

**Encouraging entrepreneurial abilities
through technology-based curriculum**

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Table of Contents

	Page
Table of contents	2
List of Tables and Figures	3
Introduction	4
Statement of the problem	6
Review of Related Literature	7
Statement of the Hypothesis	8
Method	9
Participants	9
Instrument	9
Experimental Design	10
Procedure	10
Results	11
Discussion	11
References	12

List of Tables and Figures

Table	Page
1. Experimental design	14
2. Means , Standard Deviations and t value for the difference between Lotus Notes and Traditional Entrepreneurship Curriculum.	16

Introduction

In the educational environment, there is a constant need for developing new methodologies that can enhance the teaching learning process. In the business arena, there is a need for creative people who can transform ideas into reality. Our world of constant change demands the vision, innovation, and dedication of entrepreneurs. Both, the business and the educational areas have been impacted by a technological trend that seems that will continue becoming an essential part of our lives.

The Project Oriented Learning methodology - POL - gives an innovative approach in order to improve teacher's performance in the Entrepreneurship class. The interaction is based on a technological platform that gives flexibility and develops skills among both teachers and students.

In Mexico, youth represent a large portion of the population. They require positive attitude and abilities in order to transform their ideas and goals into successful realities. The country needs people with self-development and with social responsibility. Entrepreneurs in Mexico are key players in this new globalized arena.

The ITESM, as an educational system is committed to educate students to levels of excellence in their chosen fields while fostering values and characteristics needed in entrepreneurship. ITESM teaches entrepreneurship via leadership and community service initiatives.

The Entrepreneur Program is an important part of the ITESM System because it fulfills the entrepreneurial aspect of our mission. By entrepreneur, we mean those who create their own businesses and those who apply their creative talents within existing organizations.

Our mission is to educate students to levels of excellence in their chosen fields and to develop the values and characteristics of entrepreneurship, leadership, honesty, and service.

Entrepreneurs from ITESM have contributed significantly to Mexico's economy by creating employment and providing services. A study in 1991 showed that approximately two-thirds of ITESM's graduating class of 1970 and a little more than half of the graduating class of 1980 are, or have been, owners of at least one business. Equally important, almost half of these businesses have had more than 10 employees.

Each year throughout the Entrepreneur Program, students have established approximately 300 businesses from more than 3,000 student projects. The program has trained over 30,000 students and 150 professors and is such an integral part of ITESM that its Entrepreneurial Development courses were made part of ITESM's undergraduate and high school core curricula in 1990.

There were several steps in order to offer students a refreshing Entrepreneurship course while exercising some attitudes and developing certain skills:

1. Curriculum design (both theory and activities)
2. Technological platform training course
3. Integration of the curriculum and the technological platform
4. Classes following the curriculum
5. Designed on-line activities for students in order to apply their knowledge
6. Virtual interaction between teacher and students

The purpose of this study was to research if students were able to perceive that a designed technology-based (at Lotus Notes) entrepreneurship curriculum helps them to develop some of the key entrepreneurial abilities necessary for business rather than a group attending a traditional entrepreneurship class.

Encouraging entrepreneurial abilities through technology-based curriculum

Are entrepreneurs born or taught? There has been, in recent years, more concern in order to understand in a better way the origin and nature of entrepreneurs. Researchers have been studying this phenomenon from several points of view and there still isn't a well-developed theory of entrepreneurship. There are too many approaches to this issue, but it is the trend to reduce the lack of agreement in some issues such as models, beliefs of causality and standards. The main goal for scholars is to make entrepreneurship a fully integrated and more useful discipline that could help people –especially entrepreneurs- to understand it and obtain benefits from that knowledge (Brazeal & Herbert, 1999). A common description of entrepreneurs is that they are persons who seize an opportunity and go for it. In the majority of the cases, opportunity will represent the chance to generate economic profits that will produce changes in the market, impact the community, and generate economical development in the region. Only individuals with certain special alertness to changes produced in the environment are able to act upon those circumstances and make decisions that others could not make. While making decisions, entrepreneurs influence society in different ways and scholars are researching in order to understand how those people make certain decisions in certain times (Minniti & Bygrave, 1999).

It is also relevant to mention that those decisions help not only individuals achieve a benefit, but also, the society. There is also a very important impact from society on the individuals too. Some communities generate better entrepreneurial conditions than others. If local or regional entrepreneurial activities are currently being encouraged this definitely contributes to an increase in the number of entrepreneurs. Conditions, such as legal framework to generate new ventures, are important for new initiatives, but it is also necessary for individuals to develop some entrepreneurial abilities in order to achieve their goals (Bygrave & Minitti, 2000). It is very common to see that entrepreneurs must adapt to changes over time. In many cases, they have to decide between trying to achieve certain degree of internal equilibrium in the company and a rapidly changing environment from outside. This usually results in constant transitions for the companies, new structures, and new operational activities that demand fully developed entrepreneurial skills if the new key ventures are to survive.

Time, growth, and complexity are definitely considered important challenges to growing enterprises managed by entrepreneurs. They must not only recognize that it is important to alter the organizations' elements as the environment changes, but also to make a rapid alignment of

several companies' resources to avoid costly consequences to the firm. In many cases, time is considered just a "one way road", in which any decision could be the last (Covin & Slevin, 1997).

While adapting and dealing with internal and external changes, the personal concept of time has an impact on the entrepreneurs' risk behavior. As another relevant issue to be mentioned, even in this topic there have been trait and cognitive approaches to understanding the entrepreneurial risk behavior. There is still no agreement among researchers in this topic, but some recent approaches stand for a short-range and long-range risk behavior among entrepreneurs that is also known as risk horizon, closely related with the individual future orientation (Das & Teng, 1997).

Time and risk taking are challenges that entrepreneurs face, with other key abilities such as innovation and creativity. Change is the broader set in which innovation may occur and creativity is the point of origin for innovative initiatives. Entrepreneurs contribute to society with innovations that could come as an outcome or as a process, in other words, a tangible device or knowledge that could be adopted by someone else under different circumstances. Likewise, creativity is a process that enables something new to come into existence. It is also a function of situational and personal attributes, including skills, previous experiences and availability of resources (Brazeal & Herbert, 1999). Depending on creativity and which resources are available, another entrepreneurial ability that can appear is known as decision taking. But first of all, it is important to determine if someone would like to become an entrepreneur or make some entrepreneurial decisions. According to the literature, each individual's decision regarding further action is determined by the difference between the subjective return to becoming an entrepreneur or the subjective return to doing something else. There are three simultaneous elements that describe if a person wants to become an entrepreneur: (a) the subjective initial endowment, which is personal, (b) the institutional and economic circumstances of the economy, and (c) the existing level of entrepreneurial activity in the community. All of these elements could help someone make decisions while starting up a new venture (Minitti & Bygrave, 1999). Therefore, entrepreneurial skills such as decision making, creativity, innovation and risk taking are vital in order to be able to participate in today's business environment.

The current competitive world moves individuals toward a better academic and personal preparation in order to be able to succeed. Here is where society, and especially schools are able to participate and interact with individuals by providing guided and rigorous intellectual challenge, exposure to real life situations, and the development of entrepreneurial abilities that will help students pursue and reach their personal goals. This takes us to the following question: are schools and teachers ready to prepare students to support their new ventures and develop their skills? When surveying businesses and industries about what they want from employees, they mention problem solving, teamwork, leadership, communication, and hands-on interaction with technology, important issues that school should be aware to develop in students, and also entrepreneurs should be alert to develop while looking for other opportunities and starting their new ventures. (Dean, 2000)

Problem Statement

The purpose of this study is to investigate if students are able to perceive that a designed technology-based entrepreneurship curriculum helps them to develop some of the key entrepreneurial abilities necessary for business. The course was designed using some elements of the Project Oriented Learning as a pedagogical technique.

Review of Related Literature

Due the current globalized situation, individuals, companies and society, –more than ever-, are moving toward an environment of constant change that will demand certain abilities and attitudes that will help different societies actors to grow, and, in some cases, just to survive. Entrepreneurs must develop and strengthen some principal abilities identified by researchers as vital (Brazeal & Herbert , 1999).

We cannot forget that the purpose of entrepreneurship education is to prepare individuals in thought (develop a mindset) and in action to create and successfully administer growing, profitable enterprises thereby enhancing the welfare of society. Entrepreneurial abilities and knowledge and their application during the business life-cycle could help the entrepreneur is his/her new venture. Some scholars have mentioned that creativity, risk-taking, leadership, communication and human relations are some of the skills and behaviors deemed essential (Young, 1996). In fact, it is important to mention that some models of entrepreneurial venture creation have been developed in order to help entrepreneurs while starting their own businesses. There had been proposed two opportunity recognition sequences in entrepreneurial venture creation, one is the “externally stimulated opportunity recognition” and the other is the “internally stimulated opportunity recognition”. In both cases, the decision to become an entrepreneur (Baron, 1997) and the recognition of business opportunity are important factors (Bhave,1994). There are other studies related with different entrepreneurial abilities such as decision- making (Bygrave & Minitti, 1999), and others which state the frame of reference for creativity and innovation skills (Brazeal & Herbert, 1999) .

Schools now have to adapt to societal conditions and the market. A special attention should be given to entrepreneurship curriculum that could facilitate the development of entrepreneurial abilities in the students in order to prepare them for current and future events (Dean, 2000). Schools are now providing the students with refreshing approaches of hands-on experiences to show them real-life issues that they face or will face later. Entrepreneurship courses currently being offered by several institutions and are focused on providing opportunities for students to develop their skills (Brown, 2000). There is also possible to find in the literature some experiments related with Entrepreneurship Education, some successes and failures related with this content among business and engineering schools inside and outside U.S.A. . Since the first survey undertaken in 1974 until 1991, total growth in schools offering entrepreneurship has gone from 85 to 369. The standard entrepreneurship course includes venture plan writing, speakers, readings, and cases. Some of the successes reported in the literature include: business plan for a good rather than a service, former students-become-entrepreneurs returning to speak, entrepreneurial financial planning software, and personality test instruments to develop strength and weakness awareness.

Some of the failures were entrepreneurship as a summer course; too little time, assuming accounting, finance, and marketing backgrounds; groups larger than two or three persons; and using films, videos, and straight lecturing by the instructor. (Gartner & Vesper, 1994).

Statement of the Hypothesis

Entrepreneurial abilities are long lasting skills that will help students in their personal and professional lives. The number of institutions that are aware that entrepreneurial abilities must be taught to the students in order to help them is increasing. Although there have been several research studies to entrepreneurial phenomena, its origin, characteristics, and development, entrepreneurial research is just starting. In order to contribute to the mentioned research study trend, it was hypothesized that students will be able to perceive that they are developing some entrepreneurial abilities while they are exposed to one designed technology-based entrepreneurship curriculum using some elements of the Project Oriented Learning - POL – pedagogical technique (in which key entrepreneurial abilities necessary for business will be presented through activities and assignments) rather than a traditional entrepreneurship curriculum . The null hypothesis for this study is that there is no difference between a technology-based entrepreneurship curriculum and a traditional one and students will not have a perception that they are developing entrepreneurial abilities.

Method

Participants

The ITESM High School is located in a southern area in Mexico City , with a student population of 3,000. The profile of its students is upper middle and high socio-economic class students, who are planning to graduate in order to attend College. Twenty five percent of the population have scholarship. All the students are required to have laptops in order to use it as a technological tool. Ninety percent of the population is from Mexico City, the rest come from other Mexican states and also from abroad.

The ITESM High School has three academic periods, one semester is from august to December, and the other semester is from January to May. The summer semester is during part of June and July. The entrepreneurship topic is an obligatory content, and is offered during the August-December semester. There are approximately 500 students attending entrepreneurship classes. During the January-May period they are approximately 700 students, none during the summer time. The teaching-learning process is offered through two different processes: traditional and technology based curriculum. Students choose one of those processes by selecting the schedules.

The potential population for this study was 500 students. All of them were attending entrepreneurship classes under one of the previous mentioned ways: traditional or technology based curriculum. The content is taught three hours every week, one hour on Monday, Wednesday and Friday or an hour an a half on Tuesday and half an hour on Thursday .

Sample's characteristics: sixty students selected this class due the offered schedule by authorities, they do no have any previous knowledge related with the entrepreneurship content thirty students were at a traditional teaching-learning approach and other thirty students in the technology based one .

Instrument

The ITESM System, the largest private educational system in Mexico, had been redesigning the teaching-learning process during the last five years. A fundamental part of this redesign has been to modify the teacher – student relationship in order to become a student-centered learning process, based on a technological platform called Lotus Notes Learning Space.

Every teacher must design his or her content in the Lotus Notes platform in order to teach. While the teacher is having interaction with the students via the mentioned platform, he/she has to apply a survey developed by the ITESM System in order to have constant feedback from the students and change whatever could be the perception of students in order to have a better teaching - learning process.

The test was designed to receive feedback from students in order to know more about the teacher's performance and if the students perceive that the current content is helping them to develop some attitudes and abilities, the test also includes questions related to the teaching-learning environment. The test developer is from the ITESM System but there has not been any possibility to contact her in order to determine the validity and/or reliability of the mentioned test.

For this specific research, the test will only identify the students' perception about the abilities and skills that they considered they have developed during the semester. The scale goes from 1 = totally agree, to 5 = totally disagree, and will just address if the students are able to perceive that they are developing some attitudes and abilities.

Experimental Design

From the potential sampling population of sixty students, some of them were selected randomly in order to answer the test, some of them decided to participate in the research after being asked for being surveyed. The design in this study was a posttest one and the sample was post-tested after having been exposed to certain teaching – learning conditions. In both cases the instrument measured perception of the students related with attitudes and skills. Usually groups at the ITESM are very constant, which will reduce mortality. This design will provide teacher with feedback from students during the semester, giving the teacher the opportunity to modify the curriculum when necessary to enhance his/her performance and facilitate a positive impact among the students education.

Table 1. Experimental design

<u>Group</u>	<u>Assignment</u>	<u>n</u>	<u>Treatment</u>	<u>Posttest</u>
1	Randomly	13	Lotus Notes	Attitude's perception
2	Randomly	21	Traditional	Attitude's perception

Procedure

Prior to the beginning of the semester, students selected the traditional or the technology based entrepreneurship class due the schedule the school offered to them. Entrepreneurship, is an obligatory course that students must attend and students do not have any other business-related content before this one at the ITESM High School. Students were exposed to an entrepreneurship curriculum that encourages several entrepreneurial attitudes and abilities important in today's business situation. The control group was taught in a traditional method, teacher-centered learning process, lectures at class time followed by teacher's explanations and guidance. The Lotus Notes group will be able to access the Curriculum via Lotus Notes at any time they would like. The Technology-based Curriculum included several techniques such as study cases, inside and outside classroom simulations, and teamwork activities that will reinforce students development of different attitudes and skills such as: teamwork, critical thinking, self-learning, creativity, innovation, etc. In the Lotus Notes group, students will study real-life cases and research in advance. Class time will be for discussions and a time to share experiences and ask questions of the teacher. For any other instruction or guideline the students will have to check all of the instructions and guidelines on the technological platform.

The data was collected through a self administered post test after both groups were exposed to the traditional or the technology based teaching- learning environment, in order to collect their perceptions (it was administered randomly first and then some students decided to participate as a volunteer). The data was analyzed through the use of the T test statistical tool, with a defined alpha level of 0.05, in order to determine if the null hypothesis could be rejected or not. According to the degrees of freedom (df) = 32, and a probability level of 0.05, the t value was 2.042.

Results

Some students from both groups answered a post test, is important to remind that the first group was exposed to the technology-based curriculum and the second one was exposed to the traditional teaching learning environment that is a teacher-centered environment, this class was taught by a female teacher that was her second time teaching this content. The technology-based class was taught by a male who had been teaching 4 semesters in a traditional way and two semesters using Lotus Notes.

As is possible to check at Table 2, the traditional group showed a mean of 1.92 while the Lotus Notes group presented a small difference with a lower value of 1.72, the standard deviation of both groups did not presented a great variance between each other but is still a difference.

Based on a t value = 2.042 as a reference, the finals results showed a t value = 0.98 , as a conclusion the null hypothesis is accepted.

Table 2

Means , Standard Deviations and t value for the difference between Lotus Notes and Traditional Entrepreneurship Curriculum.

	Group		t Score
	Traditional	Lotus Notes	
Posttest M	1.92	1.72	2.042 *
SD	0.65	0.41	

$p > 0.05$

Discussion

The results of the present study do not support the initial hypothesis: that students will be able to perceive that they were developing some entrepreneurial abilities while they are exposed to one technology-based curriculum. It was observed that students attending the technology-based curriculum had similar performance than the traditional group. There is no available information to know if the post test have the validity and/or reliability necessary to be accepted, but that is the way the ITESM System keep track on the students opinions in order to have a better teaching-learning process.

The presented evidence about the potential functionality of the Lotus Notes entrepreneurship curriculum could not be apply to other environments, first of all because in other schools they will probably do not have laptops, other reason could be that teachers are not familiar with the Lotus Notes or with a student-centered class orientation . The ITESM High School represents less than 1% of all the High Schools in Mexico City and its technological infrastructure represents a very high capital investment that the majority of all the other institutions are not able to afford.

Even the technology-based Entrepreneurship curriculum seems to be an innovative option to develop some entrepreneurial skills and attitudes among the students such as creativity, innovation, teamwork, etc. The course did not incorporate all the elements from the POL technique. This study did not consider the teacher's experience, the teacher and student's technological background and abilities, those variables could be or not be important to take into consideration if future studies would continue this analysis.

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