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Abstract

There has been an ongoing interest in establishing efficient methods of entrepreneurial education (EE). Within our knowledge, there is no academic research that interrogates entrepreneurship and EE for medical students. This research seeks to explore the perceived feasibility and desirability of entrepreneurship for medical students and investigate their expectations in EE. Firstly, perceptional differences in feasibility and desirability were investigated through cluster analysis. In the following step, ANOVA tests were used to examine differences in EE expectations. The data was collected using a survey questionnaire, which was developed and funded by the Tempus FoSentHE Project Consortium. Findings show that students can be clustered into four groups by taking perceived feasibility and desirability into consideration. Statistical differences were recorded for only seven of the twenty educational and entrepreneurial activities. In conclusion, students value networking activities, real experience, and prefer lecturers who are experienced entrepreneurs.

Key Words

Entrepreneurship Education, Medical Student, The Entrepreneurial Event Model.

Introduction

Today's healthcare providers face many challenging problems which are likely to increase with the world's aging population, growing healthcare costs, chronic diseases caused by modern lifestyle, and strict regulations. Innovation is an excellent coping mechanism for all of these challenges. Healthcare service providing institutions, especially academic ones, have a responsibility to innovate or give a place to innovation (Toner and Tompkins, 2008). Patient mobility and medical tourism provide opportunities to develop new forms of healthcare services for innovation, wealth generation, and entrepreneurial practices (Lunt et al., 2015; Meigounpoory et al., 2011).

Entrepreneurship in healthcare is a rising phenomenon, as the demand for new and customized services keeps increasing. Aforementioned challenges create opportunities for all those involved in the healthcare system (Wilson et al., 2012). Shifting trends, from passive patient to patient involvement, have changed the way healthcare service is delivered, along with the expectations of patients. Physicians who have the ability to understand patients' needs and characteristics possess entrepreneurial advantages that they can benefit from (Callaway and Dobrzykowski, 2009; Mitchell and Scott, 1992; Wang and Sun, 2014).

In spite of this, healthcare is a challenging industry in which to become an entrepreneur, as service delivery, organizational structure, regulations, and financing of provided services are much more complex than in other industries (Mccleary et al., 2006).

The failure rate of entrepreneurs in healthcare is unavoidable and health-tech ventures often fail because they do not understand market dynamics and customer expectations (Chase, 2011). However entrepreneurs with prior experience in a specific industry are generally more successful as a result of their knowledge of market and strategy (Chartterji, 2009). Healthcare professionals who have a graduate degree in business or healthcare administration are more aware of the changing environment in the healthcare industry and are also more attuned to entrepreneurial opportunities (Marchese et al., 2015).

An intense professional education in medicine does not provide the required knowledge accumulation for medical professionals to integrate their knowledge with the business world of their industry. Their knowledge of medicine does not help them to successfully step into the commercialization processes for new forms of medical services. By filling this gap, more healthcare professionals could become entrepreneurs (Young et al., 2003; Deng, 2018).

One solution to remedy this gap in knowledge would be for students to attend an MBA program. Modifying the curriculum or providing EE for medical students, which may give them insight into developing successful business models in different ways, are other options. In one of their studies on physicians, Young, Hough, and Peskin (2003) outlined three different motivations for healthcare professionals to obtain a graduate degree in business. One intention was career development, which was mostly mentioned

by academic faculty staff. Private practitioners that could also be considered as entrepreneurs stressed the requirements in improving efficiency and income potential. The last motivation was the desire to make a change in career path. A group of healthcare professionals with clinical or academic experience may want to alter their career direction from practitioners to managers or entrepreneurs (Miron-Shatz et al., 2014).

In the USA, more than 50 universities provide MD (Medical Degree)/ MBA (Master of Business Administration) dual programs to improve the innovative and entrepreneurial capabilities of healthcare professionals (Keogh and Martin, 2011; Marchese et al., 2015). However, the intended outcomes of EE cannot be accomplished in every instance. In some cases, training cannot improve entrepreneurial capabilities as, conversely, it can instill a negative view towards entrepreneurship (Oosterbeek et al., 2010).

EE has been investigated from different perspectives by many scholars. Researchers have studied the gap between existing and expected EE (Collins et al., 2004); the interaction of EE and technology transfer (Owens and Price, 2015); the effect of emotions on EE outcomes (Lackéus, 2013); the development of leadership skills in women (Bullough et al., 2015); the overall effectiveness of EE (Fatoki and Oni, 2014); gender and nationality differences (Dabić et al., 2012; Daim et al., 2016); and the effects on opportunity and necessity entrepreneurship (Fuentelsaz et al., 2015) to list a few examples. Other activities, which bring different stakeholders such as students,

academics, professionals, and governmental agencies together to enforce entrepreneurship, have received a lot of attention as well (Cunningham and Link, 2014; Lee and Ohta, 2010; Thorp and Goldstein, 2010).

Honig (2004) discussed a contingency model, featuring Piaget's concept of equilibration, which seeks to deliver both cognitive tools and litheness in accommodating unexpected environmental aspects faced by future entrepreneurs. However, EE research mainly targets students of business disciplines while other disciplines, such as engineering, medicine, or social sciences, are generally neglected. To our knowledge, there is no research that associates universities' entrepreneurial education activities with the perceived feasibility and desirability of entrepreneurship for medical students. This research, which follows on from previous research by Daim, Dabić, and Bayraktaroglu (2016), hopes to identify different groups among medical students in terms of perceived desirability and perceived feasibility of entrepreneurship. The study's second intention is to identify the differences in the expectations of these groups from their university in terms of EE. The rest of the paper is organized as follows: literature review, methods, results and discussions, and conclusions. The literature review covers entrepreneurship intention models and universities' role in entrepreneurship. The methodology used in this research is explained in the methods section. Findings are shared in the results and discussion section and the paper is finalized in the conclusion.

Literature review

Entrepreneurial intention models

Over the last few decades, entrepreneurship has captivated academic intention more than ever. Researchers continue to investigate the positive and negative factors affecting entrepreneurial intention from different perspectives. The relationship between personal characteristics, environmental factors, family, education, and entrepreneurial intention is studied and modeled by scholars in different ways. Although there are many proposed models in literature, these models tend to stem from two theories; namely the Theory of Planned Behavior by Ajzen (TPB), and the Entrepreneurial Event Model (EEM) by Shapero (Drnovsek and Erikson, 2005; Fitzsimmons and Douglas, 2011; Krueger et al., 2000).

TPB is a general-purpose model that aims to explain the intentions that people have towards a specific action, which can be seen to indirectly affect their perceived behavioral control and subjective norms. Intention provides some insight concerning the actual practice of the subjects studied in the model. People often make their intentions clear before taking action and, as such, understanding people's intentions makes their real practices more predictable. In this theory, the most important determinant of intention is attitude, which is influenced by perceived behavioral control and subjective norms (Ajzen, 1991).

The Entrepreneurial Event Model (EEM), more specifically, aims to clarify the formation of an intention to start a new venture. Shapero assumes that people have a tendency to protect their status quo until a serious interruption, such as immigration or loss of work, occurs. This interruption triggers research into different opportunities and, depending on the "credibility" of this newly discovered opportunity, entrepreneurial activities can take place (Krueger and Brazeal, 1994). Thus, the model of Shapero contains three constructs; namely "perceptions of desirability", "propensity to act", and "perception of feasibility". Desirability and feasibility form credibility together. Higher credibility yields the entrepreneurial event with the propensity to act (Fitzsimmons and Douglas, 2011; Krueger and Brazeal, 1994).

These two models have very similar structures to each other, although they are proposed by researchers from different research areas. Krueger, Reilly, and Carsrud (2000) tested each model and confirmed that both have strong expletory powers. They also concluded that the constructs of these models are substitutes for each other. Attitudes and subjective norms in the TPB model are associated with perceived desirability in EEM, whereas perceived behavioral control in the TPB model is the substitute of perceived feasibility in the EEM. Watson et al., 2018 used survey methods, established and validated for the assessment of entrepreneurial features by do Paco et al., 2011, to measure four characteristics: "*Entrepreneurial Interest; Support Network; Entrepreneurial Confidence; and Entrepreneurial Intention*". The survey was conducted

among 19 undergraduate or graduate health care students from New Jersey. A general conclusion was derived, demonstrating that perceived desirability and perceived feasibility are the main predictors of intention, while propensity to act or, in other words, the locus of control, sometimes appears to be insignificant (Douglas and Shepherd, 2002; Saeed et al., 2015; Schlaegel and Koenig, 2014). Perceived desirability is defined as the degree of personal appeal and willingness to participate in entrepreneurial activities. Perceived feasibility is the extent to which a person believes that he or she has the ability to start and sustain a business (Dabić et al., 2012).

In this research, EEM is accepted as the basis upon which to understand medical students' approaches to entrepreneurship and, in order to investigate the first research question of "are there any different groups in terms of perceived feasibility and desirability of entrepreneurship among medical students", a cluster analysis was performed.

Role of universities in entrepreneurship

Universities' role in entrepreneurship can be divided into three categories; namely educational support, concept development support, and business development support. (Saeed et al., 2015).

Educational support mainly embodies methods such as courses projects, internships, bachelor/master programs, conferences/workshops, and interaction with

other students. EE must be provided through alternate means than the ways in which it is applied in technical subjects. The mission of EE is not limited to the transfer of theoretical knowledge. The knowledge provided does not necessarily have to be deep, but wide. Besides knowledge accumulation, students need to improve entrepreneurial skills, grow creative problem-solving capabilities, develop a positive attitude towards being an entrepreneur, intend to be an entrepreneur, and prepare themselves to cope with failures (Welsh et al., 2016). Theoretical education can provide only some of these skills, attitudes, and intentions as this education must also be supported and integrated with experiential (Christina et al., 2015; Goldstein et al., 2016) and motivational education (Abdulghani et al., 2014; Piperopoulos and Dimov, 2015).

Universities provide concept development support through experiential learning activities and networking opportunities. Experiential learning allows learners to participate in knowledge gaining processes through activities such as simulation, role-playing, games, business plan competitions (BPC), etc. These activities immerse learners in active learning environments (Bell and Bell, 2016; Hale Feinstein et al., 2002). This method gives students the chance to enjoy learning and gives them a specific goal to achieve. Students are motivated through competition and they learn more, improve their self-confidence, and trust in their entrepreneurial skills (Bell and Bell, 2016; Grimley et al., 2011; Karns, 2005; Watson et al., 2015).

In comparison to other experiential learning activities, BPC is rather different. The main goal of BPC is to give rise to a new start-up - not to teach. Winners of the competition reach an advantageous position in terms of realizing their business plan. However, regardless of who wins the competition, competitors increase their entrepreneurial skills, gain access to mentors, and have the opportunity to network. They improve their self-confidence and risk-taking propensities (Russell et al., 2008) and so this can thus be considered both concept development support and business development support.

Universities are expected to provide support for new ventures in different forms while creating and disseminating knowledge (Goldstein, 2009; Guerrero et al., 2015; Shattock, 2005). Business development support is thus a broader concept and does not exclusively concern students. Universities that provide opportunities for their students, academics, staff, and others to explore/exploit entrepreneurial activities are considered to be “entrepreneurial universities” (EUs). These universities have several common characteristics (Guerrero et al., 2015). They all improve individual values and attitudes towards entrepreneurship; they institutionalize all three missions of universities, which are teaching, research, and entrepreneurship; and they support and offer life-long learning. Their organizational structures are flexible enough to be adaptive to industrial changes and they establish specialized units such as small business centers, research facilities, research groups or quasi-firms, liaison offices, technology transfer offices, and

incubators to support technology transfer and start-ups. They are connected to both governmental institutions and private industries, and they are constantly searching for new ways to strengthen their ties with all actors. All of these characteristics necessitate a rich diversity of activities and this richness usually cultivates business support for individual entrepreneurs and facilitates synergy among them (Jansen et al., 2015; Kirby et al., 2011).

In order to answer the second research question of "what are the differences between the expectations of the aforementioned groups and those of their university in terms of EE" hypotheses were developed and tested under the subtitles of EE, networking, and research and entrepreneurship activities. Figure 1 demonstrates the research model.

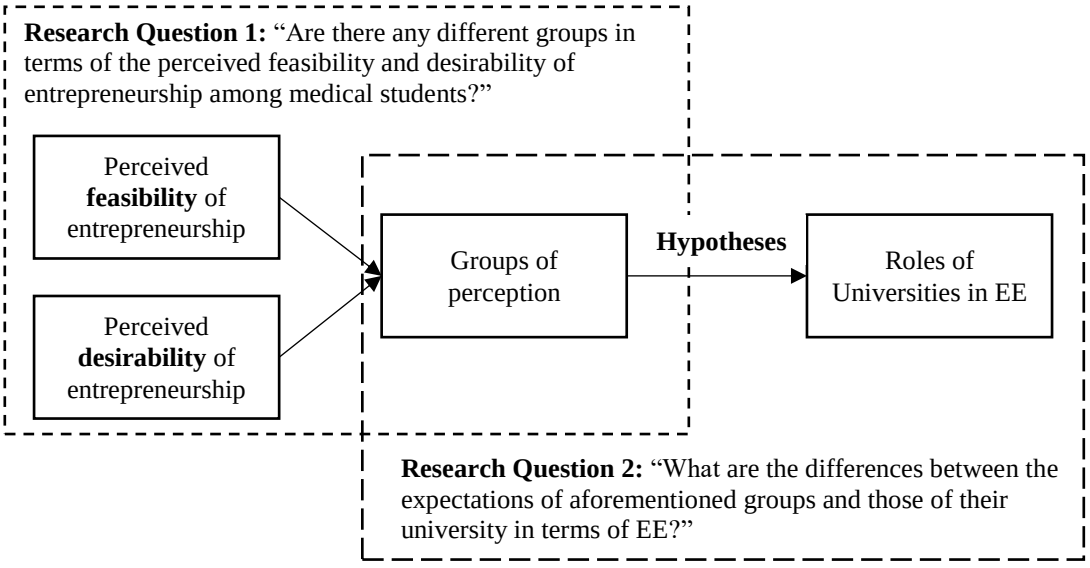

Figure 1: Research Model

Entrepreneurial education.

Technological developments and changes in market conditions provide a range of innovation opportunities which could lead to new entrepreneurial practices. However, these opportunities are not equally visible to everyone. Entrepreneurs are the people who have both enough knowledge accumulation and the desire to discover these opportunities. As Louis Pasteur said, "chance favors the prepared mind" (Krueger and Brazeal, 1994).

Differences among the professions shape the opportunities that people can discover; a new technological advancement can therefore give rise to different entrepreneurial practices. In some cases, these individuals do not chase opportunities consciously and openly, but rather they discover them without premeditative research. Accordingly, people with adequate education and experience have a higher chance of discovering an opportunity and becoming involved in entrepreneurial activities (Fellnhofer, 2017), although their degree of intention to become an entrepreneur determines whether they use this opportunity or not (Shane, 2000). EE increases a person's chance of becoming an entrepreneur by improving both required knowledge and skill-set.

Since the first entrepreneurship class of Harvard Business School in 1945, EE has been growing (Mwasalwiba, 2010). Scholars generally reach similar conclusions concerning EE, for example: EE increases a person's entrepreneurial and risk-taking

potential and, as such, people who have EE are more like to be self-employed. Researchers also postulate that employees who have EE are more successful in their professional life and have a higher income when compared to their counterparts. These scientific outcomes prove that entrepreneurs are not predestinated people. EE can significantly shape the intentions of students. The main question is how to provide EE in order to enhance the entrepreneurial potential of individuals in an effective way. In other words, what are the most influential methods to apply in an EE arena? (Charney and Libecap, 2000; Kuratko, 2005; Pittaway and Cope, 2007).

Mwasalwiba (2010) outlined thirteen teaching methods commonly used in EE by reviewing twenty-one articles on EE methodologies. These methods are listed in decreasing order as 'business simulation', 'discussion and group works', 'videos & filming', 'role models & guess speakers', 'business plan creation', 'projects', 'real venture setting up', 'games and competition', 'workshops', 'presentations', and 'study visits'. Classical teaching approaches, which are also used in other business education courses, are the most commonly applied approaches.

Esmi, Marzoughi, and Torkzadeh (2015) split suitable methods for EE into three groups as 'direct', 'interactive', and 'practical' teaching methods. Direct teaching methods cover "inviting guest entrepreneurs", "mentoring", "official speech", "seminars", "video watching and recording", "training in extracurricular activities", "training in specialized lessons", "small businesses mentoring", and "entrepreneurship

tutoring". Methods in interactive groups include "process-oriented learning", "learning from mistakes", "interviewing entrepreneurs" and "bilateral learning", "group discussion", "networking", "discussion", "problem-oriented learning", and "active learning". Practical teaching methods involve "role-playing", "training workshops", "site visiting", "class practice", "research projects", "internship", "business planning", "starting a business", "studying nature", "investment projects", and "practical experience".

Arasti and her colleagues (2012) dubbed the group project, case study, individual project, development of a new venture creation project, and problem-solving as the most effective methods for business planning courses within the EE curriculum for an Entrepreneurship Management M.Sc. program. Fatoki and Oni (2014) stressed the importance of delivering a real-life experience to the classroom by inviting lecturers from the business world, and stated that mentoring and internship programs would help students to experience and understand the business world.

Rahman and Day (2015) suggested the use of a role model in EE. As people identify with role models and think of them as similar to themselves, students wish to improve this perceived similarity. Entrepreneur role models may thus enforce the effect of EE by encouraging their followers to seek entrepreneurial opportunities. In line with their proposal, Abaho and his colleagues (2015) recommend that an EE lecturer have business and entrepreneurial experience in order to be more reliable and to become a role

model for their students. They advised that EE lecturers should have a network in the business world and pass the knowledge gained from their network to their students.

Neck and Greene (2011) suggest teaching entrepreneurship as a method more than a process. A process, by its very nature, is predictable - its inputs, outputs, and tasks are predefined; however, none of these items are clearly defined along the journey to entrepreneurship. Creating EE as a collection of required skills and techniques, and enhancing the student's experience with start-up experience, games and simulations, design-based learning, and reflective practices might encourage them to think, create, and take action.

It is important to note that there are also significant differences between targeted groups, such as undergraduate and graduate students. Undergraduate students value class learning more than graduate students. On the other hand, graduate students embrace learning in professional settings. In defining the proper methods of using EE, the risk of creating negative intentions can be minimized, while positive outcomes can be enhanced (Mayhew et al., 2016; Oosterbeek et al., 2010).

Classical EE is based on the transfer of knowledge and information (Lourenço and Jones, 2006). This approach considered students as "empty containers into which instructors poured their wisdom", which is a passive way of learning (Wright et al., 1994). This way does not provide the required skills that students need to succeed in fast-changing business environments; instead, it usually pushes students into strict

hierarchical organization structures. Entrepreneurs need a vast array of skills, attributes, and behaviors that are far beyond functional knowledge and require advance teaching methods (Gibb, 1993). The classical curriculum approach falls short in terms of reflecting successful entrepreneurs' courses of action. It is formalized and planned, whereas real-life experience shows that the actions of entrepreneurs are mostly a product of emergent processes (Harris et al., 2000). This criticism drives business schools to enrich their education techniques in an attempt to build an active, participatory, and collaborative teaching environment, as classical methods are enhanced by knowledge-sharing methods (Solomon, 2007; Sun, 2017; Wright et al., 1994). Although the search for better ways of teaching entrepreneurship has been going on for decades and valuable contributions have been made, the criticisms of EE are still prevalent. EE does not captivate today's world, and it is a few steps behind in fulfilling current needs (Fayolle, 2013; Neck and Greene, 2011). Most courses are still designed "about" entrepreneurship rather than "for" entrepreneurship, and even lesser "through" entrepreneurship (Pittaway and Edwards, 2012).

While it is known that classical EE is not enough in terms of education, it still has a place in EE (Davey et al., 2016; Esmi et al., 2015; Henry et al., 2005). According to Henry, Hill, and Leitch (2005), EE has stages, and formal education is an unavoidable part of these stages. Thus, we propose:

H1.1 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "creating specific programs in entrepreneurship" (ACT-1.1) differently.

H1.2 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "incorporating courses in entrepreneurship within academic programs such as management, engineering, technology, medicine, etc." (ACT-1.2) differently.

H1.3 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "developing internship programs in entrepreneurship" (ACT-1.3) differently.

H1.4 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "practical involvement of lecturers, teachers, and/or course assistants in entrepreneurship" (ACT-1.4) differently.

In EE, there is no "one fits all" approach. EE needs to be modified according to targeted groups' needs. The course content and style of delivery significantly changes the outcome the course (Lourenço and Jones, 2006). All entrepreneurship courses improve self-efficacy, however practice-oriented courses increase entrepreneurial intention while theory-based courses can inhibit it (Piperopoulos and Dimov, 2015). Therefore, we propose:

H2.1 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate “building practical courses that teach the best practices in entrepreneurship” (ACT-2.1) differently.

H2.2 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate “studying in small groups or teams (e.g., in preparing classwork and homework, etc.)” (ACT-2.2) differently.

H2.3 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate the “practical involvement of lecturers, teachers and/or course assistants in entrepreneurship” (ACT-2.3) differently.

As a result of the increasing accessibility of the internet, the nature of courses has changed and, as such, massive open online courses have become popular. These courses are accessible as long as the internet is available and there are no boundaries in terms of time and place. They therefore provide education with high standards for anyone who does not have the opportunity to attend an in-class course (Chatterjee and Nath, 2014; Welsh and Dragusin, 2013). Al-Atabi and Deboer (2014) explored the effectiveness of online entrepreneurship courses and concluded that online EE can be very effective. In line with discussions about online education, entrepreneur universities establishing specific departments to impose entrepreneurialism commonly build entrepreneurship websites to reach more people and enlarge their network. They communicate their ongoing and

upcoming activities, introduce their organizational structure, units, and programs, provide insights, and share experience via these websites (About Us | Lassonde Entrepreneur Institute | University of Utah, n.d.; Welcome | Entrepreneurship + Innovation, n.d.; What We Do ⎪ Institute For Entrepreneurial Excellence, n.d.). We propose:

H3.1 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "establishing websites for networking designed specifically for students wishing to become entrepreneurs" (ACT-3.1) differently.

H3.2 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "establishing websites for tutoring in entrepreneurship designed specifically for students wishing to become entrepreneurs" (ACT-3.2) differently.

Networking.

It is currently accepted that EE should not be restricted in terms of course content or formal education. Universities should make every effort to develop an out-of-class environment to promote interaction with other role-playing parties in the market, such as students from other institutions, academics, professionals, or entrepreneurs, in order to advance their students' creativity (Mayhew et al., 2016).

It is critical to create new learning spaces and to redefine organizations to support entrepreneurship (Gendron, 2004). Designing EE based on practice appears as the most favorable approach in recent studies. This approach covers using, applying, and acting

alongside understanding and knowing (Henry et al., 2005; Neck and Greene, 2011) and an interdisciplinary, project-based approach is favored in order to encourage cross-functional learning (Hynes, 1996). Interdepartmental learning helps students to learn from each other. For instance, business school students can catch up with technological advancements and develop innovative ideas when working with science students, while science students can learn how to handle management issues by studying with business school students (Mayhew et al., 2016). We propose:

H4.1 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "constructing formal and ongoing networking sessions with existing/successful entrepreneurs" (ACT-4.1) differently.

H4.2 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "constructing formal, ongoing visits to entrepreneurial enterprises" (ACT-4.2) differently.

H4.3 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "constructing formal, ongoing visits to incubators" (ACT-4.3) differently.

H4.4 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "developing exchange programs with students in entrepreneurship programs at different academic institutions, or in different cities or countries" (ACT-4.4) differently.

H4.5 Different groups of medical students are clustered according to perceived feasibility and desirability “evaluate commitment to expanding students' networking through professors and other students” (ACT-4.5) differently.

H4.6 Different groups of medical students are clustered according to perceived feasibility and desirability “evaluate developing a meaningful relationship with the community” (ACT-4.6) differently.

Research & entrepreneurship activities.

In entrepreneurial economies, universities are supposed to contribute to the regional and national economy by creating and disseminating knowledge and supporting new ventures. Although this mission seems to conflict with universities teaching and research missions at first glance, it is generally accepted and expected. Universities have the potential to create, transfer, and commercialize new knowledge. Spin-offs, copyrights, patents, licenses, and trademarks are all outputs of entrepreneurial research activities (Goldstein, 2009; Guerrero et al., 2015; Shattock, 2005).

Universities create a fruitful environment for start-ups and collaborate with private industries to turn their knowledge accumulation to marketable products and services. The collaborations between businesses and universities are mostly based on a win-win approach, which simplifies the collaboration process. In these kinds of collaborations, both parties have different interests and expectations. This diversity helps parties to

overcome intellectual property (IP) issues easily, if they occur. Although those who do not support business/university collaboration criticize these collaborations as obstacles to scientific development, the business community can support academic research by offering feedback to researchers and providing insight into how valuable their research can be for consumers. Usually, collaborations become more effective and efficient when a business is mature and large in scale. Thus, for universities, it is crucial to incorporate academics who have innovative and entrepreneurial skills into their organizations to nurture an entrepreneurial culture within universities (Cunningham and Link, 2014; Thorp and Goldstein, 2010).

As discussed, universities and business corporations are not in competition with each other; their collaboration can be rewarding for both parties when managed properly. Collaboration mostly starts through informal channels, however these connections fall short when it comes to solving some organizational and legal issues. Universities establish different "boundary spanning structures", such as technology transfer offices, industry-university cooperative research centers, research parks, and liaison offices, to formally connect the two parties (Lee and Ohta, 2010).

Technology transfer offices (TTO) are established with the intent to convert the inventions of academic staff into innovations. These offices are entrusted with the commercialization of inventions, generating licensing, and royalty income. Although

these duties are not usually put into play, studies show that the existence of TTO facilitates spin-offs from universities (Thorp and Goldstein, 2010).

In order to foster industry-university collective work, industry-university cooperative research centers are established. These centers are small in size and financed by private industries, and mainly play a mediatory role in collaborations (Adams et al., 2000). The collaboration in these centers can occur in different forms: Lynd, Styhre, and Aaboren (2013) divided these forms into four categories entitled ‘distanced’, ‘translational’, ‘specified’, and ‘developed’. All of these categories can produce successful outcomes and complement each other as long as all parties are content. The achievements of research centers are mainly dependent on their successes in mediation.

Incubator services deliver unique benefits and offer a fruitful and professional environment for start-ups, allowing them to bring synergy into their work environment. Even though universities deploy different strategies and policies for incubator services, they usually provide physical facilities for new ventures and common spaces, which intensifies interaction among new and experienced entrepreneurs and allows for the exchanging of ideas. They also provide guidance on the market, technology, legal issues, financial issues, and so on. With networking activities, incubators help inexperienced entrepreneurs to reach the right people as well (Fatoki and Oni, 2014; Jansen et al., 2015; Stal et al., 2016). We propose:

H5.1 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate the "commitment of senior administrators to creating and sustaining performance excellence with a focus on students" (ACT-5.1) differently.

H5.2 Different groups of medical students t are clustered according to perceived feasibility and desirability evaluate "commitment to developing a special focus on innovation (e.g., through the curriculum, projects, etc.)" (ACT-5.2) differently.

H5.3 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "creating incubators to support students' initiatives" (ACT-5.3) differently.

H5.4 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "developing a well-established research center for entrepreneurship" (ACT-5.4) differently.

H5.5 Different groups of medical students are clustered according to perceived feasibility and desirability evaluate "committing to robust, rigorous research in entrepreneurship at the school/department (including publication in the best journals)" (ACT-5.5) differently.

Methods

The main goal of this research was to associate universities' entrepreneurial education and activities with medical students' perceived feasibility and desirability of entrepreneurship.

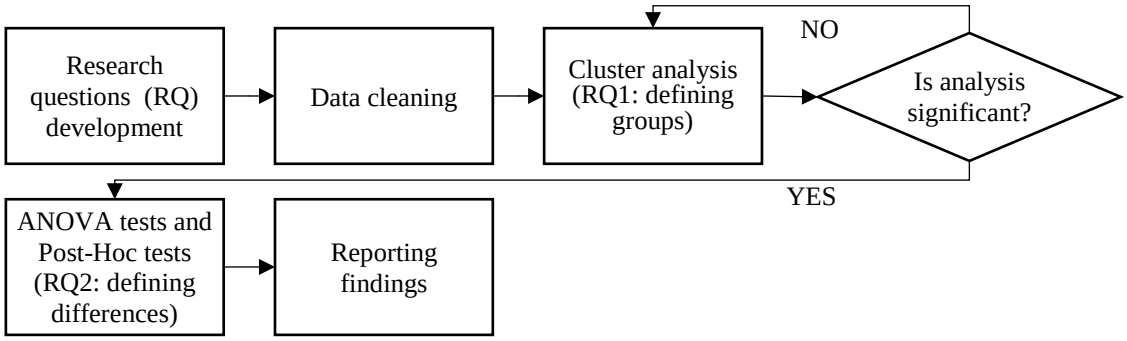

Figure 2: Flow of Reseach Process

A survey questionnaire was developed as part of the EC FoSentHE project in order to provide further insight into field and country differences as the basis for quality decision-making, with regards to the policies that could develop an entrepreneurial atmosphere and assist economic growth. One of the objectives of the project was to investigate students' attitudes towards entrepreneurship and entrepreneurial education. The questionnaire was distributed to students because they were deemed a relevant sample due to their knowledge base and intellectual reasoning and, furthermore, as students represent the last step in which to endorse entrepreneurship via education. Students were asked to fill the questionnaire out during the academic year enrollment period. The whole survey questionnaire can be found in **Appendix 1.** The questions identified as relevant for the purpose of this study were extracted from the questionnaire and tested within the scope of this research with the statistical software package SPSS 18.0, using a Likert scale with values ranging from 1 to 6. Data was collected from a total of 183 medical students from one medical school in Croatia, and 152 of these responses were used in the analysis. These

were obligatory questions that were asked when the student enrolled for the next academic year, which was necessary to monitor the student's status. 152 may seem very limited as a sample size, yet it is nearly 75% of all medical students in the university and it is worth noting that there are other studies conducted on entrepreneurship with similar or smaller sample sizes. Chen, Yao, and Kotha (2009) used data from 55 respondents to analyze the funding decisions of venture capitals in their field study. Jones and Jones (2011) investigated the impact of business plan competitions on students by collecting data from 50 students. Hamidi, Wennberg, and Berglund (2008) had a sample size of 78 in their study investigating the place of creativity in entrepreneurship. Wang and Sun (2014); Krueger, Reilly and Carsrud (2000); Guerrero, Cunningham and Urbano (Guerrero et al., 2015); and Albort-Morant and Oghazi (2016) used small data sets, and Watson et al. used 19 healthcare students as a sample. The profiles of respondents can be seen in Table 1.

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Before examining the students' expectations, it was deemed necessary to further investigate whether medical students' perceptions of the feasibility and desirability of entrepreneurialism were the same or differed significantly from each other. To examine this division, the Hierarchical Ward's Method Cluster analysis was used, based on five perceived feasibility measures: hardship (F-1), success (F-2), overwork (F-3), knowledge (F-4), and self-confidence (F-5). The four perceived desirability measures were love (D-

1), encouragement (D-2), stress (D-3), and enthusiasm (D-4). The exact questions and agreement levels are shown in Table 2. These nine questions were adopted from the previous research of Daim, Dabić, and Bayraktaroglu (2016) as they were already considered viable for the measuring of perceived desirability and feasibility constructs for EEM. There was no previous expectation of cluster characteristics but, as a cluster analysis is exploratory in nature, different numbers of clusters were tried. Researchers ultimately settled on four, as statistically significant differences existed within this number of clusters (see Table 2).

Students were asked to evaluate the necessity level of a number activities, which were identified from literature and internet searches as factors that could be linked to universities' role in entrepreneurship. Students rated fifteen different activities that were directly related to EE, and five activities that were linked to research and entrepreneurship. In Table 3, activities from ACT-1 to ACT-15 are educational activities, and those following are research and entrepreneurial activities. This data was used to examine the expectations of medical students.

Results & Discussion

Differences among medical students in terms of perceived feasibility and perceived desirability: Cluster analysis

Medical students' perceptions of feasibility were fairly moderate, as the mean values for feasibility measures were between 2.39 and 3.45, while their relatively higher perceptions of desirability, showed mean values of between 3.62 and 4.87. However, F statistics showed that there were statistically significant differences between clusters in terms of both desirability and feasibility values, with the exceptions of F-1 and F-3 (see Table 2). Students in the first cluster, which was the smallest one consisting of only nine members, were not interested in entrepreneurship at all. The mean values of feasibility measures for Cluster 1 were very close to general mean values, yet mean values of desirability measures were lower than the others. In the second cluster, with the exception of F-1 which was within the confidence interval for the overall mean value, all of the feasibility measures were below the mean values of students overall. This cluster's mean value of desirability measures clearly showed that students' perceived desirability in this cluster was higher than that measured overall. This cluster had the highest amount of personal motivation, as the mean value for D-1 ($\bar{x}_{D-1,2} = 5.48$), which is "I would love to do it", was higher than all other clusters. Only D-3 had a lower mean value ($\bar{x}_{D-3,2} = 3.00$), but D-3 was related to stress, which is negative in nature and thus should be considered as an opposition. Students in this cluster were aware of difficulties that they would have to face

if they became entrepreneurs, yet they trusted themselves and maintained a high desirability.

In general, the third cluster had mean values either within the general limit or above upper limits for both feasibility and desirability. These students were not assured of their success, and they did not trust themselves as much as the students in the second cluster did. Their belief in positive family support ($\bar{x}_{D-2,3} = 5.31$) was higher than results found for other clusters, and this was this cluster's main difference. The fourth and last cluster had mean values of feasibility measures within the general limit or above upper limits but had mean values of desirability measures which were within the general limit or below lower limits. For the fourth cluster, entrepreneurialism was as feasible as it was for the third cluster but was not desirable at all. The students had lower mean values than the second and third cluster, but higher values than the first cluster. Therefore, all of these clusters had different perceived desirability and perceived feasibility levels.

Table 2 should be placed here.

Expectation differences in entrepreneurial activities among clusters: ANOVA test

In general terms, in ACT-4.5, "commitment to expanding students' networking through professors and other students" appeared as the most important activity in educational activities ($\bar{x}_{ACT-4.5,Overall}$ =4.48). For ACT-3.1, it was "establishing websites for networking designed specifically for students wishing to become entrepreneurs"

($\bar{x}_{ACT-3.1,Overall}$=4.42); for ACT-3.2 it was "establishing websites for tutoring in entrepreneurship designed specifically for students wishing to become entrepreneurs" ($\bar{x}_{ACT-3.2,Overall}$=4.42); and, in ACT-4, it was "developing exchange programs with students in entrepreneurship programs at different academic institutions, or in different cities or countries" ($\bar{x}_{ACT-4.4,Overall}$=4.40). Other important activities that followed ACT-4.5 had a mean value of 4.40 over above. All of these activities, bar one, were networking activities; it can therefore be assumed that students prioritized networking activities above others.

The lowest mean value belonged to ACT-1.1, which was in "the process of creating specific programs in entrepreneurship" ($\bar{x}_{ACT-1.1,Overall}$=3.86). ACT-1.3 "developing internship programs in entrepreneurship" ($\bar{x}_{ACT-1.3,Overall}$=3.92) and ACT-4.3 "constructing formal, ongoing visits to incubators" ($\bar{x}_{ACT-4.3,Overall}$=3.95) had the second and third lowest mean values in general. As internship programs are directly related to educational programs, it is easy to understand why students were not interested in internship programs, as they were similarly disinterested in specific programs as well. Nevertheless, it is interesting that they did not want to make visits to incubators but did find networking activities valuable.

Table 3 should be placed here

Among research and entrepreneurial activities ACT-2.3 "practical involvement of lecturers, teachers and/or course assistants in entrepreneurship" had the highest mean

value ($\bar{x}_{ACT-2.3,Overall}$= 4.49), and ACT-5.4 “developing a well-established research center for entrepreneurship” had the lowest ($\bar{x}_{ACT-5.4,Overall}$=3.90).

From this we can deduce that medical students do not give priority to formal education methods in entrepreneurship. Instead they prefer to receive necessary education via internet websites ($\bar{x}_{ACT-3.2,Overall}$= 4.42). They were not interested in specific programs in entrepreneurship ($\bar{x}_{ACT-1.1,Overall}$ =3.86), but were more open to integrating entrepreneurial material into their existing program ($\bar{x}_{ACT-1.2,Overall}$ =4.22).

Students in Cluster 2 had higher expectations from their university than the students in other clusters. With the exception of ACT-4.5, “commitment to expanding students' networking through professors and other students”, Cluster 2 had the highest mean values. For ACT-4.5, Cluster 2 had the second highest mean value ($\bar{x}_{ACT-4.5,2}$=4.74), following Cluster 1 ($\bar{x}_{ACT-4.5,1}$=4.88).

Students with the lowest expectations were in Cluster 4. For ACT-1.3 “developing internship programs in entrepreneurship”, Cluster 1 had a lower mean value ($\bar{x}_{ACT-1.3,1}$=3.43) than Cluster 4 ($\bar{x}_{ACT-1.3,4}$=3.58); and for ACT-5.2, “commitment to developing a special focus on innovation (e.g., through the curriculum, projects, etc.)”, there was a very small difference between Cluster 1 ($\bar{x}_{ACT-5.2,1}$=3.75) and Cluster 4 ($\bar{x}_{ACT-5.2,4}$=3.76). For the rest of the activities, Cluster 4 had the lowest mean values.

These were the visible results of descriptive statistics. The results of the ANOVA test for the seven activities showed that the expectation levels of students in different clusters

were significantly different. Specifically, these were: ACT-1.2 “incorporating courses in entrepreneurship within academic programs such as: management, engineering, technology, medicine, etc. expectation levels of students in different clusters are significantly different”; ACT-3.2 “establishing websites for tutoring in entrepreneurship designed specifically for students wishing to become entrepreneurs”; ACT-4.1 “constructing formal and ongoing networking sessions with existing/successful entrepreneurs”; ACT-4.4 “developing exchange programs with students in entrepreneurship programs at different academic institutions, or in different cities or countries”; ACT-1.4 “developing workshops to practice entrepreneurial 'know-how'”; ACT-5.4 “developing a well-established research center for entrepreneurship”; and ACT-5.5 “committing to robust, rigorous research in entrepreneurship at the school/ department (including publication in the best journals)”.

To seize the source of the differences, two commonly preferred tests - Tamhane and Dunnett T3 - were run for activities that were rated with significant differences by alternate clusters. Tamhane is used in cases of equal variance, whereas Dunnett T3 is used when the assumption of equal variance is not satisfied. When variances are equal or close enough, these two tests give similar results. As shown in Table 4, the test results were very close to each other for each activity.

Statistical differences gathered in the ANOVA test were mainly the result of differences between Cluster 2 and Cluster 4. Students in Cluster 2 were significantly

more demanding than those in Cluster 4 for the activities in Table 4. One exception was that students in Cluster 3 found ACT-5, "establishing websites for tutoring in entrepreneurship designed specifically for students wishing to become entrepreneurs", more necessary than those in Cluster 4.

Students in Cluster 1 had the lowest desirability mean values, however their expectations were very similar to those of the other students.

Table 4 should be placed here

Conclusion

Entrepreneurial activities, which were the most expected activities by students in business schools/entrepreneurship education, were mostly designed for business students. There were a few examples of EE in different disciplines (Pittaway and Edwards, 2012). The untapped potential of other disciplines' students is often neglected, however the potential of other students becomes even more evident when the convergence of traditional science and computational science is considered (Thorp and Goldstein, 2010). This paves the way for medical students to be considered.

As previously mentioned, EE is generally designed for business students. Studying medicine at the undergraduate level ostensibly requires more sacrifice than studying other disciplines. It is a stressful period proven to lessen the life satisfaction of medical students (Kjeldstadli et al., 2006). The curriculum is intense, with concurrent

education, training, and practice (Carraccio et al., 2016) and so, in order to direct students to EE, it is important to understand their expectations and preferences.

The results of this research correlate with the arguments discussed in the previous section. Medical students gave priority to more flexible ways of learning entrepreneurship, preferring internet resources to allow them to attend organized classes or get involved in specific programs. Clearly, they did not want to burden themselves with more responsibilities and obligations. They valued networking activities and they favored learning from experienced entrepreneurs.

Students have different motivations for choosing medicine as a profession. While some of them stress the importance of serving humanity, others have a desire for a better income and a favorable status in society (Khami et al., 2008; Millan et al., 2005; Nedjat et al., 2006; Pagnin et al., 2013; Saad et al., 2011). In Croatia, the main motivations for medical students studying medicine were humanitarian and scientific reasons (Puljak et al., 2007). Accordingly, different approaches to entrepreneurship among medical students were to be expected. Our findings showed different groups of students in terms of their perceived feasibility and desirability with regards to entrepreneurialism.

In our case, four clusters emerged as a result of a cluster analysis in which perceived feasibility and perceived desirability measures were used as variables. Perceived feasibility was lower than perceived desirability, which was consistent with previous research on students from different disciplines (Guerrero et al., 2008).

Differences among clusters were more evident for perceived desirability than for perceived feasibility, and yet these perceptional differences were not related to expectations. Students' expectations were not extremely different as they expected their university to provide EE. One out of the four clusters appeared to be more open to entrepreneurship as this cluster had higher expectations from their institution than others had, although the differences were insignificant for most of the activities.

It was interesting to find that students generally did not prefer making visits to an incubator. This was confusing because all other results pointed to the importance of networking and learning from experienced people. Although visits to incubators may provide an opportunity for both networking and learning from those with more experience, most students probably did not like the idea of "formal" or "ongoing" visits, as they were looking for flexible ways of learning about entrepreneurship.

In conclusion, medical students could be more oriented towards entrepreneurial activities if universities chose a proper way of teaching it. Students are already open to EE but are dissatisfied with the classical way of teaching. They would like to be involved in out-of-class experiences, and expect not only knowledgeable but also experienced lecturers. The most important shortcoming to consider concerning this research is that all of the data was collected from one university and results, therefore, cannot be generalized. Even so, the findings are supported by existing literature and give some advice concerning ways in which EE could be organized for medical students. There is a research gap to be

filled in EE for students from non-business schools. This research marks the first step in that direction for medical students.

At the end, we provide the detailed conclusions as listed below:

Medical students in Croatia had different groups with different views on feasibility and desirability regarding:

- “incorporating courses in entrepreneurship within academic programs such as management, engineering, technology, medicine, etc.”
- “practical involvement of lecturers, teachers, and/or course assistants in entrepreneurship”
- “establishing websites for tutoring in entrepreneurship designed specifically for students wishing to become entrepreneurs”
- “constructing formal and ongoing networking sessions with existing/successful entrepreneurs”
- “developing exchange programs with students in entrepreneurship programs at different academic institutions, or in different cities or countries”
- “developing a well-established research center for entrepreneurship”
- “committing to robust, rigorous research in entrepreneurship at the school/department (including publication in the best journals)”

While there were no differences in other areas, there are enough differences to recommend multiple approaches to increase entrepreneurial enthusiasm among these students.

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References

Abaho, E.; Olomi, D. R.; and Urassa, G. C. (2015). 'Students' Entrepreneurial Self-Afficacy: Does the Teaching Method Matter?' in *Education + Training*, 57(2): 130–147.

Abdulghani, H. M.; Al-Drees, A. A.; Khalil, M. S.; et al. (2014).' What factors determine academic achievement in high achieving undergraduate medical students? A qualitative study' in *Medical Teacher*, 36 Suppl 1(230155): S43-8. DOI: 10.3109/0142159X.2014.886011.

'About Us | Lassonde Entrepreneur Institute | University of Utah (n.d.)' *Lassonde Entrepreneur Institute* [online]. Available at: <http://lassonde.utah.edu/about-us> (last accessed 31 January 2017).

Adams J. D.; Chiang, E. P.; and Starkey, K. (2000). *Industry-University Cooperative Research Centers*. NBER Working Paper Series. Cambridge.

Ajzen, I (1991). 'The theory of planned behavior' in *Orgnizational Behavior and Human Decision Processes*, 50: 179–211. DOI: 10.1016/0749-5978(91)90020-T.

Al-Atabi, M. and Deboer, J. (2014). 'Teaching entrepreneurship using Massive Open Online Course (MOOC)' in *Technovation*, 34(4): 261–264. DOI: 10.1016/j.technovation.2014.01.006.

Albort-Morant, G. and Oghazi, P. (2016). 'How useful are incubators for new entrepreneurs?' in *Journal of Business Research*, 69: 2125–2129.

Arasti, Z.; Falavarjani, M. K.; and Imanipour, N. (2012). 'A Study of Teaching Methods in Entrepreneurship Education for Graduate Students' in *Higher Education Studies*, '' (1)

Mar: 2–10.

Bell, R. and Bell, H. (2016). 'An Enterprise Opportunity for Entrepreneurial Students : Student Enterprise Development and Experience Assessed through the Student Voice' in *Education + Training*, 58(7/8): 751–765.

Bullough, A.; Luque, M. S.; Abdelzaher, D.; et al. (2015). 'Developing Women Leaders through Entrepreneurship Education and Training' in *Academy of Management*, 29: 250–270.

Callaway, S. K. and Dobrzykowski, D. D. (2009). 'Service Science-Orietned Entrepreneurship: Service-Dominant Logic in Green Design and Healthcare' in *Service Science*, 1(4): 225–240. DOI: 10.1002/9780470877876.

Carraccio, C.; Englander, R.; Van Melle, E.; et al. (2016). 'Advancing Competency-Based Medical Education' in *Academic Medicine*, 91(5): 645–649. DOI: 10.1097/ACM.0000000000001048.

Charney, A. and Libecap, G. D. (2000). The Impact of Entrepreneurship Education: An Evaluation of the Berger Entrepreneurship Program at the University of Arizona, *1985-1999*. *SSRN Electronic Journal*. Kansas City. DOI: 10.2139/ssrn.1262343.

Chartterji, A. K. (2009). 'Spawned with a Silver Spoon? Entrepreneurial Performance and Innovation in The Medical Device Industries' in *Strategic Management Journal*, 30: 185–206. DOI: 10.1002/smj.

Chase, D. (2011). 'HealthTech FAIL: Lessons For Entrepreneurs From Health Startups Gone Awry', *TechCrunch* [online] Available at: <https://techcrunch.com/2011/08/28/healthtech-fail-lessons-for-entrepreneurs-from-health-startups-gone-awry/> (last accessed 22nd December 2018).

Chatterjee, P. and Nath, A. (2014). 'Massive open online courses (MOOCs) in education - A case study in Indian context and vision to ubiquitous learning' at *2014 IEEE International Conference on MOOCs, Innovation and Technology in Education, IEEE MITE 2014*: 36–41. DOI: 10.1109/MITE.2014.7020237.

Chen, X. P.; Yao, X.; and Kotha, S. (2009). 'Entrepreneur Passion and Preparedness in Business Plan Presentations : A Persuasion Analysis of Venture Capitalists' Funding Decisions' in *Academy of Management*, 52(1): 199–214.

Christina, W.; Purwokom, H.; and Kusumowidagdo, A. (2015). 'The Role of Entrepreneur in Residence towards the Students' Entrepreneurial Performance: A Study of Entrepreneurship Learning Process at Ciputra University, Indonesia' in *Procedia - Social and Behavioral Sciences*, 211(September): 972–976. DOI: 10.1016/j.sbspro.2015.11.129.

Collins, L.; Hannon, P.; and Smith, A. (2004). 'Enacting entrepreneurial intent: the gaps between student needs and higher education capability' in *Education + Training*, 46(8/9): 454–463. DOI: 10.1108/00400910410569579.

Cunningham, J. A. and Link, A. N. (2014). 'Fostering university-industry R & D collaborations in European Union countries' in *International Entrepreneurship and Management Journal*, 11(42): 849–860. DOI: 10.1and 007/s11365-014-0317-4.

Dabić, M.; Daim, T.; Bayraktaroğlu, E.; et al. (2012). 'Exploring gender differences in attitudes of university students towards entrepreneurship: An international survey' in *International Journal of Gender and Entrepreneurship*, 4(3): 316–336. DOI: 10.1108/17566261211264172.

Daim, T.; Dabić, M.; and Bayraktaroglu, E. (2016). 'Students' entrepreneurial behavior: international and gender differences' in *Journal of Innovation and Entrepreneurship*, 5(1). Journal of Innovation and Entrepreneurship: 19. DOI: 10.1186/s13731-016-0046-8.

Davey, T.; Hannon, P.; and Penaluna, A. (2016). 'Entrepreneurship education and the role of universities in entrepreneurship: Introduction to the special issue' in *Industry and Higher Education*, 30(3): 171–182. DOI: 10.1177/0950422216656699.

Deng, D. (2018). 'Physician entrepreneurship: Why it matters to all of us' in *University of Western Ontario Medical Journal*, 86(S1), 12-13.

do Paço, A. M. F.; Ferreira, J. M.; Raposo, M.; Rodrigues, R. G.; et al. (2011). 'Behaviours and entrepreneurial intention: Empirical findings about secondary students' in *Journal of International Entrepreneurship*, 9(1): 20-38. Available at: <https://doi.org/10.1007/s10843-010-0071-9> (last accessed 27th December 2018).

Douglas, E. J. and Shepherd, D. A. (2002). 'Self-employment as a Career Choice: Attitudes, Entrepreneurial Intentions, and Utility Maximization' in *Entrepreneurship Theory and Practice*, 26(3): 81–90. DOI: 10.4337/9781783479801.00025.

Drnovsek, M. and Erikson, T. (2005). 'Competing models of entrepreneurial intentions' in *Economic and Business Review for Central and South - Eastern Europe*, 7(1): 55–71.

Esmi, K.; Marzoughi, R.; and Torkzadeh, J. (2015). 'Teaching learning methods of an entrepreneurship curriculum' in *Journal of advances in medical education & professionalism*, 3(4): 172–7. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/26457314> (last accessed 12th December 2018).

Fatoki, O. and Oni, O. (2014). 'Students' Perception of the Effectiveness of Entrepreneurship Education at a South African University' in *Mediterranean Journal of Social Sciences*, 5(20): 585–591. DOI: 10.5901/mjss.2014.v5n20p585.

Fayolle, A. (2013). 'Personal views on the future of entrepreneurship education' in *Entrepreneurship & Regional Development*, 25(7–8): 692–701. DOI: 10.1080/08985626.2013.821318.

Fellnhofer, K. (2017). 'Entrepreneurship education revisited: perceived entrepreneurial role models increase perceived behavioural control' in *International Journal of Learning and Change*, 9(3): 260.

Fitzsimmons, J. R. and Douglas, E. J. (2011). 'Interaction between feasibility and desirability in the formation of entrepreneurial intentions' in *Journal of Business Venturing*, 26(4): 431–440. DOI: 10.1016/j.jbusvent.2010.01.001.

Fuentelsaz, L.; González, C.; Maícas, J. P.; et al. (2015). 'How different formal institutions affect opportunity and Necessity Entrepreneurship' in *BRQ Business Research Quarterly* 18: 246–258.

Gendron, G. (2004). 'Practitioners' Perspectives on Entrepreneurship Education: An Interview With Steve Case, Matt Goldmann, Tom Golisano, Geraldine Laybourne, Jeff Taylor, and Alan Webber' in *Academy of Management Learning and Education*, 3(2): 302–314.

Gibb, A. A. (1993). 'Enterprise culture and education understanding enterprise education and its links with small business, entrepreneurship and wider educational goals' in *International Small Business Journal*, April: 11–34.

Goldstein, B. L.; Ick, M.; Ratang, W.; et al. (2016). 'Using the Action Research Process to Design Entrepreneurship Education at Cenderawasih University' in *Procedia - Social and Behavioral Sciences*, 228(June): 462–469. DOI: 10.1016/j.sbspro.2016.07.071.

Goldstein, H. A. (2009). 'The 'entrepreneurial turn' and regional economic development mission of universities' in *Annals of Regional Science*, 44(1): 83–109. DOI: 10.1007/s00168-008-0241-z.

Grimley, M.; Green, R.; Nilsen, T.; et al. (2011). 'Using computer games for instruction: The Student experience' in *Active Learning in Higher Education*, 12(1): 45–56.

Guerrero, M.; Rialp, J.; and Urbano, D. (2008). 'The impact of desirability and feasibility on entrepreneurial intentions: A structural equation model' in *International Entrepreneurship and Management Journal*, 4(1): 35–50. DOI: 10.1007/s11365-006-0032-x.

Guerrero, M.; Cunningham, J. A.; and Urbano, D. (2015). 'Economic impact of entrepreneurial universities' activities: An exploratory study of the United Kingdom' in *Research Policy* 44(3): 748–764. DOI: 10.1016/j.respol.2014.10.008.

Hale Feinstein, A.; Mann, S.; and Corsun, D. L. (2002). 'Charting the experiential territory:Clarifying definitions and uses of computer simulation, games, and role play' in *Journal of Management Development*, 21(10): 732–744. DOI: 10.1108/02621710210448011.

Hamidi, D. Y.; Wennberg, K.; and Berglund, H. (2008). 'Creativity in entrepreneurship education' in *Journal of Small Business and Enterprise Development*, 15(2): 304–320. DOI: 10.1108/14626000810871691.

Harris, S.; Forbes, T.; and Fletcher, M. (2000). 'Taught and enacted strategic approaches in young enterprises' in *International Journal of Entrepreneurial Behaviour & Research*, 6(3): 125–145. DOI: 10.1108/13552550010346217.

Henry, C.; Hill, F.; and Leitch, C. (2005). 'Entrepreneurship education and training: can entrepreneurship be taught? Part I' in *Education + Training*, 47(1): 98–111. DOI: 10.1108/00400910510586524.

Hynes, B. (1996). 'Entrepreneurship education and training - introducing entrepreneurship into non-business disciplines' in *Journal of European Industrial Training*, 20: 10–17. DOI: 10.1108/03090599610128836.

Jansen, S.; Van De Zande, T.; Brinkkemper, S.; et al. (2015). 'How education, stimulation, and incubation encourage student entrepreneurship: Observations from MIT, IIIT, and Utrecht University' in *International Journal of Management Education*, 13: 170–181. DOI: 10.1016/j.ijme.2015.03.001.

Jones, A. and Jones, P. (2011). '‘Making an impact’: A profile of a business planning competition in a university' in *Education + Training*, 53(8): 704–721. DOI: 10.1108/00400911111185035.

Karns, G. L. (2005). 'Marketing Student Perceptions of Learning Activities: Structure, Preferences and Effectiveness' in *Journal of Marketing Education*, 27(2): 163–171. DOI: 10.1177/0273475393015001O2.

Keogh, T. J. and Martin, W. M. (2011). 'The Convergence of Business and Medicine : A Study of MD / MBA Programs in the United States' in *US-China Education Review*, 2: 222–233.

Khami, M. R.; Murtomaa, H.; Jafarian, M.; et al. (2008). 'Study Motives and Career Choices of Iranian Dental Students' in *Med Princ Pract*, 17: 221–226. DOI: 10.1159/000117796.

Kirby, D. A.; Guerrero, M.; and Urbano, D. (2011). 'Making universities more entrepreneurial: Development of a model' in *Canadian Journal of Administrative Sciences*, 28(3): 302–316. DOI: 10.1002/CJAS.220.

Kjeldstadli, K.; Tyssen, R.; Finset, A.; et al. (2006). 'Life satisfaction and resilience in medical school--a six-year longitudinal, nationwide and comparative study' in *BMC medical education*, 6–48. DOI: 10.1186/1472-6920-6-48.

Krueger, N. F. and Brazeal, D. J. V. (1994). 'Entrepreneurial Potential and Potential Entrepreneurs. in *Entrepreneurship Theory and Practice*, 3(Spring): 91–104. DOI: 10.2139/ssrn.1505244.

Krueger, N. F.; Reilly, M. D.; and Carsrud, A. L. (2000). 'Competing models of entrepreneurial intentions' in *Journal of Business Venturing*, 15(February): 411–432. DOI: 10.1016/S0883-9026(98)00033-0.

Kuratko, D. F. (2005). 'The emergence of entrepreneurship education: development, trends, and challenges' in *Entrepreneurship Theory and Practice*, 29(5): 577–598. DOI: 10.1111/j.1540-6520.2005.00099.x.

Lackéus, M. (2013). 'Links between Emotions and Learning Outcomes in Entrepreneurial

Education' in *22nd Nordic Academy of Management Conference*, 2013, 1–22.

Lee, K. and Ohta, T. (2010). 'Formal boundary spanning by industry liaison offices and the changing pattern of university-industry cooperative research : the case of the University of Tokyo' in *Technology Analysis & Strategic Management*, 22(2): 189–206. DOI: 10.1080/09537320903498538.

Lind, F.; Styhre, A.; and Aaboen, L. (2013). 'Exploring university-industry collaboration in research centres' in *European Journal of Innovation Management*, 16(1): 70–91. DOI: 10.1108/14601061311292869.

Lourenço, F. and Jones, O. (2006). 'Developing Entrepreneurship Education: Comparing Traditional and Alternative Teaching Approaches' in *International Journal of Entrepreneurship Education*, 4: 111–140.

Lunt, N.; Exworthy, M,; Hanefeld, J.; et al. (2015). 'International patients within the NHS: A case of public sector entrepreneurialism' in *Social Science and Medicine*, 124: 338–345. DOI: 10.1016/j.socscimed.2014.04.027.

Marchese, M.; Healey, B.; and Belardi, F. (2015). 'Business studies journal' in *Business Studies Journal*, 7(2): 19–24.

Mayhew, M. J.; Simonoff, J. S.; Baumol, W. J.; et al. (2016). 'Cultivating Innovative Entrepreneurs for the Twenty-First Century: A Study of U.S. and German Students' in *The Journal of Higher Education*, 87(3): 420–455. DOI: 10.1353/jhe.2016.0014.

Mccleary, K. J.; Rivers, P. A.; and Schneller, E. S. (2006). 'A Diagnostic Approach to Understanding Entrepreneurship in Health Care' in *Journal of Health and Human Services Administration*, 28(4): 550–77.

Meigounpoory, M. R.; Yazdani, P.; Mirmiran, P.; et al. (2011). 'Application of Strategic Analysis to Identify Entrepreneurial Opportunities in Healthcare System: A Survey on Iranian Diabetics' Demends for Nutrition Counseling' in *Business and Management Review*, 1(4): 66–72.

Millan, L. R.; Azevedo, R. S.; Rossi, E.; et al. (2005). 'What Is Behind a Student'S Choice for Becoming a Doctor?' in *Clinics*, 60(2): 143–150. DOI: S1807-59322005000200011 [pii]\r/S1807-59322005000200011.

Miron-Shatz, T.; Shatz, I.; Becker, S.; et al. (2014). 'Promoting business and entrepreneurial awareness in health care professionals: Lessons from venture capital panels at medicine 2.0 conferences' in *Journal of Medical Internet Research*, 16(8): 184. DOI: 10.2196/jmir.3390.

Mitchell, J. and Scott, E. (1992). 'New evidence of the prevalence and scope of physician joint ventures' in *JAMA*, 268(1): 80–84. DOI: 10.1001/jama.1992.03490010082034.

Mwasalwiba. E. S. (2010). 'Entrepreneurship education: a review of its objectives, teaching

methods, and impact indicators' in *Education + Training*, 52(1): 20–47.

Neck, H. M. and Greene, P. G. (2011). 'Entrepreneurship Education: Known Worlds and New Frontiers' in *Journal of Small Business Management*, 49(1): 55–70. DOI: 10.1016/j.aqpro.2013.07.003.

Nedjat, S.; Emami Razavi, H.; Rashidian, A.; et al. (2006). 'The Motives of Medical Students in Tehran University for Choosing Medicine Field and their Outlooks for their Profession: Qualitative versus Quantitative Approach' in *Strides in Development of Medical Education*, 3(1): 1–10. Available at: http://sdmej.ir/article-1-203-en.html.

Oosterbeek, H.; van Praag, M.; and Ijsselstein, A. (2010). 'The impact of entrepreneurship education on entrepreneurship skills and motivation' in *European Economic Review*, 54(3): 442–454. DOI: 10.1016/j.euroecorev.2009.08.002.

Owens, J. D. and Price, L. (2015). 'Venture creation programs: bridging entrepreneurship education and technology transfer' in *Education + Training*, 57(1): 48–73.

Pagnin, D.; De Queiroz, V.; Oliveira Filho Márcio Amaral De; et al. (2013). 'Burnout and career choice motivation in medical students' in *Medical Teacher*, 35(5): 388–394. DOI: 10.3109/0142159X.2013.769673.

Piperopoulos, P. and Dimov, D. (2015). 'Burst Bubbles or Build Steam? Entrepreneurship Education, Entrepreneurial Self-Efficacy, and Entrepreneurial Intentions' in *Journal of Small Business Management*, 53(4): 970–985. DOI: 10.1111/jsbm.12116.

Pittaway, L. and Cope, J. (2007). 'Entrepreneurship education: a systematic review of the evidence' in *International Small Business Journal*, 25(5): 479–510. DOI: 10.1177/0266242607080656.

Pittaway, L. and Edwards, C. (2012). 'Assessment: examining practice in entrepreneurship education' in *Education + Training*, 54(8/9): 778–800. DOI: 10.1108/00400911211274882.

Puljak, L.; Brnjas Kraljevic, J.; Barac Latas, V.; et al. (2007). 'Demographics and motives of medical school applicants in Croatia' in *Medical Teacher*, 29(8): e227–e234. DOI: 788416734 [pii]\r10.1080/01421590701551714.

Rahman, H. and Day, J. (2015). 'Involving The Entrepreneurial Role Model: A Possible Development for Entrepreneurship Education' in *Journal of Entrepreneurship Education*, 18(1): 86–95.

Russell, R.; Atchison, M.; and Brooks, R. (2008). 'Business plan competitions in tertiary institutions: Encouraging entrepreneurship education' in *Journal of Higher Education Policy and Management*, 30(2): 123–138. DOI: 10.1080/13600800801938739.

Saad, S. M.; Fatima, S. S.; and Faruqi, A. A. (2011). 'Students' views regarding selecting medicine as a profession' in *The Journal of the Pakistan Medical Association*. 61(8): 832–

836.

Saeed, S.; Yousafzai, S. Y.; Yani-De-Soriano, M.; et al. (2015). 'The Role of Perceived University Support in the Formation of Students' Entrepreneurial Intention' in *Journal of Small Business Management*, 53(4): 1127–1145. DOI: 10.1111/jsbm.12090.

Schlaegel, C. and Koenig, M. (2014). 'Determinants of Entrepreneurial Intent: A Meta-Analytic Test and Integration of Competing Models' in *Entrepreneurship: Theory and Practice*, 38(2): 291–332. DOI: 10.1111/etap.12087.

Shane, S. A. (2000). 'Prior knowledge and the discovery of entrepreneurial opportunities' in *Organization Science*, 11(4): 448–469. Available at: http://search.ebscohost.com/login.aspx?direct=true&db=epref&AN=OS.AA.DDH.SHANE.PKDEO&site=ehost-live (last accessed 2nd March 2018.

Shattock, M. (2005). 'European Universities for Entrepreneurship: Their Role in the Europe of Knowledge The Theoretical Context' in *Higher Education Management and Policy*. *17*(3), 13–24.

Solomon, G. (2007). 'An examination of entrepreneurship education in the United States' in *Journal of Small Business and Enterprise Development*, 14(2): 168–182. DOI: 10.1108/14626000710746637.

Stal, E.; Andreassi, T.; and Fujino, A. (2016). 'The Role of University Incubators in Stimulating Academic Entrepreneurship' in *RAI: revista de administração e inovação*, 13(2): 27–47. DOI: 10.1016/j.rai.2016.01.004.

Sun, H. (2017). 'The PIPE Model and Core Tools for Teaching Innovation and Entrepreneurship in Chinese universities' in *Journal of Educational Research and Reviews*, 3(1): 1–9.

Thorp, H. and Goldstein, B. (2010). *The Entrepreneurial University in the Twenty-First Century*. *Engines of Innovation*. Chapel Hill: The University of North Caroline Press. DOI: 10.1007/s13398-014-0173-7.2.

Toner, M. and Tompkins, R. G. (2008). 'Invention, innovation, entrepreneurship in academic medical centers' in *Surgery*, 143(2): 168–171. DOI: 10.1016/j.surg.2007.11.004.

Wang, Y. and Sun, J. (2014). 'Mobile Health Entrepreneurship: An Opportunity Exploitation Perspective' in *Journal of Information in Healthcare*, 4(2): 41–56.

Watson, K.; Mcgowan, P.; and Smith, P. (2015). 'Leveraging effectual means through business plan competition participation' in *Industry and Higher Education*, 29(6): 481–492. DOI: 10.5367/ihe.2015.0285.

'Welcome | Entrepreneurship + Innovation (n.d.)', *Entrepreneurship + Innovation*. Available at: <https://entrepreneurship.asu.edu/> (last accessed 31 January 2017).

Welsh, D. H. B. and Dragusin, M. (2013). 'The New Generation of Massive Open Online

Course (MOOCS) and Entrepreneurship Education' in *Small Business Institute Journal*, 9(1): 51–65.

Welsh, D. H. B.; Tullar, W. L.; and Nemati, H. (2016). 'Entrepreneurship education : Process , method, or both?' in *Journal of Innovation & Knowledge*, 1: 125–132.

'What We Do │ Institute For Entrepreneurial Excellence (n.d.)', *Institute For Entrepreneurial Excellence*. Available at: <http://entrepreneur.pitt.edu/what-we-do/overview/> (last accessed 31 January 2017).

Wilson, A.; Whitaker, N.; and Whitford, D. (2012). 'Rising to the challenge of health care reform with entrepreneurial and intrapreneurial nursing initiatives' in *Online Journal of Issues in Nursing*, 17(2): 1–12. DOI: 10.3912/OJIN.Vol17No02Man05.

Wright, L. K.; Bitner, M. J.; and Zeithaml, V. A. (1994). 'Paradigm Shifts in Business Education: Using Active Learning to Deliver Services Marketing Content' in *Journal of Marketing Education*, Fall: 5–19.

Young, M. A.; Hough, D. E.; and Peskin, M. R. (2003). 'Outcomes of a Program in Business Education for Physicians and Other Health Care Professionals' in *The Southern Medical Journal*, Birmingham , Alabama *96*(10), 1000-1007.

APPENDIX 1 – Survey Instrument

Country: _____; University/College Name of academic institution:_____

1. First year of undergraduate study: _____ 2. Last year of undergraduate study: _____ 3. First year of graduate study: _____ 4. Last year of graduate study:_____

SURVEY FOR STUDENTS IN BUSINESS SCHOOL

Demographic and personal data (please circle your response)

5. Gender: (1) Female (2) Male

6. Age group: (1) 20 or under (2) 21-25 (3) 26-30 (4) 31-35 (5) 36-40 (6) 41 -45 (7) 46 or over

7. Marital status: (1) Single (2) Married (3) Divorced/Widowed

8. Your father's employment: (1) Has his own business (2) Works for someone else (3) Currently unemployed (4) Retired (5) Deceased

9. Your current student status: (1) Full-time (2) Part-time

10. Your major area(s) of study (circle all options that apply):

(1) Business/Business Administration (accounting, finance, marketing etc.)

(2) Human resource management

(3) Information technology (computers, software, hardware, internet, etc.)

(4) Entrepreneurship

(5) Management (general management, management of technological corporations, management of international businesses, etc.)

(6) Behavioral studies (organizational counseling, business psychology, etc.)

(7) Other (please specify): _____

11. Your current employment status (circle all options that apply):

(1) I have my own business (part-time)
(2) I have my own business (full-time)
(3) I work for a small or new company
(4) I am working part-time/full-time in a business owned by an immediate family member (spouse, parent, sibling, child)
(5) I work for a large company or corporation
(6) I am currently unemployed
(7) I am retired

Intentions

12. After you have finished your studies at your academic institution (regardless of whether you obtain a degree), what do you intend to do?

IMPORTANT: If you answer "*yes*" to 1 or 2 **go to question 13**. If you answer "*yes*" to 4 or 5 **go to question 14**; finally if you answer "yes" to 3 please **address both questions 13 and 14**.

	No	Yes
1. Start my own business		
2. Partner with someone to start a business		
3. Work for a business owned by an immediate family member (spouse, parent, sibling, child)		
4. Work for someone else in a small or new company		
5. Work for a large company or corporation		

13. Why would you choose to start your own business? (Check all options that apply):

Reason for starting a business in the future	
1. For the pure challenge of it	
2. For the creation of wealth	
3. For the independence	
4. It is inspiring	
5. It is more rewarding	
6. I control my schedule and activities	
7. My family is my model for entrepreneurship	
8. I have always wanted to do this	
9. For the greater good	
10. It is creative	
11. It is varied	
12. I like to take risks	
13. I want to be broadly involved in the operation of all aspects of a business	
14. I am not proficient in 'traditional' jobs	
15. Other (specify):	

14. Why would you choose to work as a salaried employee for someone else? (Check all options that apply):

Reason for being a salaried employee in the future	
1. Financial stability (earning a monthly salary)	
2. It is more predictable (working hours, career path, vacation, payment in kind)	
3. It provides a wide range of career-development opportunities	
4. It enables a work/life balance	
5. It is someone else's responsibility to manage the business	
6. It provides more opportunities to gain diverse work experience	
7. It provides opportunities to learn how to deal with others (bosses, customers, colleagues, employees, etc.)	

8. It provides more opportunities to learn diverse skills (conflict resolution, stress management, managing people, effective meeting management , etc.)	
9. You meet many people	
10. It provides more opportunity to specialize in my area	
11. It expands my networks	
12. I have no qualifications to manage/lead my own business	
13. If a company would be willing to hire me, I would go for it	
14. Other (specify):	

Perceived feasibility

Address the following statements with regards to starting <u>your own business</u> after completing your education (check <u>one</u> for each of the following statements):

	1	2	3	4	5	6
15. How hard do you think it would be?	Very hard					Very easy
16. How certain of success are you?	Very certain of success					Very certain of failing
17. How overworked would you be?	Very overworked					Not overworked at all
18. Do you know enough to start a business?	Know everything					Know nothing
19. How sure of yourself are you?	Very sure of myself					Very unsure of myself

Perceived desirability

Address the following statements with regards to starting <u>your own business</u> after completing your education

	1 Not at all	2	3	4	5	6 Very much
20. I would love doing it						
21. My immediate family members would encourage my doing it						
22. I would be tense.						
23. I would be enthusiastic.						

Your entrepreneurial experience (circle your response)

24. Have you ever launched your own business? (1) No (**proceed to question 28**) (2) Yes
25. When did you launch your business? (please specify the year)_____

26. How long did you run/have you been running your business? (in no. of years)_____
27. What is/was the industry division to which your business belongs/belonged? (Check all options that apply):

Business Industry		**Business Industry**	
1. Agriculture		9. Business activities	
2. Manufacturing (mining and industry)		10. Public administration	
3. Electricity and water supply		11. Education	
4. Construction (building and civil-engineering projects)		12. Health, welfare and social services	
5. Wholesale and retail trade, and repairs		13. Community, social, personal and other services	
6. Accommodation services and restaurants		14. Services for households by domestic personnel	
7. Transport, storage and communications		15. Extra-territorial organizations and bodies	
8. Banking, insurance, financial institutions		16. Other (specify): _____	

28. **Are any of your immediate family members (parents, spouse, siblings, children) entrepreneurs?**
(1). No (**go to question no. 30**)
(2). Yes. If so, (3). How many entrepreneurs are in your family? (please specify number) _____

Positiveness of experience

29. How would you describe your experience as an entrepreneur?

1—Very negative	**2**	**3**	**4**	**5**	**6—Very positive**

What do/did your parents do for a living? (Check your response for your mother and for your father):

Professional domain	30. Mother:	31. Father:
1. **Academic professionals** (e.g., scientist, engineer and architect, lawyer)		
2. **Associate professionals and technicians** (e.g., medical laboratory worker, nurse, teacher, accountant, lawyer, worker in the arts or sports)		
3. **Managers**		
4. **Clerical workers** (e.g., cashier, secretary, customer service clerk)		
5. **Agents, sales workers and service workers** (e.g., financial and business service agent, tour guide, steward)		
6. **Skilled agricultural workers**		
7. **Manufacturing, construction and other skilled workers** (e.g., machinery mechanic and fitter, painter, woodworker and carpenter, driver)		
8. **Unskilled workers** (e.g., domestic and related helper, watchperson porter and docker)		
9. **Unemployed**		

What is your feeling towards the career of:

	1—Very unsatisfactory	2	3	4	5	6—Very satisfactory
32. Your mother						
33. Your father						
34. Yours (until now)						

Needs to be met at academic institutions

Address your academic studies at your university/college: check the extent to which each suggested program/activity/project might prompt your success in an entrepreneurial career. Please note that each of the following suggested programs/activities/projects would require your complete involvement and contribution (time, money, etc.), and that some would evaluate your performance and provide you with grades (internship programs, research, student-exchange programs, etc). Your choices should reflect these requirements.

1—Not needed at all ----------6—Very much needed

	1	2	3	4	5	6
35. Creating specific programs in entrepreneurship						
36. Incorporating courses in entrepreneurship within academic programs such as: management, engineering, technology, medicine, etc.						
37. Developing internship programs in entrepreneurship						
38. Creating incubators to support students' initiatives						
39. Establishing websites for networking designed specifically for students wishing to become entrepreneurs						
40. Establishing websites for tutoring in entrepreneurship designed specifically for students wishing to become entrepreneurs						
41. Constructing formal and ongoing networking sessions with existing/ successful entrepreneurs						
42. Practically involvement of lecturers, teachers and/or course assistants in entrepreneurship						
43. Constructing formal, ongoing visits to entrepreneurial enterprises						
44. Constructing formal, ongoing visits to incubators						
45. Developing a well-established research center for entrepreneurship						
46. Developing a meaningful relationship with the community						
47. Committing to robust, rigorous research in entrepreneurship at the school/department (including publication in the best journals)						
48. Developing exchange programs with students in entrepreneurship programs at different academic institutions, or in different cities or countries						
49. Commitment of senior administrators (e.g., entrepreneurship program directors, deans, advisory board members, etc.) to creating and sustaining performance excellence with a focus on students						
50. Commitment to developing a special focus on innovation (e.g., through the curriculum, projects, etc.)						

51. Building practical courses that teach best practices in entrepreneurship						
52. Studying in small groups or teams (e.g., in preparing classwork and homework, etc.)						
53. Commitment to expanding students' networking through professors and other students						
54. Developing workshops to practice entrepreneurial 'know-how'						

55. Check the 3 most significant needs <u>for you</u> from the list above (questions 35-54)**:**

Suggested programs/activities/projects	Number in the list above
1.	
2.	
3.	

56. From the list above (questions 35 to 54), **list 3 programs/activities/projects that <u>already exist</u> at your academic institution for student entrepreneurs:**

Programs/activities/projects	Number in the list above
1.	
2.	
3.	

Survey for Deans at your Academic Institution[1]

1—Strongly disagree----------6—Strongly agree

	1	2	3	4	5	6
1. Commitment to academic offerings in entrepreneurship in your Unit is increasing						
2. Commitment to research in entrepreneurship in your Unit is increasing						
3. Commitment to outreach offerings in entrepreneurship to the community is increasing						
4. Entrepreneurship research is rigorous						
5. Development of entrepreneurship centers, incubators and/or research centers in entrepreneurship is proactively encouraged and supported in your Unit						
6. Development of a unique program in entrepreneurship based on the theoretical and scholarly domain is supported in your Unit						
7. Commitment to fostering entrepreneurship in your Unit is increasing						
8. Establishing practical programs for students wishing to become entrepreneurs is supported in your Unit						
9. Commitment to raising money for entrepreneurship programs in your Unit (core courses, seminars, etc.), the highest quality research and/or entrepreneurial centers is increasing						

10. Remarks and comments:

[1]Following Brush et al., 2003; as the terminology for schools teaching business is diverse (e.g., Business School; School of Business Administration; Department of Business, etc.), we use the term 'Unit' to indicate the entity under the Dean's jurisdiction.

TABLES

Table 1: Profile of Respondents

Year of Study	1	2	3	4	5	6	7	Unknown
	4	43	23	35	29	16	1	1
Gender	Female: 100			Male: 51			Unknown:1	
Age	20 or lower: 46			21-25: 103			26-30: 3	
Marital Status	Single: 150					Married: 2		
Student Status	Full time: 151					Part time: 2		
Employment Status	Family member business: 1			Unemployed: 149			Unknown: 2	

Table 2 Descriptive Statistics for Feasibility & Desirability Measures

Clusters		F-1	F-2	F-3	F-4	F-5	D-1	D-2	D-3	D-4
1 N=9	Mean	2.33	3.11	2.56	3.89	2.33	1.22	1.78	2.00	1.67
	Min	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	1.00
	Max	5.00	6.00	5.00	6.00	4.00	2.00	3.00	3.00	3.00
	Std. Dev.	1.41	1.69	1.42	1.36	1.22	0.44	0.97	0.87	0.87
2 N=50	Mean	2.62	2.02	2.12	3.00	1.88	5.48	5.18	3.00	5.00
	Min	1.00	1.00	1.00	1.00	1.00	3.00	1.00	1.00	3.00
	Max	5.00	4.00	4.00	5.00	4.00	6.00	6.00	5.00	6.00
	Std. Dev.	0.92	0.68	0.96	0.86	0.77	0.71	1.32	0.99	0.97
3 N=48	Mean	2.46	3.25	2.56	3.54	3.02	4.98	5.31	4.52	5.19
	Min	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	4.00
	Max	5.00	5.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00
	Std. Dev.	1.07	0.93	1.13	1.13	1.16	1.21	0.85	1.2	0.7
4 N=45	Mean	2.33	3.13	2.49	3.76	2.91	2.89	4.67	3.67	3.62
	Min	1.00	1.00	1.00	2.00	1.00	1.00	3.00	1.00	1.00
	Max	5.00	6.00	5.00	6.00	5.00	6.00	6.00	6.00	6.00
	Std. Dev.	1.09	0.97	1.08	1.05	0.87	1.27	1.07	1.15	1.01
Mean		2.47	2.8	2.39	3.45	2.57	4.3	4.87	3.62	4.45
Min		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Max		5.00	6.00	5.00	6.00	6.00	6.00	6.00	6.00	6.00
Std. Dev.		1.05	1.07	1.09	1.08	1.08	1.69	1.36	1.32	1.32

Confidence interval α=0.95	Upper Limit	2.637	2.966	2.555	3.601	2.757	4.566	5.105	3.864	4.647
	Lower Limit	2.296	2.629	2.217	3.267	2.415	4.029	4.677	3.448	4.225
F Test		0.65	17.72	1.65	5.1	14.06	79.5	28.42	22.45	58.34
Significance		0.59	<0.01	0.18	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Feasibility: F-1 It would be very hard to do; F-2 I am certain that I would be successful; F-3 I would be overworked; F-4 I know enough to start a business; and F-5 I trust myself. Agreement: (1) very much agree; (2) strongly agree; (3) mildly agree; (4) mildly disagree; (5) strongly disagree; and (6) very much disagree.
Desirability: D-1 I would love to do it; D-2 My immediate family members would encourage me to do it; D-3 I would be tense; and D-4 I would be enthusiastic. Agreement: (1) not at all; (2) slightly; (3) somewhat; (4) moderately; (5) very much; and (6) extremely

Table 3: Descriptive Statistics and ANOVA Test Results

Hypotheses	Cluster	N	Mean	Std. Dev.	Std. Error	Min	Max	F Test (Sig.)
H1.1	1	8	3.88	1.55	0.55	2	6	2.392 (α=.072)
	2	45	4.11	1.48	0.22	1	6	
	3	42	4.05	1.27	0.20	1	6	
	4	40	3.38	1.35	0.21	1	6	
	Overall	13	3.86	1.40	0.12	1	6	
H1.2	1	8	4.13	1.46	0.52	2	6	3.839 (α=.011)
	2	46	4.72	1.28	0.19	1	6	
	3	43	4.19	1.44	0.22	1	6	
	4	41	3.71	1.45	0.23	1	6	
	Overall	13	4.22	1.43	0.12	1	6	
H1.3	1	7	3.43	1.90	0.72	1	6	2.479 (α=.064)
	2	46	4.26	1.25	0.19	1	6	
	3	43	3.95	1.15	0.18	2	6	
	4	40	3.58	1.26	0.20	1	6	
	Overall	13	3.92	1.28	0.11	1	6	
H1.4	1	8	4.50	1.41	0.50	3	6	4.654 (α=.004)
	2	46	4.63	1.20	0.18	2	6	
	3	41	4.20	1.36	0.21	1	6	
	4	41	3.59	1.41	0.22	1	6	
	Overall	13	4.18	1.38	0.12	1	6	
H2.1	1	8	4.38	1.51	0.53	3	6	1.798 (α=.151)
	2	45	4.44	1.25	0.19	1	6	
	3	42	4.24	1.30	0.20	1	6	
	4	41	3.80	1.36	0.21	1	6	
	Overall	13	4.18	1.33	0.11	1	6	
H2.2	1	8	4.00	2.00	0.71	1	6	
	2	46	4.46	1.49	0.22	1	6	

	3	42	4.36	1.21	0.19	2	6	1.627 (α=.186
	4	41	3.85	1.28	0.20	1	6	
	Overall	13	4.22	1.39	0.12	1	6	)
H2.3	1	8	4.00	1.51	0.53	2	6	1.587 (α=.196)
	2	45	4.73	1.39	0.21	2	6	
	3	43	4.60	1.18	0.18	3	6	
	4	41	4.20	1.45	0.23	1	6	
	Overall	13	4.49	1.36	0.12	1	6	
H3.1	1	8	4.38	1.41	0.50	3	6	1.386 (α=.250)
	2	46	4.74	1.31	0.19	1	6	
	3	43	4.33	1.36	0.21	1	6	
	4	41	4.17	1.39	0.22	1	6	
	Overall	13	4.42	1.36	0.12	1	6	
H3.2	1	8	4.38	1.60	0.56	2	6	4.343 (α=.006)
	2	46	4.76	1.30	0.19	1	6	
	3	42	4.64	1.23	0.19	2	6	
	4	41	3.80	1.40	0.22	1	6	
	Overall	13	4.42	1.38	0.12	1	6	
H4.1	1	8	3.88	1.89	0.67	1	6	4.378 (α=.006)
	2	46	4.65	1.16	0.17	2	6	
	3	41	4.39	1.24	0.19	2	6	
	4	41	3.76	1.09	0.17	1	6	
	Overall	13	4.26	1.26	0.11	1	6	
H4.2	1	8	3.75	1.75	0.62	1	6	2.075 (α=.107)
	2	46	4.20	1.41	0.21	1	6	
	3	42	4.33	1.26	0.19	2	6	
	4	40	3.65	1.31	0.21	1	6	
	Overall	13	4.05	1.37	0.12	1	6	
H4.3	1	8	4.13	1.89	0.67	1	6	1.519 (α=.213)
	2	45	4.13	1.36	0.20	1	6	
	3	42	4.07	1.22	0.19	2	6	
	4	41	3.59	1.22	0.19	1	6	
	Overall	13	3.95	1.32	0.11	1	6	
H4.4	1	8	4.00	2.00	0.71	1	6	4.916 (α=.003)
	2	46	4.93	1.20	0.18	2	6	
	3	42	4.48	1.42	0.22	1	6	
	4	39	3.77	1.56	0.25	1	6	
	Overall	13	4.40	1.49	0.13	1	6	
H4.5	1	8	4.88	1.25	0.44	3	6	1.680 (α=.174)
	2	46	4.74	1.14	0.17	3	6	
	3	42	4.38	1.13	0.17	3	6	
	4	41	4.22	1.39	0.22	1	6	
	Overall	13	4.48	1.23	0.11	1	6	
H4.6	1	8	4.38	1.41	0.50	3	6	
	2	46	4.54	1.39	0.21	1	6	

	3	43	4.37	1.27	0.19	1	6	0.411 (α=.745)
	4	41	4.22	1.41	0.22	1	6	
	Overall	13	4.38	1.35	0.12	1	6	
H5.1	1	8	4.38	1.51	0.53	3	6	1.990 (α=.118)
	2	46	4.39	1.27	0.19	1	6	
	3	42	4.07	1.31	0.20	1	6	
	4	41	3.76	1.11	0.17	1	6	
	Overall	13	4.10	1.27	0.11	1	6	
H5.2	1	8	3.75	1.98	0.70	1	6	2.266 (α=.083)
	2	46	4.41	1.22	0.18	1	6	
	3	42	4.19	1.25	0.19	1	6	
	4	41	3.76	1.11	0.17	1	6	
	Overall	13	4.11	1.27	0.11	1	6	
H5.3	1	8	4.25	1.67	0.59	2	6	1.267 (α=.288)
	2	45	4.49	1.49	0.22	1	6	
	3	42	4.24	1.19	0.18	1	6	
	4	40	3.90	1.43	0.23	1	6	
	Overall	13	4.22	1.40	0.12	1	6	
H5.4	1	8	4.13	1.36	0.48	3	6	4.990 (α=.003)
	2	46	4.22	1.36	0.20	2	6	
	3	43	4.16	1.25	0.19	2	6	
	4	41	3.22	1.41	0.22	1	6	
	Overall	13	3.90	1.40	0.12	1	6	
H5.5	1	8	4.13	1.36	0.48	3	6	4.624 (α=.004)
	2	46	4.54	1.36	0.20	1	6	
	3	43	3.95	1.27	0.19	1	6	
	4	41	3.51	1.25	0.19	1	6	
	Overall	13	4.03	1.35	0.11	1	6	

1: not needed at all, 6 very much needed

Table 4: Post-Hoc Tests for ANOVA

Hypotheses	Clusters		Mean Difference (i-j)	Std. Error	**Tamhane**			**Dunnett T3**		
					Sig.	95% Confidence Interval		Sig.	95% Confidence Interval	
	i	j				Lower Bound	Upper Bound		Lower Bound	Upper Bound
H1.2	2	4	1.01	0.29	.006	.215	1.806	.006	.216	1.805
H1.4	2	4	1.05	0.28	.002	.282	1.808	.002	.283	1.807
H3.2	2	4	.96	0.29	.009	.171	1.741	.009	.172	1.740
	3	4	.84	0.29	.029	.058	1.618	.029	.059	1.617
H4.1	2	4	.90	0.24	.002	.246	1.546	.002	.247	1.545
H4.4	2	4	1.17	0.31	.002	.336	1.996	.002	.336	1.996
H5.4	2	4	1.00	0.30	.007	.195	1.801	.007	.196	1.799
H5.5	2	4	1.03	0.28	.002	.278	1.785	.002	.279	1.784