doing what is right. That way, risk is reduced and outcome expectation is maximized. Knowing is important but how to deal with the unknown is even more important.

In addition to structured education, entrepreneurial students need a club to provide a family away from home. Time spent in entrepreneurially munificent incubators provide needed guidance, nurture and visibility. Visits to local and other incubators provide needed exposure to complement the entrepreneurial mindset. A weekly televised forum on entrepreneurship involving students, faculty, and visitors, and broadcast on the university TV channel and/or satellite radio, can provide special interest exposure of incubator companies to potential investors, general exposure to future university freshman recruits, and favorable public relations in general.

A CDR index was introduced for the first time in this paper. The positive wealth-health, and CDR index relationship paradigm is indisputable today. Recommendations for future studies include the formal measurement of the CDR index. Then, the wealth-health CDR relationship can be calculated. This may lead to a source of useful CDR analytics that serve to change the zero sum mindsets of academicians; and of those communities and governments that have yet to recognize that low CDR is the real obstacles to their economic success. Economic success is a function of the CDR index, not the visible characteristics of people in a country. In the archetypal model for entrepreneurship education, diversity has the potential to expand the pool of innovators and thereby increase the size of the world's economy, to the benefit of all people. A plus sum mindset in which the best ideas can rise to the top.

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