IMPACT ASSESSMENT OF AN EDUCATIONAL INTERVENTION BASED ON THE CONSTRUCTIVIST PARADIGM ON THE DEVELOPMENT OF ENTREPRENEURIAL COMPETENCIES IN UNIVERSITY STUDENTS

by

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INTRODUCTION

0.1. SCOPE AND OBJECTIVES OF THE DISSERTATION

Changing economic and social conditions are now creating a demand for different kind of instructional approaches from what traditional teaching can offer. It is such that organizations as the European Commission have emphasized the need for education and training systems to adapt to the demands of the knowledge society (European Commission, 2004). Following this line of thought, current trends in education suggest that learning can be better achieved when learners get actively involved in constructing knowledge that some authors refer to as constructivist view of teaching and learning (Crawford and Witte, 1999; Lord, 1998), which has its origin in the works of notable scholars as John Dewey, Jerome Bruner, Jean Piaget, and Lev Vigotsky (Bruner, 1960; Dewey, 1896: 1933; Vygotsky, 1986; Piaget, 1969; Piaget and Inhelder, 1967; Piaget and Inhelder, 1969). The constructivist perspective holds that "meaningful learning is achieved when people try to make sense of the world – when they construct an interpretation of how and why things are – by filtering new ideas and experiences through existing knowledge structures" (Snowman and Biehler, 2003, 301).

The concept of constructivism has received an important attention in contemporary educational practices as evidenced in the current education literature (Cobern, 1993; Crawford and Witte, 1999; Lord, 1998; Null, 2004; Perkins, 1999; Simpson, 2002); and its relevance and influence in science and management education (Kolb, 1984; Devos, Van den Broeck, and Vanderheyden, 1998; Mathews, 1993; Prawat, 1992), as well as in other disciplines (Cummings and Harlow, 2000) are evident as this theory is becoming to pervade in the language of educators. In fact, a shift towards constructivist teaching practices is noticeable as demonstrated in current educational reforms at all levels (Mathews, 1993; Null, 2004; Simpson, 2002). Specifically, the appropriateness of the constructivism theory in management and entrepreneurship

education has been acknowledged in the extant literature in the sense that it allows the existence of an open learning process (Lobler, 2006). Under this approach, students are called to govern their own learning process and the instructors play the role of facilitators rather than evaluators of performance. The existence of innovative approaches that address the need of increasing the students' knowledge, capabilities and attitudes has become crucial for personal fulfillment and development, inclusion, employment (European Commission, 2004), and entrepreneurial mindset. In addition, we have to take into consideration that today's world is experiencing rapid technology changes, which makes technological innovation and entrepreneurship be seen as the new forces for economic growth worldwide (Lalkaka and Abetti, 1999). In line with this assertion, the European Commission posits that entrepreneurship is one of the key components to be included in current educational systems in order to prepare people for successful participation in society.

As a scholar domain, entrepreneurship has been subject of special interest among scholars. Nowadays, it is well recognized for its contribution to the world economy; however, debate about whether we can teach students to become entrepreneurs seems to continue to exist throughout the years (Fiet, 2000a; Garavan and O'Cinneide, 1994a; Lalkaka and Abetti, 1999). Other crucial questions are: What should be taught? How should it be taught? (Fayolle, 1998) What opportunities does an entrepreneurship course offer? What are the limitations in implementing it and how can its effectiveness be assessed? (Moro, Poli and Bernardi, 2003).

In sum, the above discussion stresses that entrepreneurship education needs to be addressed from a different perspective. In this respect, we agree with previous studies that constructivism can serve as a theoretical underpinning for entrepreneurship education (Lobler, 2006). In accordance with this assumption, we propose an educational intervention that integrates the constructivist view of teaching

and learning into the entrepreneurship domain. Hence, this dissertation embraces three objectives. One is to design and implement an educational intervention based on the constructivist perspective that seeks to encourage students to develop entrepreneurial competencies through relevant learning experiences. As objective 1 suggests the need of identifying entrepreneurial competencies to be instilled in students, objective 2 is addressed by developing a working list for instructional design purposes. The third objective is to propose a conceptual framework that facilitates the assessment of the effectiveness of the intervention. Research guided by these objectives will contribute to the pedagogical side of entrepreneurship and to the search of uniformity of content and approach of courses for teaching entrepreneurship. By addressing these issues, we provide relevant information for educators to help them adjust their course content and curricula in order to help students acquire/develop knowledge and skills as well as an attitude change towards entrepreneurship. As we also cover methodological aspects on how to assess the effectiveness of the proposed intervention, the dissertation offers some tools to measure the impact of entrepreneurship education. By using them, educators will count with information that can help them reorient their efforts and existing practices.

0.2. RESEARCH QUESTIONS

Four research questions are addressed to meet the objectives of this dissertation:

1. What are the entrepreneurial competencies that universities should address in entrepreneurship education at the undergraduate level?

2. What is the impact of an educational intervention based on a constructivist approach on the development of relevant entrepreneurial competencies in university students at the undergraduate level?

3. Do differences in the students' self-assessed entrepreneurial competencies have an impact on their entrepreneurial self-efficacy?

4. Are the students' intentions to start their own business positively influenced by their entrepreneurial self-efficacy and attitudes toward entrepreneurial acts?

As will be described later, an exploratory study was conducted to answer the first research question. For answering the second, third and fourth research questions, we performed a quasi-experimental design among students exposed to entrepreneurship training during one academic term at ESPOL; a technically-oriented university in Ecuador. In doing so, we formulated six hypotheses that are presented in Table 0.1.

Table 0.1. Research Questions and Hypotheses of the Dissertation

RQ 2: What is the impact of an educational intervention based on the constructivist approach on the development of relevant entrepreneurial competencies in university students at the undergraduate level?	**H1**: Students who have been exposed to entrepreneurship training that follows a constructivist approach in settings that mimic real-world situations will exhibit higher levels of entrepreneurial competencies at the knowledge and skill levels after the educational intervention.
	H2: Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward entrepreneurial acts after the educational intervention. **H2a**: Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward the identification of business opportunities after the educational intervention. **H2b**: Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward the evaluation of business opportunities after the educational intervention. **H2c**: Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward developing a personal network of contacts after the educational intervention. **H2d**: Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward convincingly communicating ideas to stakeholders in a business context after the educational intervention.

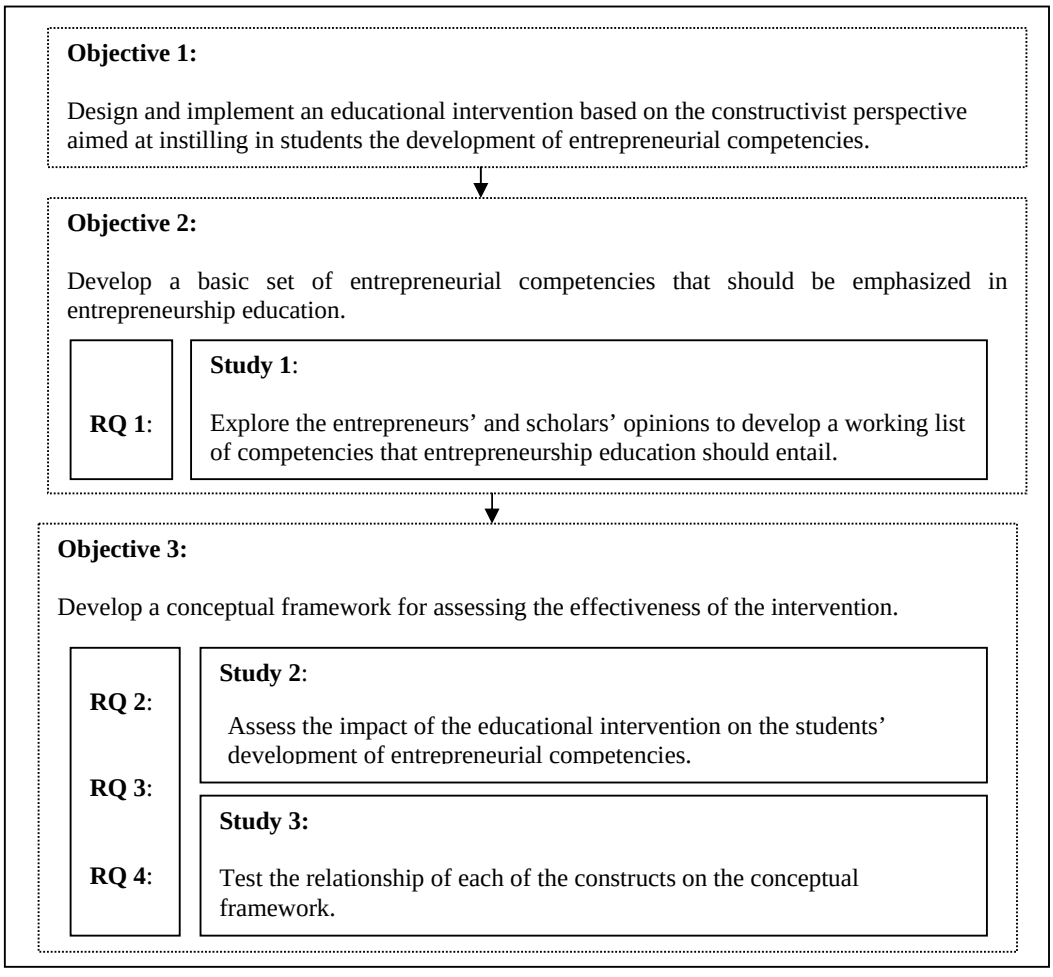
Table 0.1. (Cont.) Research Questions and Hypotheses of the Dissertation

RQ 2: What is the impact of an educational intervention based on the constructivist approach on the development of relevant entrepreneurial competencies in university students at the undergraduate level?	**H3**: Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will exhibit higher levels of entrepreneurial competencies after the educational intervention than students who work individually. **H3a**: Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of opportunity identification competency than students who individually work on their term projects after the educational intervention. **H3b**: Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of opportunity evaluation competency than students who individually work on their term projects after the educational intervention. **H3c**: Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of networking competency than students who individually work on their term projects after the educational intervention. **H3d**: Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of communication competency than students who individually work on their term projects after the educational intervention.
RQ 3: Do differences in the students' self-assessed entrepreneurial competencies have an impact on their entrepreneurial self-efficacy?	**H4**: Students who self-report higher levels of entrepreneurial competencies will exhibit higher levels of entrepreneurial self-efficacy after the educational intervention.
RQ 4: Are the students' intentions to start their own business positively influenced by their entrepreneurial self-efficacy and attitudes toward entrepreneurial acts?	**H5**. Students who exhibit more favorable attitudes towards entrepreneurial acts will exhibit higher intention to create their own business in the near future after graduating from the university **H6**: Students who exhibit higher entrepreneurial self-efficacy after the completion of the educational intervention will exhibit higher intention to create their own business in the near future after graduating from the university.

0.3. STRUCTURE OF THE DISSERTATION

As already mentioned, the dissertation encompasses three objectives. Figure 0.1 presents the structure of the dissertation and how these objectives are related to each of the research questions.

Fig. 0.1. Structure of the Dissertation



We approached the first objective by an exhaustive literature review regarding the relevance of the constructivist perspective to entrepreneurship education. We argue that traditional methods in which teachers are mainly disseminators of information does not foster learning since students are led to be passive in the learning process. A constructivist approach, on the other hand, supports an educational system in which students are central to the learning process and are active individuals in search of making meaning of newly presented information. An intervention based on the constructivist principles can enable students to develop entrepreneurial competencies. Thus, identifying what competencies students need to focus on becomes an important first step in designing a proper educational intervention.

The first research question is concerned with objective 2 and addresses the need of developing a working list of competencies that entrepreneurship education should entail. To answer this question, we conducted survey research in the first study. By reviewing the extant entrepreneurship literature, we elaborated an initial list of competencies that have been linked to entrepreneurial success. Then, we used this list to ask Ecuadorian entrepreneurs and scholars from several countries to give their perceptions on which competencies are most crucial when getting involved in an entrepreneurial venture. Examining entrepreneurs' competencies is of great relevance because of their expected causal relationship with venture initiation and success (Bird, 1995). Therefore, having the inputs from the practitioners' and scholars' perspective is legitimized by the importance of getting better insights on what entrepreneurship education should entail.

The next three research questions, which are RQ2, RQ3, and RQ4, are concerned with the third objective. As shown in Fig. 0.1, the studies 2 and 3 were conducted to answer these questions. While study 2 is oriented to test the individual hypotheses of the dissertation, study 3 is aimed at making an integrative analysis to test such

hypotheses by examining the interrelatedness of the various constructs defined in this dissertation. Thus, the purpose of the third study was to derive a mathematical model to relate the criterion variable (the students' entrepreneurial intentions) to the predictors (self-perceived knowledge and skill competencies through the mediation of the students' entrepreneurial self-efficacy and their attitudes toward entrepreneurial acts). The hypothesized model was tested by the use of the structural equation modeling technique (SEM).

The underlying assumption on the second study is that competencies are changeable and learnable that enables the possibility of an educational intervention (Bird, 1995; Man, Lau and Chan, 2002). For the purpose of this dissertation, as already mentioned, an educational intervention based on a constructivist perspective was approached. To assess its effectiveness, a quasi-experimental research with a pre-test-post-test multiple group design was performed. That is, the second research question was addressed by studying the impact of the proposed intervention on the development of entrepreneurial competencies in university students at the undergraduate level. Two experimental and one control groups were selected for this study. By doing so, we wanted to observe possible differences in the students' entrepreneurial competencies.

The third research question was examined by analyzing the differences in self-perceived competencies and the extent to which these differences have an impact on the students' entrepreneurial self-efficacy (ESE). According to Boyd and Vozikis (1994), entrepreneurial intentions are linked to the likelihood of creating a new business, and such intentions are influenced by the individual's self-efficacy. Therefore, the self-efficacy construct is useful in predicting entrepreneurial intentions. To measure the students' ESE, a questionnaire developed by De Noble,

Jung, and Ehrlich (1999) was administered at the outset and at the completion of the intervention as suggested by (Cox, Mueller, and Moss, 2002).

The fourth question was addressed by examining the extent to which the students' ESE and attitudes toward entrepreneurial acts have an influencing effect on their intention to create a new enterprise. The rationale for studying intentions is that they are conceived as immediate antecedents of actual behavior (Ajzen, 1991). Krueger, Reilly, and Carsrud (2000, 411) also argue that "intentions are the single best predictor of any planned behavior, including entrepreneurship". Hence, to increase our understanding of an intended behavior in entrepreneurship, it is necessary to be familiar with the antecedents of the intentions. Thus, examining the antecedents of intention to be an entrepreneur can give us insight into the prediction of actual firm-creation behavior (Fayolle and Gailly, 2004).

O.3.1. Organization of Chapters of the Dissertation

This dissertation is organized in five chapters in addition to the present (*Introduction*) that include: 1) Literature review; 2) Research questions and hypotheses; 3) Research method; 4) Results; and 5) Discussion and conclusions. A summary of each chapter is described next.

Chapter 1 represents a review of the existing literature. This chapter is divided into four sections: first, a review of the objectivist and constructivist theories is done; second, previous research on entrepreneurship education is examined and the concept of a competency is introduced. A discussion about entrepreneurial competencies is carried out in order to identify relevant competencies that should be emphasized in entrepreneurship education; third, the constructivist perspective is reviewed in terms of how it supports an action-oriented instructional approach for entrepreneurship

education; and fourth, a model of an educational intervention for the development of entrepreneurial competencies is described.

Chapter 2 summarizes the literature review and presents the conceptual framework of the dissertation showing the relationships among the study variables and the corresponding hypotheses. This chapter presents each of the four research questions and develops the hypotheses that were tested via instruments administered to undergraduate students of ESPOL. As described earlier, the first research question is addressed by an exploratory study (*Study* 1) and no hypothesis was formulated. To answer the second, third and fourth questions, six hypotheses were put forward: three of them are associated to research question 2; one hypothesis is related to research question 3; and two for research question 4. The studies 2 and 3 were devoted to test all of the formulated hypotheses.

Chapter 3 describes the research method of the dissertation that explains the issues involved in the design of the survey instruments and how the gathering of data was carried out. As the second objective of the dissertation is aimed at assessing the effectiveness of the proposed educational intervention, this chapter provides a detailed explanation of how this assessment was performed. In study 2, we address the impact of the intervention on the development of entrepreneurial competencies by gathering data through two types of instruments. One is a more objective measure of the students' entrepreneurial competencies than the second instrument. That is, the first instrument requires that students respond to hypothetical cases that mimic real world situations. By doing so, we seek to investigate how they would act in circumstances that demand their entrepreneurial behavior. The second instrument is based on self-reported measures. As the present study was performed by using quasi-experimental research, students were inquired to answer the questions on the two instruments both before and after the completion of the intervention.

Chapter 4 presents the results of the data analysis. For a better understanding, the major findings of the dissertation are presented in two sections: first, the formulated hypotheses are individually tested in order to demonstrate whether or not they are supported by the data collected via the survey instruments; second, a more complex analysis of data was performed by the use of the LISREL statistical tool. This analysis was carried out in order to obtain a mathematical model to explain to what extent the entrepreneurship course has an impact on the students' entrepreneurial competencies which, in turn, may have an effect on their entrepreneurial intentions through the mediating role of their self-efficacy beliefs. The model also considers the effect of the students' attitudes on their intentions to new venture creation.

In Chapter 5, discussion and conclusions are presented according to the main findings described in the previous chapter (*Results*). This section elaborates on the findings and discusses about the contributions for the entrepreneurship field. Specifically, the findings on each of the three studies are discussed. According to the results in the first study, this chapter presents a working list of competencies that are suggested for entrepreneurship education. Following the findings on the second study and third studies, we provide initial evidences that a constructivist approach is appropriate to enable students to develop entrepreneurial competencies. Finally, the chapter discusses the limitations and implications for future research. Of special importance are those implications associated to teaching entrepreneurship.

CHAPTER 1: LITERATURE REVIEW

Today's world is experiencing rapid technology changes that make technological innovation and entrepreneurship be seen as the new forces for economic growth worldwide (Lalkaka and Abetti, 1999). Besides this assertion, political bodies around the globe have included the stimulation of entrepreneurship into their strategic goals and policies. The European Commission (2004a), for example, posits that entrepreneurship is one of the key components to be included in current educational systems in order to prepare people for successful participation in society. In fact, the contribution of entrepreneurship to the world economy is well recognized; nevertheless, there is still debate about whether we can teach students to become entrepreneurs (De Faoite, 2003; Fiet, 2000a; Garavan and O'Cinneide, 1994a; Moro, Poli and Bernardi, 2003). If so, questions that need to be answered are: what should be taught? How should it be taught? How should entrepreneurship education be assessed? (Fayolle, 1998; Moro et al., 2003; Clark, Davis and Hornish, 1984)

From one side, the debate addresses the problem of a lack of uniformity in courses' content and approach and lack of theoretical rigor (Falkang and Alberti, 2000; Fiet, 2000a). Certainly, entrepreneurship is considered as a complex subject to study in the context of teaching and learning because it depends on the individuals' self-regulated actions and on characteristics that may not be easy to influence (Pihkala and Miettinen, 2002). However, it is believed that entrepreneurship can be taught or, at least, certain features of it -through socialization and formal training- as opposed to something genetically conceived (Chell and Allman, 2003; Falkang and Alberti, 2000; Kirby, 2002; Klandt, 1998; Kuratko, 2003). On the other side, debate is still in place due to a lack of a well defined method for assessing the effectiveness of entrepreneurship education (Moro et al., 2003; Clark, Davis and Hornish, 1984; and Falkang and Albert, 2000). Most of research has focused on course contents, pedagogical and audience characteristics. In this respect, we think that the effectiveness can be measured in terms of the competencies developed by students

during the course of an educational intervention. This requires that researchers assess the target competencies before and after the intervention. This approach does not deny the possibility of making longitudinal studies to investigate actual behavior of those who have received entrepreneurship training.

As we agree that entrepreneurship can be taught, we maintain that new instructional approaches should address the development of students' knowledge, capabilities and attitudes. In line with this thought, the European Commission (2004b) stresses that these aspects are crucial for personal fulfillment and development, inclusion, employment, and entrepreneurial mindset. Accordingly, current educational methods have to emphasize a more active involvement of students in constructing knowledge; a suggestion that aligns with the constructivist view of teaching and learning (Crawford and Witte, 1999; Lord, 1998). Following this direction, the dissertation posits that a constructivist view of education is a better approach for achieving learning than the objectivist perspective. As a way of understanding the rationale of this contention, the following section discusses these two perspectives of education.

1.1. TWO VIEWS OF EDUCATION: THE OBJECTIVIST AND CONSTRUCTIVIST PERSPECTIVES

Instructional systems have addressed learning from different perspectives. The two commonly referred models in the field of instructional design are the objectivist (Gagné, Wager, and Briggs, 1992; Lakoff, 1987) and the constructivist paradigms (Von Glaserfield, 1984; Watzlawick, 1984). The assumption of the objectivist view is that learning is the process of mapping a predetermined concept of reality onto the learner's mind. On the other hand, the constructivist view maintains that learning outcomes are not always predictable as each learner can have its own interpretation of reality (Jonassen, 1991). As discussed in the next section, behavioral theories built

upon the objectivist position (Driscoll, 2005) in the sense that learning is viewed in terms of a change in behavior that occurs primarily as a function of environmental factors (Schunk, 2004). In contrast, constructivist theories assume that individuals structure their own knowledge of the world into a unique pattern by subjectively connecting new facts or experiences into meaningful relationships (Wilson and Daviss, 1994). Before going further in discussing relevant issues on these two perspectives, we consider important to review the meaning and types of learning for its implications in an educational intervention.

1.1.1. The Conception of Learning

Learning is a lifelong activity that involves the acquisition and modification of knowledge, a variety of competencies and behaviors (Driscoll, 2005; Schunk, 2004). In this sense, the term lifelong refers to more than the obvious fact that people continuously learn throughout their lives. In other words, it stresses the idea that people are endurably committed to learning, which implies that lifelong learners experience more than a lively curiosity and a willingness to study, more even than a serious involvement in some subject matter (Bereiter and Scardamalia, 1989). This means that lifelong learners have learning goals among those top-level goals that govern their major life plans. Learning is such a complex subject to study that theorists would not agree about its precise nature and how people learn. Nevertheless, a general definition that is commonly accepted considers that learning is a relatively permanent change in a person's knowledge or in the capacity to behave in a given fashion due to practice or any form of experience (Woolfolk, 2007; Ormrod, 2003; Schunk, 2004).

According to the above definition, learning can be given two major interpretations. The first involves a relatively permanent change in knowledge. That is why some

psychologists emphasize that the outcome of learning is the change in knowledge. Others, however, stress that learning is change in behavior. For this second interpretation, several criteria can be understood as inherent in the definition of learning (Schunk, 2004). The first criterion refers to it as a change in the capacity for behavior, which implies that people have learned something when they become capable of doing it differently. However, learning is not directly observable, but rather its products are seen in terms of what people say, write, and do. Learning involves not only knowledge and abilities but values, attitudes, and habits of mind (American Association for Higher Education, 1992); nevertheless, people may not explicitly demonstrate these competencies when learning occurs. This explains why the above definition of learning involves a changed capacity to behave in a given fashion (Schunk, 2004). The second criterion is that the capacity for change endures over time although learning may not last forever. In other words, if people do not use what they know, it is very likely that they would forget such knowledge as time goes on. The third criterion is that learning occurs due to experience. In some instances, particular behaviors depend on the environment. It can happen, for instance, when little children become able to produce actual words as they interact with others.

In accordance with the two interpretations of learning, psychologists have different postures based on their focus. Behavioral psychologists, on the one hand, are oriented by the assumption that the outcome of learning is change in people's behavior in a stimulus-response relationship (Ormrod, 2003). This implies that learning can be shaped by selective reinforcement (Jonassen, 1991). The theoretical explanations that underlie the behavioral theory have its roots on the Skinner's assumptions of operant conditioning (Skinner, 1953; 1954; 1968). Operant conditioning departs from the assumption that organisms learn to operate in their environment, and their behaviors are the result of their experiences with environmental stimuli. This implies that environmental stimuli bring about changes

in how people behave. The use of operant conditioning principles in educational applications goes in line with the idea that they can help students learn desirable behaviors, also referred as behavior modification (Snowman and Biehler, 2003). Because decades of research have been devoted to develop educational techniques based on these principles, advocates and teachers have traditionally justified their use. Nevertheless, they have been subject of some criticism. It is not the purpose of this dissertation to review them in details; however, it is important to mention why such criticisms are in place. As emphasized by Snowman and Biehler (2003), one of the problems is because students get reinforced only when they do what is expected by teachers. Another problem is the possibility of inappropriate or even unethical use of potential power by teachers.

Cognitive psychologists, on the other hand, are focused on changes in knowledge as they believe that learning is an internal mental activity that cannot be observed directly (Woolfolk, 2007). In this line, learning entails not only the knowledge that people posses but what they are able to do with what they know (American Association for Higher Education, 1992), specifically for solving different problems in different settings (Snowman and Biehler, 2003). Knowledge and knowing are seen as the outcomes of learning (Woolfolk, 2007). From a cognitive perspective, these two elements are important in the learning process. The first refers to what the individual brings to new learning situations. The second goes beyond previous learning in the sense that it also guides new learning. To better understand the issues involved in learning, the next section will discuss the various levels of learning as they are relevant in the cognitive perspective; a posture that aligns with the constructivist view of learning.

1.1.2. Types of Learning

The extant literature has identified different kinds of learning. Based on the work of Bloom and his colleagues, the kinds of learning are categorized as knowledge, comprehension, application, analysis, synthesis, and evaluation (Bloom, 1956). The importance of reviewing each of these types of learning is legitimized for their implications in defining educational objectives and in identifying relevant activities to foster students' learning (Reigeluth and Moore, 1999). Students working at the knowledge level are basically oriented to remember and recall information ranging from concrete to abstract. Comprehension is a higher level than knowledge as students are able to understand and make use of what is being communicated. At the comprehension level, students can translate, interpret, and extrapolate the communication. Then, students can apply appropriate concepts learnt to a problem or situation even when they are not asked to do so. At the analysis level, learners can break down the subject of study into its parts and define the relationship between them. The next kind of learning according to Bloom (1956) is the ability to synthesize, which implies that students are able to create a product, combining parts from previous experience and new material to create a whole. The final level is associated to evaluation. Students are able to make judgments about the value of materials, ideas, and so forth.

Different names have been adopted for the categories of Bloom's classification as various theorists have proposed other taxonomies in regards to the kinds of learning in the cognitive domain (Anderson, 1983; Ausubel, 1968b; Gagné, 1985; Merrill, 1983). The cognitive conceptions derive from the belief that learning is associated with the mental processes that occur within an individual, known as cognition. Specifically, the term cognition refers to how a person acquires, stores and uses knowledge (Hayes and Allinson, 1994). As the different taxonomies proposed by

other scholars show many similarities, Reigeluth and Moore (1999) developed a synthesis of the various types of learning, which include: memorization, understanding relationships, applying skills, and applying generic skills. According to this synthesis, the taxonomy is seen as an interconnected categorization scheme. While they seem to be as distinct categories, they can somehow overlap one another in a sort of continuum. For example, a student may need to memorize some information to apply a skill, but this may not always be the case. Although it is not the purpose of this dissertation to review in details each of the taxonomies put forward in the existing literature, a synthesis is worthwhile to have a common view of instructional approaches to foster learning in students. The terms used in this synthesis and how they are described are discussed next.

The synthesized terms proposed by Reigeluth and Moore (1999) stress that memorization is the simplest and most superficial level of learning; a type of learning extensively addressed by behaviorists. Its widespread use in most educational settings is, perhaps, because it is the easiest way to teach and test.

The second level of learning is understanding or understanding relationships, a synonym for comprehension in the Bloom's classification (Bloom, 1956) and meaningful learning in the Ausubel´s taxonomy (Ausubel, 1963). Understanding is a crucial value of education (Gardner, 1991; Perkins and Blythe 1994; Perkins, 1992) as it is believed to be at the top rank on the short list of high priorities when considering the many agendas of education (Perkins and Blythe, 1994). According to Elmore (1995, p. 363), understanding "can occur at the same time at the basic level of facts and procedures and at other higher levels of imposing meaning and drawing inferences". Specifically, this kind of learning refers to the relationships among elements of knowledge (Reigeluth and Moore, 1999), which means that learners' construction of these relationships organizes the elements into knowledge structures

– also known as schemata (Snowman and Biehler, 2003). Understanding occurs when our schemata are well formed and a certain situation is consistent with what we expect (Snowman and Biehler, 2003). The fact that dogs bark and birds fly is an example of something to which schemata give us expectations about such objects and events. The term schemata is associated to abstract information structures by which a person's store of knowledge is organized in long-term memory (Anderson, 1984). According to Reigeluth and Moore (1999), the behavioral perspective has offered little guidance for this type of learning. On the other hand, the cognitive view has provided better explanations to advance our understanding of how this type of learning occurs and how to foster it (Reigeluth and Moore, 1999).

Understanding is a type of learning that is of much concern among educators. As emphasized by Perkin and Blythe (1994) many activities at most schools are not performances that demonstrate understanding. It is common to see that learners do not understand the relevance of what they learn (Schank, Berman and Macpherson, 1999). That is, typical classroom practices usually fail at challenging students to thoughtful engagement in performance that show understanding. Many of those activities are oriented to build knowledge or routine skills that seem not to lead students to learn for understanding (Perkin and Blythe, 1994). Although the acquisition and retention of knowledge can serve for important purposes (Perkins and Unger, 1999), acquired knowledge per se does not guarantee understanding; that is, knowledge becomes relevant when the learner can deploy it with understanding. This means that usually learners are not encouraged to exercise a variety of thought-demanding things with a topic such as explaining, looking and finding evidence, generalizing, applying, making analogies, and representing the topic in a different way (Perkin and Blythe, 1994).

The third and fourth types of learning refer to higher order thinking skills, learning strategies, and metacognitive skills. The difference between these two types of learning is that generic skills are domain-independent whereas the other is domain-dependent; that is, the latter is only applicable within one subject area. Reigeluth and Moore (1999) emphasizes that these kinds of learning remain among the most difficult to teach and test. Although the extant literature does not provide a precise definition about what is meant by "higher order skills", their key features can be described by recognizing them when they occur (Resnick, 1987a). Some examples of these features are the following:

- Higher order thinking is *non-algorithmic*, which means that the path of action is not fully specified in advance.
- Higher order thinking often yields *multiple solutions*, each with costs and benefits, rather than unique solutions.
- Higher order thinking involves the application of multiple criteria, which sometimes conflict with one another.
- Higher order thinking involves uncertainty. Not everything that bears on the task at hand is known.

Another area of interest regarding the last two levels of learning, as proposed by the various instructional taxonomies, is related to learning strategies. They refer to that every person uses hi/her own approach to achieve learning objectives, which are in line with the concept of metacognition. For example, some students may take notes while others may relate certain concepts and principles to their own life and experiences (Ormrod, 2003). Metacognition addresses a learner's knowledge and belief regarding his/her own cognitive processes – that is, the ability to think about the way we think (Reigeluth and Moore, 1999). In other words, the meaning of metacognition is associated to the knowledge we have about how we learn

(Woolfolk, 2007). To better understand the essence of metacognition, a comparison of it should be made with cognition (Snowman and Biehler, 2003). As previously described, cognition is used to describe how information is processed which involves the way it is acquired, encoded, stored in memory, retrieved, and used for a given purpose. On the other hand metacognition refers to our knowledge about those operations and the way they are used to accomplish a learning goal. The importance of metacognition lies in its implications in an educational context in terms of how an instructional approach can help students enhance their metacognitive skills. In this sense, Vygostky's analysis suggests that an appropriate way to help learners improve their metacognitive skills and quality of their learning is to allow them to regulate their own behavior (Vygotsky, 1986). Although the outcomes of learning may become observable in human performance, the process involved is not that obvious (Driscoll, 2005).

Reviewing the taxonomies of learning is worthwhile to better understand what is meant by learning and how people come to learn which, in turn, is relevant for its implications in educational applications. Being aware of the types of learning facilitates the definition of educational objectives and the identification of relevant activities to promote learning. In designing in and out-class activities, for example, teachers can make a deep examination of them to verify whether such activities foster students' learning. This implies that they get understanding of the topics covered and are able to apply what they know when circumstances thus demand. As has been highlighted, learning is a complex phenomenon that different theories have been proposed to explain learning and the process whereby it occurs. For the purpose of this dissertation, the objectivist and constructivist perspectives of education will be reviewed in the following sections. The rationale for looking at these two streams of thoughts relies on the fact that the former has been largely applied in schools and universities while the latter is becoming a subject of increasing interest among

scholars. By contrasting them, the dissertation attempts to provide explanations in support of the pertinence of integrating the constructivist perspective into entrepreneurship education.

1.1.3. The Objectivist Perspective

According to objectivists, reality is independent from and outside the knower, which makes learning a matter of transferring what exists in reality to what is known by the learner (Driscoll, 2005); therefore, knowledge is objective (Lakoff, 1987). As the objectivist position assumes that the world is real, Jonassen (1991) maintains that reality and its structure can be modeled for the learner and he/she is expected to assimilate. By taking this position, students are led to learn about the real world, which implies that they are not encouraged to construct their own explanations about given events. Hence, it is the teacher that is to interpret events for them.

Following the objectivist position, behaviorists have studied learning by observing people's behaviors – understood as responses—and the environmental events – considered as stimuli—that precede and follow those responses (Ormrod, 2003). Consequently, environmental stimuli bring about changes in how people behave. Based on this conception, learning in educational applications has to do with the transferring of knowledge from teachers to learners (Jonassen, 1999). In this sense, a behaviorist view of education is a knowledge transmission approach as learners are told about the world and are expected to replicate its content and structure in their thinking. One of the implications of this assumption is that educators are encouraged to develop a classroom environment to foster desirable student behaviors (Ormrod, 2003). Also, they have to identify and apply specific stimuli that may influence behaviors exhibited by students. Going in this direction, instructional tools, such as lecture-based sessions and textbooks, have been oriented to deliver as much

information as possible and as quickly as possible. Although these tools might be somehow effective and efficient – the former understood as how well the instruction works and the latter in terms of the level of effectiveness divided by the time and/or cost of the instruction – they have often allowed students to be passive in a classroom (Major and Palmer, 2001; Reigeluth, 1999).

When following a transmission approach as the one promoted by lecture- based or media-based tools, several shortcomings can be identified (Fiet, 2000b; Lobler, 2006; Schank, Berman, and Macpherson, 1999). One shortcoming is that educators are rather concentrated on imparting factual knowledge to students than leading the knowledge out of the learner; thereby, students commonly rely on transcription, memorization, and repetition for learning. The problem is that students may not be able to retrieve and properly use such knowledge. Another deficiency is that schools are not commonly oriented to give students the opportunity to pursue new knowledge with the idea of achieving intrinsically motivating goals. Students are mainly led to learn facts, or even skills, for the purpose of completing some homework problems or getting them prepared to pass a test. This way, students may indeed acquire new knowledge; nonetheless, it may not help them to achieve relevant and meaningful goals. Another problem relates to that students are usually taught in a decontextualized fashion, which means that the acquired knowledge or skills is not connected to how they will be used in real life (Schank, Berman and Macpherson, 1999). Furthermore, criticism of a transmission-type instructional approach is also due to its predictability and boredom effect on students (Fiet, 2000b). It means that students and teachers are likely to get bored when a class session becomes predictable; thus, students are never surprised. Because of predictability, students may become passive in their learning and unwilling to cooperate (Fiet, 2000b). Under this situation students may not learn what they are supposed to; therefore, not able to demonstrate understanding of a topic.

As emphasized by the European Commission, we are at the point where different education and training systems are needed to adapt to the demands of the knowledge society (European Commission, 2004). A challenge for educators, then, is to get students actively involved in the learning process and to get them motivated to learn. As Resnick (1987, 18) states, "school should focus its efforts on preparing people to be good adaptive learners, so that they can perform effectively when situations are unpredictable and task demands change". The ability to adapt is crucial in today's world because we are living in a highly competitive society where advances in technology are always changing. To keep up with the changes, often new skills must be developed. In line with these thoughts, Elmore (1995) contends that the object of teaching is to enhance intentional learning and not simply the mastery of content or the solution of particular problems. Intentional learning is an ample term that entails the cognitive processes that have learning as a goal rather than an incidental outcome (Bereiter and Scardamalia, 1989; Elmore, 1995). Specifically, intentional learning refers to "the active management of different types of knowledge and processes of cognition around concrete problems" (Elmore, 1995, 358). This definition implies an active involvement of learners in constructing knowledge, which is the basic premise of the constructivist perspective of learning.

1.1.4. The Constructivist Perspective

The constructivist perspective has its origin in the works of John Dewey, Jerome Bruner, Jean Piaget, and Lev Vigotsky (Bruner, 1960; Dewey, 1896: 1933; Vygotsky, 1986; Piaget, 1969; Piaget and Inhelder, 1967; Piaget and Inhelder, 1969). This perspective in education has received important attention as evidenced in the current education literature (Crawford and Witte, 1999; Lord, 1998; Null, 2004; Perkins, 1999; Simpson, 2002), and its relevance and influence in science and management education (Devos, Van den Broeck, and Vanderheyden, 1998;

Mathews, 1993; Prawat, 1992), as well as in other disciplines (Cummings and Harlow, 2000; Lobler, 2006) has become to pervade the language of educators. This assertion aligns with contemporary educational trends in that learning can be better achieved when learners get actively involved in constructing knowledge (Crawford and Witte, 1999; Lord, 1998).

According to constructivism, reality is in the mind of individuals and constructed by them, or at least they interpret it, based on their appreciations (Jonassen, 1991). This implies that learners must be able to discover the basic principles themselves in order to get a good understanding of learning subject matters. Therefore, learners are seen as active individuals in search of meaning and not empty containers to be filled (Driscoll, 2005). This assumption makes a personal meaning making be central to the learning process and it is in line with the principles of the constructivist paradigm. A major hallmark of the constructivist perspective is that "meaningful learning is achieved when people try to make sense of the world – when they construct an interpretation of how and why things are – by filtering new ideas and experiences through existing knowledge structures" (Snowman and Biehler, 2003, p. 301). People learn meaningfully when they get an understanding of the world by making a real connection of their prior knowledge to new information (Driscoll, 2005). Thus, meaningful learning gives the notion that new material expands, modifies, or elaborates information already in long term memory (Schunk, 2004). A related concept to meaningful learning is situated cognition – also called situated learning. This term refers to the idea that problem-solving skills, cognitive strategies, and knowledge are closely linked to the specific environment in which they are learned (Snowman and Biehler, 2003). Therefore, learning is better achieved when a given task is more authentic to an individual's life experiences.

1.1.4.1. Two Compatible Forms of Constructivism

The constructivist perspectives of learning can take one of two forms: one has a cognitive focus, and the other emphasizes the role of culture and social context (Snowman and Biehler, 2003). Even though these two variations emphasize different aspects of learning, they are not incompatible and both have an important role in meaningful learning. This means that the cognitive perspective does not deny the possibility of learning in groups, and the social approach does not deny the value of working independently of others. This compatibility can occur, for example, among people that play musical instruments in an orchestra (Snowman and Biehler (2003). They usually practice individually or in a group because there are some things that are best learned by themselves – breathing, fingering, or bowing – or, otherwise, as part of the orchestra. The cognitive view derives from Piaget's ideas because it focuses on the cognitive processes that occur within individuals. According to Piaget's theory, children invent and reinvent knowledge as they develop and interact with their surrounding environment (Driscoll, 2005). This means that individuals acquire knowledge through their actions as they approach their environments. The social form of constructivism takes into account that people's arguments and points of view have a relevant effect on meaningful learning (Snowman and Biehler, 2003). One of the main influences in modern constructivist thinking comes from Vygotsky's ideas as he added the social context to the constructivist epistemology – a theory about what knowledge is and how it is acquired (Vygotsky, 1978). He believed that individual development and learning are facilitated as people are embedded in social activities.

The two forms of constructivism discussed above provide the basic principles whereby individuals are identified according to three distinct roles: the active, social and creative learners (Phillips, 1995; Perkins, 1999). The active role of the learner

implies that knowledge and understanding are actively acquired as opposed to be passively done (Perkins, 1999). An active involvement in the learning process demands that learners discuss, debate, hypothesize, investigate, and take viewpoints instead of just listening, reading, and working through routine exercises. The social side of individuals implies that knowledge and understanding are socially accomplished (Perkins, 1999). This means that people usually do not construct them individually, but interacting with others, especially in the presence of more knowledgeable others. Similarly, Jonassen (1999) maintains that learning most naturally occurs not in isolation but by working in teams to solve problems. The knowledge and skills that learners acquire by a social interaction are connected to existing schemes and gradually internalized. This process makes learners to become more self-regulated and independent (Snowman and Biehler, 2003). The creative role of individuals from a constructivist perspective holds that they need to create or recreate knowledge for themselves (Perkins, 1999). For assuming this role, learners have to be guided to rediscover scientific theories, historical perspectives and so on (Perkins, 1999). In this sense, the active and creative roles complement one another.

The three roles of learners described above have important implications in education in the sense that different kinds of knowledge call for distinct constructivist responses. From a practical perspective, the social and creative aspects of learners often accompany the active role (Perkins, 1999) although it does not always have to be this way. In this respect, we maintain that organizing learning experiences so that learners are engaged in testing and building knowledge in a social manner or to invent or reinvent points of view provides a good environment for deep understanding of topics. Therefore, we believe that the active, social and creative sides of learners are crucial aspects to be considered when delineating an educational intervention to foster entrepreneurial activity. It is commonly cited that entrepreneurs frequently exhibit entrepreneurial behaviors that amongst several others include:

searching and exploiting opportunities, developing and using personal networks of contacts, taking initiatives, persevering to achieve a goal, and strategic thinking (Karp, 2006). From our perspective, these are supporting attributes of entrepreneurs that are related to the three roles mentioned above. Thus, a constructivist approach is very appropriate for entrepreneurship education. For its relevance in this dissertation, we think that it is important at this point to review practical aspects for constructivist teaching.

1.1.4.2. Applied Aspects for Constructivist Teaching

Advocates of constructivism maintain that active learning in motivating contexts is the foundation on which educators build their teaching strategies and classroom environments (Crawford and Witte, 1999). As simple as arranging a classroom in such a way that groups of students can work together signals an active learning environment, invites students to interact with one another, and supports a community learning which, in turn, promote students' engagement in the learning process. Crawford and Witte (1999) emphasize that five common attributes – called contextual teaching strategies-- can be identified when organizing classroom environments to fit into the constructivist paradigm. These strategies are discussed next.

1.1.4.2.1. Relating

The first strategy refers to the idea of promoting learning in the context of a person's life experiences. This is important because what people have learned is more easily remembered when they have similar experiences that trigger their memories (Schank, Berman, and Macpherson, 1999). Thus, the essence of this strategy is to provide students with the vehicle to facilitate learning as they are encouraged to relate their

existing knowledge with aspects of science. For example, students can be asked to use their knowledge of physics in trying to explain why the ball thrown by a pitcher curves right or left or drop down as it approaches home plate. This way, we can expect that students achieve learning as they get familiar with the phenomenon.

1.1.4.2.2. Experiencing

The next strategy refers to the possibility of allowing students to exercise hands-on experiences inside the classroom. By experiencing, the learner has an active role in the learning process and learns by doing as opposed to just listening, reading, and working through routine exercises (Perkins, 1999). Schank et al. (1999) contend that the benefit of having students exercise hands-on activities is that they inevitably come to learn content when accomplishing their tasks.

1.1.4.2.3. Applying

The third commonly used teaching strategy is associated to applying learned concepts in relevant and realistic situations (Crawford and Witte, 1999). As can be noted, this approach is similar to the one in which learning is promoted in the context of a person's life experiences. A basic assumption of a person-situation interaction resides in that beliefs and knowledge are formed as people interact in situations (Schunk, 2004). This assumption fits well with the constructivist premise that context is a natural feature of learning.

1.1.4.2.4. Cooperating

The fourth strategy has to deal with that some students struggle with working individually in solving problems, especially when they involve realistic situations.

Since learning is a social as well as an individual process (Slavin, 1997) many people learn more effectively when working in groups (Gardner, 1999). In groups, students have the opportunity to assume different roles, to observe and interact with their peers, and to have debates on issues that complement one another. Also, working in groups prevents students from getting frustrated when trying to solve a difficult problem individually as they usually find a peer who possesses a slightly higher cognitive level (Applefield, Huber, Moallem, 2000). By promoting group work, learners can build relationships and communication with others for learning purposes. This, in turn, helps to assist the mutual construction of knowledge.

1.1.4.2.5. Transferring

The last strategy commonly used in teaching that follows a constructivist fashion is related to the use of knowledge in a new context or situation. This strategy is called transferring in the sense that learners are encouraged to use their knowledge in unfamiliar situations (Crawford and Witte, 1999). It is not surprising to see students unable to apply their knowledge when required to invoke it appropriately in different situations (Gardner, 1999). That is why constructivist teachers are challenged to look for innovative strategies in their teaching to accomplish learning goals. By introducing novel ideas, curiosity or emotions learning is more likely to be achieved. This can happen when students are invited to react emotionally in a given situation. For example, in a mathematics class, the teacher distributes an article for discussion whose author provides statistics to argue that youngster should not be permitted to obtain a driver's license unless they are older than 18 (Crawford and Witte, 1999). Assuming that students enrolled in this class are 16 and 17 years old, one can expect that they react emotionally to this argument as it involves them indirectly. In consequence, students get naturally engaged in a lively debate.

From the above discussion, we can notice that several features of the constructivist perspective can be counted as plausible arguments for its pertinence in educational applications. In fact, the extant literature emphasizes that the constructivist approach has enjoyed great acceptance during the last decades (Perkins, 1999), which is evidenced by current educational reforms at all levels (Mathews, 1993; Null, 2004; Simpson, 2002). Some of the explanations for such advocacy include: the need for having better ways to teach and learn; the favorable findings of previous research in the sense that active engagement in learning may lead to better retention, understanding, and proper use of knowledge; the relevance of the social dimension in that it often, although not always, fosters learning; and the possibility to engage students in discovery or rediscovery processes that help them achieve deeper understanding.

1.1.4.3. The Controversy about the Constructivist View of Education

Despite of such a great acceptance, constructivism has been subject of criticism. In this respect, Snowman and Biehler (2003) emphasizes that some limitations of this approach can be observed, which are summarized as coming from four possible sources: 1) the difficulty of creating highly detailed lessons plans; 2) the constructivist perspective is more time consuming and more demanding than a lecture-format approach; 3) the possibility that some students can construct their own interpretations of things regardless whether they are taught from a constructivist perspective; and 4) The constructivist perspective is not the only approach that teachers will ever need. For example, memorization of factual information may sometimes be essential, and sometimes an instructional objective can be achieved by the use of clear and well-organized lecture. One of the main sources of criticism comes from that most educators and non-educators have conceptions of constructivism that are incorrect (Battista, 1999). In mathematical education, for

instance, Battista emphasizes that many of them have a pedagogical posture that evidences a lack of academic rigor. That is, educators usually let students engage in whatever interests them and use any methods they wish regardless whether these methods are correct or not. In consequence, Battista suggests that adequate attention should be paid about not only the essence of mathematics but also about how students learn mathematical ideas.

Another reason for criticism is due to that teachers are to determine what knowledge they would like their students to acquire, which is basically an opposite position to the constructivist perspective (Carson, 2005). This means that a contradictory argument arises since knowledge and truth in constructivism are subjective in nature and relative to the perceiver. Accordingly, Carson claims that objectivism is a more reasonable philosophy of education than constructivism from a theoretical and practical perspective. This is especially at the primary and secondary levels of education because at these ages students may not understand what construction of knowledge means and how it is achieved. Students have the tendency of letting their teachers to transfer them a body of knowledge. Carson (2005) also maintains that practicing constructivists fail at telling students that there are not right-or-wrong answers or that any interpretation of a given topic is correct. And, by doing so, students are encouraged to be careless and uncritical readers, writers and thinkers.

Contrasting with critics of the constructivist perspective, advocates of constructivism argue that such criticisms are misdirected and that the possible setbacks of this approach can be attenuated by an adequate educational intervention (Brooks and Brooks (1993). As previously discussed, one common criticism of constructivism is that it subordinates the curriculum to the interest of students (Holloway, 1999). In respond to critics, Brooks and Brooks (1993) suggest that students' learning can be stimulated by posing problems of emerging relevance to students. They do not need

to be pre-existing for students. That is, we should not assume that students arrive in a classroom with a demonstrated interested in learning about certain topics. It is through the mediation of teachers that students can increase their interest in a subject matter and, in turn, relevance can emerge. This implies that educators must direct attention to their students in order to realize the learning opportunities that the constructivist perspective can offer (Brooks and Brooks, 1993). In sum, whether we choose constructivism as a theoretical underpinning, we need to recognize and honor this paradigm as a valid alternative that promotes the construction of new understandings. This demands that students become central to the learning process and educators play the role of facilitators. This means that educators have to acknowledge the challenge of having to create a proper learning environment. By doing so, they and their students will be encouraged to think and explore.

1.1.4.4. Constructivism Ahead

In traditional teaching practices, students' learning is conceived as a process that entails repeating newly presented information (Jackson, 1986). Under this perspective, the primary role of teachers is to convey knowledge to students (Crawford and Witte, 1999). As Brooks and Brooks (1999) note, one main shortcoming of this approach is that it often leads students to believe that they are uninterested in certain subject areas. From a constructivist perspective, on the other hand, Brooks and Brooks (1999) argue that interest of students is a function of how they are taught rather than a function of the particular subject areas. This means that constructivist teachers look for what students can generate, demonstrate, and exhibit as opposed to what they can repeat. Therefore, the goal of teachers is to enable their students to achieve deep understanding. This implies that the arrival of new information triggers the development of knowledge structures that enables us to question our prior ideas (Brooks and Brooks, 1999). In accordance with this view,

we maintain that instruction under a constructivist perspective can meet the required changes that contemporary education demands.

As emphasized by the European Commission (2004b), there is a need for increasing the students' knowledge, capabilities and attitudes for personal fulfillment and development, inclusion, employment, and entrepreneurial mindset. To be consistent with this thought, education needs to change from a focus on simply imposing knowledge into learners' minds to a focus on helping students use their understanding (Elmore, 1995). As they reach understanding, students become capable of drawing inferences from facts, approaching unfamiliar problems, and explaining why their approaching of problems is the way they do (Elmore, 1995). Current educational systems also ask for a change in the role of students, from being passive to active learners and a shift from teacher-centered to student-centered model of education (Brooks and Brooks, 1993).

Changing economic and social conditions are now creating a demand for different kind of instructional approaches from what traditional teaching can offer. That is why, currently, educational reforms are shifting towards constructivist teaching practices, from primary school to university levels (Mathews, 1993; Null, 2004; Simpson, 2002). For a successful educational reform, Elkind (2004) contends that three issues need to be in alignment: teacher, curricular, and societal. The first refers to that some teachers are wedded to an objectivist view that knowledge is independent of the learner and needs only to be transmitted. Many teachers seem to have difficulties in translating projects assigned to their students into learning objectives. This problem becomes more accentuated because of an increasingly test-driven curriculum with little opportunities for creativity and innovation.

The second aspect for a true implementation of constructivism in education is associated to curricular readiness. Elkind (2004) claims that we can expect children to reconstruct the knowledge we would like them to acquire when we succeed in matching their ability levels with what a certain task demands. That is, we need to understand the logical demands that a subject matter makes on the student's reasoning. This consideration is in line with Piaget and his colleagues' suggestion in that cognitive development of children is linked to neurological changes (Inhelder and Paiget, 1958). Their work found that cognitive development is dependent to a certain extent on maturation of brain. This means that children at elementary school cannot think as adults do because they are neurologically immature.

The third aspect refers to that a successful implementation of any reform pedagogy requires a societal consciousness of a felt need for change (Elkind, 2004). This is not an easy task because traditional teaching practices are too compelling for many educators to give up (Brooks and Brooks, 1999). As already discussed, most schools prepare students to repeat specific procedures and as much information as possible; thereby, they are seen as having learned the topics covered in class. Another deficiency is that students are commonly asked to demonstrate learning by the use of multiple-choice or short answers tests.

Summarizing the previous discussion, the extant literature has stressed that contemporary education has to be oriented to prepare individuals to be good adaptive learners. This implies that students should be prepared to perform effectively in a changing environment. In this regard, we contend that the constructivist perspective is a valid alternative to face the challenges and to meet the requirements that the knowledge society demand. We also maintain that this perspective is consistent with how entrepreneurs learn; that is, they are motivated to learn, they are curious, they try different avenues to get insights and so on (Lobler, 2006). Furthermore, we think

that learning is more likely to be achieved through a proper application of the constructivist principles. Before discussing these issues, the next section presents a review of previous research on entrepreneurship education.

1.2. PREVIOUS RESEARCH ON ENTREPRENEURSHIP EDUCATION

This section reviews relevant issues regarding entrepreneurship education. To better understand these issues, it is firstly presented a discussion about the various definitions of entrepreneurship. Next, an overview of entrepreneurship education is presented, in which different approaches to teaching entrepreneurship are described. The definition of a competency and its relevance for entrepreneurship education is then discussed followed by a review of entrepreneurial competencies put forward in the extant literature.

1.2.1. Defining Entrepreneurship

Entrepreneurship is not a new topic, and it is recognized as a growing field of interest. Several factors seem to have contributed to the increasing interest in entrepreneurship. Amongst others, economic turbulences and frequent recession periods, high unemployment rates and fluctuation in international trade cycles that many industrialized countries have suffered in the last decades are some of the reasons for the revival of interest in this field (Garavan and O'Cinneide, 1994a). Scholars have deliberated on entrepreneurship since the middle of the eighteenth century emphasizing its role in the economy and society (Kirby D, 2003). However, entrepreneurship is still considered as a relatively young and emerging discipline (Moro et. al., 2003; Dana, 1992) though no consensus has been reached on its definition.

The extant literature evidences a lack of a universally accepted conception of entrepreneurship. One of the intended definitions states that it refers to the ability to create and build something from practically nothing (Timmons, 1989). This concept implies a set of actions as initiating, doing, achieving, and building an enterprise or organization as opposed to just watching, analyzing or describing one. In other words, entrepreneurship demands the ability for sensing an opportunity where others see chaos, contradiction and confusion. Other scholars understand entrepreneurship as a variety of activities such as creation, founding, adapting, and managing a venture (Cunningham and Lischeron, 1991). In a market-oriented perspective, entrepreneurship is defined as a business entry, whether by creating a new one or acquiring an existing business and whether independently or within an established organization (Vesper, 1993; Vesper and Gartner, 1997).

Another definition is of Lumpkin and Dess (1996) in which new entry is considered as the fundamental purpose of entrepreneurship. This definition gives the notion of accomplishing new or established markets with new or existing goods or services. Lumpkin and Dess (1996) emphasizes, however, that distinction needs to be made between what new entry consists of and how it is undertaken. The former can be seen as the act that may be carried out by an individual, a small firm, or a business unit of a large corporation. The latter, on the other hand, involves the strategies that have to be defined to exploit an entrepreneurial venture, which is understood as entrepreneurial orientation (EO). That is, from a firm-level strategic position, the way a new entry is undertaken is explained by EO, which refers to the processes, practices, and decision-making activities that lead to new entry. This orientation involves autonomy, innovativeness, risk-taking, proactiveness, and competitive aggressiveness. Autonomy is seen as the spirit of independence necessary to new venture creation. The term independence is used to indicate an independent action of an individual or a team to carry out an idea from the inception to its completion.

Innovativeness is understood as the initiative towards the development of new ideas that may result in new products, services or technological processes. Risk taking bears the idea of assuming personal risk, which can happen for instance when an individual takes the risk of becoming self-employed rather than working for a big company. Proactiveness has to do with a forward-looking perspective that comes together with an innovative or new-venturing activity. Competitive aggressiveness is associated to a firm's propensity to assume a challenge to outperform industry rivals in the marketplace.

Entrepreneurship is also understood as continual innovation and creativity (Kuratko, 2005), which involves a process that often leads to the creation of a new enterprise (Cromie, 2000; Law and MacMillan, 1988). Central to this process is the search for business opportunities. Shane and Venkataraman (2000) and Venkataraman (1997) maintain that entrepreneurship is concerned with the study of how opportunities to produce future goods and services are discovered and exploited, by whom, and with what consequences.

From a social-oriented perspective, other scholars consider that the definition has to emphasize the creation of wealth for the individual and the adding of value to society (Kao, 1993; Tan, Williams and Tan, 2005). This means that some illegal activities such as bank rubbery and drug trafficking must not be included as kinds of an entrepreneurial endeavor. Accordingly, Kao (1993) defines entrepreneurship as the process of making changes; doing something different that leads to create wealth for the individual and to add value to society. Thus, this conception fits into the social view of entrepreneurship in that the aim is the benefit for society rather than merely the maximization of individual profits (Tan, Williams and Tan, 2005). According to Hisrich and Peters (2002), there are some common aspects in all the proposed conceptions; that is, creativity, independence, risk taking, and rewards.

In sum, after reviewing the variety of definitions, it is possible to conclude that three aspects are relevant in all these attempts: the discovery and exploitation of an opportunity (Shane and Venkataraman, 2000; Venkataraman, 1997); the individual who pursues such opportunity (Brandstätter, 1997); and the wealth creation and the adding of value to society (Kao, 1993; Tan, Williams and Tan, 2005). For the purpose of this dissertation, the first and second features will be considered as they are of great relevance and fundamental from an educational perspective. This leads us to define entrepreneurship in terms of the discovery of an opportunity by an individual who is able to deploy his/her entrepreneurial competencies in defining appropriate strategies to exploit such opportunity. According to this definition, schools and universities can meet the challenge of making students more entrepreneurial by equipping them with competencies to face the difficulties of an entrepreneurial endeavor. As will be discussed later, entrepreneurship education should be oriented not only to increase the students' knowledge and skills but also an attitude change. For this purpose, we argue that the constructivist view of education is the way to go as it challenges students to have an active involvement in the learning process and to get them motivated to learn. An adequate intervention fitting into the constructivist perspective can help instill in university students the development of entrepreneurial competencies for successful business startups and the survival of profitable enterprises. The rationale of this contention is that competencies at the knowledge, skill and attitude levels are possible to be influenced in a relatively short term.

1.2.2. An Overview of Entrepreneurship Education

During the last decades, the number of entrepreneurship courses offered by universities and colleges in the USA and Europe has evidenced a remarkable increase (Robinson and Haynes, 1991; Vesper and Gartner, 1997; Charney and

Libecap, 2000; Hisrich and Peters, 2002). By 1995 in the USA, more than 400 schools had been offering entrepreneurship courses (Vesper and Gartner, 1997), while at the start of the new millennium, more than 1600 schools were offering over 2200 courses (Katz, 2003; Kuratko, 2005). At the beginning of the 21st century, more than 50 universities in the USA were offering not only single courses as part of entrepreneurial training, but also complete programs (Koch, 2003). Nowadays, entrepreneurship is being taught at almost all schools with American Assembly of Collegiate Schools of Business (AACSB) accredited MBA or 4-year degrees, as well as nearly at all national ranked schools (Katz, 2003).

Previous studies have also reported an increase in entrepreneurship education in other countries, (Binks, Starkey, and Mahon, 2006). The gross number of entrepreneurship courses offered at England higher education institutes had increased by 15% from 104 to 120 between 1997 and 1999, with a gross attendance increase of about 23% for the same period (Levie, J., 1999). In Spain and The Netherlands, Koch (2003) indicates that, in recent years, at least some universities give the possibility of attending modules on entrepreneurship when studying economics courses. Koch also indicates that comparable courses are hardly found in Italy and France. Although political parties have been taking initiatives to promote entrepreneurship education in European countries, almost all these countries are well behind the situation in the USA. Similar case is also true for Germany, Austria and Switzerland even though important efforts have been observed to catch up during the last decade.

The growth and importance of entrepreneurship education and training is reflected on the contribution for the economy and regional growth. Although relatively little research has been conducted on the impact of entrepreneurship education, the existing evidences seem to indicate that it has contributed to enhance new venture creation and self-employment. One of the relevant studies was conducted among

business graduates at an American university from 1985 through 1998 (Charney and Libecap, 2000, 2003). This study revealed that approximately 54% of 105 graduates in entrepreneurship were involved in new venture creation compared to 17% of 406 non-entrepreneurship graduates. The study also showed that 27% of entrepreneurship graduates were self-employed compared to 9% of non-entrepreneurship graduates. Important to remark is that the study was designed to analyze the marginal effects of entrepreneurship education by controlling for individual-specific characteristics. They included: year of birth, gender, ethnicity, high school graduation year, and educational and employment history. According to the numbers reported by Charney and Libecap (2000, 2003), the average propensity for entrepreneurship graduates to own their own business is three times that for non-entrepreneurship graduates.

While the above discussion stresses that entrepreneurship education has experienced a significant growth worldwide in the last two decades, no general agreement has been reached on what is meant by entrepreneurship education. One possible explanation for this lack of agreement relays on that no universally accepted definition of entrepreneurship exists (Fones and English, 2004). To address this issue, the next section will discuss several definitions of entrepreneurship education put forward in the existing literature. By doing so, we seek to have a common view of entrepreneurship education and an operational definition for the purpose of this dissertation.

1.2.2.1. How is Entrepreneurship Education Defined?

Hood and Young (1993) maintain that entrepreneurship education is concerned with preparing individuals for the creation and successfully administration of profitable enterprises, thus contributing to the economy and regional development. Kourilsky defines entrepreneurship education as "opportunity recognition, marshalling of

resources in the presence of risk, and building a business venture" (Kourilsky 1995, p.12). Other scholars conceive entrepreneurship education in terms of a program oriented to inform, train and educate anyone interested in awareness creation and start of a new venture, or small business development (Bechard and Tolohouse, 1998). While education for entrepreneurship focuses on carrying out a new combination of business elements, education for small business ownership focuses on what is needed to reproduce or acquire an existing business. Klandt (1998) points out that a distinction should be made between entrepreneurship as a scholarly domain and traditional business administration. The latter sees entrepreneurship education as a cross-section subject that is concerned with many business administration areas. The former, on the other hand, considers things from a very specific perspective that involves the entrepreneur as a whole, giving an emphasis on the creative, the future, the yields and the growth. From this point of view, the entrepreneur is central as he/she is continuously being challenged in regards to his/her strategic thinking and operative ability. This means that entrepreneurship education is oriented towards recognizing and exploiting new business opportunities emphasizing the overall role of the entrepreneur in his/her newly-founded, growth-oriented company.

According to Koch (2003), entrepreneurship education can take one of two forms depending on the objectives to be accomplished. The first orientation aims to prepare students to become competent in analyzing the possible implications of economic policy concepts for entrepreneurial action. In this sense, the educational perspective addresses the issue of entrepreneurship, in which learning focuses on theories associated to the entrepreneur, his/her features, and his/her role in the economy and society. The second addresses learning with the idea of preparing individuals for their own entrepreneurial career. Thus, the driven force is the dominating desire to gain competencies to enable students to create a new company or to work as a self-employed entrepreneur.

For this dissertation, entrepreneurship education is viewed in terms of the competencies that can be developed that will enable students to identify and exploit a business opportunity. As such, students are expected to develop their knowledge and skills as well as to change their attitudes to better face the challenges and difficulties involved in an entrepreneurial endeavor. This is particularly relevant for those who are aiming to become entrepreneurs later on and are therefore interested in developing entrepreneurial competencies. In this line, a typical target group of entrepreneurship education includes people with a similar disposition to actual entrepreneurs (Klandt, 1998). For other students who may not be interested in being entrepreneurs, it is also important to attend any kind of entrepreneurship training because it can give them a sense of what entrepreneurship is about and what issues are involved in the entrepreneurial process. In addition, being exposed to entrepreneurship training is beneficial for students because it can help them self-reflect on the traits and capabilities that they may or may not have for an entrepreneurial career. Beyond the main interest in getting an overall understanding about entrepreneurship, it can give individuals some clues and capabilities whether challenges call for intrapreneurial actions when working in a large corporation. In summary, the intended conception of entrepreneurship education proposes that entrepreneurial competencies should be instilled in students regardless of whether they will actually become entrepreneurs in their future careers. Therefore, the definition of a competency is an important input in delineating a proper instructional approach. Before discussing what is meant by a competency and its relevance for entrepreneurship education, the next section reviews several approaches that have been proposed for teaching entrepreneurship.

1.2.2.2. Approaches to Entrepreneurship Education

The underlying assumption of entrepreneurship education resides in that entrepreneurship can be taught (Chell and Allman, 2003; Falkang and Alberti, 2000; Kirby, 2002; Klandt, 1998; Kuratko, 2003). One of the challenges of entrepreneurs is to remain constantly innovative, which drives them to learn continuously in their everyday activities. This thought is an important consideration for entrepreneurship education as the capacity for innovation of individuals is a crucial factor to succeed in business (Walker, Damanpour and Avellaneda, 2007). An associated term is creativity, which is a well recognized concept in the innovative process (Kuratko & Hodgetts, 2004). Being creative requires being different, curious and persistent that enable individuals to generate novel ideas. By taking these considerations into account, we maintain that educators are called to look for learning opportunities in order to foster the students' creativity and innovative thinking as essential competencies for an entrepreneurial activity. The next section will discuss several approaches for entrepreneurship education, put forward in the extant literature.

1.2.2.2.1. Entrepreneurial Learning Approach

Klandt (1998) contends that entrepreneurship education needs to be oriented to a more active participation of learners, which can be accomplished by approaching learning in an entrepreneurial mode. Entrepreneurial learning stems from the idea that the learner assumes an active role and learns by doing (Klandt, 1998). With a traditional learning mode, on the other hand, the learner takes a passive role that can happen, for instance, when listening to a lecture and the teacher becomes a disseminator of information. Entrepreneurial learning takes place through a variety of possibilities: learning through face-to-face exchange of information instead of media-based mechanisms (e.g. using books); learning from other colleagues instead of just

one person in a hierarchical position; learning under deliberate pressure instead of contemplative learning (Klandt, 1998). In this respect, teaching methods should include the implementation of activities such as business simulations, case discussion, role playing, interaction, team work, creativity development, networking, business games, term projects, listening to the testimony of guest entrepreneurs, internships, and business plan competitions (Henry, Hill and Leitch, 2005a, 2005b; Klandt, 1998; Koch, 2003; Moro, et al., 2003; Shepherd, 2004; Uebe-Emden and Schuhen, 2006). In the same line, any educational approach can be more effective when it becomes more practical or real-world based (Saee, 1996), which makes students to be central to the learning process and to become more actively involved.

1.2.2.2.2. Student-Approved System Approach

Fiet (2000b) proposes the use of a student-approved system through which students are committed to practice specific skills during class sessions. By following this system, students are encouraged to acquire competencies through their practice with theory-based activities. This approach requires that students exercise learning activities associated to the concepts to be mastered during class sessions. An important feature of this approach is that it allows every student to get involved in the activities and the discussions that arise as part of the learning activity. Furthermore, Fiet (2001) contends that the use of activities associated to theoretical content offers several advantages as it prevents students from getting bored and invites them to have an active participation in the learning process. A theory-based activity can take place, for example, when studying issues related to the discovery of opportunities by entrepreneurs. In this case, theories associated to this particular topic include informational economics and decision making (Busenitz, and Barney, 1997; Fiet, 1996; 2000a, Hayek, 1945). To be a stimulating activity, it needs to be exercised in a surprising fashion so that students are constantly on the alert for

something new; otherwise, the pedagogical benefit of an activity may be lost (Fiet, 2000b). This approach encourages interactions among students and between students and facilitators. It also allows all the entire class to become mentors in a learning approach that facilitates class-wide learning. Having students more involved in the learning process is beneficial in the sense that any system is expected to work better if they feel good about it and decide about their learning. One of the disadvantages, nevertheless, is the time consuming nature of this teaching method.

1.2.2.2.3. Self-Directed Learning Approach

Bird (2002) proposes a self-directed learning approach as a suitable method for adult learning. This approach is grounded on applied theory as suggested by Fiet (2000a). Self-direction proposes that students get involved in the design and execution of a learning project, which is a kind of a learning contract that challenges students to develop entrepreneurial competencies. As the individual is central to the learning process, the instructor plays a role of facilitator rather than an evaluator of performance. Moreover, the instructor provides conceptual frameworks, guidance, feedback and motivation so that students are expected to develop new knowledge and behavior. Thereby, students are assisted to understand and apply underlying course concepts.

1.2.2.2.4. Experiential Learning Approach

Another approach to entrepreneurship education is experiential in nature (Bird, 2002; Carland and Carland, 2001). This approach is based on the experiential learning model that involves a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Previous research has emphasized the importance of the Kolb's model because it helps understand the

learning process. In this regard, an individual's learning style has been linked to the entrepreneurial abilities within the process of deciding to become an entrepreneur (Ulrich, 2001). According to the Kolb's model, in stage 1, an individual gets a concrete experience that forms the basis for reflective observation and abstract conceptualization. In educational applications, students, for example, can have a concrete experience when they work for an entrepreneurial company as an internship-type activity (Bird, 2002). Following the first stage, students may self-assess on their own entrepreneurial profile at stage 2, while in stage 3 they may try to link previous experience with formal concepts and the possibility of creating a new business. It is at this point when individuals may form their intentions to start their own businesses (Bird, 2002). At the fourth stage, students may end up with thinking about experimenting themselves the required steps towards creating a new venture.

As can be noted in the above discussion, while educational approaches for teaching entrepreneurship vary, there are areas of general agreement that can be addressed when designing an intervention. The first refers to the importance of an active involvement of individuals in the learning process, which is a crucial concern in contemporary educational systems. This consideration makes the suggested approaches fit well into the entrepreneurship domain because the inherent behavior of entrepreneurs is their active role when starting and running a new enterprise. Such methods also fit well into the constructivist view of education since active involvement of students is fundamental under this perspective.

The second area is associated to the belief that individuals learn more effectively by doing. By having students exercise a variety of in and out-class activities, linked to theoretical content (Fiet, 2000a) and designed to mimic real-world experiences, they are more likely to achieve learning. As Fiet (2000a, p. 10) states, "we weaken our teaching effectiveness when we try to teach the answers to questions that have not

been addressed in the literature of a theoretical stream of research". Whenever activities associated to theoretical content become scarce in a teacher's repertoire, an alternative is to assign a group of students the responsibility to present a particular topic. The activity created by them will be rewarded or penalized otherwise. To prevent students from using an uninteresting activity, the teacher can and should review it with them before class.

The third area demands an examination of what is relevant for students to know and what competencies need to be addressed. Consequently, the question regarding what we should teach in entrepreneurship courses is addressed. As we have contended, it is crucial to equip students with entrepreneurial competencies to better face the challenges of setting up and running a business. This posture is particularly important regardless of whether or not students actually become entrepreneurs later on in their lives. Accordingly, teachers are challenged to structure opportunities for students to refine or revise their understandings of how and why things are by presenting new information, asking questions, promoting research, and challenging current concepts (Brooks and Brooks).

In summary, we maintain that teaching entrepreneurship through lectures and reading texts does not encourage students to be active in their learning process; hence, it does not promote the development of entrepreneurial competencies. In contrast, our contention is that an alternative paradigm is the constructivist view of education. As stressed by Lobler (2006), under this paradigm, education is driven by basic principles that include: 1) having students being central to the learning process and teachers being facilitators of learning rather than disseminators of information; 2) letting students achieve their learning goals while giving them support; 3) discussing with students what content to be covered and the competencies to be developed; 4) avoiding the use of tests to evaluate students' performance, instead facilitating their

learning through relevant activities that mimic real-world situations; 5) allowing interaction among students and group work while receiving feedback from teachers; 6) allowing students to solve problems on their own while leading to find solutions by asking motivating questions. In alignment with these principles, the dissertation proposes an action-oriented approach that fits well into the constructivist perspective. As discussed in Chapter 3 (*Research Method),* this approach is structured in such a way that students are guided to exercise a variety of activities oriented to influence the development of entrepreneurial competencies. The next section presents the definition of a competency followed by a review of the extant literature on entrepreneurial competencies.

1.2.3. The Definition of a Competency and its Relevance for Entrepreneurship Education

A competency is defined as an underlying characteristic that a person brings to a job situation, which can result in effective and/or superior performance in such job (Boyatzis, 1982). Similarly, Spencer and Spencer (1993, p. 9) define "a competency as an underlying characteristic of an individual that is causally related to criterion-referenced effective and/or superior performance in a job or situation". As the existence or possession of a given characteristic may or may not be known to the individual, it may be an unconscious aspect that he or she is unable to articulate (Boyatzis, 1982). The words underlying characteristic in the definition of a competency gives the notion of a fairly deep and permanent part of an individual's personality, which serves as a predictor of behavior in different situations and tasks. Causally-related refers to that a competency causes or predicts behavior and performance. Criterion-referenced gives the idea that the competency actually predicts how well a person does something, as measured on a specific standard. Spencer and Spencer (1993) emphasize that this ultimate part is critical because a

characteristic cannot be considered as such unless it predicts something meaningful in real-world situations.

Competencies are commonly categorized as "threshold" and "differentiating" (Boyatzis, 1982; Spencer and Spencer, 1993). Threshold competencies are understood as essential characteristics needed to perform a job or task at a level to be minimally effective. They usually include knowledge, basic skills, motives, traits, self-images, or social roles that do not distinguish superior from average performers. An example of a threshold competency for a soccer player is knowledge of the basic rules of this sport, or the ability to properly kick the ball as strong as he/she can. In contrast, differentiating competencies are those that distinguish superior performance from average. Achievement-motivated salespeople, for example, set themselves goals higher than those required by the organizations in which they work.

There are five types of competency characteristics, which include motives, traits, self-concept, knowledge, and skills. As described by Spencer and Spencer (1993), these characteristics are as follows:

1) Motives refer to the things about what a person consistently thinks or wants that cause action. This characteristic is present, for example, when people always exhibit a pattern that is consistent with setting goals for themselves, assuming responsibilities for achieving them, and trying to do better in another occasion.
2) Traits include both physical characteristics and consistent responses to situation or information. They can also include emotional self-control and initiative. These characteristics can become observable, for instance, when people face a difficulty in their life and because of that, they try to resolve it without waiting for someone who can do it.

3) Self-concept is a set of characteristics that include attitudes, values, or self-image. Similar to motives and traits these characteristics are less visible as they reside in the inner part of an individual; thereupon, they are more difficult to influence with an educational intervention. For example, people who value being in a management position and do not naturally like it may fail because they were not able to adapt to the demands of a new situation.
4) Knowledge is a complex competency that refers to information a person has in specific content areas. What is crucial of this competency level is related to what people are able to do with their knowledge. That is, memory of specific facts is not as important as knowing which of these facts is relevant to a particular issue and where to find them when required (Spencer and Spencer, 1993). It is not surprising to see students not being able to retrieve and properly use what they know. For example, students may be able to apply equations to routine textbook problems related to Newtonian physics. Nevertheless, we cannot be convinced whether these students really understand Newton's theory (Perkins, 1994). In other words, students may be good at answering to knowledge tests as they measure rote memory. According to Hood and Young (1993), knowledge can be formal or informal. The former is necessary as it enables an individual to foster creative or informal knowledge. In a business context, formal knowledge mainly refers to content areas associated to business and commercial knowledge. Informal knowledge, on the other hand, represents a person's imaginative attempts to construct meaning from everyday experience.
5) Skills are the abilities to perform certain physical or mental tasks. A basketball player, for example, can show a good physical skill to throw the ball into the basket as he/she is able to score more goals than other players. A computer programmer's ability to write and organize thousands of code lines in order to develop a useful software package.

The characteristics of a person can be seen as an iceberg split up into two parts: one is visible and includes knowledge and skills, and the other is hidden and comprises self-concept, traits or motives (Spencer and Spencer, 1993). This graphical representation implies that the most visible part of competency characteristics is more malleable than trait and motives; therefore, possible to be changed by an educational intervention in the short run.

From what has been discussed, a competency can be seen as a combination of attributes possessed and used by individuals in performing a job or task. In this sense, an alternative view of a competency is one that makes an integration of three domains: the "self", the "know" and the "know-how" (Ibarra, 2000). From our understanding, competencies related to the "self" include the attitudes, values, social roles and self-images. The competencies associated to the "know" are those that involve the specific or technical knowledge required to perform a task in a given area whereas the "know-how" competencies consist of abilities that can be developed through experience and practice. Commonly, people exhibit different levels of competencies at a given moment depending on the context in which they are performed (Boyatzis, 1982); that is, they are context sensitive. The set of competencies possessed by an individual represents the capability that he or she brings to a situation. It is important to remark, however, that these competencies describe what people can do, not necessarily what they do in a given situation, nor do always regardless of the circumstance (Boyatzis, 1982). When these competencies are exhibited to a required quality and they are well balanced, we contend that these features can make the difference between a superior and average performer in a certain arena.

For a better understanding of what the three aforementioned features imply, let's take the example of two famous tennis players. Although both are good performers, one

of them is excellent at serving the ball and, perhaps, hitting the ball to his/her forehand. The other player is not as excellent as his/her rival in these abilities; however, he/she shows a relatively high quality level and a well-balanced variety of abilities. That is, he/she is able to combine several abilities, such as hitting the ball on the volley, employing drop shots, hitting the ball to his/her backhand, and so on. This second player is more likely to exhibit a differentiating performance than the other when the quantity and quality of these attributes are well balanced.

The concept of a competency has been mainly applied in the world of business, specifically in recruiting and selecting new employees (Stoof, 2005). In the management field, this concept has been acknowledged as it helps determine which characteristics of managers are related to effective performance (Boyatzis, 1982; Martin and Staines, 1994; Spencer and Spencer, 1993). Furthermore, increasing attention has been paid to competency-based education (Stoof, 2005), and its relevance in entrepreneurship education and training at the university level as well as other training venues has become apparent (Bird, 2002; Grichnik, 2005; Johannisson, 1991). Scholars have stressed the importance of preparing students for a modern, uncertain and changing environment. In this context, the need for people to develop entrepreneurial competencies has been considered as one of the main agendas in entrepreneurship education and training. Henry, Hill and Leitch (2005a, 2005b) point out that several concerns count on plausible arguments for such a need. At the global context, reductions of trade barriers together with accelerated technological changes create more uncertainty and a fertile ground for opportunities. At the society level, the tendency to privatization, deregulation, new forms of governance, increased environmental concerns, and a growing interest in recognizing the rights of minority groups are a source of complexity and uncertainty. At the organizational level, decentralization, downsizing, re-engineering, strategic alliances, mergers, and the increasing demand for flexibility in the workforce are some of the main forces that

play a decisive role in the existence of an uncertain climate. At the individual level, not only are people exposed to more responsibilities and stress at work but also to continuous changes in the environment that demand more creative and innovative responses.

Depending on the discipline in which people develop their activities, they must have a number of competencies (Boyatzis, 1982). A neurosurgeon who specializes in surgery related to brain diseases, for example, must have an ability to diagnose the problem and a fine muscle control as he or she has to operate with careful movements in small spaces. Similarly, a computer technician who specializes in repair and maintenance of computers must be able to find and solve the problem in the functioning of the system. As we can notice, these two experts must have some competencies that are similar because both must have deep knowledge of the functioning of the system they are treating. On the other hand, they must also have some competencies that differ from each other. For example, the risk involved in accomplishing their duties is different because neither the neurosurgeon nor the patient can afford experimentation.

Similar to the two experts described above, individuals must have a number of entrepreneurial competencies to succeed in business. The next section will make a detailed review of entrepreneurial competencies. These competencies may vary according to the development of the particular venture (e.g. early stage compared to a growing stage firm), the sector in which it operates (high tech versus fast moving consumer goods) and the environmental circumstances that drive an entrepreneur to initiate in business (Dubini, 1988; Gatewood, Shaver and Gartner, 1995; Kourilsky and Walstad, 2002).

1.2.3.1. Entrepreneurial Competencies

Based on the work of Boyatzis (1982), entrepreneurial competencies are defined as underlying characteristics possessed by a person which result in new venture creation, survival, and/or growth (Bird, 1995). These characteristics include generic and specific knowledge, motives, traits, self-images, social roles, and skills that may or may not be known to the person (Boyatzis, 1982). That is, these characteristics may be unconscious attributes of an individual.

Earlier it was emphasized that an individual-level competency is a useful concept for its predictive power of a person's behavior in a wide variety of situations and job tasks (Spencer and Spencer, 1993). Specifically, in the entrepreneurship field, the concept of an entrepreneurial competency has been acknowledged as it provides educators, policy makers, and other stakeholders with an important predictor of venture outcomes (Bird, 1995). Although entrepreneurs do not have jobs in the traditional sense, they do have jobs or tasks as they pursue and run a new business (Bird, 2002; Bhide, 1994; Bruderl and Preisendorfer, 1998; Heunks, 1998; Olson, 1985; Reid, 1999). In other words, the entrepreneurs' performance of roles and tasks is relevant for their personal and venture success. That is, entrepreneurs are permanently challenged to exhibit a set of competencies to succeed in their entrepreneurial endeavors.

Previous studies have been conducted in which the concept of entrepreneurial competency has been the guiding principle of analysis (Chandler and Hanks, 1994; Chandler and Jansen, 1992; Man and Lau, 2000). These studies, however, were oriented to link managerial or entrepreneurial competencies with firm-level performance. In an educational setting, on the other hand, we are mainly interested in individual-level competency as we attempt to help students become more skilled and

motivated to start and succeed in new ventures (Bird, 2002). Thus, a common concern among scholars is to get students to behave more entrepreneurially. To do so, one of the goals of entrepreneurship education is to instill in students the development of entrepreneurial competencies as to be better prepared for an entrepreneurial life (Fiet, 2001). One of the first steps towards competency-based education is the identification of relevant entrepreneurial competencies as they are believed to predict business formation and success within and across cultures (Mansfield, McClelland, Spencer, and Santiago, 1987). Knowing what competencies need to be developed is crucial in trying to meet the training needs of people in each phase of the entrepreneurial process. Previous studies have suggested that entrepreneurship education has to be oriented to intervene in each stage of development, which include: awareness, pre startup, startup, growth, and maturity (Cox, 1996; Henry et al., 2005a, 2005b).

By paying attention to the training needs of individuals, educators and trainers can devise their content and approach to improve the entrepreneurial learning process. At the first stage, an educational intervention mainly focuses on the various aspects of creating and running a new business. This implies that courses at the undergraduate and graduate levels should seek to promote the development of skills and values, and possibly an attitude change towards starting, owning, and managing a company, or working in a successful organization (Jamieson, 1984). At latter stages in the entrepreneurial process, education addresses the needs of would-be entrepreneurs for a self-employment career by encouraging them to set up and manage their own businesses as well as to secure their growth and future development (Jamieson, 1984). The distinction regarding the levels or characteristics of entrepreneurial competencies will be explained in detail in the next section. At this point, it is sufficient to note that different levels exist and that these have implications for entrepreneurship education.

1.2.3.1.1. Levels of Entrepreneurial Competencies

An action, or specific behavior of an individual, is manifested by competencies which, according to Boyatzis's model, they are an expression of a characteristic or several characteristics (Boyatzis, 1982). In this model, these characteristics are the various levels that include motives and traits, social role and self-concept, knowledge and skills. In the case of entrepreneurs, different levels of entrepreneurial competencies are exhibited by individuals who start businesses or carry out changes in existing organizations and who add value through their opportunistic vision and effort (Bird, 1995).

At the motives and traits level, for example, research has found that tolerance of ambiguity, locus of control, propensity to take risk, achievement values and task motivations are common attributes of entrepreneurs (Koh, 1996; Miner, Smith, and Bracker, 1989; Pandy and Tewary, 1979). Bird (1995) points out, however, that research is mixed. That is the case of risk-taking propensity because no conclusive results have been found. Therefore, it is not definitely linked to entrepreneurial effort and outcomes, which means that risk-taking propensity cannot be attributed to entrepreneurs. Some researchers argue that entrepreneurs are more inclined to take moderate rather than high risk as they tend to assess and calculate it carefully (Cunningham and Lischeron, 1991).

At the social role and self-concept level (Bird, 1995), competencies include: recognizing the importance of business relationships, concern for high quality of work, recognizing and acting on opportunities, assertiveness, recognizing one's own limitations, and being persistent and taking actions to overcome obstacles (DuCette, 1986; McBer, 1983, 1986; McCleland, 1987; Spencer and Spencer, 1993). Furthermore, at the role-level competencies, previous research emphasizes that the

entrepreneurial role is crucial to be successful in business (Chandler and Hanks, 1994; Chandler and Jansen, 1992). This role refers to behavioral actions associated to scanning for opportunities, selecting those that are promising, and formulating strategies to exploit them. Specifically, the entrepreneurial role demands the existence of two distinct competencies: (1) the ability to recognize, envision and act on a promising opportunity, and (2) the willingness and capacity to work hard for long hours.

At the knowledge and skill level, previous research has identified several entrepreneurial competencies. One of the contributions is of Hood and Young (1993) who addressed the content areas of knowledge and skills. By asking 100 leading entrepreneurs and chief executive officers (CEOs) in America's fastest-growing entrepreneurial firms, they found that competencies most frequently cited as important to succeed in business were finance/cash management, engineering, accounting, marketing, and sales. Furthermore, leadership, oral and written communication, and human relations were considered the most important skills areas of knowledge to success. In trying to provide clarity about the patterns of entrepreneurial behavior, Mitton (1989) derived a list of competencies commonly exhibited by entrepreneurs, including having a big picture perspective, spotting unique opportunities, making a total commitment to their entrepreneurial venture, seeing a need for total control, having a utilitarian view of what's right, welcoming uncertainty, using contacts and connections, embracing competence of others, and possessing a special know-how.

Deriving from the management literature, Herron and Robinson (1993) propose a set of skills associated to entrepreneurial actions, which include: knowledge and proficiency in designing products, services and processes, understanding and competence in dealing with organizational matters, understanding and proficiency in

maneuvering within an industry, proficiency in positively affecting behavior of organization members, creating and effectively use of human networks, and understanding and controlling the enterprise as a whole.

1.2.3.1.2. Intentional Model of Entrepreneurial Competencies

All the studies conducted to identify competencies of entrepreneurs are important contributions toward a theory of entrepreneurial competency. However, they have been mostly derived from management theories. Trying to expand the concept of competencies, Bird (1995) proposes a model of intentional actions. Studying entrepreneurs' intentions is worthwhile in the sense that they guide their goal setting, commitment and the required efforts for venture development (Bird, 1988). According to this model, three activities are central to entrepreneurship – sustaining temporal tension, sustaining strategic focus, and developing intentional posture (Bird, 1988).

Temporal tension refers to a present-future orientation of entrepreneurs, which means that entrepreneurs are both now and future-oriented people. Strategic focus refers to the entrepreneurs' orientation toward goals. Entrepreneurs who are able to define clear goals are more opportunistic and instrumental, and they are expected to out-perform entrepreneurs who have life-style goals. Entrepreneurs whose attributes embrace flexibility, field independence and cognitive complexity are expected to develop the "the strategic zoom lens" considered crucial for venture success. Intentional posture is associated to people's position in relation to their values, needs, and beliefs. This means that successful entrepreneurs are those who have lower levels of intrapersonal role conflict, better skills in team building, and more developed networking skills.

1.2.3.2. The Relevance of Entrepreneurial Competencies to Entrepreneurship Education

As mentioned elsewhere, this dissertation proposes an educational intervention to instill in students the development of entrepreneurial competencies. Previous research has stressed that entrepreneurial competencies are contingent on the individual needs and interests at a specific stage within the entrepreneurial process (Cox, 1996; Henry et al., 2005a, 2005b). As we know of, research does not provide clear information on what competencies need to be emphasized at the different stages of the entrepreneurial process. However, research has emphasized that the discovery and exploitation of opportunities is central in the entrepreneurial process (Ardichivili, Cardozo, and Ray, 2003; Shane and Venkataraman 2000; Venkataraman 1997). Therefore, we maintain that basic competencies at early stages of students' entrepreneurial development should include the identification and evaluation of business opportunities. Earlier it was indicated that many other competencies have also been mentioned as important for success in business. In consequence, one question needs to be answered: What are the entrepreneurial competencies that universities should address in entrepreneurship education at the undergraduate level? In this regard, we maintain that the model proposed by Boyatzis (1982) is of great relevance as it provides the framework that helps identify what competencies and at what level they should be addressed in entrepreneurship education. It also helps link the activities to be included in an educational intervention with the levels of competencies that we want to influence in students. Since the Boyatzis' model is conceived as involving various competency levels, some more easily changed than others, the intervention can be designed according to the span of time required to be effective. Thus, the concept of a competency opens new avenues for intervention in terms of selection for and teaching entrepreneurship (Bird, 1995).

The underlying assumption on focusing education on competency development resides on the idea that entrepreneurial competencies are changeable and learnable in a relatively short term (Bird, 1995; Man, Lau and Chan, 2002). This is possible because entrepreneurial competencies are performed by individuals; hence, they are behavioral and observable and partly internal within an individual (Bird, 1995). In other words, the keystone to the study of entrepreneurial competencies is that some competencies are easily observed; therefore, possible to be changed in a relatively short term, enabling the possibility of an educational intervention (Bird, 1995; Bird, 2002; Man, Lau & Chan, 2002). These competencies are especially those associated to knowledge, skills and attitudes. At motives and traits levels, on the other hand, competencies are in the inner part of an individual (Boyatzis, 1982); therefore, they are based on an individual personality and hard to change in a short period of time (Bird, 2002). This means that some competencies are more difficult to be taught than others, especially those that are inherent on a person, hence less visible. That is, they can be changed "with conscious intention over time by the individual" (Bird, 2002, p. 206). This could happen, for example, in individuals who can deal with failure more easily than others and assimilate it as learning instead of a cause for stigma.

The various levels of competencies are characteristics possessed by individuals that are not completely apart from each other. That is, competencies always include an intent, which are the motives or traits force that cause action toward and outcome. For example, knowledge and skill competencies invariably include a motive or trait, or self-concept competency, which provides the drive force or push for the knowledge or skill to be used" (Spencer and Spencer, 1993). This means that influencing competencies that reside at a deeper level is beneficial for its effect in using those at the knowledge and skill level. Bird (2002) maintains that proper training can affect the development of entrepreneurial competencies both the behavioral/skill and social role/self-concept levels.

To support the kind of learning that fosters entrepreneurial competencies in students, we need the existence of a different approach from what a lecture-based technique can offer. In this regard, we contend that the alternative paradigm is the constructivist view of education as it provides the basic principles to support and explain the required changes. The next section will discuss the relevance of the constructivist perspective to entrepreneurship education.

1.3. THE CONSTRUCTIVIST PERSPECTIVE AND ENTREPRENEURSHIP EDUCATION

As already discussed, the constructivist perspective has become well accepted and widely applied in different educational applications, such as in science and mathematics education (Akkus, Kadayifci, Atasoy, and Geban, 2003; Crawford and Witte, 1999; Matthews, 1993; Perkins and Blythe, 1994). In the entrepreneurship domain, however, little has been done to integrate the constructivist view into entrepreneurship education. Nevertheless, constructivism has been acknowledged for it provides more comprehensive understandings of the entrepreneurial process (Karp, 2006). In this respect, research is concerned with what is inside of entrepreneurs that drives them to construct their reality of the world and, hence, influence their actions.

Some of the reasons for not having a generalized application in entrepreneurship education may be that constructivist techniques are often more demanding and time consuming than are media-based or lecture-based teaching practices. From the side of learners, constructivist learning experiences can require high cognitive demands, and they may not respond well to the challenge (Perkins, 1992). Lobler (2006) argues that constructivism has been overshadowed by objectivism as the latter lends itself to the implementation of mechanical processes which make it be efficient and functional. It means that students are commonly led to memorize and repeat newly

presented information by using tests. If they are good enough at responding well to the tests, they are seen as having learned.

Advocates of constructivism maintain that the use of teaching practices under this perspective help learners to internalize and reshape, or transform new information (Brooks and Brooks, 1999). Furthermore, the resources, commitment and cognitive processes that entrepreneurs are expected to handle to identify opportunities, evaluate and exploit opportunities (Shane and Venkataraman, 2000; Venkataraman, 1997) provide a good argument to justify the appropriateness of the constructivist perspective in entrepreneurship education. According to Lobler (2006), the use of the constructivist perspective in management and entrepreneurship education allows the existence of an open learning process (Lobler, 2006). Under this approach, students are called to govern their own learning process and the instructors play the role of facilitators rather than evaluators of performance. By getting them to manage their learning process, learners are allowed "to take every opportunity to answer the question in concern" (Lobler, 2006, 1). This makes the learning process similar to the entrepreneurial process because entrepreneurs must permanently make every effort to learn what is needed for success.

Instructional strategies supported by a constructivist perspective may present, to some extent, more difficulties than a media-based or lecture-based educational approach. Interesting for educators, however, is that a constructivist framework poses more challenges to them as they have to innovate in their courses and to create motivating environments (Crawford and Witte, 1999; Iran-Nejad, 1995). Creating environments where teachers and students are encouraged to think and explore can facilitate their engagement in the learning process (Brooks and Brooks, 1999) which, in turn, may lead to better retention, understanding, and proper use of knowledge (Perkins, 1999).

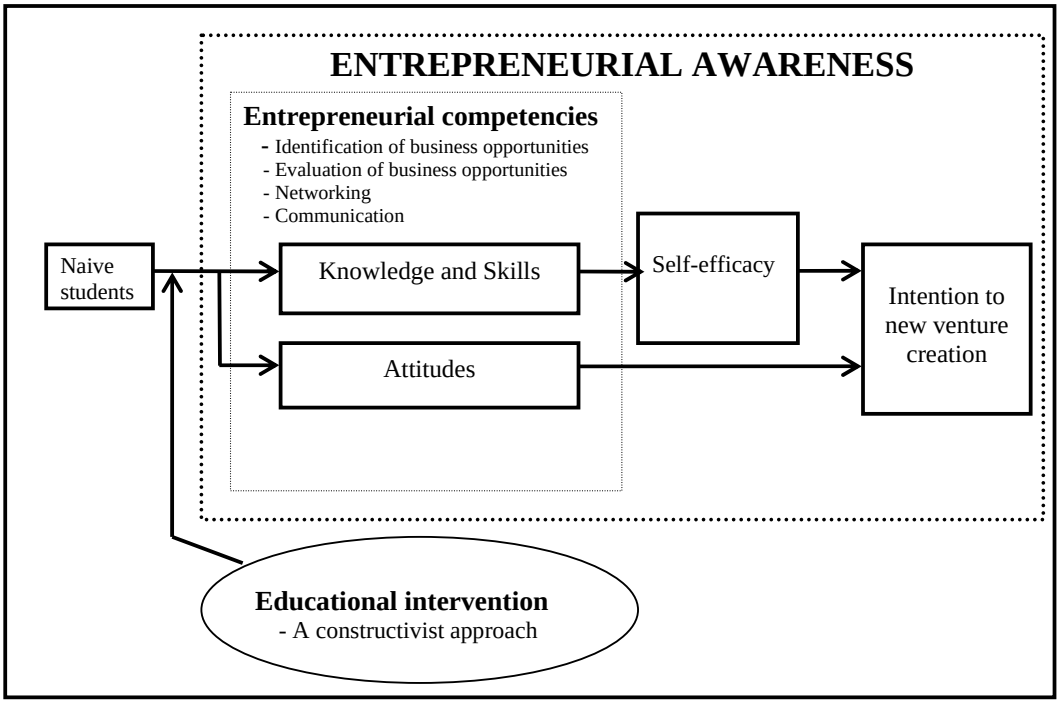
Binks, Starkey, and Mahon (2006) contend that business schools have failed to reflect how students actually learn. An educational system where instructional practices are designed to get learners prepared for tests, do not foster deep learning. Nor can they apply acquired concepts to new settings. That is why current view of business and entrepreneurship education considers that we are at the time to replace the existing traditional practices with an alternative paradigm (Binks et al., 2006). According to Lobler (2006), this paradigm is the constructivist perspective. In alignment with this assertion, we agree that the constructivist view is very appropriate to entrepreneurship education. As already discussed, this perspective of education is driven by basic principles that invite students to govern their own learning.

Since the constructivist perspective has been recently introduced into the field of entrepreneurship, little has been done to assess its effectiveness. To address this issue, one of the objectives of this dissertation is aimed at answering the questions: What is the impact of an educational intervention based on a constructivist approach on the development of relevant entrepreneurial competencies in university students at the undergraduate level? Do differences in the students' self-assessed entrepreneurial competencies have an impact on their entrepreneurial self-efficacy? Are the students' intentions to start their own business positively influenced by their entrepreneurial self-efficacy and attitudes toward entrepreneurial acts? Seeking to answer these questions, the impact will be measured in terms of how the intervention affects entrepreneurial competencies at the level of knowledge, skills and attitudes. The effect of the intervention on these three competency characteristics is important as they may positively affect the students' entrepreneurial intentions. The next section will discuss the model proposed in this dissertation as it explains the process of awareness creation in students.

1.4. MODEL OF AN EDUCATIONAL INTERVENTION FOR THE DEVELOPMENT OF ENTREPRENEURIAL COMPETENCIES

Thus far, the existing literature suggests that entrepreneurship education can be categorized according to the needs of the audience; that is, education about, for and in enterprise (Henry, et al., 2005a, 2005b). This dissertation focuses on education about entrepreneurship, which has awareness creation as the main objective expecting to instill in students the development of entrepreneurial competencies (see Fig. 1.1). By doing so, the dissertation proposes an educational intervention supported by the constructivist perspective that aims at fostering entrepreneurial competencies as a way of getting students more confident when starting and running an enterprise. The conceptual model of the dissertation considers the Boyatzis's definition of a competency (Boyatzis, 1982) as we maintain that it provides the framework that can facilitate the assessment of the intervention. The underlying assumption on this definition is that a person's competencies are classified into three levels that include: 1) knowledge and skills; 2) social role and self-concept, including attitude and values; and 3) motives and traits. Knowledge and skill competencies are the most external in an individual; hence, the more easily observed and possible to be changed through formal training in a short time. The social role and self-concept level competencies are less superficial than knowledge and skills but not as internal as those at the motive and trait level; that is, they lie somewhere in between, which include attitudes, values, or self-image (Spencer and Spencer, 1993). At the deepest level, competencies are personality-based; hence, they are more hidden and more difficult to assess and develop in a short period.

Fig. 1.1. Model of an Educational Intervention for Developing Entrepreneurial Competencies



The conceptual framework adopts the definition of entrepreneurial competencies suggested by Bird (1995), which is based on the Boyatzis' model. According to (Bird, 1995, 51) "entrepreneurial competencies are defined as underlying characteristics such as generic and specific knowledge, motives, traits, self-images, social roles, and skills which result in venture birth, survival, and/or growth. By following this conception, the dissertation focuses on four relevant competencies for starting and running a new venture, including: identification and evaluation of business opportunities, networking and communication (see Section 1.4.2).

As shown in Fig. 1.1, the conceptual framework emphasizes that the intervention is intended to instill in students the development of competencies at the most superficial levels, including knowledge, skills, and attitudes. This does not mean that

motive and trait competencies might not be influenced by the proposed educational intervention. However, we do not expect to observe a change on competencies at the personality level after completion of the intervention as they are relatively stable (Bird, 2002; Boyatzis, 1982; Spencer and Spencer, 1993). These level competencies would require longer exposure to entrepreneurship training.

In accordance to (Krueger and Brazeal, 1994), the conceptual model of the dissertation also proposes that an increase in the students' entrepreneurial self-efficacy is likely to occur as the students internalize the acquired competencies. Affecting the self-efficacy beliefs in students is crucial because of its likelihood of influencing their entrepreneurial intentions and, hence, the possibility of venture creation (Boyd and Vozikis, 1994; Chen, Greene, and Crick, 1998).

1.4.1. Implications of the Model from an Educational Perspective

As shown in Fig. 1.1, this dissertation proposes a model of an educational intervention that explains the issues involved in the process of awareness creation. This model has two implications from an educational perspective.

1.4.1.1. Implication of the Model for Entrepreneurship Teaching Practices

One important implication is associated to the goal to be achieved in the learning process; that is, the acquisition/development of entrepreneurial competencies. To achieve this goal, an action-oriented approach is suggested as a practical example of the constructivist view of education. This approach fits well into the constructivist perspective in the sense that it exposes students to challenging situations that allow them to govern their own learning (Lobler, 2006) and to learn by doing. By exposing students to learning experiences that require high cognitive demands – as it is the

case of the mini-enterprise activity described in detail in section 3.3.2 -- students can internalize the acquired competencies and, in turn, increase their entrepreneurial self-efficacy.

According to the proposed model, students with little or no prior experience or exposure to entrepreneurship – namely "naive students" – become aware of entrepreneurship as a career option when entering the learning process. In this process, students get awareness about the challenges and difficulties involved in an entrepreneurial venture. At this stage, it is also crucial for students to realize about the competencies required to exercise the tasks, strategies and commitment to exploit a business opportunity. Consequently, it is our contention that a primary objective of an intervention at the awareness stage is the development of entrepreneurial competencies at knowledge, skills and attitude levels. We have already explained that these competency characteristics are easier to be changed than those at the motives and trait levels (Bird, 1995; Bird, 2002; Man, Lau & Chan, 2002). In addition, research has emphasized that self-efficacy is a primary objective at early stages in the entrepreneurial process (Cox, 1996).

Promoting self-efficacy is crucial in the entrepreneurial process since students may strengthen their intentions to become entrepreneurs (Boyd and Vozikis, 1994; Chen et al., 1998). However, to really enhance their self-efficacy, people must fully internalize the acquired competencies through perceived mastery (Krueger and Brazeal, 1994). As it will be explained later, self-efficacy can be affected through mastery and vicarious experience, social persuasion and self-assessment of physiological state. These factors can be promoted by giving students the opportunity to act entrepreneurially or to participate in entrepreneurial ventures (Cox, 1996). Another possibility is to have entrepreneurs or students who are already embarked in an entrepreneurial venture to give them the testimony of how they started their own

business. These opportunities for self-efficacy enhancement are considered in the educational intervention proposed in this dissertation (see section 3.3.2).

1.4.1.2. Implication of the Model for Assessment of an Educational Intervention

Another implication of the proposed model has to do with assessing the effectiveness of the suggested intervention. This is an important concern among scholars as research on the matter remains sparse. In fact, the existing literature has stressed the lack of well defined methods for assessment of entrepreneurship education (Moro et. al., 2003; Clark, Davis and Hornish, 1984; and Falkang and Alberti, 2000).

Must of research has focused on course contents, pedagogical and audience characteristics, and the like (Falkang and Alberti, 2000). Assessment has been mainly oriented to measure students' satisfaction. Although this measure can serve to revise and improve content and approach of an intervention, it is not a sufficient measure for effectiveness assessment purposes (Falkang and Alberti, 2000). It has been suggested that assessment of an intervention should include the measures of skills and attitudes of students at the outset and at the training completion (Chell and Allman, 2003; Falkang and Alberti, 2000; Pihkala and Miettinen, 2002). Furthermore, since self-efficacy and intentions are considered as relevant precursors of venture creation (Bird, 1988; Boyd and Vozikis, 1994), research has also suggested that these aspects should be measured before and after each intervention (Cox, 1996; Cox, Mueller and Moss, 2002).

Building from previous research, we contend that a more refined method of assessment is required to have a better picture of the students' entrepreneurial development. Although detailed explanation is provided in section 3.1 (*Overview of the Methodology)*, at this point it is enough to say that such a method involves the

first two levels of the KirkPatrick's Model (Kirkpatrick, 1999). This model is intended to evaluate training programs based on four levels that include: reaction, learning, behavior and results. The last two levels are useful when a follow up of training is required by periodically observing the behavior of students and the outcomes of their actions. This model can be extensive to entrepreneurship education and training because of the observability of entrepreneurial competencies that allows the use of qualitative and quantitative methods to measurement.

The reaction level is important as it provides the necessary inputs that allow the revision and reformulation of an educational intervention. At the second level, the primary interest is the students' learning, which is the main objective of the dissertation regarding the effectiveness of the intervention. At this level, the assessment method in the dissertation focuses particularly on measuring entrepreneurial competencies at the knowledge, skill and attitude levels. The competencies of interest include the identification and evaluation of business opportunities, networking and communication. As described in the next sections, the rationale behind our decision relies on the relevance of these competencies in the entrepreneurial process. Focusing the analysis on these competencies does not deny the importance of others regarding the effectiveness of an educational intervention. Certainly, further research is recommended to investigate the extent to which other competencies can be instilled in students. It is important to remark, however, that working with a smaller number of competencies allows to focus the study and to go into more detailed examination of possible changes of the students' performance after completion of training. As the focus of the dissertation regarding the assessment of the proposed intervention is on the competencies mentioned above, the next section will review them and their relevance in the entrepreneurial process.

1.4.2. Review of Relevant Entrepreneurial Competencies

As indicated, we selected four entrepreneurial competencies for the purpose of testing the proposed model of educational intervention. These competencies include: Identification and evaluation of business opportunities, networking and communication that are reviewed next.

1.4.2.1. Identification and Evaluation of Business Opportunity Competencies

The pursuit of opportunities has gained attention as central to understanding the phenomenon of entrepreneurship. In this sense, the field of entrepreneurship refers to the study of how opportunities to produce future goods and services are discovered and exploited, by whom, and with what consequences (Shane and Venkataraman 2000; Venkataraman 1997). Consequently, it has been stated that "the field involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of opportunities; and the set of individuals who discover, evaluate, and exploit them" (Shane and Venkataraman, 2000, p. 218). Entrepreneurs identify opportunities by a continuous scan of their environment looking for information that may lead to new business opportunities (Kaish and Gilad, 1991). Since the exploitation of an opportunity involves the selection of the right one, its evaluation is crucial to succeed in business (Hills and Lumpkin, 1997). Evaluation of potential opportunities – sometimes referred to as due diligence – involves collecting information, in an effort that attempts to quantify the intuition or gut feeling (Lindsay and Craig, 2002). That is why, prior research has emphasized that the identification and evaluation of a feasible economic opportunity are essential initial steps of a new venture creation (Baron, 2004).

1.4.2.2. Networking

Previous studies have stressed the importance of entrepreneurs' social network for their entrepreneurial success (Bird, 1988; 1995; Larson, 1991; Johannisson, 1988). Networking refers to the ability to establish linkages with other business people and stakeholders for mutual learning and collaborative working aimed at achieving common objectives (Onstenk, 2003). When starting a business, the social relations play an important role in the sense that discussing with the entrepreneurs' personal contacts about the new venture can give them some ideas, for example, on where to obtain resources such as information, property, capital, and credit (Greve and Salaff, 2003). Other scholars have also stressed the relevance for entrepreneurs to possess and expand their networks of personal contacts as a source of valuable information about a potential entrepreneurial opportunity (Hills, Lumpkin, and Singh, 1997). Dubini and Aldrich (1991) maintain that entrepreneurship is inherently a network activity. That is, the pursuit of an opportunity demands that entrepreneurs mobilize resources that include not only knowledge and confidence, but also the use of personal contacts. In summary, these contacts may be helpful in providing relevant information, raising capital and money, and so on.

1.4.2.3 Communication

Communication skills are considered essential in managing an organization (Penley, Alexander, and Jernigan, 1991). That is, communication and management are closely linked because of managers' responsibilities. This linkage is explicitly observed in several managerial roles as suggested by Mintzberg (1973), which include: liaison, monitor, disseminator, spokesman, and negotiator. The ability to communicate with others has also been identified as relevant for entrepreneurial success (Bird, 1995; Onstenk, 2003; Hood and Young, 1993). That is, entrepreneurs have to be able to

persuade and discuss with various stakeholders such as customers, clients, suppliers, competitors and service providers issues involved in their ventures. Furthermore, communication skills are also crucial when looking for financial resources to launch a business. A clear and persuasive presentation of a business model is expected to gain interest of investors and other stakeholders. This is confirmed by Hood and Young (1993) since they found that communication both written and orally was one of the attributes of entrepreneurs most frequently mentioned in importance as essential for entrepreneurial success.

As we have stressed, instilling in students the development of entrepreneurial competencies is a primary goal of entrepreneurship education. However, teaching competencies – particularly at the knowledge and skill levels – should not be considered as a complete answer to promote a desirable change in students toward entrepreneurship. As Garavan and O'Cinneide (1994a) point out, knowledge, skills and attitudes are the three major features of innovators and entrepreneurs. Accordingly, Jamieson (1984, p. 19) maintains that the entrepreneurship discipline includes "the teaching of skills, knowledge and attitudes for people to go out and create their own futures and solve their problems". Thus, while enhancing knowledge and skills is crucial in making students more confident in what they are able to do, an attitude change is a necessary condition to get them engaged in entrepreneurial behavior. Previous studies have emphasized the relevance of attitudes toward entrepreneurial acts as they are linked to perceptions of what individuals find personally desirable (Krueger and Brazeal, 1994; Olson and Bosserman, 1984). To an entrepreneurial act, a person first experiences an intention (Boyd and Vozikis, 1994) which, in turn, is influenced by his/her attitudes and perceived self-efficacy beliefs (Ajzen, 1985). In other words, attitudes and self-efficacy become immediate antecedents of intentions (Boyd and Vozikis, 1994). These two concepts are

discussed next as they are important components in the model proposed in this dissertation.

1.4.3. Attitudes of Individuals and Their Functional Aspects

The existing literature reveals a widespread recognition that attitude is a critical success factor and a topic of concern among scholars. However, attitude development or change is usually not paid enough attention, which is especially true in the context of entrepreneurship education Garavan & O'Cinneide (1994a). The lack of attention to this issue becomes evident when designers of instructional systems try to do something to affect attitude (Kamradt and Kamradt, 1999). Attitude is an intrinsic characteristic of individuals that is defined as a psychological tendency to react favorably or unfavorably with respect to the object of the attitude (Ajzen, 1982; Eagley and Chaiken, 1993; Robinson, Stimpson, Huefner, and Hunt, 1991; Rosenberg and Hovland, 1960). The psychological tendency refers to an internal state of a person lasting for at least a short time. The way how people react to an object can be overt or covert based on a combination of three learning domains: cognition, affect, or behavior (psychomotor) (Kamradt and Kamradt, 1999; Robinson et al., 1991). The three components of an attitude interact through an explicit structure and process. The activation of a latent attitude takes place by the presence of an unresolved need state which, in turn, serves as a stimulation of a feeling in the affective component of all related attitudes (Kamradt and Kamradt, 1999). Immediately after activating the affective feeling, the cognitive component becomes active followed by a course of action that is selected from the available alternatives.

For an explanation of how this process comes about, Kamradt and Kamradt (1999) present the example of a nutritional need. In this case, the feeling of hunger is stimulated by the nutritional need which, in consequence, activates the affective

component of all attitudes that might be crucial in obtaining food. As the cognitive component comes into place, one of the actions to resolve the need is the use of a person's reason and experience, and the other is the selection of a course of action from several alternatives. Finally, the behavioral component operates in order to implement the chosen action.

The conception of an attitude has important implications to education and entrepreneurship. For educational applications, the tripartite model of an attitude allows educators to use instructional strategies to accommodate each component so that a final effect is achieved. As suggested by Kamradt and Kamradt (1999, 580), one way of doing that is to "nudge each component of an existing attitude a small amount in the direction of the matching component in the target attitude." The idea is to subtly push all the three dimensions until an attitude shift has been achieved. The assumption behind this thought is that people's natural aversion to attitudinal discordance is not absolute, and that most individuals are able to tolerate a certain degree of dissonance. In this line, the design of a lesson in a particular subject has to take into account the activation of the attitude in question in such a way that all the three components are accessible to learners and teachers. For example, role-play exercises might be adequate when a teacher wants to affect in a positive way an attitude associated to interpersonal behavior. It might be the case that a learner does not show his/her own initiative to interact with others. Thus, these types of exercises offer an opportunity to activate an attitude by exposing individuals to situations that call for its use.

Attitude is a useful term in explaining the phenomenon of entrepreneurship. Robinson et al. (1991) found evidences that entrepreneurs can be differentiated from non-entrepreneurs based on their attitudes toward entrepreneurship. According to Olson and Bosserman (1984), one of the main attributes that makes an

entrepreneurial orientation possible is linked to certain learned attitudes or specific beliefs about activities and situations. Drucker (1970) maintains that three attitudes are critical for entrepreneurs to be successful. The first refers to having a focus on opportunities instead of problems which leads people to orient their efforts to finding the right things to do and being opportune. The second attitude is associated to a market focus. That is, the belief that a person must pay careful attention to satisfying customers needs if he/she wants to succeed in business. The third attitude refers to the idea that entrepreneurs must think about the obsolescence of their products or services which, in turn, can get them improved or replaced in a timely manner.

Previous studies have emphasized that attitudes towards entrepreneurship are key to explaining new business startups (Phan, Wong, and Wang, 2002)). The linkage between the attitudes that individuals show toward starting a new business is tied to the propensity for entrepreneurial venture. That is why, Phan et al., (2002) suggest that introducing students to entrepreneurship at early stage can be beneficial as they develop positive attitude towards starting new business. In summary, attitudes are of high importance in entrepreneurship education because of its implications to entrepreneurial activity. Since they are possible to be changed, attitudes toward entrepreneurial acts can be influenced by proper education.

1.4.4. The Concept of Self-efficacy

Self-efficacy refers to "people's belief in their capabilities to mobilize the motivation, cognitive resources, and courses of action needed to exercise control over events in their lives" (Wood and Bandura, 1989, p. 364). One of the reasons for a generalized interest of the study of self-efficacy is that it appears to strongly affect a variety of behaviors (Snowman and Biehler, 2003). It is not enough to possess certain skills but being able to use them well and consistently under a variety of

circumstances, especially the most difficult ones. Wood and Bandura (1989) explain that beyond the required skills to be successful, a person must also have a strong belief in his or her capabilities to exercise control over events for the achievement of a desire goal. If a person perceives that certain behavior goes beyond his or her ability, the person will not act, even in the case of a perceived social demand for that behavior (Boyd and Vozikis, 1994).

1.4.4.1. Factors that Affect Self-efficacy

According to Bandura's theory, there are four ways by which people develop and strengthen beliefs about their efficacy: (1) mastery experiences (or past performance); (2) modeling; (3) social persuasion; and (4) judgments of their own physiological states (Bandura, 1982). Mastery experiences are considered the most effective way through which individuals develop a strong sense of efficacy. That is, people develop a sense of what they are able to do or not by thinking about how well they have performed in the past on a given task. The second source of influence is modeling or what Bandura refers to as vicarious experience (Bandura, 1982). It means that people partly judge their capabilities in comparison with others. Self-efficacy may also be influenced by social persuasion that takes place when we frequently try to give realistic encouragements to other people. The last source is related to physiological states from which people partly judge their capability, strength, and vulnerability.

The concept of self-efficacy has been subject of extensive research as it has important implications in management science and entrepreneurship (Boyd and Vozikis, 1994; Krueger and Brazeal, 1994; Wood and Bandura, 1989). Prior research, for example, identified a positive effect of entrepreneurial self-efficacy on the likelihood of being an entrepreneur (Chen, Greene, and Crick, 1998). Self-

efficacy is influential in the development of entrepreneurial intentions and, hence, the likelihood that those intentions will result in venture creation (Boyd and Vozikis (1994). Therefore, it becomes apparent that self-efficacy enhancement should be seen as an aspect of primary interest in entrepreneurship education. Initial evidence has been found that perceptions of formal learning have a positive impact on entrepreneurial intentions through the mediating role of entrepreneurial self-efficacy (Zhao, Seibert, and Hills, 2005). As more research is needed to confirm previous findings, one of the main questions that the dissertation seeks to answer is whether an educational intervention has an indirect effect on the students' intentions to start their own business through their self-efficacy beliefs.

CHAPTER 2: RESEARCH QUESTIONS AND HYPOTHESES

This section summarizes the discussion of the previous chapter (*Literature Review*) and presents the theoretical framework of the dissertation showing the relationships among the study variables and the corresponding hypotheses. As indicated, this dissertation embraces three objectives. The first is to propose an educational intervention based on the constructivist perspective. This objective addresses the pertinence of integrating the constructivist perspective into entrepreneurship education. It was our aim to find support as to why constructivism is a theoretical underpinning that can explain the required changes in entrepreneurship education. To do so, we conducted an exhaustive review of the education literature in order to get understanding of the basic principles of constructivism and their practical implications in entrepreneurship education.

The second objective is to identify a basic set of entrepreneurial competencies that should be emphasized in entrepreneurship education. This objective led us to pose the first research question:

R1: *What are the entrepreneurial competencies that universities should address in entrepreneurship education at the undergraduate level?*

In answering this question, our aim was to have a working list of competencies that can be instilled in students who have not had previous exposure to formal training in entrepreneurship. We will explain in detail in section 3.3.2 (*Research Method*) that the proposed educational intervention follows an action-oriented approach as a practical example of the constructivist view. This approach demands that students exercise a number of activities both individually and in groups enabling them to govern their own learning and to learn by doing. Therefore, identifying relevant entrepreneurial competencies is helpful in delineating the in and out-class activities to be exercised by students during the course of the intervention.

The third objective is oriented to empirically test the extent to which the proposed intervention has an impact on the development of entrepreneurial competencies in students. To do so, we proposed a conceptual framework that relies on the assumption that a constructivist approach provides the setting for competency development. As students internalize the target competencies, their self-efficacy beliefs are expected to be enhanced which, in turn, may influence their intentions to start their own business. Thus, the third objective leads us to answer the next three research questions:

R2: *What is the impact of an educational intervention based on a constructivist approach on the development of relevant entrepreneurial competencies in university students at the undergraduate level?*

R3: *Do differences in the students' self-reported levels of entrepreneurial competencies have an impact on their entrepreneurial self-efficacy?*

R4: *Are the students' intentions to start their own business positively influenced by their entrepreneurial self-efficacy and attitudes toward entrepreneurial acts?*

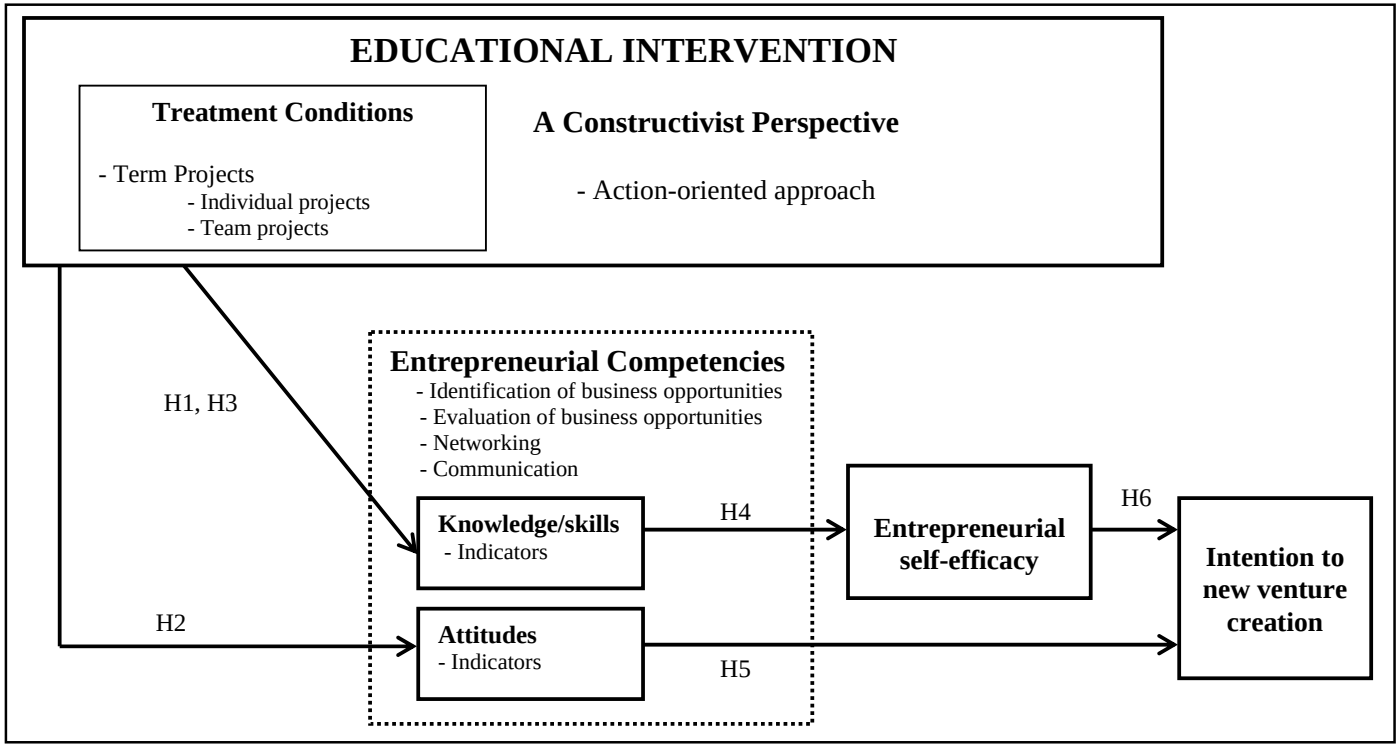
The next sections will first describe the conceptual framework of the dissertation, followed by the study hypothesis.

2.1 Conceptual Framework of the Dissertation

Figure 2.1 summarizes the literature review and presents the conceptual framework of the dissertation. This is an extended description of the model described in Chapter 1 (*Literature Review*), in which the constructs of interest are shown and how they relate to each other. The underlying assumption in this framework is that entrepreneurship can be taught by an adequate educational intervention. This

assumption, however, does not imply that every student attending an educational entrepreneurship program will become entrepreneur; we should not pretend to. That is, the outcomes of entrepreneurship education and training should not be directly equated with new venture creation. Instead, the expected outcomes are associated to the development of the knowledge, skills and attributes that are necessary in pursuing an entrepreneurial venture.

Fig. 2.1. Conceptual Framework of the Dissertation



As can be noted in Fig. 2.1, the framework consists of a model that seeks to explain what constructs are involved and their relationships within the process of students' entrepreneurial awareness. That is, the model relies on the assumption that an entrepreneurship course, serving as the educational intervention, has an influence on the students' development of entrepreneurial competencies. It further proposes that the acquisition of knowledge and skill level competencies will have an impact on the students' intentions to new venture creation through the mediation of their entrepreneurial self efficacy. Finally, the model proposes that positive attitudes toward entrepreneurial acts influence the students' intentions to start their businesses.

Previous studies have contributed to the entrepreneurship literature by using intentional models in trying to explain the entrepreneurship phenomenon. One of these models is the Shapero's entrepreneurial event model (SEE) in which entrepreneurial intentions depend on three elements: a) the perception of the desirability, b) the propensity to act, and c) the perception of feasibility (Shapero, 1982). Based on Ajzen's theory of planned behavior intentions are explained by: a) subject's attitudes toward the behavior, b) subjective norms, and c) the subject's perception of behavioral control (Ajzen, 1991). Another model of intentions was developed by Bird (1988) which considers that entrepreneurial intentions are based on a combination of both personal and contextual factors. Further development of the Bird's model was made by Boyd and Vozikis (1994) to include the concept of self-efficacy taken from the social learning theory. Another model was proposed by Davidsson (1995), which suggested that entrepreneurial intentions can be influenced by: a) conviction, defined by general attitudes (change, compete, money, achievement, and autonomy) and domain attitudes (payoff, societal contribution and know how); conviction, in turn, is related to personal variables including age, gender, education, vicarious experience and radical change experience.

Different studies have been conducted around the models described above (see e.g. Audet, 2002); Autio, Keeley, Klofsten, and Ulfstedt, 1997; Boyd and Vozikis, 1994; Davidsson, 1995; Krueger et al., 2000; Peterman and Kennedy, 2003; Souitaris, Zerbinati, and Al-Laham, 2007). To our knowledge, few empirical evidences have been reported regarding the effect of exposing students to entrepreneurship education on the entrepreneurial intentions. Previous studies have suggested that entrepreneurship education should improve the perceived feasibility for entrepreneurship by promoting self-efficacy and perceived desirability for an entrepreneurial career (Krueger and Brazeal, 1994). One study is of Peterman and Kennedy (2003) in which it was found that expousre to enterprise education affects intention. However, the sample was taken at high school rather than at the university level. Another study found evidences that an entrepreneurship program influenced an attitude change toward self-employment and that the overall intentions are stronger when attitudes are higher among university students (Souitaris, Zerbinati and Al-Laham, 2007).

From the discussion above, we see a need for more research to investigate the extent to which entrepreneurship education accounts for an increase on students' self-efficacy as well as an attitude change in relation to the intentions to create a new venture.

Accordingly, the conceptual model of the dissertation seeks to test the effect of entrepreneurship education – considered here as an exogenous influence – on attitudes and intentions. The conceptual model also considers the effect of entrepreneurship education on intentions through its impact on self-efficacy. This model differes from other studies in that it considers the effect of the educational intervention on the students' knwoledge and skill competencies as a first step in measuring whether their entrepreneurial self-efficacy beliefs increased or not. From

the theory of planned behavior, perceived behavioral control is one of the attitudinal antecedents of intentions (Ajzen, 1991). Perceived behavioral control reflects the perceived feasibility of performing the behavior which, in turn, is closely related to perceptions of self-efficacy (Krueger et al., 2000). Thus, as students internalize the target competencies, their sense of having the necessary capabilities to exercise control over events is expected to be higher. This means, as we argue, that those students who strongly belief in their capabilities will make the acquired/developed competencies become part of their behavior and thinking. Such students are expected to report high self-efficacy beliefs and, in turn, high intention to start their own business. The model proposes an integrative approach to measure the effectiveness of the intervention. That is, the students' entrepreneurial competencies are the expected outcomes of the educational intervention, and they can indirectly predict intentions to start a new business.

In sum, the conceptual model hypothesizes that self-efficacy beliefs fully mediate the relationship between the students' knowledge and skill competencies and their intentions to new venture creation. Also, attitudes toward entrepreneurial acts directly affect intentions. In the next section, we formulate the study hypotheses by explaining how each construct is related to one another.

2.2. STUDY HYPOTHESES

Building from previous studies, six hypotheses are formulated to explain the relationship between each of the constructs in the proposed model. The first two hypotheses are formulated by discussing how a constructivist perspective is supportive in facilitating students to develop entrepreneurial competencies at the knowledge, skill and attitude levels. Then, one hypothesis is stated as working in groups offers a better setting for learning than working individually in specific

activities. Finally, three hypotheses are formulated by discussing the influence of the intervention supported by the constructivist perspective on the students' entrepreneurial intentions through the mediating role of self-efficacy beliefs and attitudes. In general terms, a mediation effect exists when a mediator variable provides complete or partial explanation for the relation between the predictor (independent variable) and the criterion (dependent variable) (Baron and Kenny, 1986).

2.2.1. The Constructivist Perspective as a Supportive Approach for Competency Development

This section discusses the relevance of the constructivist perspective to entrepreneurship education and how it supports the development of entrepreneurial competencies. As proposed by the conceptual model, competencies are characteristics considered at three different levels. The knowledge and skill competencies are the most visible; hence, more likely to be influenced through formal training (Spencer and Spencer, 1993). The next more internal competencies involve self-image self-concept including attitudes and values whereas the most internal are the core personality. Personality-based competencies are the most difficult to assess and develop through education in the short term (Boyatzis, 1982; Spencer and Spencer, 1993). Accordingly, the dissertation focuses in those competencies at the knowledge, skill and attitude levels. The underlying assumption of this decision is that these competencies are the major features of innovators and entrepreneurs (Garavan and O'Cinneide, 1994a).

2.2.1.1 Knowledge and Skill-Level Competencies

Knowledge, skills and understanding are all three commitments of most teachers (Perkins, 1998). This entails that teachers are expected to assist students in learning of knowledge as well as their understandings and intellectual skills (Reigeluth and Moore, 1999). Accordingly, learning involves not only the knowledge that people possess but what they are able to do with what they know (American Association for Higher Education, 1992). That is, knowledge is something of value when an individual can deploy it with understanding (Perkins and Unger, 1999). Understanding implies that a learner can go beyond rote and routine thought and action (Perkins, 1998). In this regard, active engagement in learning may lead to better retention, understanding, and active use of knowledge (Perkins, 1999); features that are in line with the constructivist perspective. An instructional approach supported by the constructivist perspective yields significant better acquisition of scientific conceptions than a lecture-based instruction (Akkus, Kadayifci, Atasoy, and Geban, 2003). This can happen because the former refers to understanding where the latter refers to facts and knowledge to be transferred to students (Lobler, 2006). "To understand a topic means no more or less than to be able to perform flexibly with the topic – to explain, justify, extrapolate, relate, and apply in ways that go beyond knowledge and routine skill" (Perkins, 1998, 42).

Brooks and Brooks (1999) argue that the use of constructivist practices can enable students to refine and revise their understandings as they are led to be active in the learning process. Students get actively involved when: learning is grounded in direct experience, academic activities challenge the students' suppositions, their points of view are sought and valued, they are given the opportunity to find their own solutions to problems, and they are allowed to argue their thoughts, ideas and opinions against others (Brooks and Brooks, 1999; DeFillippi and Ornstein, 2003;

Lobler, 2006). For entrepreneurship education, Tracey and Phillips (2007) posit that a strong experiential component is required to expose students to the tacit elements involved in entrepreneurial activity. In this regard, we maintain that this requirement can be supported by constructivism as this perspective promotes active experimentation through hands-on experiences in realistic contexts. As students have a substantial amount of practice, they get good understanding of learnt concepts and become able to apply them in different situations. Therefore, involving students in relevant learning experiences in which they are encouraged to become active and are given the opportunity to learn by doing, we can expect that they will achieve learning for competency building. Based on the above discussion, the following hypothesis is formulated:

H1*: Students who have been exposed to entrepreneurship training that follows a constructivist approach in settings that mimic real-world situations will exhibit higher levels of entrepreneurial competencies at the knowledge and skill levels after the educational intervention.*

2.2.1.2. Attitudes toward Entrepreneurial Acts

The extant literature emphasizes that attitudes toward entrepreneurship are central to explaining new business startups (Phan, Wong and Wang, 2002) as they are an important impetus to influence innovative and entrepreneurial behavior patterns (Garavan and O'Cinneide, 1994a). Thus, introducing students to entrepreneurship at early stage in the entrepreneurial process can be beneficial as they develop positive attitude toward starting new businesses (Phan et al, 2002) as well as initiating and implementing new ideas within existing organizations. However, attitude development or change is usually not paid enough attention, which is especially true in the context of entrepreneurship education (Garavan & O'Cinneide, 1994a). In this

respect, we argue that traditional teaching practices in business education do not promote an attitude change. This happens because students are often allowed students to be passive in their learning (Major and Palmer, 2001; Reigeluth, 1999). That is, students' learning is commonly conceived as a process in which they are led to repeat newly presented information (Jackson, 1986). The problem with this approach is that it often leads student to believe that they are uninterested in a subject matter (Brooks and Brooks, 1999). Under a constructivist perspective, on the other hand, students are allowed to be active in their learning in search of meaning and not empty containers to be filled (Driscoll, 2005).

From our perspective, applying the constructivist principles in entrepreneurship education can promote an attitude change by exposing students to learning opportunities that mimic real-world situations. This can happen, for example, when we activate the students' needs for being successful in accomplishing a certain assignment. This is the case of a learning experience in which they have to compete in the market place by offering an innovative product or service. The students' unresolved need state stimulates a feeling of uncertainty in the affective component as they do not know what customers are looking for. Then, the cognitive component comes afterwards so that students begin looking for alternative products or services to be competitive. Next, a course of action is chosen from available alternatives.

Finally, the behavioral component is activated as the course of action is implemented. By allowing students to reflect and discuss on the incidents, their feelings and emotions in dealing with the situation as the one just described, we can expect that students can mobilize their attitudes. Their perceptions of desirability for entrepreneurship may be improved by showing them that this activity is highly regarded and socially acceptable and that it can be personally rewarding work.

To our knowledge, prior research has not reported the extent to which a constructivist perspective accounts for the students' attitude change toward entrepreneurial acts. However, evidences indicate that entrepreneurship programs can influence an increase on attitudes toward self-employment among university students (Souitaris et al., 2007). This leads us to speculate that students will mobilize their attitudes when they are exposed to hands-on experiences associated to a business context. Accordingly, we formulate the following hypothesis:

H2: *Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward entrepreneurial acts after the educational intervention.*

Specifically in terms of the four entrepreneurial competencies that were selected for assessing the effectiveness of the proposed intervention, four sub-hypothesis are formulated:

H2a: *Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward the identification of business opportunities after the educational intervention.*

H2b: *Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward the evaluation of business opportunities after the educational intervention.*

H2c: *Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward developing a personal network of contacts after the educational intervention.*

H2d: *Students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward convincingly communicating ideas to stakeholders in a business context after the educational intervention.*

2.2.1.3. Team Learning and the Development of Entrepreneurial Competencies

As learning is a social and an individual process, knowledge and understanding are co-constructed in dialogue with others (Perkins, 1999). Working in groups is a useful strategy, especially when problem-solving exercises involve realistic situations (Crawford and Witte, 1999). This strategy prevents students from getting frustrated when working individually in complex tasks. When working in groups, learning is facilitated as students have the opportunity to assume different roles, to observe and interact with their peers, and to have debates on issues that complement one another (Gardner, 1999). In this regard, previous research emphasizes that working in teams is more beneficial than doing individually, especially for low achievers (Hoogveld, Paas and Jochems, 2003). Furthermore, other studies confirm that a cooperative learning strategy have resulted in higher achievement in mathematics education compared to doing individually (Whicker, Bol, and Nunnery, 1997). This view of education aligns with Vygotsky's ideas in that individual development and learning are facilitated as people are embedded in social activities (Vygotsky, 1978). This implies that a social context plays a crucial role in what and how knowledge is acquired (Vygotsky, 1978).

As we have discussed, the constructivist perspective in education emphasizes the effect of other people's arguments on meaningful learning (Snowman and Biehler, 2003). That is, the presence of more knowledgeable others can exert a positive influence in people's learning. This means that "the knowledge and skills that are

acquired through the guidance of others are connected to existing schemes and gradually internalized, allowing the learner to become increasingly self-regulated and independent" (Snowman and Biehler, 2003, 306). Thus, exposing students to team work activities in realistic contexts will enable them to achieve learning for competency development. As we have discussed, this is in line with the social dimension of the constructivist perspective. Accordingly, we formulate the following hypothesis:

H3: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will exhibit higher levels of entrepreneurial competencies after the educational intervention than students who work individually.*

Derived from the above hypothesis, we formulated four sub-hypotheses in terms of the competencies selected for the purpose of testing the effectiveness of the intervention proposed in this dissertation. These competencies include: the identification and evaluation of business opportunities, networking and communication. Before presenting the following hypotheses, we will summarize the existing literature regarding the relevance of these competencies in the entrepreneurial process.

The entrepreneurship literature stresses that the search and exploitation of business opportunities are a major impetus to entrepreneurship (Shane and Venkataraman 2000; Venkataraman 1997). In searching for opportunities, entrepreneurs continuously scan their environment seeking to find information that may lead to create a new venture (Kaish and Gilad, 1991). Once a potential opportunity is initially visualized, the next step is to make a further evaluation, which involves

collecting relevant information to quantify the intuition or gut feeling (Lindsay and Craig, 2002).

In regard to the networking competency, the existing literature emphasizes that entrepreneurship is inherently a network activity (Dubini and Aldrich, 1991). As such, it is crucial for entrepreneurs to have and properly use their networks of contacts (Bird, 1988; 1995; Larson, 1991; Johannisson, 1988). A social network is relevant for entrepreneurs in the sense that it can be a source of information and new ideas in their entrepreneurial endeavors (Greve and Salaff, 2003). Thus, the role of social competence in entrepreneurs' success is something that matters. In this respect, Baron (2000) maintains that the ability to interact with others is one important determinant of success in many circumstances of a person's life. This is especially true for entrepreneurs because they are in frequent interaction with several stakeholders, which may include bankers, potential customers, prospective employees, providers, and so on.

An embedded competency in developing a social network has to do with having good communication ability. Previous studies emphasize the relevance for entrepreneurs of being able to persuade and discuss with various stakeholders issues related to their ventures (Bird, 1995; Onstenk, 2003; Hood and Young, 1993). It is also crucial for entrepreneurs to be a good communicator, especially when they look for funding of their entrepreneurial ventures as they have to be clear and persuasive in presenting their business ideas.

As we have argued, the above mentioned competencies can be developed through the course of an educational intervention supported by the constructivist view. By following this approach, we maintain that competency development is possible as students are allowed to be active and central to the learning process. An intervention

supported by a constructivist approach promotes interaction among students and group work while receiving feedback from teachers. As students work in groups, they have the opportunity to interact with their peers and to discuss on issues that complement one another (Gardner, 1999). It is even more beneficial for students when learning is approached by having heterogeneous teams compared to homogeneous teams; that is, when teams consist of members with different backgrounds, training and perspectives. Based on the above discussion, we formulate the following four hypotheses:

H3a: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of opportunity identification competency than students who individually work on their term projects after the educational intervention.*

H3b: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of opportunity evaluation competency than students who individually work on their term projects after the educational intervention.*

H3c: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of networking competency than students who individually work on their term projects after the educational intervention.*

H3d: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of communication competency than students who individually work on their term projects after the educational intervention.*

2.2.2. Linking the Students' Entrepreneurial Competencies and Self-Efficacy Beliefs

As we defined earlier, self-efficacy refers to a person's belief that he or she has the capability to accomplish a certain level of performance or desire outcomes (Bandura, 1986). Using this concept in the field of entrepreneurship, Boyd and Vozikis (1994) refer to it as entrepreneurial self-efficacy (ESE), which is an individual's belief that he or she is capable of performing the roles and tasks commonly exercised by an entrepreneur. One of the main reasons for a generalized interest of the study of self-efficacy is that it appears to strongly affect a variety of behaviors (Snowman and Biehler, 2003). While possessing the necessary skills for performing a certain task is essential, people also need to have a resilient self-belief in their capabilities in order to succeed in accomplishing certain goals (Wood and Bandura (1989). That is, to be successful a person must possess strong self-efficacy beliefs as it will stimulate their motivation and problem-solving skills. In other words, a person's belief in regard to whether certain goals can be achievable is affected by their self-efficacy beliefs (Boyd and Vozikis, 1994). In consequence, a person will not act if he or she perceives that certain behavior or desire outcome goes beyond his or her ability. In sum, it is not enough to influence in students the development of entrepreneurial competencies to be prepared for an entrepreneurial career but also to foster their self-efficacy beliefs. As Krueger and Brazeal (1994) argue, promoting self-efficacy is more than merely teaching competencies. To really enhance self-efficacy, people must fully internalize those competencies through perceived mastery. This means that students will exhibit higher self-efficacy levels when they have internalized the acquired/developed competencies as to become part of their behavior and thinking.

We can expect that a pedagogical approach based on the constructivist perspective can promote self-efficacy enhancement. Previous research has reported that an

instructional approach supported by the constructivist perspective yields significant acquisition of scientific conceptions (Akkus, Kadayifci, Atasoy, and Geban, 2003). This acquisition of concepts implies that understanding has occurred, which enables students to apply the acquired knowledge in different situations (Perkins, 1999).

In the entrepreneurship domain, current trends suggest the use of a variety of learning experiences to expose students to real-world situations (Edelman and Manolova, 2008) as a way of increasing students' self-efficacy. These learning experiences, amongst others, can include role-playing games/competitions, simulations, development of real projects, team work, videos, testimony of guest entrepreneurs, internships, and business plan competitions (Henry, Hill and Leitch, 2005a, 2005b; Klandt, 1998; Koch, 2003; Moro, et al., 2003; Shepherd, 2004; Uebe-Emden and Schuhen, 2006), and a temporary actual start of a business as we suggest in this dissertation. All of these pedagogical activities are related to the mechanisms of self-efficacy development, which include: mastery experience that can result from a repeated performance of a certain task; role modeling by using videos and testimonies of successful entrepreneurs; social persuasion by mentoring students regarding their career goals (Zhao et al., 2005); and one's own physiological state by showing them that this activity is worth and socially acceptable and that it can be personally rewarding work. Based on the above discussion, we formulate the following hypothesis:

H4: *Students who self-report higher levels of entrepreneurial competencies will exhibit higher levels of entrepreneurial self-efficacy after the educational intervention.*

2.2.3. Attitudes toward Entrepreneurial Acts as Immediate Antecedents of Intentions to New Venture Creation

It has been emphasized that the study of attitudes is helpful in explaining the entrepreneurship phenomenon (Drucker, 1970; Olson and Bosserman, 1984; Phan et al., 2002; Robinson et al, 1991) because they are relevant in influencing innovative and entrepreneurial behavior (Garavan and O'Cinneide, 1994a). That is, attitudes are an important explanatory variable of entrepreneurial actions through its influence on intentions. In general terms, to form attitudes toward performing a certain behavior, there must be a belief that performing the behavior will result in certain consequences (Boyd and Vozikis, 1994; Fishbein and Ajzen, 1975). Specifically, in the entrepreneurship domain, Krueger and Brazeal (1994) argue that key attitudes such as those associated to intrinsic interest in innovation or creating a high-growth venture are crucial to predict intentions toward entrepreneurial acts. That is, these attitudes are those internal forces within an individual that indirectly cause a potential behavior by influencing intentions.

As Robinson et al. (1991) maintain, attitudes are open to change and may be influenced by formal training. Other authors have also proposed a link between entrepreneurship education and entrepreneurial attitudes and intentions (see e.g. Dyer, 1994; Krueger and Brazeal, 1994). However, few studies have been conducted to show empirical evidence on such link. In this respect, Peterman and Kennedy (2003) found that exposure to enterprise education affects intentions to start a business, but the sample was taken at high school rather than at the university level. Souitaris et al., 2007) reported that an entrepreneurship program accounted for the increase of some attitudes and the overall intentions to become self-employment among university students. From the above discussion, it is apparent the need for

empirical studies to test the relationship between attitudes-intentions in an educational context. Therefore, we propose that:

H5: *Students who exhibit more favorable attitudes towards entrepreneurial acts will exhibit higher intention to create their own business in the near future after graduating from the university.*

2.2.4. Entrepreneurial Self-efficacy and Intentions to New Venture Creation

It was earlier reviewed that attitudes are important determinants of intentions. According to Bird 81988), intention is defined as a state of mind directing a person's attention and action toward a given object in order to accomplish something. Revising the Bird's model of intention, Boyd and Vozikis (1994) suggest that attitude and self-efficacy constructs influence intentions. This implies that bringing about changes in an individual's attitudes may not be sufficient to influence changes in behavior. That is, for a behavioral response to take place, individuals must also need to have high self-efficacy beliefs because of their influence on intentions. The extent to which people belief that they are capable of successfully creating a new venture is an step further toward the formation of entrepreneurial intentions (Krueger, 1993) and, in turn, the likelihood that those intentions will result in entrepreneurial actions (Boyd and Vozikis, 1994).

According to social cognitive theory, an individual's judgment of efficacy can be instilled through four main processes, including: mastery experience (or past performance), modeling (or vicarious experience), social persuasion, and judgments of a person's physiological states (Wood and Bandura, 1999). We can expect that an educational approach that addresses all these mechanisms will strengthen students' self-efficacy beliefs, which is the case of the intervention proposed in this

dissertation. Previous research has reported that perceptions of formal learning were significantly related to entrepreneurial self-efficacy and a considerable indirect effect on intentions to start a new business. Accordingly, we formulate the following hypothesis:

H6: *Students who exhibit higher levels of entrepreneurial self-efficacy after the completion of the educational intervention will exhibit higher intention to create their own business in the near future after graduating from the university.*

CHAPTER 3: RESEARCH METHOD

Current chapter describes the methodology used to test the forgoing hypotheses regarding the effect of an entrepreneurship course, serving as the educational intervention, on the development of students' entrepreneurial knowledge and skills and, possibly, an attitude change toward entrepreneurial acts. Since "self-efficacy is a useful construct in explaining the dynamic process of evaluation and choice that surrounds the development of entrepreneurial intentions" (Boyd and Vozikis, 1994, 66), this section further describes how this construct was defined and measured. First, an overview of the methodology is discussed (section 3.1) followed by a description of the three studies carried out to respond to the research questions (sections 3.2 to 3.4).

3.1 OVERVIEW OF THE METHODOLOGY

One of the main objectives of the dissertation is aimed at assessing the effectiveness of the proposed educational intervention. Accordingly, this chapter provides a detailed explanation of how this assessment was performed and includes all the issues involved in the design of the survey instruments and how the gathering of data was carried out. The chapter is structured into three studies that provide a complete description of the research method. The first study addresses the issues regarding the importance and implications of entrepreneurial competencies to entrepreneurship education. The second study is carried out in two parts and it is aimed at investigating the impact of the proposed educational intervention on the students' development of entrepreneurial competencies at the knowledge, skill and attitude levels. The first part of the study evaluates the students' reaction about the intervention followed by the students' learning as suggested by Kirkpatrick (1999).

As perception of formal learning has been found to be an important antecedent of entrepreneurial intentions through the mediating role of entrepreneurial self-efficacy

(Zhao et al., 2005), the second part of study intends to assess in more specific terms the extent to which the expected relationship exists. That is, we expect that the presence of entrepreneurial competencies at the knowledge and skill level, as the result of formal training, can have an effect on entrepreneurial intention through the mediation of the students' self-efficacy beliefs. Testing the hypotheses in this study requires the use of general linear repeated measures model (GLM). This technique is helpful in testing the effect of the educational intervention on the enhancement of the students' entrepreneurial knowledge and skills from the outset to the end of the educational intervention. Since attitudes are crucial in the entrepreneurial process, performing the GLM tool is also useful in investigating the extent to which the intervention has an effect, if any, on the students' attitudes toward the creation of a venture.

The third study is concerned with deriving a mathematical model by the use of the structural equation modeling tool (SEM). The relevance of using SEM is threefold: 1) the possibility of quantifying and testing the theoretical framework developed in this dissertation; 2) the possibility of taking into account the measurement error; and 3) the possibility of measuring the latent variables that are present in the proposed theoretical model which, otherwise, are not possible to be observed directly (Raykov and Marcoulides, 2000). Latent variables are theoretical or hypothetical constructs that take place when direct observation of behavioral issues on individuals seems not to be possible.

3.2 FIRST STUDY

This study is oriented to answer the first research question and attempts to shed some light on the ongoing debate about the areas and content that need to be emphasized in entrepreneurship education. Specifically, the study is oriented to provide information

that can be used by educators when having to delineate the competencies that students should acquire/develop by means of entrepreneurship education. The study was tackled by an exhaustive review of the existing literature regarding the competencies of entrepreneurs followed by an analysis of responses to a survey among entrepreneurs and academics in the field of entrepreneurship. Ecuadorian entrepreneurs and scholars from several countries were inquired to give their opinions about the competencies that are believed to be crucial when getting involved in an entrepreneurial venture.

Because of the implications to competence-based entrepreneurship education, entrepreneurs were also asked to indicate their point of view regarding the entrepreneurial competencies that need to be stressed in educational settings. Reflecting on the entrepreneurs' opinions in regard to what entrepreneurial competencies are believed relevant is valuable because of their expected causal relationship with venture initiation and success (Bird, 1995). Having their inputs is also important as they are helpful to design content and curricula to prepare university students in thought and action to an entrepreneurial life. Therefore, having the opinions from the practitioners' and scholars' perspective is of great value for getting better insights on what entrepreneurship education should entail.

3.2.1. Sample

As indicated, the first study involved the use of two distinct populations, one for entrepreneurs and the other for academics. For the first, the population consisted of nearly 1870 companies within the SME sector after eliminating many of firms that had incomplete data in the initial list provided to the researcher. The list of companies was obtained from the Chamber of Commerce in Guayaquil, one of the most industrial and commercial cities in Ecuador. A purposeful sample of 60

Ecuadorian entrepreneurs was drawn from the population whose companies met two basic criteria: 1) the company had to be less than six years old as I was interested in relatively newly created firms; and 2) the company had to be a manufacturing or service firm. That is, the study excluded firms whose main activity was to resell goods from other companies. Thus, the selected sample included firms in: development of software products, manufacturing of agricultural products, food production, manufacturing of electronic and mechanical products, services in computer science, consulting services in management and related areas, and mechanical and electrical services. In order to secure an acceptable response rate, the entrepreneurs were contacted by phone and invited to participate on the survey. Forty entrepreneurs agreed to participate and answered the questionnaire. Eighty five percent of the entrepreneurs were male, in average 40 years old, and the majority of them possessed a degree at least at the undergraduate level.

For the population of academics, experts in the field of entrepreneurship, a purposeful sample was selected that consisted of 53 scholars. These scholars were chosen from a list of participants who had attended one of the important European conferences in entrepreneurship in the year 2004. The questionnaire was sent to scholars by the Internet with a cover letter explaining the purpose and scope of the study. Forty three academics answered the questionnaire, from which 30 were from countries that included: Austria, Australia, Belgium, Canada, Finland, France, Germany, Hungary, Italy, New Zealand, Singapore, Sweden, Switzerland, United Kingdom, and United States of America. The other 13 scholars were from Ecuador, for a response rate of 88.3%.

3.2.2. Survey Instruments

Based on the existing literature, two questionnaires were developed and presented to respondents (see Appendices 1 and 2). One of the questionnaires was administered to entrepreneurs and the other to academics who are experts in the field of entrepreneurship. A list of entrepreneurial competencies was fulfilled by reviewing the works of Boyatzis (1982); Chandler and Jansen (1992); Hood and Young (1993); Spencer and Spencer (1993); Chandler and Hanks (1994); Garavan, and O'Cinneide (1994b); Bird (1995; 2002); Kirpatrick (1999); Shane, S. (2000); Lindsay, N. J. and Craig, J. (2002); Man and Lau (2000); Man, Lau and Chan (2002); Onstenk (2003); Kuratko (2003); Thompson (2003); DeTienne, and Chandler (2004); Honig (2004); Stoof (2005); and Alvarez and Barney (2006). The questionnaires in this study sought to explore the validity of the entrepreneurial competencies put forward in the entrepreneurship literature. The survey instrument to entrepreneurs was designed to gather information in three main areas: 1) demographic characteristics; 2) the respondents' opinions regarding the importance of possessing and exhibiting competencies when starting and running a new business; and 3) the respondents' opinions about the set of competencies that should be prioritized in entrepreneurship courses offered in universities seeking to impact on the students' awareness in future career perspectives (see Appendix 2). The other questionnaire intended to have inputs from an academic perspective in order to enrich the study among practitioners regarding the importance of competencies needed to entrepreneurial actions (see Appendix 1). The questionnaire to entrepreneurs was administered either by a face-to-face interview, the internet, or telephone while the one to scholars was done by the internet.

3.3. SECOND STUDY

This study seeks to answer the second, third and fourth research questions. The main focus of the study is on the effect of an entrepreneurship course, serving as the educational intervention, on the students' development of entrepreneurial competencies. A further step is to analyze whether these competencies have an effect on the students' entrepreneurial intentions through the mediation of their self-efficacy beliefs. Mediation refers to the fact that a given variable accounts for the relationship between the predictor and the criterion (Baron and Kenny, 1986). This implies that a variable functions as a mediator has to meet the following conditions: a) variations in the independent variable account for variations in the variable that is supposed to be the mediator; b) variations in the mediator significantly account for variations in the dependent variable; and c) when the two paths described above are controlled, a previously significant relationship between the independent and dependent variables is significantly diminished or not existing at all (Baron and Kenny, 1986).

The underlying assumption of the proposed intervention is that competencies are changeable and learnable (Bird, 1995; Man et. al., 2002). On the basis of this assumption, the dissertation proposes an educational intervention that follows a constructivist perspective. The next sections provide a detailed description of the intervention followed by a review of the type of experimental design, sample and survey instruments used in the study. For a better understanding of how the effectiveness of the intervention was assessed, what follows is a detailed description of the framework for the assessment.

3.3.1 Assessing the Effectiveness of the Educational Intervention

In general terms, one of the main reasons for evaluation of education and training is to determine their effectiveness and, thereby, to find ways through which they can be enhanced. As proposed in this dissertation, the method used for assessing the impact of the educational intervention proposed in this dissertation derived from the four-level model of evaluating training suggested by Kirkpatrick (1999). This model includes reaction, learning, behavior and results which are briefly reviewed next.

At the reaction level, the evaluation objective is mainly oriented to measure how those who participate in the training react to it. This means that assessing reaction seeks to measure the students' feeling after completing the training, which can be seen as similar to measuring customer satisfaction in a business context. This evaluation level is important because it tells us how favorable trainees react to training. In other words, if we expect training to be effective, trainees must react favorably to it. It is also relevant because the future of a given program and its improvement depend on how positively the audience reacts to it. However, having favorable reaction may not guarantee learning, but unfavorable reaction reduces the likelihood of its occurrence (Kirkpatrick, 1999).

The second level is oriented to measure whether the learning objectives are accomplished. In this sense, evaluation of learning demands that the trainers set up the specific objectives of training whereas participants are expected to change attitudes, improve knowledge, and/or increase skills. As reviewed earlier, we can have a sense of whether people have learned something when they become capable of doing it differently. In other words, we can expect that people demonstrate a change in their capacity for a desirable behavior when learning has occurred. Thus,

how people behave as a result of formal training becomes relevant for the purpose of assessment.

The third level refers to change in behavior attributed to attending a training program. Important to be aware of is that one may be misguided by a wrong perception that a certain training program was ineffective because no change in behavior was observed. If this is the case, an obvious conclusion is that such training should be discontinued because, apparently, it was not effective. The answer to this appreciation is that there are other conditions that play an important role for change to occur. According to Kirkpatrick (1999), four conditions need to be present for a behavioral change: 1) a desire to change; 2) knowledge of what to do and how to do something; 3) a right climate; and 4) a reward for having changed. It is not the focus of this dissertation to analyze all these requirements as the third and the fourth conditions may not be directly managed through an educational intervention. On the other hand, the first two requirements can be accomplished by an adequate intervention (see section 3.3.2).

Finally, the fourth level of evaluation refers to the results that we expect to occur because of the attendance to training. The results to be achieved depend on the objectives that we stated prior to the delivery of the training program. Some results may not be measured directly in terms of increased production and sales, decreased costs, higher profits, and so on. For example, when one major objective of a training program is to change attitudes of supervisors toward minorities in their workplaces, results are not tangible and cannot be measured in terms of dollars. A possible assessment approach in this case is to see supervisors treating all people fairly or showing no discrimination. Although these are not tangible results, it is hoped that tangible results will become evident. Likewise, measuring the effectiveness of an intervention within the entrepreneurship domain on such topics as spotting unique

opportunities, having a big picture perspective, or coping with uncertainty is relatively difficult. However, we can conduct evaluations by observing desired behaviors. Let's assume, for example, that we are to assess how alert students are to spot unique opportunities. One possibility is to measure results by observing to what extent they are able to perceive unresolved problems or unmet needs in their environment. Although these abilities may not guarantee the discovery of an opportunity, they may be the precursor of visualizing a unique business idea.

In the entrepreneurship field, previous studies have proposed various methods for assessing entrepreneurial competencies. These methods mainly look at the individuals involved in the start, survival, and growth of a new organization – that is, the entrepreneurs (Bird, 1995). As shown in Table 3.1, the various approaches can be qualitative, quantitative, retrospective and concurrent, objective and self-report.

Table 3.1. Potential Methods for Assessing Entrepreneurial Competencies

Self-reflective diaries
Retrospective reconstruction of events and behavior
Observation
Oral histories
Archival data such as letters and calendars
Critical event interviewing
Managerial repertoire grid (Gartner, 1985)
Participant observation
Videotapes about entrepreneurs
Journalists' accounts of entrepreneurs
Observational ratings by role set (e.g., employee, suppliers, lenders, customers)
Interviews of role set members
Job shadowing over time
Simulations such as in-basket exercises
Entrepreneurship games
Thinking aloud and analysis of protocols
Cases and analysis of solutions

Source: Bird (1995)

The methods presented in Table 3.1 are mostly oriented to investigate what competencies entrepreneurs are expected to exhibit in their entrepreneurial endeavors. In this sense, they are intended to offer more objective measures than a self-report approach. Beyond the assessment of entrepreneurial competencies, these methods are meant to find patterns that help distinguish successful from less successful entrepreneurs. In educational applications, however, we are mainly interested in looking at the extent at which education and training influence the students' entrepreneurial development. It means that some of these approaches may not be completely adequate for educational applications. For example, a critical event interview is intended "to get behind what people say they do to find out what they *really* do" (Spencer and Spencer, 1993, 115). According to this method, people are asked to describe how they actually behaved in particular incidents, which is pertinent to research about the entrepreneurs' behaviors. By following this approach, researchers are interested in knowing from a direct source what entrepreneurs do in particular situations. It also helps identify what makes them successful. This way, the competencies of entrepreneurs can be extensive to educational settings with the purpose of encouraging students to become more entrepreneurial. Similarly, oral histories or journalists' accounts demand that entrepreneurs give their own testimonies about their entrepreneurial acts.

From the above discussion, it is clear that the evaluation of entrepreneurship education and training is not an easy task. That is why assessment of the effectiveness of an educational intervention is a major concern among scholars; hence, a subject of considerable debate (McMullan and Gillin, 2001; Falkang and Alberti, 2000; Pihkala and Miettinen, 2003). Researchers have different positions in regard to the time frame of assessment. On the one side, advocates of longitudinal studies prefer this kind of approach as it allows researchers to observe how the students' careers unfold (Bird, 2002; Ehrlich, De Noble, Jung, and Pearson, 2000;

Garavan and O'Cinneide, 1994a). On the other side, some researchers suggest evaluations at completion of an entrepreneurship course instead of years later (Clark et al, 1984; Cox, Mueller, and Moss, 2002). Cox et al. (2002) contends that even a comprehensive longitudinal study might not provide a cause-and-effect relationship between entrepreneurship education and new venture creation. This can happen because of the time and possible events that are likely to occur between the completion of a course and a business startup. Therefore, Cox (1996) proposes an assessment approach in which measures are taken before and after each educational intervention of an individual's entrepreneurial development process. By doing so, students' performance can be followed throughout their careers, which is relevant for research and pedagogical purposes.

From our perspective, assessment should be made at the start and at the end of a given intervention. Then, a follow up of the individuals, subjects of the assessment, can provide a better sense of whether the intervention was indeed effective. This implies that longitudinal studies need to be implemented. In this respect, the third and fourth levels of evaluations suggested by Kirkpatrick (1999) – that is, behavior and results – seem to be valuable tools to measure the effectiveness of an educational intervention. Measuring these issues may give more precise outcomes when performed on the long run or in working environments where individuals can be continuously observed.

Although the Kirkpatrick's model suggests that thorough evaluation of training can be made by measuring its effectiveness through a four level approach (reaction, learning, behavior and results), the last two levels are not addressed in this dissertation as they are more appropriate for longitudinal studies. That is the case, for example, when the interest is in measuring entrepreneurial activity because it

becomes observable as the time goes on in the students' future development and as they get motivated and experienced to create a venture.

By adopting the first two levels of the Kirkpatrick's model, this dissertation proposes an assessment approach that involves reaction and learning. The former is important as it gives educators the necessary inputs about whether the intervention was well accepted which, in turn, can serve as feedback for improvement. At the level of learning, the assessment is aimed at measuring the effectiveness of the proposed educational intervention before and after its completion. By doing so, we can have first insights of what to expect latter on in the students' future entrepreneurial careers. Specifically, assessment on this dissertation is aimed at finding evidences of whether the constructivist perspective is an appropriate approach to instill in students the development of entrepreneurial competencies. We address this issue by assessing relevant entrepreneurial competencies exhibited or self-reported by students at the outset and at the end of the intervention. To do so, the analysis departs from the definition of a competency at the individual level. Specifically, it seeks to assess to what extent an action-oriented approach on an entrepreneurship course, serving as the educational intervention, would likely lead to increased levels of knowledge and skills and possibly an attitude change in university students.

A first approximation for assessing the effectiveness of an educational intervention is the use of self-reported measures, as suggested by Chandler and Jansen (1992). Under this approach students are inquired to self-assess their entrepreneurial competencies along the selected constructs – in this case the four competencies that are the focus of this dissertation. This assessment method is a valuable alternative as self-perceived competencies are considered to be valid indicators of actual competencies (Gist, 1987; Chandler and Jansen, 1992). A possible problem, however, is the potential of social desirability (see section 3.3.5). An alternative

approach to assessment is the use of simulated or hypothetical cases that mimic real-world situations (Johannisson, Landstrom and Rossenberg, 1998). The use of these tools is a promising option for assessing entrepreneurship education effectiveness because they offer both situational approaches and theoretical models. Confronting students to real-life situations challenges them to formulate their own ideas about incidents that entrepreneurs usually face in their entrepreneurial endeavors. According to this method, students are asked to respond to inquiries resulting from short description of hypothetical situations in order to evaluate how they would behave in such cases.

A further step of the proposed method of assessment is concerned with measuring the students' entrepreneurial self-efficacy and intentions. These are important measures as they are an indication of potential entrepreneurial activity of students any day in their future career. Entrepreneurial self-efficacy has been found to be influential in the development of entrepreneurial intentions (Boyd and Vozikis, 1994) and, hence, a valuable indicator of the likelihood of becoming an entrepreneur (Chen, Greene, and Crick, 1998). A recent study has also found that entrepreneurial self-efficacy exerts a mediating role in the development of students' intentions to become entrepreneurs (Zhao, Seibert, and Hills, 2005). Specifically, perceptions of formal learning had the largest indirect effect on entrepreneurial intentions. This is an indication that formal academic courses can have a positive impact on students' intentions to start their own business. If we expect that an educational program stimulates students' entrepreneurial development, investigating to what extent their entrepreneurial self-efficacy has increased due to the training program is a necessary further step in assessing its effectiveness.

Once we have investigated the extent to which the students' entrepreneurial self-efficacy has changed, measuring its influence on intentions to create their ventures

becomes important. As already mentioned, intentionality refers to a state of mind directing a person's attention toward a given object or a path to achieve something (Bird, 1988). Measuring intentions is important because they are considered as immediate antecedents of actual behavior (Ajzen, 1991). It has been argued that intentions are "the single best predictor of any planned behavior, including entrepreneurship" (Krueger, Reilly, and Carsrud, 2000, 411). Entrepreneurial intention deserves researchers' attention because the opportunity identification process is considered as an intentional process (Krueger et al., 2000).

3.3.2. The Educational Intervention

An entrepreneurship course, serving as the educational intervention, provided the setting for this study (see Appendix 9). The course was developed under the context of the "Entrepreneurship Development" component of the Flemish Inter-University Development Cooperation Program in Ecuador, VLIR-IUS Program. While several perspectives have played a role in the design of this course, one of the major sources of inspiration originated from the experiences with two different courses on entrepreneurship as being taught for several years at the Department of Management, Innovation and Entrepreneurship of the Faculty of Economics and Business Administration of the Ghent University. A training program – namely "Training the Trainers Program" -- was provided by professors from the Ghent University in order to train instructors appointed to teaching the entrepreneurship course at ESPOL.

Two other sources for the development of course content were based on training offered by the University of Texas at Austin, USA, and the "Universidad de la Frontera", Chile. The former was delivered through the IC^2 Business Incubator and consisted of six modules spread over eight months. Strong emphasis was given to technology commercialization, essentially based on the Jolly Vijay´s Model (Vijay,

1997). Training also emphasized on activities related to information gathering, networking, and development of abilities to convincingly present business ideas. Since the program offered by IC^2 was mainly oriented to train researchers and technology entrepreneurs, no enough insights were given on how to teach undergraduate students on the entrepreneurship topic. That is why an important contribution was also from INCUBATEC, a Chilean business incubator linked to the "Universidad de la Frontera". This organization was in charge of managing an entrepreneurship course offered to undergraduate students at five universities in Chile.

The training offered by INCUBATEC was under the format of a short-type course that consisted of 48 class-hours. The educational approach followed an experiential learning mode by performing in-class tasks using games and practical exercises. Through the variety of activities, participants had the opportunity to go through a cycle of concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 1984). Part of training consisted of an out-class task, in which students were required to run a mini-enterprise for a few days and to prepare a written report on the outcomes. The underlying assumption of this approach is that students – especially engineering students – commonly experience a relatively heavy load of work since they have to work on different projects in each of the courses on their education. Thus, using an experiential-learning approach may get students more interested in the entrepreneurship field because a great part of the activities are exercised in class sessions. As these activities are related to content that is mainly reviewed in a class session, students may have more free time to devote to other course assignments.

Although all the three training programs described above included somehow similar content and tools, they had notable differences in their focus as well as in their

structure of training and in the audience to which entrepreneurship training was targeted. In sum, these three alternative approaches gave relevant contributions for the design and implementation of the introductory entrepreneurship course at ESPOL. The designed course is mandatory for all undergraduate students, being taught halfway in their curricula. The course is delivered on a time schedule of fourteen weeks totaling 56 hours of class sessions. Students are required to develop all the assigned activities, giving greater emphasis on the term project, as for evaluation purposes to meet the university's rules on the grading system. The term project consisted of development of a preliminary business plan, in which students elaborate a feasibility study of a product or service proposed by them.

3.3.2.1. Educational Framework

The educational framework departs from the belief that entrepreneurs are not born, they develop (Garavan and O'Cinneide, 1994a; Krueger and Brazeal, 1994; Hisrich and Peters 2002). The underlying assumption on the framework is that competencies are changeable and learnable, which opens the possibility of an educational intervention (Man, Lau and Chan, 2002). On the basis of this assumption, the course followed an action-oriented approach in order to promote significant learning experiences associated to theoretical content, as suggested by Fiet (2000b). By doing so, students are encouraged to learn theories that teach them what they should do to succeed in a business context. Furthermore, involving students in relevant learning activities is a crucial step in challenging them to develop entrepreneurial competencies through practice. This approach aligns with the constructivist perspective in that learning is essentially active, which implies that a person who is truly passive is incapable of learning (Abbott and Ryan, 1999). An educational system, in which students are allowed to actively participate in achieving their learning goals, is expected to work better if they feel good about it and decide about

their learning. When learning something new, a person brings to that experience all previous knowledge and current mental patterns (Abbott and Ryan, 1999). This means that the new experience is integrated into an active web of understanding already existing in that person's mind.

3.3.2.2. Structure, Content and Teaching Approach

This course is supported by a learning management system (LMS) tool similar to Blackboard ® or WebCT ®. The goals of the course are fourfold: 1) having an impact on students' awareness in future entrepreneurial career perspectives; 2) providing students with insights into the entrepreneurial process; 3) confronting students to entrepreneurial competencies and traits; and 4) letting students explore their own entrepreneurial skills and motivations. Overall, the course is divided into six basic units: a) entrepreneurship and its contribution to the world's economy; b) creativity and its link to the innovation process; c) identification and evaluation of business opportunities; d) review of entrepreneurial competencies; e) issues related to new venture creation; and f) development of a feasibility study or an early stage business plan as it is interchangeably used in this dissertation.

All class sessions are structured in such a way that students exercise a variety of activities on an individual or group basis. Next, an open discussion is carried out among students about their findings. Thereafter, the instructor presents the underlying theoretical concepts and gives feedback as related to the exercised activity. Finally, the instructor opens a plenary discussion to draw final conclusions on the learnt concepts. The implementation of this course approach is supported by the use of a mix of techniques in a flexible way to promote meaningful learning. Moreover, this approach seeks to confront the students' beliefs, traits and capabilities

with real-world situations, frequently faced by entrepreneurs when starting and running an enterprise.

The class sessions and learning techniques are intended to let students deal with uncertainty, independent thinking and doing, and working with others to solving problems. Thereby, they are exposed to challenging situations that allow them to learn by doing and to develop entrepreneurial awareness and competencies. Role playing, for example, is one of the relevant techniques used to drive students through learning experiences that foster their knowledge building and demonstrate it with understanding performances. One of the role playing activities is a business game entitled "Buyers and Sellers", in which a group of students are the buyers and the others are the sellers. Each of the groups is given specific instructions. Buyers play one of the three roles: innovators, mainstream, or laggards. The various groups of sellers are asked to specify the characteristics of an innovative digital camera and to sell it to the three types of buyers. The complete task is carried out in a cycle of two rounds. By using this game, students are exposed to concrete experimentation. In between the two rounds, students are allowed to sit back from the experience and review the drawbacks on the first round. The two-round business game gives students the possibility of modifying their strategies and trying them again to be competitive. The relevance of this activity is that it allows students to experience with a business that simulates real-world conditions related to value proposition and customer knowledge. Also, it gives the opportunity for open discussions among students and feedback from their peers and instructors.

The use of cases and videos are also important components of the entrepreneurship course. Six cases and eight short videos that portray real-world entrepreneurial endeavors are included for analysis and discussion either in-class sessions or via virtual forums. Two of the cases and six videos have been taken from the experiences

of Ecuadorian entrepreneurs. We contend that having contact with or listening to the testimony of Ecuadorian entrepreneurs is important for including a situated learning experience into the course activities. The underlying idea is that the more true to life a given task is, the more meaningful the learning it can be (Snowman and Biehler, 2003).

Two other activities to provide the means for active experimentation are: 1) a mini-enterprise initiated and run for a week by students enrolled in the course; and 2) a term project, in which students are committed to develop an early stage business plan. These two activities are oriented to expose students to complex situations, such as lack of information, uncertainty, development and use of personal contacts, search for advice from experts, and so on. The mini-enterprise is aimed to challenge students to issues that an entrepreneur has to deal with when creating and running a new venture. This activity is relevant for entrepreneurship education as it helps to create an entrepreneurial culture among students (European Commission, 2004a). For developing the mini-enterprise, students gather and manage resources and time in order to develop product or service to be offered within the university campus. Advice is given to students not to use class time, nor to run any illegal business, nor to cause any disturbance to the university community. Their goal is to obtain the largest profits during the week time schedule. Mini-enterprises compete among each other for a prize. A three-page report must be written and used for discussion and reflection on the experiences gained by the students.

In the term project, students develop a feasibility study, doing a preliminary market research with limited resources (Sarasvathy, 2001). Having limited resources is usually the case of entrepreneurs (Hisrich and Peters, 2002). Rather than only presenting the whole document at the course completion, students are asked to present the progress on their feasibility study in several class sessions. The progress

of a specific stage on it is usually presented the week that follows the session where the underlying concepts were discussed. Fourteen from a total of 56 hours of class are devoted to review and discuss the various sections of the term project.

Other techniques are also used to support the course delivery. These techniques involve in-class discussions, discussion forums supported by LMS media, and case studies. Most of these techniques are suitable towards development of competencies via the students' involvement in real world-based activities. Brookfield (2004) argues that discussion is an effective learning technique when we require students to solve problems, explore concepts, and change attitudes. Moreover, discussions through electronic media are also powerful tools, especially to support some of the modes of experiential learning, as it offers the opportunity for students to take time to reflect and conceptualize recently acquired knowledge (Gunawardena, Lowe, and Anderson, 1997; Schellens and Valcke, 2005). Case studies are another way of instruction - based on actual situations- that allow students to apply learnt principles to problem-solving. This analytical tool has been extensively used in business schools and extended to other study fields (Marsick, 2004; Schaper, 1999).

As discussed above, the educational intervention follows an action-oriented approach which is consistent with the basic principles of the constructivist perspective. That is, students are central to the learning process and teachers are facilitators of learning instead of disseminators of information. Students are encouraged to become active in their learning through their involvement in the execution of all the activities both individually and in teams. The intervention promotes interaction through class discussions among students either within team work activities or in plenary sessions. Students are not evaluated based on tests but on what they demonstrate while performing the in and out-class activities. Students are confronted with real-world situations that allow them to learn meaningfully. It seems reasonable to assume that

all the learning experiences to which students are exposed enable them to develop entrepreneurial competencies. Table 3.2 illustrates how two of the main activities included in the proposed intervention can influence competency development. For this purpose, we will focus on the four relevant entrepreneurial competencies as selected in this dissertation.

Table 3.2. Influences of Activities on Competency Development

Influence	Activity							
	Mini-enterprise				Term project			
	Competencies				Competencies			
	OI	OE	NW	CM	OI	OE	NW	CM
Deliberate search of information and sources of potential opportunities	X				X			
Exercising brainstorming sessions to visualize a business opportunity	X				X			
Applying various criteria to evaluate the possibility of success with the product or service to be offered		X				X		
Interacting with family, close friends and other persons in their social networks as sources of information, potential new ideas, and economic support			X	X			X	X
Looking for potential customers				X				X
Interacting with all the stakeholders involved in pursuing their venture			X	X			X	X
Looking for advice from experts							X	X
Presenting their venture plan to teachers and invited reviewers								X
Marketing their product or service			X	X				
Making reasonable projections of profits		X				X		

OI: Opportunity Identification; **OE**: Opportunity Evaluation; **NW**: Networking; **CM**: Communication

Although the focus is on the four entrepreneurial competencies already mentioned, it is important to remark that the proposed intervention offer opportunities for development of other crucial competencies. For example, students have to deal with managing limited resources when having to start and run the mini-enterprise. Having limited resources is usually the case of entrepreneurs (Hisrich & Peters, 2002). When exposed to this difficulty, students are led to learn where and how to get funding for their ventures. They also are encouraged to activate their creativity in making an optimal use of their scarce resources. In all of these activities as in those mentioned in Table 3.2 students have to make decisions, hopefully the right ones. Therefore, decision making is a crucial competency that is embedded in every task that they have to accomplish. In sum, it can be seen in Table 3.2 that the various tasks in which students get involved when dealing with starting and running a business (mini-enterprise) provides the setting for competency development. As students are challenged to compete in the market place, they have to be flexible with a wide variety of tasks that promote the development of entrepreneurial competencies.

3.3.3. Pre-test-Post-test Multiple Group Quasi - Experimental Design

Research on the second study was conducted as a multiple group pretest-posttest quasi-experimental design. Students enrolled in the entrepreneurship course served as the population for the study, and they were separated into two experimental groups. The study also involved a control group that included a set of students who did not receive any treatment at all. Two instructional treatments were implemented in the proposed entrepreneurship course to observe possible differences in the students' self-reported levels of competencies after the course completion. These two treatments represent the experimental conditions for the study, in which students were required to develop a venture plan as a term project. The venture plan – as

defined in this dissertation – is a kind of preliminary business plan or feasibility study. One experimental group was assigned the project to be worked in groups of up to 5 students while the other had to do it individually. As described earlier, the development of a venture plan is only one of a variety of activities exercised in the proposed intervention. This activity is worth doing as the students are exposed to the uncertainties and difficulties commonly faced by entrepreneurs when creating and running a new enterprise. It is not the mechanical process involved in developing the venture plan what is important but the use of their creativity, problem solving-skills, previous knowledge and experience, personal network of contacts, communication skills, strategic thinking, and so on.

3.3.4. Sample

A sample of 236 students was drawn from the population that amounted to nearly 470 students who were enrolled in the entrepreneurship course being offered at all the undergraduate programs at ESPOL. From this sample, 202 students were exposed to one of the two instructional treatment conditions and 34 to the other. The latter group was significantly smaller than the former as the students were given the options to work on their term projects either at the individual basis or in teams of 4 or 5 individuals. As it was expected, most of the students chose the latter option because they did not like the idea of working alone in their term projects. This position is understandable because the venture plan to be assigned to each student is a very demanding task; hence, a considerable work load to be developed individually. To prevent instructors from having too few volunteers for the study, they promised students some extra points for the final grade.

3.3.5. Survey Instruments

In order to know antecedents of students, a questionnaire was administered in which respondents were asked: 1) date of birth and gender; 2) whether they have known an entrepreneur; 3) their parents' employment status; and 4) whether they have a relative who is an entrepreneur (see Appendix 3). A second instrument was used to measure the students' reaction to the intervention. The questions were oriented to gather information regarding the course-related issues (see Appendix 4). Other four instruments were used to measure the students' learning. Specifically, these instruments aimed at assessing the students' entrepreneurial competencies that focused on three of the underlying characteristics (levels) of competencies – that is, knowledge, skills and attitudes. Specifically, the goals of this part of the study were fourfold: 1) examining whether students were able to properly use their entrepreneurial knowledge and skills in situations that mimic real-world settings; 2) measuring self-perceived entrepreneurial competencies; 3) measuring the students' attitudes toward entrepreneurial actions; 4) examining the extent to which the students' attitudes and entrepreneurial self-efficacy change as a result of the proposed educational intervention; and 5) examining the extent to which the students' self-efficacy exert a mediating role on the students' intentions to start a business. The main inquiry of the third instrument required that students choose the best alternative among five options in a set of four very short real-world type cases (see Appendix 5). The content validity of a first version of the instrument was done by eight faculty members of ESPOL who were trained for outstanding teaching about and for entrepreneurship. As already mentioned, these faculty members received training from three institutions, each with different focus. An improved version of the instrument was then administered to the subjects of the study.

The fourth instrument was aimed at gathering data regarding the students' self-assessment entrepreneurial competencies, which was performed along the four sub-scales selected for the study (see Appendix 6). These sub-scales include: identification of business opportunities, evaluation of business opportunities, networking and communication abilities. The instrument consisted of two parts: one was oriented to the students' self-assessment of knowledge and skills, and the other was aimed at assessing the students' attitudes toward entrepreneurial acts.

The measurement of the students' knowledge and skills was carried out by the use of a self-reported measurement scale as suggested by Chandler and Jansen (1992) and Chandler and Hanks (1994) (see first section of Appendix 6). Self-reported measures were performed since evidences indicate that self-perceived competencies are considered as appropriate measures of actual competencies (Gist, 1987; Chandler and Jansen, 1992). A potential problem, however, is social desirability biases. Social desirability refers to the inclination of presenting oneself in a manner that is viewed favorably by others (Fisher, 1993; Nancarrow, 2007). That is, instead of describing what one actually thinks, believes or does, he/she is tempted to give social desirable responses. To diminish this inconvenience, the instructions on this questionnaire emphasized the importance of honesty on the self-assessment as recommended by Chen et al. (1998). Also, confidentiality and presentation of results on aggregate figures of the complete sample were promised. To measure the students' attitudes, the instrument developed by Robinson et al. (1991) was followed and adapted (see second section of Appendix 6). The next section presents each of the measures as defined in this study.

3.3.6. Measures

This section provides a description of the variables involved in the three main constructs that are the main focus of the dissertation, which include entrepreneurial competencies, self-efficacy and intentions. Each of these constructs is measured by multiple item scales.

3.3.6.1. Self-perceived Entrepreneurial Competencies

Self-perceived entrepreneurial competencies were operationalized according to the self-reported measurement scale suggested by Chandler and Jansen (1992) and Chandler and Hanks (1994). By following this approach, the students' entrepreneurial competencies were measured along two of the underlying characteristics of an individual-level competency that include knowledge and skills. The variables were gauged by the use of a seven-point Likert scale, being 1 "Strongly disagree" and 7 "Strongly agree." A total of 14 items were used to collect data in regard to the students' self-perceived entrepreneurial competencies, focusing specifically on the identification and evaluation of business opportunities, networking and communication abilities. An example of these items is as follows: "One of my greatest strengths is the ability to perceive unresolved problems that lead me to formulate a business idea." Out of the 14 items, four were used to measure identification and similarly for evaluation of business opportunities; three for networking and three for communication abilities.

The content validity of the questionnaire was performed by local experts in the field of entrepreneurship. Once the first Spanish version of the questionnaire was available, a pre-test was conducted among 135 students enrolled in six of the entrepreneurship classes, being offered in the first academic term 2005-2006. The

factor analysis performed on the 14 items grouped them in four factors. After reviewing the results of the factor analysis, one item was eliminated from further use (see Table 3.3).

Table 3.3 Varimax Rotation for the Self-assessed Competencies

Items	Component (Constructs)			
	Identification of business opportunities	Networking	Communication	Evaluation of business opportunities
Perceiving unresolved problems	**.743**	.065	.106	.213
Applying own criteria for evaluating opportunities	.256	.051	-.083	**.803**
Good relationship with others in a business context	.012	**.833**	.248	.021
Convincingly communicating orally and in writing	.413	.056	**.697**	-.036
Making public presentations	-.018	.422	**.618**	.184
Evaluating pros and cons of business ideas	.099	-.005	.454	**.640**
Clearly presenting my ideas	.161	.093	**.826**	.106
Visualizing opportunities	**.446**	.168	.356	.427
Developing personal network of contacts	.432	**.741**	-.046	.064
Identifying unmet needs	**.734**	.153	.177	.201
Identifying product and services well accepted	**.685**	.042	.112	.056
Applying existing criteria for evaluation of business opportunities	.096	.047	.077	**.769**
Keeping good interpersonal relations	.046	**.835**	.100	.039

N= 135

The overall internal consistency of the instrument was relatively high (Cronbach's Alpha = 0.844). Similarly, the Cronbach's Alpha coefficients for each of the subscales were close to the cut-off point of 0.7 and two exceeded this point, which is acceptable for a newly created scale (Nunnally, 1978) (see Table 3.4).

Table 3.4. Reliability Statistics for the Four Competency Constructs

Competency constructs	**Cronbach's Alpha**	**Number of items**
Identification of business opportunities	0.728	4
Evaluation of business opportunities	0.673	3
Networking	0.764	3
Communication	0.660	3

N= 135

3.3.6.2. Attitudes of Students toward Entrepreneurial Acts

Earlier it was stressed that an important attribute of entrepreneurs is their attitudes as they are crucial for success in a business context. Attitudes are formed and transmitted by social interactions, and are contingent on the culture in which people are immersed (Ajzen, 1991). From this perspective, entrepreneurial attitudes are a function of contextual factors as well as the way they interact (Krueger and Brazeal, 1994). In this sense, the educational system and its context play an important role in promoting an attitude change toward entrepreneurial acts. Therefore, paying attention to the students' entrepreneurial attitudes is worthwhile for their implications to entrepreneurship research. Going in this direction, this dissertation proposes an attitude scale that intends to measure possible differences in the students' attitudes before and after the proposed intervention. To do so, the measurement instrument was developed according to the attitude approach suggested by Robinson et al. (1991). These authors maintain that an attitude scale that takes into account the affective, cognitive, and behavioral components – known as the tripartite model -- is a better approach than the unidimensional construct based on affective reaction alone (Kamradt and Kamradt, 1999; Robinson et al., 1991). Supporting this thought, Kamradt and Kamradt (1999) contend that attitude is the fundamental unit of learning. In this sense, small pieces of cognitive, affective and psychomotor learning compose attitudes as a whole.

As used in this dissertation, the subjects of the attitudes are the four domains of entrepreneurial competencies introduced in earlier sections, which include: identification and evaluation of business opportunities, networking and communication abilities. Following the approach of Robinson et al. (1991), these domains become the attitude subscales on the proposed multidimensional instrument and represent either an affective, cognitive, or behavioral reaction. The items in this instrument were screened and edited by the researcher and two professors, one expert in the field of entrepreneurship and the other in education based on content relevance for both the four subscales and the three attitude components. This process resulted in a total of 36 items; three for each subscale and within each component (see second section of Appendix 6). An example of one of the indicators for this attitude scale is as follows: "I know that having a network of personal contacts is of great relevance for success in businesses." The variables were measured by a seven-point Likert type scale, being 1 "Strongly disagree" and 7 "Strongly agree."

The pre-test of the Spanish version of the instrument was carried out on a sample of 135 students. The overall internal consistency of the instrument was well above the cut-off point of 0.7 (Cronbach's Alpha = 0.9). The Cronbach's Alpha coefficients for each of the attitude components and each subscale were above the cut-off point of 0.7, except one (see Table 3.5).

Table 3.5. Reliability Statistics for the Four Subscales and the Three Attitude Components

Subscales	**Cronbach's Alpha**	**Number of items**
Identification of business opportunities	0.732	9
Evaluation of business opportunities	0.734	9
Networking	0.652	9
Communication	0.749	9
Components		
Affective	0.792	12
Cognitive	0.766	12
Behavioral	0.808	12

N= 135

3.3.6.3. Entrepreneurial Self-efficacy

Self-efficacy is considered a crucial component of intentional models, in which a person is seen as an intentional decision-maker. Accordingly, the concept of self-efficacy is of great relevance in the field of entrepreneurship for its mediating role on an individual's intentions to new venture creation. In this line, Boyd and Vozikis (1994) maintain that entrepreneurial intentions are linked to the probability to create a new venture, and such intentions are influenced by the individual self-efficacy. Therefore, measuring self-efficacy becomes one of the important initial steps within the entrepreneurial process. Thus, the fifth instrument was oriented to measure the students' entrepreneurial self-efficacy and was adopted from the work of De Noble et al. (1999).

The selected instrument consists of a set of items that asks the respondent to self-assess his or her ability to perform the required tasks for a target behavior. In this case, the target behavior is creating a new business. The questionnaire is divided into six constructs that include the following: 1) Developing new product and market opportunities; 2) Building an innovative environment; 3) Initiating investor relationships; 4) Defining core purpose; 5) Coping with unexpected challenges; and

6) Developing critical human resources (see Appendix 7). This measurement instrument was used in this dissertation as it has proved to be consistent at differentiating between students who were entrepreneurship majors and those who were not (De Noble, et al., 1999). The questionnaire items were translated from English to Spanish and back-translated for accuracy reasons as recommended by Behling and Law (2000). The variables were measured by using a seven-point Likert scale, being 1 "Strongly disagree" and 7 "Strongly agree."

To pre-test the Spanish version of the instrument, 135 students were selected from ESPOL University. The study conducted by De Noble, et al. (1999) reported that the internal consistency reliability coefficients of this instrument were close to the cut-off point of 0.7 for all the six subscales of the measurement; four of them exceeded this cut-off point. According to Nunnally (1978), this is acceptable for a newly created scale. When the internal consistency statistics was performed on the data gathered by the pilot test, the results reported by De Noble, et al. (1999) were confirmed as the overall Cronbach's Alpha was 0.942, which exceeded the cut-off point of 0.7. Also, the Cronbach's Alphas for each of the subscales were all above this cut-off point (see Table 3.6).

Table 3.6. Cronbach's Alphas for the Six Subscales of the Self-efficacy Construct

Self-efficacy Construct	Cronbach's Alpha	Number of items
Developing new product and market opportunities	0.880	7
Building and innovative environment	0.831	4
Initiating investor relationships	0.864	3
Defining core purpose	0.835	3
Coping with unexpected challenges	0.836	3
Developing critical human resources	0.812	3

N= 135

3.3.6.4. Students' Intentions to New Venture Creation

Previous studies have suggested that intention can be used as a reliable predictor of further entrepreneurial actions since the act of starting a new company is typically a planned behavior (Krueger et al., 2000). Hence, measuring intentions is an important step into the prediction of actual firm-creation behavior (Fayolle and Gailly, 2004) as intentions are considered to be immediate antecedents of actual behavior (Ajzen, 1991). For measuring the students' intentions to new venture creation, this dissertation adopted the set of questions proposed by Liñan (2005) (see Appendix 8). This is the sixth instrument consisting of six items aimed at unveiling the respondents' intentions to start their own businesses in the future. Following the recommendation of Behling and Law (2000), the questionnaire was translated from English to Spanish and back-translated to secure accuracy of responses. The items were built as seven-point Likert-type scale, being 1 "Strongly disagree" and 7 "Strongly agree."

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Similar to the other instruments used in this dissertation, 135 students were selected for the pre-test of the Spanish version. By doing so, the internal consistency of the instrument was well above the cut-off point of 0.7 (Cronbach's Alpha = 0.92), as shown in Table 3.7.

Table 3.7 Cronbach's Alpha for the Students' Intention Construct

Intention Construct	**Cronbach's Alpha**	**Number of items**
Students' intentions to new venture creation	0.92	6

N= 135

3.4. THIRD STUDY

The purpose of the third study was to derive a mathematical model to relate the criterion variable (the students' entrepreneurial intentions) to the predictors (entrepreneurial competencies and attitudes). The formulation of the model was developed by the use of the structural equation modeling technique (SEM), by means of the LISREL 8.8 software package. SEM is a powerful technique used in different disciplines as it provides researchers with a comprehensive method for quantifying and testing theories (Raykov and Marcoulides, 2000). Another important characteristic of SEM's models is that they explicitly take into account measurement error that is present in most scientific fields and contain latent variables. The former refers to inaccuracies of measuring the variable values due to the deficiencies of the measurement instrument whereas the latter is a theoretical or hypothetical construct that can only be approximated by an observable variable (Hair, Anderson, Tathan, and Black, 1995).

For the present study, the use of SEM is pertinent as it helps estimate a series of separate, but interdependent, multiple regression equations simultaneously for modeling students' intention to new venture creation. By applying the SEM technique, the dissertation sought to develop a model to explain the extent to which formal training in entrepreneurship that follows a constructivist perspective has an impact on the students' entrepreneurial competencies. The formulation of the model is intended to predict the students' intentions from information associated to their entrepreneurial knowledge, skills and attitudes. The model suggests that the students' perceptions on their knowledge and skills regarding the creation of a new venture influence the development of intentions through the mediating role of their entrepreneurial self.-efficacy. It is further suggested that formal training in entrepreneurship influences the individuals' behavioral intentions through their

attitudes toward entrepreneurial acts. In the proposed model, the influencing effect of attitudes and perceived self-efficacy beliefs on the development of entrepreneurial intentions is consistent with Ajzen's (1985) theory of planned behavior. In sum, the model proposes that a person exposed to entrepreneurial training is expected to exhibit higher intentions to start a business when his/her attitudes and self-efficacy are high in relation to what a given opportunity requires.

3.4.1. Sample

For deriving the model using the SEM technique, students who were exposed to the educational intervention were considered (N = 236). The sample consisted of 202 and 34 students in the experimental groups 1 and 2, respectively. The former group included students who worked on term projects in teams of 4 or 5 individuals whereas the latter worked on similar projects individually. As indicated in Chapter 4 (*Results*), no significant differences were found between the score means for the study variable of interest; therefore, data on these two groups were considered altogether for the purpose of the SEM analysis.

3.4.2. Measures

Performing SEM analysis requires the use of observed data that become the dependent variable values of the latent constructs. As described in previous sections, the study variables of interest included: 1) Self-perceived measures along the four entrepreneurial competencies at T2 (time at post-test); 2) the four attitude subscale scores at T2; 3) measures of entrepreneurial self-efficacy at T2; 4) Entrepreneurial intention indicators at Time 2; and the students' antecedents and entrepreneurial intention measures at Time 1 (time at pre-test) that served as control latent variables. In this study, antecedents of students referred to any exposure to entrepreneurial role

models before the start of the entrepreneurship training. Thus, students were asked to indicate whether they had known an entrepreneur or one of their parents or both had owned a business or had been self-employees, or one relative had been an entrepreneur. A value of 1 indicated that they had been exposed to an entrepreneurial role model and 0 otherwise. This way, six latent variables were defined for the SEM analysis.

CHAPTER 4: RESULTS

4.1 OVERVIEW OF THE RESULTS

Current chapter describes the results of the three studies addressed in this dissertation. Accordingly, the chapter is structured into three major sections. The sections are presented in chronological order to describe the results of each study. Following this structure, the first section summarizes the results of Study 1 by examining the importance of entrepreneurial competencies according to the entrepreneurs' and scholars' perceptions (section 4.2). By doing so, this part of the study seeks to identify the competencies that should be emphasized in entrepreneurship courses at the undergraduate level.

The second section describes the results of Study 2 regarding the effectiveness of the intervention (section 4.3). As indicated, the evaluation of the students' reaction is firstly presented. Then, the section summarizes the effect of the educational intervention supported by the constructivist perspective on the development of the students' entrepreneurial competencies. Specifically, a description of the results is provided with regard to the impact of the intervention on competencies at the knowledge and skill level as well as the extent to which an attitude change toward entrepreneurial acts took place. Next, a summary of the effect of knowledge and skill competencies on the students' entrepreneurial self-efficacy is presented. The results on the second study report how the students' intentions toward creating a venture are influenced by their self-efficacy beliefs and attitudes toward entrepreneurial acts.

The third section reports the results of Study 3. As previously described, the purpose of the third study was to make an integrative analysis of the relationship between the latent variables of the proposed model. Therefore, this section reports the analysis of data regarding the mediating role of self-efficacy on the students' intentions to new venture creation (section 4.4). It is also reported the influencing effect of the

students' attitudes on their entrepreneurial intentions. This section extends the procedure used in the previous section in which individual hypotheses are tested. Thus, the main objective is to obtain a model to explain the extent to which the educational intervention has an ultimate impact on the students' entrepreneurial intentions.

4.2 STUDY 1

As discussed in Chapter 3 (*Research Method*), the first study is aimed at answering the first research question which is as follows: What are the entrepreneurial competencies that universities should address in entrepreneurship education at the undergraduate level? The study is exploratory and no hypothesis was formulated to test this research question. The main objective is to provide useful information for educators that can help determine the entrepreneurial competencies that students should develop through the course of an educational intervention. The study is organized into two sections. First, the importance of entrepreneurial competencies, according to the entrepreneurs' and scholars' perceptions, is discussed. Then, a summary of entrepreneurs' opinions is presented in regard to the competencies that entrepreneurship education should entail.

4.2.1. Entrepreneurs' and Scholars' Perceptions on the Importance of Entrepreneurial Competencies

In the first part of Study 1, entrepreneurs and scholars experts in the field of entrepreneurship were asked to indicate their opinions regarding the importance of competencies when getting involved in an entrepreneurial venture. Tables 4.1 and 4.2 present the intercorrelations among the study variables of interest for the entrepreneurs' and scholars' responses, respectively. As can be noted, some variables

were significantly correlated with one another. However, these correlations were not so high as to suggest that they were not different. Therefore, all variables were included for further analysis.

TABLE 4.1 Zero-Order Correlations for Study Variables of Interest in regard to Entrepreneurs' Perceptions

	1. AT	2. DM	3. TB	4. OI	5. WC	6. CWS	7. CWU	8. INNT	9. INTT	10. DVM	11. DM	12. CWF	13. OE	14. ISP	15. NW	16. TCR	17. TW	18. OC
1. AT	-																	
2. DM	.022	-																
3. TB	.174	.086	-															
4. OI	-.151	.165	.007	-														
5. WC	.271	.161	.300	-.033	-													
6. CWS	.110	.062	.036	.242	-.004	-												
7. CWU	-.097	.161	-.141	.570**	.080	.321*	-											
8. INNT	.038	.409**	.091	.094	.060	.066	.276	-										
9. INTT	.267	.266	.185	.165	.092	.272	.328*	.231	-									
10. DVM	.075	.146	.314*	.352*	.081	.350*	.458**	.363*	.488**	-								
11. DM	.134	-.085	-.250	.237	.081	.263	.401*	.178*	-0.53	.338*	-							
12. CWF	.133	-.119	-.037	-.337*	-.260	.057	-.021	-.068	-.107	-.203	.063	-						
13. OE	.270	-.114	.352*	.148	.257	.014	.188	.000	.189	.146	.214	-.150	-					
14. ISP	.312	.018	.403**	-.051	.159	.028	.033	.111	.251	.212	.123	.074	.565**	-				
15. NW	-.216	.152	.126	.262	.070	.261	.201	.376*	.038	.345*	.380*	-.126	.262	.157	-			
16. TCR	.047	.024	-.121	.324*	.157	.234	.497**	.205	.245	.326*	.458**	-.139	.447**	.163	.413**	-		
17. TW	.051	.183	.532**	-.019	.216	.060	.072	.117	.424**	.312	-.045	-.229	.445**	.340*	.163	.120	-	
18. OC	-.065	-.055	.025	.139	-.106	.176	.212	.006	.228	.280	.235	-.173	.409**	.278	.359*	.359*	.450	-

N = 40; ** **p** < 0.01; * **p** < 0.05; Cronbach's alpha = 0.74; **AT**: Analytical Thinking; **DM**: Decision Making; **TB**: Team Building; **OI**: Opportunity identification; **WC**; Written Communication; **CWS**: Coping with Stress **CWU**: Coping with Uncertainties; **INNT**: Innovative thinking; **INTT**: Intuitive thinking; **DVM**: Having a Different View of the Market; **DM**: Deal Making; **CWF**: Coping with Failure; **OE**: Opportunity Evaluation; **ISP**: Identifying and Solving Problems; **NW**: Networking; **TCR**: Taking Calculated Risk; **TW**: Team Work; **OC**: Oral Communication.

TABLE 4.2 Zero-Order Correlations for Study Variables of Interest in regard to Scholars' Perceptions

	1. AT	2. DM	3. TB	4. OI	5. WC	6. CWS	7. CWU	8. INNT	9. INTT	10. DVM	11. DM	12. CWF	13. OE	14. ISP	15. NW	16. TCR	17. TW	18. OC
1. AT	-																	
2. DM	.363*	-																
3. TB	.269	.298	-															
4. OI	-.007	.186	.124	-														
5. WC	.403**	.158	.108	.388*	-													
6. CWS	-.206	-.038	-.236	-.277	-.177	-												
7. CWU	.106	.136	.262	-.020	-.110	.339*	-											
8. INNT	.119	.015	.117	.403**	.179	-.291	.023	-										
9. INTT	.011	.133	.045	.166	.064	.170	.183	.329*	-									
10. DVM	-.118	.018	.039	.210	-.136	.021	-.024	.215	.255	-								
11. DM	.049	.066	.158	.065	.145	-.097	.265	.137	.006	-.047	-							
12. CWF	.134	.150	.132	-.283	-.063	.178	.165	-.159	-.109	-.100	.004	-						
13. OE	.245	.146	.003	-.071	.264	-.078	-.051	.193	-.199	-.018	.155	.421**	-					
14. ISP	.126	.205	-.026	.264	.234	.086	.092	.125	.193	.118	.342*	.166	.163	-				
15. NW	.025	.066	.483**	.037	.064	-.170	.139	.143	.073	.135	.151	.321*	.016	.125	-			
16. TCR	.092	.214	.042	.101	.204	.083	.028	.043	-.025	.322*	.074	.220	.469**	.125	.094	-		
17. TW	.203	.220	.551**	-.037	.405**	-.230	.104	.396**	.177	.135	.219	.474**	.433**	.010	.272	.263	-	
18. OC	.047	.144	.242	-.103	.270	-.147	-.166	.280	.105	.311*	.067	.274	.186	.080	.230	.373*	.450**	-

N = 43; ** **p** < 0.01; * **p** < 0.05; Cornbach's alpha = 0.7; **AT**: Analytical Thinking; **DM**: Decision Making; **TB**: Team Building; **OI**: Opportunity Identification; **WC**; Written Communication; **CWS**: Coping with Stress **CWU**: Coping with Uncertainties; **INNT**: Innovative thinking; **INTT**: Intuitive Thinking; **DVM**: Different View of the Market; **DM**: Deal Making; **CWF**: Coping with Failure; **OE**: Opportunity Evaluation; **ISP**: Identifying and Solving Problems; **NW**: Networking; **TCR**: Taking Calculated Risk; **TW**: Team Work; **OC**: Oral Communication

Before testing whether significant differences existed between the means for each of the variables associated to the entrepreneurial competencies, we first performed the Levene's test. This statistical procedure was used to observe if the data regarding the scores on the importance of the entrepreneurial competencies for the two groups had equal variances. This test resulted in equality of variances for all of the variables, except for "Decision Making", "Identifying Business Opportunities", and "Innovative Thinking", as the significance values were above the 0.05 level (see Table 4.3).

Table 4.3 Test of Homogeneity of Variances for the Entrepreneurs' and Scholars' Data

Entrepreneurial Competencies	Levene Statistic	df1	df2	Sig.
Analytical Thinking	.375	1	81	.542
Decision Making	37.391	1	81	.000
Team Building	1.298	1	81	.258
Identifying Business Opportunities	5.596	1	81	.020
Written Communication	.083	1	81	.774
Coping with Stress	.713	1	81	.401
Coping with Uncertainties	.003	1	81	.957
Innovative Thinking	7.607	1	81	.007
Intuitive Thinking	.071	1	81	.791
Different View of the Market	3.798	1	80	.055
Deal Making and Negotiation	.017	1	81	.895
Coping with Failure	.034	1	81	.855
Evaluating Business Opportunities	.021	1	81	.884
Identifying and Solving Problems	1.413	1	81	.238
Networking	.155	1	81	.695
Taking Calculated Risk	.108	1	81	.743
Team Work	1.250	1	81	.267
Oral Communication	.078	1	81	.780

To overcome the violation of the equality of variances for the three variables that did not meet the t-test requirement, a nonparametric test was performed. In this case, the Mann-Whitney test procedure served for the purpose of determining whether the scores of the two groups differ. By doing so, similar results were obtained as those

achieved by the use of the t test. Accordingly, this test was then exercised with the data gathered among entrepreneurs and scholars.

Responses from entrepreneurs and scholars regarding the relevance of entrepreneurial competencies are summarized in Table 4.4. As can be seen, results indicate relative differences in responses from the entrepreneurs' perspective compared to the scholars' opinions. Entrepreneurs, on the one hand, chose decision making most frequently as of high importance when embarking on and running an entrepreneurial venture, whereas scholars were in favor of identifying business opportunities.

Table 4.4 Descriptive Statistics for Entrepreneurs' and Scholars' Perceptions on Entrepreneurial Competencies

Entrepreneurial Competencies	**Entrepreneurs' Perceptions** N = 40							**Scholars' Perceptions** N = 43						
			1 VLI	**2 LI**	**3 MI**	**4 HI**	**5 VHI**			**1 VLI**	**2 LI**	**3 MI**	**4 HI**	**5 VHI**
	M	**SD**	**% of Respondents**					**M**	**SD**	**% of Respondents**				
Decision making	4.88**	0.34	-	-	-	12.5	87.5	4.51**	0.67	-	-	9.3	30.2	60.5
Innovative thinking	4.63*	0.59	-	-	5.0	27.5	67.5	4.26 *	0.93	-	-	20.9	27.9	51.2
Identifying and solving problems	4.63 **	0.54	-	-	2.5	32.5	65.0	4.19 **	0.85	2.3	2.3	7.0	51.2	37.2
Having a different view of the market	4.50 **	0.78	-	5.0	2.5	30.0	62.5	3.60 **	1.00	2.4	11.6	27.9	39.5	18.6
Oral communication	4.48 *	0.88	-	7.5	2.5	25.0	65.0	4.07 *	0.86	-	4.6	18.6	41.9	34.9
Deal making and negotiation	4.45 **	0.68	-	2.5	2.5	42.5	52.5	4.02 **	0.80	-	2.3	23.3	44.2	30.2
Identifying business opportunities	4.40	0.93	-	-	12.5	27.5	60.0	4.67	0.61	-	2.3	-	25.6	72.1
Evaluating business opportunities	4.40	0.67	-	-	10.0	40.0	50.0	4.51	0.67	-	-	9.3	30.2	60.5
Networking	4.30	0.76	-	-	17.5	35.0	47.5	4.35	0.72	-	-	14.0	37.2	48.8
Coping with failure	4.30 *	0.97	2.5	2.5	12.5	27.5	55.0	3.86 *	0.97	2.3	4.7	25.6	39.5	27.9
Team work	4.23 **	0.89	-	-	17.5	37.5	45.0	3.58 **	1.01	2.3	13.9	23.3	44.2	16.3
Team building	4.18	0.78	-	2.5	15.0	45.0	37.5	3.86	0.97	-	11.6	18.6	41.9	27.9
Intuitive thinking	4.08	0.97	2.5	2.5	20.0	35.0	40.0	3.79	0.97	2.3	4.7	30.2	37.2	25.6
Analytical thinking	4.05 **	0.88	-	2.5	27.5	32.5	37.5	3.49 **	0.91	-	9.3	51.2	20.9	18.6
Coping with uncertainties	3.98	0.89	-	7.5	17.5	45.0	30.0	4.19	0.76	-	-	21.0	39.5	39.5
Coping with stress	3.98	1.07	2.5	7.5	20.0	30.0	40.0	3.91	0.90	-	4.7	30.2	34.9	30.2
Taking calculated risk	3.85	0.80	-	2.5	32.5	42.5	22.5	3.91	0.84	-	2.3	32.6	37.2	27.9
Written communication	3.83 **	1.01	2.5	7.5	22.5	40.0	27.5	3.07 **	1.01	7.0	18.6	41.8	25.6	7.0

VLI = Very Low Importance; **LI** = Low Importance; **MI** = Medium Importance; **HI** = High Importance; **VHI** = Very High Importance
For the t test ** $\mathbf{p} < 0.01$; * $\mathbf{p} < 0.05$

As shown in Table 4.4, most of the respondents (87.5% of entrepreneurs) indicated that decision making is a highly important competency that must be exhibited by entrepreneurs in their entrepreneurial endeavors. This yielded an average close to 5, the highest value on the scale (M = 4.88). Furthermore, innovating thinking, identifying and solving problems and having a different view of the market were the next three entrepreneurial competencies in order of importance based on the mean values. On the other hand, 72.1% scholars considered identifying business opportunities as of very high importance to success in business, which resulted in an average of 4.67. Evaluating business opportunities, decision making, and networking were the next three competencies most frequently cited by scholars as highly important for entrepreneurship. When looking at the significance values, some commonalities can be observed between the responses of entrepreneurs and scholars. That is, competencies that include: identifying and evaluating business opportunities, networking, team building, intuitive thinking, coping with uncertainties, coping with stress, and taking calculated risk are not significantly different at the 0.05 level. This is an indication that both parties somehow agree regarding the relevance of such competencies for entrepreneurial activity.

The observed commonalities and differences seem to reveal that respondents have different attitudinal posture. That is, it appears that entrepreneurs value the selected competencies from a more practical perspective than scholars. Possible explanations for the different postures are discussed in section 5.1.1. For now, we can say that these results are a valuable input for the development of a list of competencies that entrepreneurship education should entail.

4.2.2. Competencies to be Emphasized in Entrepreneurship Education

As the present study sought to identify a set of entrepreneurial competencies for educational purposes, entrepreneurs were also asked to indicate their opinions in

regard to the competencies that should be prioritized in entrepreneurship education at the undergraduate level. Scholars were not inquired to give their opinions on this matter in order to avoid the possibility of having biased responses. This could happen because most of the surveyed scholars were teaching entrepreneurship courses at their institutions. Under this consideration, entrepreneurs were specifically inquired to choose eight entrepreneurial competencies from the list provided on the survey instrument. By doing so, the goal was to obtain a reduced list of competencies with the idea of facilitating the design of an instructional method for teaching entrepreneurship to undergraduate students. Since these are naïve students, we can expect that they are in their early-stage of entrepreneurial development. Following the proposed approach, the responses were arranged so that the number of "High Priority" and "Very High Priority" answers (last right column in Table 4.5) was combined, and the percentage was calculated relative to the number of respondents.

Table 4.5 Frequently Suggested Entrepreneurial Competencies to Entrepreneurship Education by Entrepreneurs

Entrepreneurial Competencies	1 VLP	2 LP	3 MP	4 HP	5 VHP	% HP and VHP Responses
Decision making	-	6	-	4	30	85.0
Innovative thinking	-	7	-	4	29	82.5
Identifying and solving problems	-	13	1	6	20	65.0
Having a different view of the market	-	13	1	7	19	65.0
Identifying business opportunities	-	17	-	5	18	57.5
Deal making and negotiation	-	17	-	7	16	57.5
Oral communication	-	16	2	6	16	55.0
Networking	-	21	3	5	11	40.0
Team work	-	24	2	4	10	35.0
Evaluating business opportunities	-	24	2	4	10	35.0
Intuitive thinking	-	26	3	4	7	27.5
Coping with failure	-	27	2	4	7	27.5
Team building	-	26	5	2	7	22.5
Coping with uncertainties	-	31	1	2	6	20.0
Analytical thinking	-	31	2	1	6	17.5
Taking calculated risk	-	31	3	3	3	15.0
Coping with stress	-	35	-	3	2	12.5
Written communication	-	35	-	3	2	12.5

N = 40; **VLP** = Very Low Priority; **LP** = Low Priority; **MP** = Medium Priority; **HP** = High Priority; **VHP** = Very High Priority

As we can see, the most frequently cited competencies as of high or very high priority to entrepreneurship education were decision making and innovating thinking, 85% and 82.5% respectively. These percentages are consistent with their opinions on the first parte the study since they valued these competencies as of high importance to succeed in business. The next six competencies selected the most by entrepreneurs were: identifying and solving problems, having a different view of the market, identifying business opportunities, deal making and negotiation, oral communication, and networking.

When asked about the rationale behind their selections, the entrepreneurs responded that their continuous exposure to challenging and uncertain situations demand for their ability to make quick decisions. That is, their success in business is contingent upon their ability to make right decisions in a timely manner. As indicated, the next entrepreneurial competency most frequently cited by entrepreneurs was innovative thinking. A common answer to the question why thinking innovatively is crucial for their success, entrepreneurs indicated that today's world is highly competitive and moves in an atmosphere of rapid technology changes. In this context, the market demands their innovative capability as their companies need to keep pace with changes in the market by being creative, flexible, adaptive and anticipative.

Similarly, identifying and solving problems and having a different view of the market were competencies frequently chosen among those that should be emphasized in entrepreneurship education. In this regard, they pointed out that being perceptive to what is going on in the context where they develop their business activities is important to success. This includes the context outside and inside their companies. In other words, by being sensitive, they can be aware of the need of an opportune intervention within their organizations. Moreover, their ability to visualize unresolved problems is relevant in their entrepreneurial endeavors as they may become a source of new business ideas. Also, they indicated that the ability of

viewing the market from a different perspective enables them to find alternative solutions to a given issue. It means that they have to be able to see what others may not see at all. By viewing the market differently, new ways of doing things may become apparent.

Next, the competencies presented in Table 4.5 were summarized and grouped by taking the eight most frequently cited as high in priority for entrepreneurship education (see Table 4.6). To do so, the model proposed by Boyatzis (1982) was used. By following this model and the categorizations suggested by Bird (1995), the competencies were classified in one of the three levels according to the definition of a competency, which are as follows: 1) traits and motives; 2) social role and self-concept; and 3) knowledge and skills. This grouping is an important further step in defining and understanding what activities may work best at each competency level for an individual's entrepreneurial development. In other words, educators can make the linkage between the activities and the entrepreneurial competencies they seek to instill in students.

Table 4.6. Grouping of Most Frequently Cited Entrepreneurial Competencies

At the social role and self-concept level
Having a different view of the market
Deal making and negotiation
Networking
At the knowledge and skill level
Decision making
Innovative thinking
Identifying and solving problems
Oral communication
Identifying business opportunities

The grouping proposed in Table 4.6 should not be seen as a rigid categorization in the sense that some competencies may involve more than one level. For example, the

networking competency may cross the boundary of the social role and self- concept to the skill level and even motives and traits. This can happen because people would need to have good communication skills and intrinsic motivations whether they are expected to expand their social networks. However, the proposed categorization is worth as it can facilitate the design and implementation of a proper instructional approach for competency development.

4.3. STUDY 2

The Study 2 was intended to answer the second, third and fourth research questions, which are the following: What is the impact of an educational intervention based on a constructivist approach on the development of relevant entrepreneurial competencies in university students at the undergraduate level? Do differences in the students' self-assessed entrepreneurial competencies have an impact on their entrepreneurial self-efficacy? Are the students' intentions to start their own business positively influenced by their entrepreneurial self-efficacy and attitudes toward entrepreneurial acts? The summary of results of this study is organized into three main sections. As described, the assessment approach followed the Kirkpatrick's model of evaluation of training, including reaction and learning (Kirkpatrick, 1999). First, the evaluation of the students' reaction is presented (section 4.3.1). Next, the results regarding assessment of learning are summarized. The assessment consisted of measuring the effect of the constructivist educational intervention on the development of entrepreneurial competencies in students. Specifically, knowledge, skill and attitude levels are analyzed by testing individual hypotheses (section 4.3.2). This last section also presents the results in regard to the influence of the students' self-efficacy and attitudes toward entrepreneurial acts on their entrepreneurial intentions.

4.3.1. Evaluating Students' Reaction to the Intervention

This section presents the main results about the students' reaction to the educational intervention. As explained in Chapter 3 (*Research Method*), the first step in assessing the effectiveness of the intervention involves the analysis of data in regard to the students' perceptions about the training. The two experimental groups are included for the analysis (N=236); that is, one that consists of students who worked in teams in the term project activity and the other who did it individually. Table 4.7 shows the intercorrelations among the study variables of interest. As can be observed, all the variables were significantly correlated with one another. They grouped in one factor by performing principal component analysis as expected because all of them measure key aspects associated to the delivery of the course.

Table 4.7 Descriptive Statistics, Scale Reliability, and Zero-Order Correlations for the Students' Reaction

	M	SD	Gender	Age	CME	CCRPD	IFL	CAAIC	AAHA
Gender	-	-	-						
Age	23.2	4.82	-.351	-					
1. CME	4.00	.96	-.015	.060	-				
2. CCRPD	4.09	.89	.002	.079	.556 *	-			
3. IFL	4.29	.81	-.109	.112	.531 *	.461 *	-		
4. CAAIC	3.94	.94	.040	.007	.635 *	.553 *	.551 *	-	
5. AAHA	4.02	.89	.043	-.005	.451 *	.296 *	.435 *	.486 *	-

N = 236; Cronbach alfa = 0.85; * **p** < 0.01
CME: Course met my expectations; **CCRPD**: Course content was relevant for my personal/professional development; **IFL**: Instructor facilitated my learning; **CAAIC**: Course approach attracted my interest; **AAHA**: Agenda for activities and homework was appropriate.

For the evaluation of students' reaction, respondents were asked to give their appreciation about the relevance of the entrepreneurship training for their future personal and professional development. Also, they were inquired to give their opinions regarding the course content and approach. A summary of the students' responses on how they reacted to the intervention is presented in Table 4.8.

Table 4.8. Students' Reaction on the Educational Intervention

	1 SD	2 D	3 N	4 A	5 SA	% A and SA Responses
Course met my expectations	3	13	35	116	69	78.4
Course content was relevant for my personal/professional development	4	8	34	106	84	80.3
Instructor facilitated my learning	2	3	32	87	112	84.3
Course approach attracted my interest	7	8	45	107	69	74.6
Agenda for activities and homework was appropriate	2	10	48	97	79	74.6

N = 236; **SD**: Strongly disagree; **D**: Disagree; **N**: Neutral; **A**: Agree; **SA**: Strongly agree

As noted in Table 4.8, overall students' reaction was favorable to the educational intervention since all the percentages were close to 75% or above when combining the "Agree" and "Strongly agree" answers. It is interesting to see that the majority of students considered that the course met their expectations and it was relevant for their personal and professional development. This result seems to indicate that the theoretical and practical issues covered in the course had meaning for them. Another interesting result is that the course approach was well accepted by the students although it was perceived as very demanding.

By using and open question, students were inquired to indicate what they liked and disliked most and to give some recommendations for improvement. In this regard, more than 80% of students mentioned that the course was very demanding since the workload of homework and preparation for the in and out-class activities required additional research; hence, it was very time consuming. On the other hand, more than 70% of students indicated that the course approach motivated and encouraged them to participate in class discussions and to interact with their peers and with the instructor. Specifically, about 40% of students expressed that the mini-enterprise activity was very appealing as it exposed them to tasks that mimicked real-world situations; thereby, to uncertainty and difficulties involved in starting and running a business. A final comment was that they liked the course approach because it

prevented them from getting bored and the activities encouraged them to be active and participative.

The overall rating of the course was nearly 83% by aggregating the good and very good answers; that is, 61% of respondents rated the course as good and 23.3% very good. The students' recommendations for improvement addressed the relevance of having close contact with entrepreneurs as it allows them to talk and ask questions about their entrepreneurial endeavors. It was also mentioned that visiting the entrepreneurs' companies is an out-class activity that would stimulate their interest for an entrepreneurial career. Some students recommended the use of the proposed approach in other courses.

4.3.2. Effect of the Educational Intervention on the Development of the Students' Entrepreneurial Competencies

This part of the study was aimed at answering the second, third and fourth research questions by studying the impact of the constructivist educational intervention on the development of entrepreneurial competencies in undergraduate university students. As discussed in Chapter 3 (*Research Method*), this study was also intended to assess the extent to which these competencies are antecedents of entrepreneurial intentions through the mediating role of entrepreneurial self-efficacy. Firstly, students were asked to answer a set of four very short real-world type cases. Specifically, students were inquired to choose the best alternative among five options in each case. Responding to these cases served as a proxy to measure the students' entrepreneurial competencies at the knowledge and skill level. By taking this approach, it is expected that the students' entrepreneurial attitudes can be implicit in their responses. However, this dimension was ignored at this point as a more specific measure was used by the attitude scale proposed in this dissertation. Secondly, students were inquired to respond to a set of questions regarding their self-perceived

entrepreneurial competencies. As mentioned, these competencies included: identification and evaluation of business opportunities, networking and communication.

Table 4.9 presents the means, standard deviations, Cronbach's alpha coefficients and intercorrelations among the study variables of interest for the pre-test. As can be noted, some variables were significant correlated to one another although they were not so high as to suggest that they were not different.

TABLE 4.9 Descriptive Statistics, Scale Reliabilities and Zero-Order Correlations for the Study Variables of Interest

	M	SD	Gender	Age	EKS	SPOIC	SPOEC	SPNWC	SPCOMC	ATTI	ESE	EINT
Gender	-	-	-									
Age	23.2	4.82	-.351**	-								
EKS	13.3	3.96	.029	.033	(0.68)							
SPOIC	4.7	.72	.079	.081	-.018	(0.73)						
SPOEC	4.8	.66	-.006	.121	-.022	.529**	(0.67)					
SPNWC	5.1	.80	.016	.087	.072	.481**	.424**	(0.76)				
SPCOMC	4.9	.79	-.051	.073	-.047	.367**	.404**	.378**	(0.66)			
ATTI	5.4	.55	.120	.026	.056	.362**	.285**	.358**	.257**	(0.90)		
ESE	4.9	.61	.045	-.015	-.021	.438**	.372**	.520**	.449**	.451**	(0.94)	
EINT	6.0	.91	-.003	.097	.026	.347**	.265**	.242**	.344**	.461**	.437**	(0.88)

N = 236; ** **p** < 0.01; Scale reliabilities (Cronbach's alpha) are in parentheses; Male = 1; Female = 2

EKS: Entrepreneurial knowledge and skills; **SPOIC**: Self-perceived Opportunity Identification Competency; **SPOEC**: Self-perceived Opportunity Evaluation Competency; **SPNWC**: Self-perceived Networking Competency; **SPCOMC**: Self-perceived Communication Competency; **ATTI**: Aggregated measure of attitudes **ESE**: Entrepreneurial Self-efficacy; **EINT**: Entrepreneurial Intention

4.3.2.1 Test of Hypothesis 1

Hypothesis 1 stated that students who have been exposed to entrepreneurship training that follows a constructivist approach in settings that mimic real-world situations will exhibit higher levels of entrepreneurial competencies at the knowledge and skill levels after the educational intervention. To test this hypothesis, the general linear repeated measures model (GLM) technique was performed. For this technique, the scores of the students for the two instruments – the short-case type test and the self-ratings – were considered.

The multivariate tests showed that one or all the dependent variables changed due to the education intervention, as the significance values for the variable "T" (time) was less than 0.01 (see Table 4.10). Contrarily, the EXCG variable that identifies the three groups of the study was not significant at the 0.05 level, indicating that the means of the dependent variables between the subjects were not different. While this is especially true for the two experimental groups, differences did exist compared to the scores on the dependent variables for the control group. That is, students in the control group reported lower scores than those in the two experimental groups as it was expected because they did not receive the entrepreneurship training. We can also notice that the interaction between time and groups (T*EXCG variable) is significant at the 0.01 level, which is indicative of an effect of the intervention on the entrepreneurial competencies among the two experimental groups.

Table 4.10. Multivariate Tests for the Entrepreneurial Competency Variables

Effect (Experimental Groups 1 and 2 and Control Group Included)												
	Between Subjects						Within Subjects					
	Intercept			EXCG			T			T*EXCG		
Tests	**V**	**F**	**p**	**V**	**F**	**p**	**V**	**F**	**p**	**V**	**F**	**p**
Pillai's Trace	.98	2811.0	.000	.06	1.7	.081	.10	5.9	.000	.09	2.5	.006
Wilks' Lambda	.02	2811.0	.000	.94	1.7	.081	.90	5.9	.000	.91	2.5	.006
Hotelling's Trace	52.6	2811.0	.000	.06	1.7	.082	.11	5.9	.000	.09	2.5	.006
Roy's Largest Root	52.6	2811.0	.000	.04	2.4	.039	.11	5.9	.000	.07	3.6	.004

N1 = 202; N2 = 34: **V**: Test statistics value; **T**: time; **EXCG**: Experimental Group 1 and 2 and Control Group;
T* EXCG: Time and group interaction

When performing the tests of within-subjects contrasts, we found that all the dependent variables had significance values lower than 0.01. This means that the significant results of the multivariate tests presented above are due to the effect of the educational intervention on the entrepreneurial competencies (see Table 4.11). This result, however, is true for the experimental group1 as will be seen in Table 4.12.

Table 4.11. Tests of Within-Subjects Contrasts

Source	Measure	T	df	F	p	Partial Eta Squared
T	**EKS**		1	6.430	.012	.023
	SPOIC		1	12.089	.001	.043
	SPOEC	T1 vs. T2	1	16.849	.000	.059
	SPNWC		1	12.827	.000	.045
	SPCOMC		1	12.831	.000	.045
T *EXCG	**EKS**		2	2.859	.059	.021
	SPOIC		2	1.534	.218	.011
	SPOEC	T1 vs. T2	2	1.478	.230	.011
	SPNWC		2	4.900	.008	.035
	SPCOMC		2	7.132	.001	.050
Error(time)	**EKS**		271			
	SPOIC		271			
	SPOEC	T1 vs. T2	271			
	SPNWC		271			
	SPCOMC		271			

N= 274; **T**: Time; **T1**: Time at Pre-test; **T2**: Time at Post-test; **EKS**: Entrepreneurial Knowledge and skills;
SPOIC: Self-perceived Opportunity Identification Competency; **SPOEC**: Self- perceived Opportunity Evaluation Competency;
SPNWC: Self-perceived Networking Competency; **SPCOMC**: Self-perceived Communication Competency

The differences in score means from the pre-test (T1) to the post-test (T2) can be observed in the summary of the estimated marginal means (see Table 4.12). This table shows that the score means associated to the dependent variables for the two experimental groups are higher on the post-test than on the pre-test and higher than those of the control group as expected. However, no significant differences are observed in the score means for all the self-perceived variables in the experimental group 2. Certainly, more research is suggested with a larger sample in this second group to confirm or refute the results reported in the present study. On the other hand, the positive impact of the proposed intervention on the students' entrepreneurial competencies at the experimental group 1 is a promising result. In other words, these results are initial evidence that an educational intervention supported by the constructivist perspective positively affects the students' competency development.

Table 4.12. Estimated Marginal Means

		M			SE	
		T1	**T2**	**d**	**T1**	**T2**
EKS	**G1**	13.4	14.2	.8*	.28	.24
	G2	12.3	14.3	2.0*	.68	.59
	Control	13.3	13.0	-.3	.64	.56
SPOIC	**G1**	4.7	5.1	.4**	.05	.06
	G2	4.7	5.0	.3	.12	.14
	Control	4.6	4.7	.1	.13	.14
SPOEC	**G1**	4.8	5.3	.5**	.05	.06
	G2	5.0	5.3	.3	.11	.13
	Control	4.7	4.9	.2	.14	.11
SPNWC	**G1**	5.1	5.7	.4**	.05	.08
	G2	5.3	5.6	.3	.18	.18
	Control	5.1	5.1	.0	.13	.17
SPCOMC	**G1**	4.9	5.5	.6**	.05	.07
	G2	5.0	5.2	.2	.14	.16
	Control	4.8	4.8	.0	.13	.15

N= 274; ** p < 0.01; * p < 0.05; **M**: Mean; **SE**: Standard Error; **G1**: Experimental Group 1 (N1 = 202); **G2**: Experimental Group 2 (N2 = 34); **CONTG**: Control Group (N = 38); **T1**: Time at Pre-test; **T2**: Time at Post-test; **EKS**: Entrepreneurial Knowledge and skills; **SPOIC**: Self-perceived Opportunity Identification Competency; **SPOEC**: Self- perceived Opportunity Evaluation Competency; **SPNWC**: Self-perceived Networking Competency; **SPCOMC**: Self-perceived Communication Competency

Summarizing the results presented in Table 4.12, we can say that the significant differences observed in the dependent variables for the experimental group 1 gives support to hypothesis 1. That is, exposure to entrepreneurship training that follows a constructivist approach will result in higher levels of entrepreneurial competencies at the knowledge and skill level after completion of the intervention.

4.3.2.2 Test of Hypothesis 2

This section is aimed at testing hypothesis 2 by analyzing the results associated to the effect of the constructivist educational intervention on the students' attitudes toward entrepreneurial acts. This hypothesis stated that students who have been exposed to entrepreneurship training that follows a constructivist approach will exhibit more favorable attitudes toward entrepreneurial acts after the educational intervention. Table 4.13 presents the means, standard deviations, Cronbach's alpha coefficients and intercorrelations among the attitude subscales for the pre-test. Again, data collected among the two experimental groups were considered for this test.

TABLE 4.13 Descriptive Statistics, Scale Reliabilities, and Zero-Order Correlations for the Attitude Subscales and Intentions

	M	SD	Gender	Age	AOI	AOE	ANW	ACOM	EINT
Gender	-	.-	-						
Age	23.2	4.82	-.351**	-					
AOI	5.1	.64	.048	.004	(0.74)				
AOE	5.8	.66	.089	.033	.658**	(0.74)			
ANW	5.7	.69	.140*	.052	.625**	.564**	(0.66)		
ACM	5.2	.60	.129*	-.007	.657**	.599**	.652**	(0.75)	
EINT	6.0	.91	-.003	.097	.425**	.381**	.451**	.298**	(0.88)

N = 236; ** p < 0.01; * p < 0.05; Scale reliabilities (Cronbach's alpha) are in parentheses; Male = 1; Female = 2
AOI: Attitude toward Opportunity Identification; A**OE**: Attitude toward Opportunity Evaluation;
ANW: Attitude toward Networking; **ACM**: Attitude toward Communication; **EINT**: Entrepreneurial Intention

As noted in Table 4.13, the four subscales of the attitudes include: opportunity identification and evaluation, networking and communication. Given that these subscales all measure some aspects of entrepreneurial actions, a degree of interrelatedness among them can be expected. We can see that the subscales were statistically significant to one another, accounting for 31.8% to 43.3% of the variance. This is an indication of a relatively higher degree of redundancy between subscales than expected. For further research, there may be a need to combine the subscales; however, for the sake of this study the correlations were not so high that the subscales could be considered as different measures of entrepreneurial acts.

The general linear repeated measures model (GLM) technique was performed with the data regarding the students' attitudes toward entrepreneurial acts. The multivariate tests indicated that one or all the attitude subscales changed due to the education intervention, as the significance values for the variable "T" (time) was less than 0.01 (see Table 4.14). Similarly, the EXCG variable that identifies the three groups of the study was significant at the 0.05 level, which is an indication that, on average, the three groups have different scores in one or all the attitude subscales.

Table 4.14. Multivariate Tests for the Attitude Subscales

Effect (Experimental Groups 1 and 2 and Control Group Included)												
	Between Subjects						**Within Subjects**					
	Intercept			**EXCG**			**T**			**T*EXCG**		
Tests	**V**	**F**	**p**	**V**	**F**	**p**	**V**	**F**	**p**	**V**	**F**	**p**
Pillai's Trace	.98	3888.1	.000	.07	2.4	.015	.43	49.5	.000	.07	2.4	.015
Wilks' Lambda	.02	3888.1	.000	.93	2.4	.015	.58	49.5	.000	.93	2.4	.015
Hotelling's Trace	58.0	3888.1	.000	.07	2.4	.015	.74	49.5	.000	.07	2.4	.014
Roy's Largest Root	58.0	3888.1	.000	.05	3.5	.008	.74	49.5	.000	.06	3.8	.005

N = 274; **V**: Test Statistics value; **T**: time; **EXCG**: Experimental Group 1 and 2 and control group;
T* EXCG: Time and group interaction

Table 4.14 also shows that the interaction between time and groups (T*EXCG variable) is significant at the 0.05 level, which means that an effect of the intervention occurred on the students' attitudes among the two groups who were exposed to the entrepreneurship training.

Looking at the tests of within-subjects contrasts, we can see that the AOI and ACM subscales are significant at the 0.01 level. This indicates that the significant results of the multivariate tests are due to the effect of the educational intervention on the students' attitudes toward opportunity identification as well as toward proper communication in a business context (see Table 4.15).

Table 4.15. Tests of Within-Subjects Contrasts for the Attitude Scale

Source	Measure	T	df	F	p	Partial Eta Squared
T	AOI	T1 vs. T2	1	58.424	.000	.177
	AOE	T1 vs. T2	1	.034	.854	.000
	ANW	T1 vs. T2	1	1.067	.302	.004
	ACM	T1 vs. T2	1	90.428	.000	.250
T*EXCG	AOI	T1 vs. T2	2	4.221	.016	.030
	AOE	T1 vs. T2	2	.361	.697	.003
	ANW	T1 vs. T2	2	2.047	.131	.015
	ACM	T1 vs. T2	2	1.639	.196	.012
Error(time)	AOI	T1 vs. T2	271			
	OEA	T1 vs. T2	271			
	ANW	T1 vs. T2	271			
	ACM	T1 vs. T2	271			

N = 236; **T**: Time; **T1**: time at pre-test; **T2**: Time at post-test; **AOI**: Attitude to Opportunity Identification; **AOE**: Attitude to Opportunity Evaluation; **ANW**: Attitude to Networking; **ACM**: Attitude to Communication

To observe the differences in score means at T1 (pre-test) compared to those at T2 (post-test) for the three groups of the study, a summary of the estimated marginal means was developed (see Table 4.16).

Table 4.16. Estimated Marginal Means for the Attitude Subscales

		M			SE	
		T1	**T2**	**d**	**T1**	**T2**
AOI	**G1**	5.1	5.6	.5**	.05	.05
	G2	4.9	5.5	.6**	.11	.13
	Control	4.9	5.1	.2	.10	.12
AOE	**G1**	5.8	5.8	.0	.05	.06
	G2	5.6	5.7	.1	.11	.14
	Control	5.7	5.7	.0	.11	.13
ANW	**G1**	5.8	5.7	-.1	.05	.05
	G2	5.4	5.6	.2	.12	.13
	Control	5.6	5.6	.0	.11	.12
ACM	**G1**	5.2	5.8	.6**	.04	.05
	G2	5.0	5.7	.7**	.10	.13
	Control	5.1	5.5	.4*	.10	.12

N= 274; ** **p** < 0.01; * **p** < 0.05; M: Mean; **SE**: Standard Error; **G1**: Experimental Group 1; **G2**: Experimental Group 2; **CONTG**: Control Group; **T1**: Time at Pre-test; **T2**: Time at Post-test; **AOI**: Attitude toward Opportunity Identification; **AOE**: Attitude toward Opportunity Evaluation; **ANW**: Attitude toward Networking; **ACM**: Attitude toward Communication

As can be noted, the score means associated to the AOI and ACM attitude subscales for the two experimental groups were significantly higher on the post-test than on the pre-test and higher than those of the control group. This result reveals that the intervention had a positive impact on these two attitude subscales. This finding seems to indicate that some or all the activities performed by students are in the right directions to promote an attitude change toward entrepreneurship. As described, great emphasis is given in the proposed intervention to awaken the students' curiosity as a way of finding potential business opportunities. In addition, students were frequently asked to participate in class discussions as well as in public presentations. All of this seems to have contributed to the attitude change in the above mentioned subscales.

However, it should be noticed in Table 4.16 that the score means of the ACM subscale significantly increased from T1 to T2 for the control group ($p < 0.05$). This is not an expected result since the control group did not receive the entrepreneurship training. A possible explanation is that the observed change in the students' attitudes toward good communication at the control group may be due to the influence of other courses taken during the academic term when the study was conducted. This could happen because current trends in teaching practices are commonly demanding active participation of students in class discussions. Some of the tasks that students are usually asked to execute involve preparation for oral presentations and written reports. As long as these tasks are performed in a regular basis, it is expected that students increase their communication skills; thereby, students may become more confident in presenting their works. As a result, it is likely that the students' attitudes toward good communication change in the positive direction. According to the results described above, we can say that the attitude change may not completely attributable to the educational intervention. Therefore, more research is needed to confirm or reject the findings on this study.

In sum, the results presented in this section partially support hypothesis 2 since only two of the four subscales significantly changed from T1 (time at pre-test) to T2 (time at post-test). That is, students exposed to an intervention that follows a constructivist approach increased their attitudes toward opportunity identification and good communication in a business context.

4.3.2.3 Test of Hypotheses 3

As mentioned, hypothesis 3 indicated that students exposed to an instructional approach supported by the constructivist perspective in which term projects are developed in teams will exhibit higher levels of entrepreneurial competencies after the educational intervention than students who work individually. Specifically in terms of the self-reported measures, four sub-hypotheses were formulated, which are as follows:

H3a: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of opportunity identification competency than students who individually work on their term projects after the educational intervention.*

H3b: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of opportunity evaluation competency than students who individually work on their term projects after the educational intervention.*

H3c: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of networking competency than students who individually work on their term projects after the educational intervention.*

H3d: *Students who follow an instructional approach supported by the constructivist perspective in which term projects are developed in teams will self-report higher levels of communication competency than students who individually work on their term projects after the educational intervention.*

For testing hypothesis 3, the Levene's test was firstly performed to observe whether the data regarding the "knowledge and skills" variable and the four self-perceived variables for the two experimental groups had equal variances. This test resulted in equality of variances as the significance values were well above the 0.05 level. Next, the t-test was used to see whether statistical differences existed on the post-test scores of the students' entrepreneurial competencies at the knowledge and skill level for the two experimental groups. For this test, both the short case-based measurements and the self-perceived measures were used (see Table 4.17).

Table 4.17. T-Test for the Entrepreneurial Competency Scores on the Post-test

	M		**SD**		**SE**	
	G1	**G2**	**G1**	**G2**	**G1**	**G2**
EKS	14.2	14.3	3.42	3.14	.24	.54
SPOIC	5.1	5.0	.88	.77	.062	.13
SPOEC	5.3	5.3	.87	.76	.06	.13
SPNWC	5.7	5.6	1.12	1.07	.08	.18
SPCOMC	5.5	5.2	.96	.99	.07	.17

G1: Experimental Group 1 (N= 202); **G2**: Experimental Group 2 (N= 34); **M**: Mean; **SD**: Standard Deviation;
SE: Standard Error of the Mean; **EKS**: Entrepreneurial Knowledge and Skills;
SPOIC: Self-perceived Opportunity Identification Competency; **SPOEC**: Self-perceived Opportunity Evaluation Competency;
SPNWC: Self-perceived Networking Competency; **SPCOMC**: Self-perceived Communication Competency

Table 4.17 shows that the score means for the two groups were close to each other in all the variables of interest; hence, not significant differences existed. This means

that the two treatment conditions did not make any difference in the students' performance. This result does not give support to hypothesis 3. This is an unexpected result. In fact, previous research has shown that individuals working in teams on somewhat difficult tasks perform better than those doing individually (Crawford and Witte, 1999; Hoogveld, et. al., 2003; Whicker, et. al., 1997). As will be discussed in Chapter 5 (*Discussion and Conclusions*), a possible explanation relies on the fact that the term project was the only activity developed at the individual basis by students in the experimental group two.

4.3.2.4 Test of Hypotheses 4

In this section, we report the results regarding the relationship between the students' self-assessed entrepreneurial competencies and their self-efficacy beliefs. This relationship is stated in hypothesis 4 as follows: Students who self-report higher levels of entrepreneurial competencies will exhibit higher levels of entrepreneurial self-efficacy after the educational intervention. The test of this hypothesis was carried out by regressing the aggregate measure of entrepreneurial self-efficacy (ESE) indicators as the dependent variable on the five predictors of the study; that is, the post-test scores on the short-case-based type test, and the self-ratings on the four entrepreneurial competencies of interest. Since the two experimental groups were exposed to the entrepreneurship training and no significant differences existed in any of the explanatory variables, the data set for these two groups was considered altogether. Results of the regression procedure are presented in Table 4.18. As we can see, three of the five predictors are significant at the 0.01 level. All of these predictors are self-perceived measures, including opportunity identification, opportunity evaluation and communication.

Table 4.18. Regression of ESE on Entrepreneurial Competency Variables

	Unstandardized Coefficients			
Model	**B**	**SE**	**t**	**p**
(Constant)	2.969	.23	12.94	.000
EKS	-0.01	.009	-1.09	.277
SPOIC	.130	.05	2.68	.008
SPOEC	.212	.05	4.41	.000
SPNWC	.039	.04	1.06	.290
SPCOMC	.130	.04	3.43	.001

N = 236; Dependent Variable: Sum of ESE Indicators on the Post Test;
R square = 0.405; Std. error of the Estimate = 0.46
EKS: Entrepreneurial Knowledge and skills; **SPOIC**: Self-perceived Opportunity Identification Competency; **SPOEC**: Self- perceived Opportunity Evaluation Competency; **SPNWC**: Self-perceived Networking Competency; **SPCOMC**: Self-perceived Communication Competency

As can be noted in Table 4.18, the regression model explained 40.5% of the variance in the students' entrepreneurial self-efficacy. According to this model, higher scores on any of the three predictors yield higher levels of entrepreneurial self-efficacy since all the regression coefficients were positive. This result provides initial indication that a positive relationship exists between the students' self-efficacy beliefs and their self-perceived entrepreneurial competencies; therefore, hypothesis 4 is supported.

4.3.2.5 Test of Hypothesis 5

Hypothesis 5 states the relationship between the students' intentions to create their own ventures and their attitudes toward entrepreneurial acts. That is, students who exhibit more favorable attitudes towards entrepreneurial acts will exhibit higher intention to create their own business in the near future after graduating from the university. This hypothesis was tested by regressing the aggregate measure of entrepreneurial intentions on the four attitude subscales; that is, opportunity identification and evaluation, networking, and communication. Data on the two

experimental groups were used as they both were exposed to the entrepreneurship training. Table 4.19 presents the results of the regression procedure. Two of the four predictors are significant at the 0.05 level, which are: Attitudes toward opportunity identification and evaluation.

Table 4.19. Regression of Intentions on the Attitude Subscales

	Unstandardized Coefficients			
Model	**B**	**SE**	**t**	**p**
(Constant)	1.996	.49	4.11	.000
AOI	.336	.13	2.52	.012
AOE	.417	.14	3.02	.003
ANW	.145	.12	1.24	.215
ACM	-.175	.13	-1.38	.168

N = 236; Dependent Variable: Sum of Intention Indicators on the Post Test;
R square = 0.274; Std. error of the Estimate = 0.88
AOI: Attitude toward Opportunity Identification; **AOE**: Attitude toward Opportunity Evaluation;
ANW: Attitude toward Networking; **ACM**: Attitude toward Communication

As seen in Table 4.19, the regression model explains 27.4% of the variance in the students' entrepreneurial intentions. Since the regression coefficients of the two predictors retained in the model were positive, an increase on any of them produces an increment on the entrepreneurial intention variable. According to this result, hypothesis 5 is supported.

4.3.2.6 Test of Hypothesis 6

Hypothesis 6 stated that students who exhibit higher levels of entrepreneurial self-efficacy after the completion of the educational intervention will exhibit higher intention to create their own business in the near future after graduating from the university. For testing this hypothesis, the post-test scores of the students' intentions

to start their own business were regressed on their entrepreneurial self-efficacy. Table 4.20 shows the regression model.

Table 4.20. Regression of the Entrepreneurial Intention variable on the ESE Scores

	Unstandardized Coefficients			
Model	**B**	**SE**	**t**	**p**
(Constant)	2.297	.58	3.98	.000
Sum of ESE Indicators at post-test	.687	.10	6.61	.000

N = 236; Dependent Variable: Sum of Intention Indicators on the Post Test;
R square = 0.157; Std. error of the Estimate = 0.94

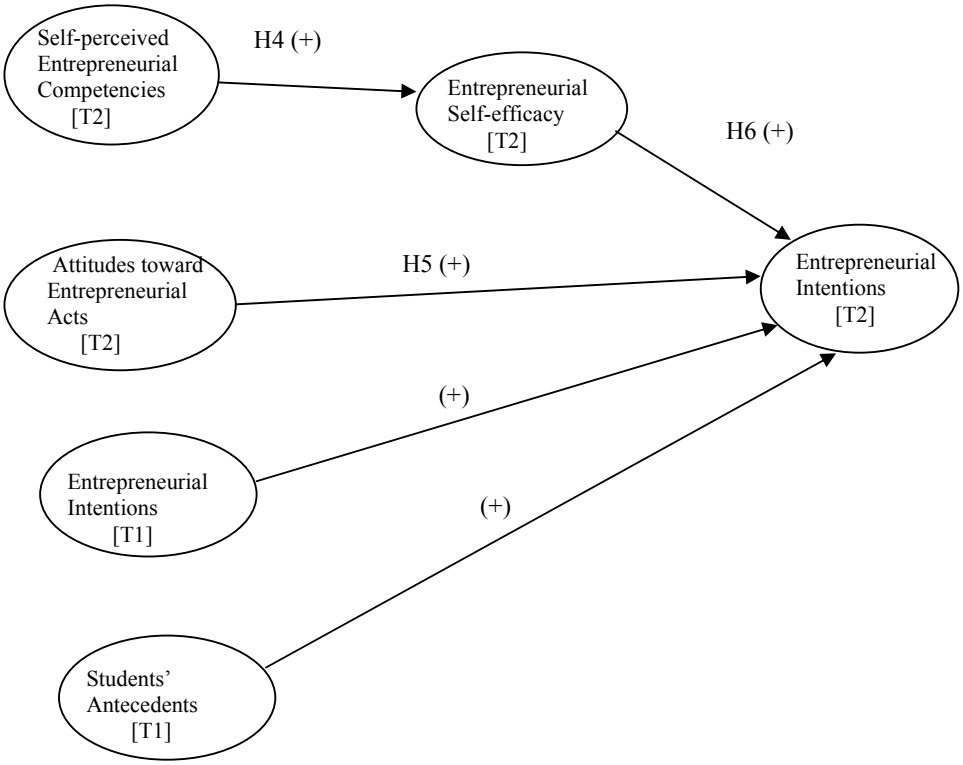
We can see in Table 4.20 that a positive relationship exists and the variance explained by the model is nearly 16% (R square = 0.157). According to this model, higher levels of entrepreneurial self-efficacy will yield higher intentions to create a new venture in the near future after graduating from the university. Although this result indicates that the relationship is not that strong, it provides initial indication that the students' intentions are positively related to their self-efficacy beliefs; therefore, hypothesis 6 is supported.

4.4. STUDY 3

As described in Chapter 3 (*Research Method)*, Study 3 was oriented to test the conceptual model proposed in this dissertation. We were interested in making an integrative analysis of the model by testing the relationship between the latent variables. The hypothesized model proposed that entrepreneurial intentions are influenced by the students' self-perceived entrepreneurial competencies through the mediating role of entrepreneurial self-efficacy. It was also proposed that the students' attitudes toward entrepreneurial acts influence their intentions to new venture

creation (See Fig. 4.1). Testing the model as a whole extends the analysis performed in previous sections in which individual hypothesis were tested.

Fig. 4.1 Hypothesized Model of Entrepreneurial Intentions



We tested the model by the use of the structural equation modeling technique. To do so, six latent variables were included: entrepreneurial intentions at T2 (time at post-test) represents the dependent variable; entrepreneurial self-efficacy at T2 mediates the relationship between self-perceived entrepreneurial competencies and intentions; and entrepreneurial attitudes at T2 is related to intentions. We considered two other

constructs as control variables, which are: entrepreneurial intentions at T1 (time at pre-test) and students' antecedents at T1 (time at pre-test). As the students' antecedents, we included four indicators: knowing an entrepreneur, father or mother is an entrepreneur or self-employed, and one of the students' relatives is an entrepreneur. By controlling for these variables, we wanted to prevent the criterion latent variable from being biased by external influences other than those that were expected to change due to the intervention.

As previously discussed, we found that the variables of interest were significantly related to one another as proposed in the hypothesized model. To test the model as a whole, we performed the structural equation modeling technique (SEM). Table 4.21 presents a summary of the model fit indexes.

Table 4.21 Goodness-of-Fit Indexes for the Structural Equation Models of the Study

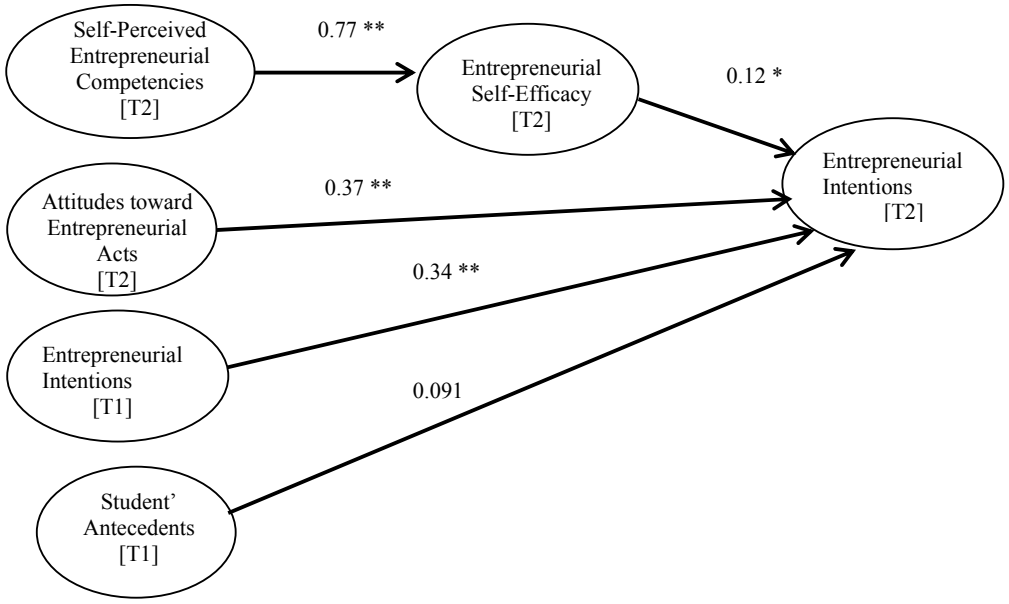
	χ^2	df	RMSEA	SRMSR	NFI	CFI	AGFI
Hypothesized model	703.2 **	394	0.058	0.058	0.93	0.97	0.80
ALT1: (SPCOMP direct path)	488.4 **	242	0.066	0.053	0.93	0.97	0.82

** $p < 0.01$; ALT: Alternative Model; RMSEA: root-mean-square error of approximation; SRMSR: standardized root-mean-squared residual; NFI: norm fit index; CFI: comparative fit index; AGFI: adjusted goodness-of-fit index

The hypothesized model stated a full mediation of self-efficacy between self-perceived entrepreneurial competencies and entrepreneurial intentions. The model also proposed that the students' attitudes toward entrepreneurial acts are expected to be positively related to intentions to create a new business. As noted in Table 4.21, results of this analysis indicate that the indexes are to some extent below the requirements to assure that the model represents a good approximation of the data

(Hu and Bentler, 1999). It is important to remark, however, that there are not strict norms for these indexes below which a model cannot be regarded as a reasonable description of the analyzed data and vice versa (Raykov and Marcoulides, 2000). As a rough guide it has been suggested that AGFI index in the middle of 0.9 or above and the RMSEA below 0.05 provide a good approximation of the data (Hu and Bentler, 1999). Thus, the model fit indexes presented in Table 4.21 provide initial evidence that the self-efficacy variable mediates between the students' entrepreneurial competencies and their intentions to new venture creation. Figure 4.2 shows the standardized path estimates of the hypothesized model.

Fig. 4.2 Hypothesized Model of Students' Intentions to New Venture Creation



* p < 0.05; ** p < 0.01; T1: Time at pre-test; T2: Time at post-test;
Parameter estimates are from the full mediation standardized solution.

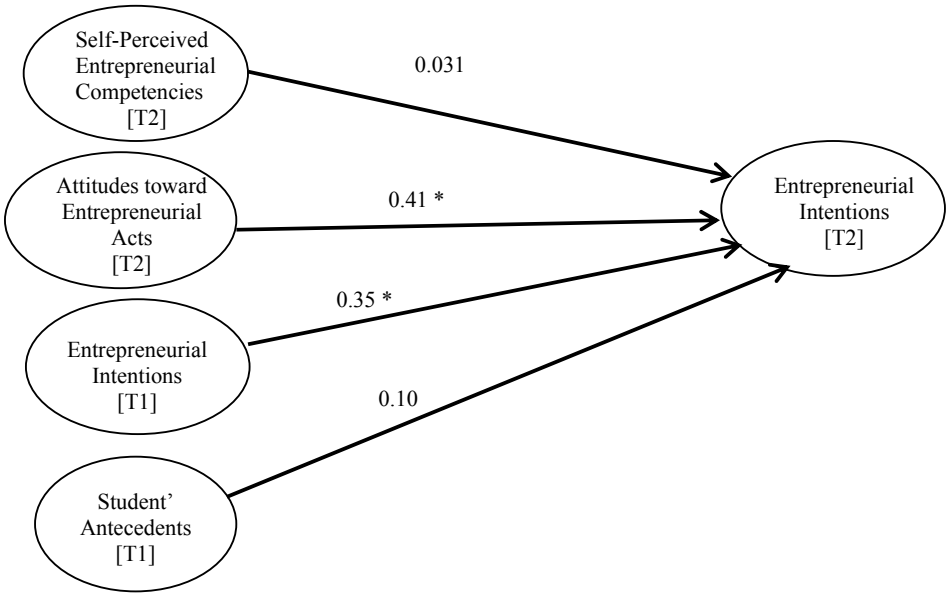
As can be noted in Figures 4.2, the parameter estimate for the relationship between the self-perceived entrepreneurial competencies and self-efficacy variables was significant at the 0.01 level ($\gamma = 0.77$). Similarly, the regression coefficient for the relationship between the self-efficacy and entrepreneurial intention variables was significant at the 0.05 ($\gamma = 0.12$). We can also see that entrepreneurial attitudes are positively related to the students' intention to start their own business as expected ($\gamma = 0.37$). We should notice in Fig. 4.2 that students bring with them initial intentions to create a new venture when they enter the entrepreneurship training. That is, a significant positive relationship ($\gamma = 0.34$) is observed between students' intentions at T1 (time at pre-test) and those at T2 (time at post-test). In contrast, we can see that he students' antecedents are not significantly related to entrepreneurial intentions; therefore, the students' intentions are not influenced by their demographics characteristics. This is consistent with previous studies in the sense that demographic characteristics are deficient in predicting entrepreneurship (Robinson et al., 1991). These authors explain that what determines an individual to become an entrepreneur is the specific reaction to circumstance and no necessarily a given set of personal characteristics.

Summarizing, the results from the structural equation modeling analysis confirm the tests of individual hypotheses performed in previous sections. That is, support for hypotheses 4, 5 and 6 provide initial evidence that entrepreneurial self-efficacy mediates the relationship between the students' self-perceived entrepreneurial competencies and their intentions to new venture creation. Also, we found preliminary proof that students' attitudes toward entrepreneurial acts positively influence their intentions although not very strong relationship. Thus, the results indicate that individuals who self-reported higher on entrepreneurial competencies

each reported higher levels of entrepreneurial self-efficacy and, in turn, more entrepreneurial intentions. Likewise, students who exhibited higher entrepreneurial attitudes each reported higher intentions to new venture creation. The hypothesized model explained 60% of the variance in the entrepreneurial self-efficacy and 42% in the entrepreneurial intentions.

Figure 4.3 is an alternative model as we wanted to test for the direct path between the entrepreneurial competency and intention latent variables. We can see that the parameter estimate for such direct path was not significant at the 0.05, suggesting that a full mediation existed as hypothesized.

Fig. 4.3 Alternative Model of Students' Intentions to New Venture Creation



* $p < 0.01$; T1: Time at pre-test; T2: Time at post-test;
Parameter estimates are from the partial mediation standardized solution.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

In this dissertation, we have investigated whether an educational intervention based on a constructivist approach can have an effect on the students' development of entrepreneurial competencies. The extent to which these competencies are antecedents of entrepreneurial intentions through the mediating role of entrepreneurial self-efficacy was examined. It was also investigated whether the students' attitudes toward entrepreneurial acts changed after completion of the intervention, and how these attitudes are positively related to the students' entrepreneurial intentions. In the following sections, we first discuss the results presented in Chapter 4 (*Results*) as related to the three studies addressed in this dissertation (section 5.1). Next the conclusions are presented followed by the limitations and implications for entrepreneurship education and future research (section 5.2).

5.1 MAIN FINDINGS

This section discusses the main findings of the dissertation, which is organized according to the chronological order of each of the three studies as described in Chapter 2 (*Research Method*). Following this structure, we will firstly discuss the findings on the study conducted among entrepreneurs and scholars, experts in the field of entrepreneurship, in order to determine the competencies that entrepreneurship education should entail. Next, the pertinence of the constructivist perspective in teaching entrepreneurship is analyzed. Then, a discussion on the impact of the proposed intervention on the development of entrepreneurial competencies is presented. Finally, the findings regarding the test of the conceptual model proposed in this dissertation are reviewed.

5.1.1. Findings of Study 1

As described in Chapter 4 (*Results*), results in Study 1 allowed us to answer the first research question which asked about the entrepreneurial competencies that universities should address in entrepreneurship education at the undergraduate level. Results in this study evidenced relative differences in responses between entrepreneurs and scholars, experts in the entrepreneurship field, with regard to the importance of competencies required when getting involved in an entrepreneurial venture. The first most frequently chosen competency by scholars was opportunity identification followed by evaluation of business opportunities and decision making, whereas entrepreneurs selected most decision making followed by innovative thinking and identifying and solving problems. These differences look as if both parties had distinct attitudinal positions. On the one hand, scholars seem to have a less practical attitude and take into account the competencies that are viewed as crucial in the entrepreneurship literature (Bird, 1995; Chandler and Hanks, 1994; Chandler and Jansen, 1992). Accordingly, we think that the focus of scholars may be less on which competencies entrepreneurs really exhibit and frequently exercise in a real life situation. This could be especially true since the extant literature posits that entrepreneurship is about the identification and the development of entrepreneurial opportunities (Ardichivili and Cardozo, 2000; Baron, 2004; Hills and Lumpkin, 1997; Shane and Venkataraman 2000; Venkataraman 1997).

On the other hand, the concerns of entrepreneurs, already embarked on an entrepreneurial opportunity, seem to be a little more downstream and focused on some critical tasks that amongst others may involve: access to a substantial customer base, securing following up financing, negotiating with providers, developing and effectively using personal network of contacts, understanding and controlling the enterprise as a whole, understanding and proficiently maneuvering within an

industry, embracing competence of others, pursuing special know-how to a competitive position in the marketplace, maintaining a strategic focus, and dealing with uncertainty (Baron and Markman, 2003; Bird, 1988; 1995, Dubini and Aldrich, 1991; Herron and Robinson, 1985; Mitton, 1989; Witt, 2004). Important to remark, however, is that these competencies may vary according to the development of the particular venture (e.g. early stage compared to a growing stage firm), the sector in which it operates (high tech versus fast moving consumer goods) and the environmental circumstances that drive an entrepreneur to initiate in business (Dubini, 1988; Gatewood, Shaver and Gartner, 1995; Kourilsky and Walstad, 2002). In addition, the level of exhibition of these competencies can determine whether they are categorized as threshold or success (Bird, 2002). The former understood as those entrepreneurial competencies necessary to successfully create a business, and the latter as those required for success in such a venture (Bird, 1995). By taking these complexities, the specificities of each entrepreneurial venture become a step further in the analysis although the present study was not in that direction.

The findings of the present study are valuable as they provide us with insights of how entrepreneurs and scholars value the set of entrepreneurial competencies put forward in the entrepreneurship literature. Observing the commonalities and differences in opinions from both parties was worth doing because it represented an important step in trying to identify the competencies that need to be emphasized in entrepreneurship education. Building on the above discussion, the study was complemented by asking entrepreneurs to specify the competencies that entrepreneurship education should entail. Important to mention is that scholars were not inquired to give their opinions on this matter to avoid possible biased responses because many of them were teaching entrepreneurship-related courses at their institutions. The findings indicated that the majority of surveyed entrepreneurs suggested decision making competency as the first in priority for entrepreneurship education. This suggestion supports the

extant literature since decision making is considered a crucial competency within the entrepreneurial process for its implications and issues involved (Busenitz and Barney, 1997; Eisenhardt, 1989; Smith, Gannon, Grimm, and Mitchell, 1988). One of the issues commonly discussed is about how quickly decisions need to be made in a business-related context. For example, in fast-paced settings like the computer industry, fast decisions are commonly made because of rapid changes in demand, competition and technology (Eisenhardt, 1989). Similarly, decision-making behaviors of entrepreneur go in this direction as they usually have to make intuitive and quick decisions, for instance, in relation to market opportunities, organizational problems, and employees' needs (Man and Lau, 2000).

Another important finding is that most of the interviewed entrepreneurs considered innovative thinking as one of high priority for entrepreneurship education. This finding aligns with previous studies in that individuals' capacity for innovation is considered a crucial factor to succeed in business (Walker, Damanpour and Avellaneda, 2007), and a differentiating criterion to distinguish entrepreneurs from non-entrepreneurs (Carland, Hoy, Boulton and Carland, 1984; Kuratko and Hodgetts, 2004; Lumpkin and Dess, 1996; Man, and Lau, 2000; Robinson et al, 1991; Utsch and Rauch, 2000). Accordingly, the entrepreneurs' opinion reveals that students need to be educated to get them engaged in thinking innovatively to support the development of new products, services, or technological processes. This idea is in line with that of Drucker (1985) in that innovation and entrepreneurship are not innate characteristics and as such, they can be learned if one is ready and willing.

Based on the findings previously discussed, we developed a working list in order to respond to the first research question of the dissertation, which asked about the competencies that should be addressed in entrepreneurship education. As explained in the previous Chapter, entrepreneurs were inquired to choose eight competencies

from the list provided to them. Next, we classified them according to the model proposed by Boyatzis (1982) and further developed by Spencer and Spencer (1993) and the categorization suggested by Bird (1995). By following this approach, we classified the competencies in one of the three competency levels, which are, traits and motives, social role and self-concept, and knowledge and skills. Thereby, having a different view of the market, deal making and negotiation, and networking were categorized as competencies at the social role and self-concept. Similarly, decision making, innovative thinking, identifying and solving problems, oral communication, and identifying business opportunities were included within the knowledge and skill competency level.

An important observation from the categorization described above is that competencies within the motive and trait level were not present in the proposed working list. This means that some competencies such as intuitive thinking, coping with uncertainties, coping with failure, and coping with stress were not among the eight highest in priority for entrepreneurship education according to the entrepreneurs' perspective. One possible explanation for these results may be that entrepreneurs consider these competencies as those that are more difficult to influence by an educational intervention. We think that further research should go in this direction as to explore why such competencies were not among the most frequently cited by entrepreneurs. Another possible reason for what we found is that competencies at the motive and trait level reside in the inner part of an individual; therefore, to some extent hidden, deep, and central to personality (Spencer and Spencer, 1993). As motives and traits are at the deepest level of the competency model proposed by Boyatzis (1982) and further developed by Spencer and Spencer (1993), they are based on an individual personality and difficult to change in the short term (Bird, 2002). In this regard, the findings are not surprising since "the most easily observed and changeable level of individual competency is that of skills,

knowledge, or behaviors" (Bird, 2002, 207). In accordance with this assertion, we posit that the findings of Study 1 are of great relevance for instructional design purposes because they can help delineate the activities for instilling in students the development of entrepreneurial competencies.

5.1.2. Findings of Study 2

Once we have defined the entrepreneurial competencies to be emphasized in entrepreneurship education, a step further was to answer the question regarding the educational method for learning and teaching of such competencies. To answer this inquiry, the dissertation argues that a constructivist approach is the way to go for teaching entrepreneurship. As human reality is constantly being constructed, described and developed by individuals (Karp, 2006), we contend that preparing students under this perspective fits well into who entrepreneurs are and what they regularly do when facing an entrepreneurial venture (Mitchell, Smith, Morse, Seawright, Peredo, and Mckenzie, 2002). That is, entrepreneurship education needs to be oriented to enable individuals to create mental maps that support commitment and mental structures associated to the necessary skills, knowledge and capabilities to new venture creation (Mitchell et al, 2002). According to this thought, we maintain that entrepreneurial activity among students can be fostered by encouraging them to develop entrepreneurial competencies similar to those routinely exercised by young children. Amongst others, these competencies involve exploring the surrounding environment, trying different avenues to get insights of how things are, being creative, and being impatient (Lobler, 2006).

As presented in Chapter 3 (*Research Method*), the dissertation proposed an action-oriented approach for teaching entrepreneurship that fits well into the constructivist perspective. That is, we think that this approach provides the setting to learn by

doing with activities grounded on applied theory as recommended by Fiet (2000a). By following this method, educators can move away from tests that evaluate students' performance, in favor of self-directed learning techniques (Lobler, 2006). Moreover, students can be challenged to be active in the learning process and to construct knowledge by themselves, which are features in line with the constructivist perspective (Brooks and Brooks, 1999; Snowman and Biehler, 2003; Schunk, 2004). Since exposing students to relevant activities is crucial in enabling them to develop entrepreneurial competencies (Fiet, 2000b, 2001), the proposed intervention included meaningful experiences in order to challenge the learners' suppositions (Brooks and Brooks, 1999).

The so called "mini-enterprise", for example, was one of the important activities aimed at exposing students to complex situations, such as lack of information, uncertainty, development and use of personal contacts, search for advice from experts, and so on. From these experiences, we provided the environment for students to become aware of the difficulties in creating a venture and in dealing with limited resources, which is usually the case for entrepreneurs (Hisrich and Peters, 2002). Furthermore, students were encouraged to think innovatively as to be able to enter the market with and innovative product or service and to remain competitive (Carland et al, 1984; Lumpkin and Dess, 1996). In addition, they had the opportunity to experience the need of possessing and developing a network of contacts both during the startup phase and in other phases of running the business (Greve and Salaff, 2003; Witt, 2004). Another benefit of the mini-enterprise activity was the possibility for students to realize the importance of having good communication skills, which are regarded as essential for entrepreneurial advancement (Hood and Young, 1993). Other potential benefits were related to the opportunity for students to put in practice especial know-how and previous experience for designing a specific product or service as well as to embrace competence of others and to build a proper

team. As a way of assessing the issues discussed above, one of the major objectives of the dissertation was to investigate the effect of a constructivist educational intervention on the development of entrepreneurial competencies in university students. For this purpose, the dissertation focused on knowledge, skill and attitude measures.

5.1.2.1. Knowledge and Skill Level Competencies

The results presented in this section allowed us to respond to the second research question regarding the impact of an entrepreneurship course based on a constructivist approach on the development of relevant entrepreneurial competencies in university students. Overall, the findings in this study provided initial evidence that the proposed intervention did have a positive impact on students' entrepreneurial competency development. That is, students who were exposed to the entrepreneurship training exhibited higher scores on entrepreneurial competencies at the knowledge and skill level from T1 (time at the start of the intervention) to T2 (time at the end of the intervention), and higher than subjects in the control group. These findings reveal that the constructivist approach is in the right direction and a promising method for teaching entrepreneurship.

As described in Chapter 4 (*Results*), this approach was well accepted by students, demonstrated by their positive reaction to the intervention and their enthusiasm in performing all the in and out-class activities. The eagerness of students in working on the assigned tasks, for example, became publicly observable when they had to start and run their own business – namely the mini-enterprise – for a period of about four days. Moreover, many students exhibited a strong interest in hearing the speech of entrepreneurs who were invited to present their testimony about the issues involved in creating and managing their ventures. Important to remark is that some

of these guest speakers were professionals who graduated from ESPOL, a technically-oriented university in Ecuador that served as the host institution where this study was conducted. The speeches of entrepreneurs are yearly organized by the Center for Entrepreneurship Development of ESPOL, as part of an important event called "The Entrepreneurs' Week". For instructors, it was also worthwhile because it challenged them to design and implement learning experiences to promote situated and meaningful learning through relevant activities that simulated real-world situations (Izquierdo, Caicedo, and Chiluiza, 2007). That is, students were given learning tasks set in realistic contexts in accordance with the constructivist principles (Driscoll, 2000; Fink, 2003; Herrington and Oliver, 1999; Schunk, 2004). Also, they were provided with the setting to view ideas and problems from multiple perspectives allowing students' interactions and their previous experience in order to attain learning goals; features that are in line with the constructivist perspective (Brooks and Brooks, 1999; Gardner, 1999; Jonassen, 1999; Snowman and Biehler, 2003)

Even though the proposed intervention seems to be promising, we have to admit that its impact was not as considerable as we expected. That is, the differences in the score means from T1 (pre-test) to T2 (post-test) for each of the entrepreneurial competency variables among the experimental groups were not as high as we anticipated compared to those in the control group. Important to recall is that the latter group was not exposed to the entrepreneurship training. These findings are not surprising in the sense that an intervention delivered during one academic term seems to be insufficient for trainees to achieve higher levels of entrepreneurial development. Certainly, more research is needed to confirm or contrast these findings. To our knowledge, not previous research has reported whether a longer period of exposure to entrepreneurship training can help students develop to greater extent entrepreneurial competencies. Moreover, entrepreneurship is a complex

subject to study in the context of teaching and learning because it depends on the individuals' self-regulated actions and on characteristics not easy to influence (Pihkala and Miettinen, 2003). However, the significant differences found in students' entrepreneurial competencies at the knowledge and skill level across time are an initial indication that such competencies can be measured and changed through formal training.

5.1.2.2. Findings Related to Students' Entrepreneurial Attitudes

Regarding the attitude measures, we found that a significant change occurred in the positive direction from pre-test to post-test for two attitude subscales associated to entrepreneurship; that is, identifying business opportunities and proficiently communicating business ideas. On the other hand, not significant differences existed among the other two subscales of the attitudes that included: evaluation of business opportunities and networking. These findings are consistent with previous studies that have reported that students' attitudes toward entrepreneurship changed after completion of a training program (Hatten, Ruhland, 1995). Other studies have found that an entrepreneurial attitude scale, similar to the one used in this dissertation, is a good measure for understanding the psychology of entrepreneurship (Robinson et al, 1991). According to Robinson et al (1991), there are numerous possible attitude models associated with entrepreneurship that can be explored. In this respect, the dissertation used one model that involved four attitude subscales. Since two of these subscales were significant, the findings provided initial indication that attitudes toward entrepreneurship can be changed through an adequate educational intervention.

5.1.2.3. Findings Based on the Treatment Conditions

As previously discussed, the dissertation also investigated the effect of the proposed intervention on students' development of entrepreneurial competencies under two treatment conditions: the one involved students working in teams and the other working individually on a term project. This experiment was worthwhile because the constructivist conceptions of learning assume that knowledge is individually and socially coconstructed by learners based on how they interpret their experiences in the world (Jonassen, 1999). The findings revealed that not differences existed between students working in teams in the term project activity and those who did it individually. This was not an expected result since usually people learn more effectively when working in groups than doing at the individual basis (Gardner, 1999). This can happen because in a group setting students can have the opportunity to assume different roles, to observe and interact with their peers, and to have debates on issues that complement one another (Gardner, 1999). A plausible explanation for this result is the fact that students exercised all the activities, except the term project, most the same as the others did; i.e. the only different activity in the overall intervention was the term project. In addition, this assignment was progressively developed and reviewed in several class sessions as new concepts were introduced, which allowed students to receive feedback from the instructor and their classmates. This way, they had the opportunity to grasp underlying concepts, to reflect on their mistakes, and to make the necessary changes as they were advancing in the project. Therefore, this sole activity did not account for distinguishing the students' performance in the course.

5.1.2.4. Findings Related to Students' Entrepreneurial Self-Efficacy

Up to this point, the dissertation has reported that a constructivist approach for teaching entrepreneurship had a positive impact on students' development of entrepreneurial competencies. Next, we were interested in measuring the students' entrepreneurial self-efficacy in order to answer the third research question, which was as follows: Do differences in the students' self-reported levels of entrepreneurial competencies have an impact on their entrepreneurial self-efficacy? As Krueger and Brazeal (1994) emphasize, fostering self-efficacy beliefs goes beyond teaching competencies because students and trainees must fully internalize those competencies through perceived mastery. Accordingly, we think that individuals may possess certain competencies; nevertheless, they may not deliberately exploit them unless these competencies become part of their behavior or thinking. Therefore, a step further toward assessing the effectiveness of the proposed intervention was to examine whether students internalized these competencies as to increase their entrepreneurial self-efficacy (ESE).

The findings revealed that students reported higher levels of ESE after completion of the entrepreneurship training. Thus, the increase of ESE scores from pre-test to post-test provided initial indication that students indeed internalized the competencies subjects of the study. These findings are consistent with previous research that perceptions of formal training account for the enhancement of ESE among students concentrating in business-related majors (Zhao et al, 2005). In contrast, a counterintuitive result was reported by Cox et al (2002) because they found that ESE scores were lower among students in the post-course group compared to the pre-course group. In their study, however, there were students whose major was in international business that exhibited marginally significant higher level of entrepreneurial self-efficacy at the course completion. Another aspect to remark in

the study conducted by Cox et al (2002) is the use of a particular experimental design. That is, students enrolled in an introductory entrepreneurship course were separated into two groups; the one identified as the pre-course and the other as the post-course. This means that students in each group did not answer the questionnaire both at the beginning and at the end of the intervention. Contrarily, the research design on the dissertation considered that each of the two experimental groups respond to the survey instruments both at the pre-test and at the post-test. Since not conclusive results have been found in regard to measuring ESE before an after an intervention, the findings of the dissertation are of great value. Based on what we found, we think that the way we applied the instruments was in the right direction to observe possible changes in ESE scores. In addition, using a constructivist approach to teaching entrepreneurship facilitated the enhancement of ESE through the increase of self-perceived scores of entrepreneurial competencies.

5.1.2.5. Findings Related to Students' Entrepreneurial Intentions

The fourth research question asked about whether a relationship existed between the students' entrepreneurial self-efficacy and their intention to start their own business. Responding to this question is of great relevance in the entrepreneurship field since ESE beliefs are considered a good predictor of individuals' intentions to become entrepreneur (Boyd and Vozikis, 1994; Chen et al, 1998). Intentions, in turn, are important because they may influence actual behavior (Bird, 1988). In this line, the dissertation firstly tested an individual hypothesis that focused on the relationship of entrepreneurial self-efficacy and intentions to start a new business. Then, this relationship was examined by testing a complete model of intentionality as described in Chapter 3 (see Section 3.4). By testing the individual hypothesis, the findings provided evidence that ESE scores were positively related to intentions, which are consistent with previous research (Boyd and Vozikis, 1994; Chen et al, 1998; De

Noble, et. al. 1999). Accordingly, the findings confirm other studies and support the relevance of entrepreneurship education in stimulating students' intentions to new venture creation.

5.1.2.6. Findings Related to the Test of Model of Students' Entrepreneurial Development

As presented in previous chapters, the dissertation formulated a model of students' entrepreneurial development. The hypothesized model stated that entrepreneurial self-efficacy exerts a mediating role between entrepreneurial competencies and entrepreneurial intentions. It was also hypothesized that high attitudes toward entrepreneurship are positively related to high intentions to create a new venture. Results from the structural equation modeling technique provided evidence that students showing high self-perceived entrepreneurial competencies exhibited high entrepreneurial self-efficacy which, in turn, demonstrated high intentions to become entrepreneurs. These findings are in accordance with previous research in that entrepreneurial self-efficacy mediates between entrepreneurial intentions and perceptions of formal training (Zhao et al, 2005). Important to highlight on the Zhao's study is the effect of perceived learning from entrepreneurship-related courses on students' intentions because it provides educators with an avenue for educational interventions. Therefore, the findings in the dissertation are of great importance in that entrepreneurship education can enhance entrepreneurial self-efficacy through its impact on the development of entrepreneurial competencies in students.

The hypothesized model also proposed that attitudes toward entrepreneurial acts are positively related to intentions to new venture creation. In this respect, the findings revealed that high attitudes were associated to high intentions to start a business. This

result supports previous research in that attitudes are precursor of intentions which, in turn, indirectly influence behavior (Bagozzi, 1981; Bonfield, 1974).

5.2 CONCLUSIONS

To conclude the dissertation, we want to emphasize that the constructivist perspective is the way to go for entrepreneurship education. Current educational practices in science-related areas have constructivism as the new paradigm although this perspective has not been widely applied in the field of entrepreneurship. Under this paradigm, education is driven by basic principles that include: 1) centrality of students in the learning process and the role of teachers is of facilitators of learning rather than disseminators of information; 2) students are encouraged to achieve their learning goals while teachers give them support; 3) students are invited to discuss what content to be covered and the competencies to be developed; 4) students' performance is not evaluated through the use of tests, instead students' learning is assessed while they exercise relevant activities that mimic real-world situations; 5) students are encouraged to interact with their peers in group work activities and class discussions while receiving feedback from teachers; 6) students are encouraged to solve problems on their own while asking motivating questions that lead them to find solutions.

By following the basic principles of constructivism, students are given the opportunity to achieve learning by accepting different perspectives on issues and solutions to problems, by modifying existing conceptions in the light of new information, and by creating a motivating environment that promotes active participation of students. Accordingly, we have stressed that constructivism provides the theoretical underpinning that supports much of how entrepreneurs learn and what they do in their entrepreneurial endeavors. In line with this view of education, we

proposed an action-oriented approach for teaching entrepreneurship as a practical example of the constructivist perspective. Through this approach, students are enabled to learn by doing as opposed to just listening, reading, and working through routine exercises. As we found a positive impact on the students' development of entrepreneurial competencies, we contend that working on relevant activities makes students internalize those competencies as to become part of their behavior or thinking. Once these competencies are internalized, entrepreneurial self-efficacy beliefs are enhanced which, in turn, positively influence intentions to new venture creation. From what has been discussed, our final conclusion is that entrepreneurial competencies can be learned and changed through the course of an intervention supported by the constructivist principles.

5.3 LIMITATIONS AND IMPLICATIONS OF THE DISSERTATION

This section discusses the limitations of our study (section 5.3.1) and proposes an agenda for future research (section 5.3.2).

5.3.1 Limitations of the Study

There are aspects that need to be considered when interpreting the results. The next subsections describe the sample and methodological limitations.

5.3.1.1 Sample Limitation

As described in Chapter 3 (*Research Method*), a multiple group pre-test-post-test quasi-experimental design was used to assess the effectiveness of the educational intervention. Thus, two experimental groups and a control group were considered for

the study. The sample size of the experimental group 2 (N = 34) was relatively small since students in this group were asked to work in their term projects at the individual basis. Students were allowed to voluntarily accept or reject to do it individually. Although they were promised some extra points in their final grades, some of them were unwilling to collaborate with the research study since the term project was considered as a very demanding activity. The sample size of the control group (N= 38) was also relatively small. This happened because many of the questionnaires were filled out by students only at T1 (pre-test) but not at T2 (post-test); therefore, they were eliminated for further analysis. Therefore, greater sample sizes are clearly needed for more accurate and better interpretations of the findings.

5.3.1.2. Methodological Limitations

Five limitations were identified due to methodological choices. Our first limitation is related to the first study in which we were interested in determining the competencies that should be emphasized in entrepreneurship education. For this purpose, the subjects of the study were only Ecuadorian entrepreneurs. Therefore, it is desirable to conduct research in which entrepreneurs from other countries with similar or different cultural, social and economic conditions are interviewed. By paying attention to contextual factors, further research can enrich our understanding of what and why some competencies are more important than others. Such contingencies can also give us better insights on the difficulties and challenges entrepreneurs face in their entrepreneurial endeavors.

The second limitation is related to the measures used to assess the effectiveness of the intervention. Although one of the instruments is a more objective measure of how students react on circumstances that mimic real-world situations, it is not an

assessment of real behavior of students when confronted to an entrepreneurial endeavor.

The third limitation is related to the fact that students in the experimental groups and in the control group were not selected at random, which happened because of the common practical difficulties in conducting research in an educational context. Trying to carry out experimental research, for example, may a pose a problem of ending up with two few students that answer the questionanires at the outset and at the end of the intervention. We overcome this difficulty by selecting all the available students enrolled in the entrepreneurship course. Following this approach, we were able to collect a considerable amount of students (N=274). Hence, the design of the study was quasi-experimental rather than a true experiment.

The next limitation is associated to subjectivity because all the instruments were only based on perceptual measures. This choice can be subject to criticism in that perceptions are likely to differ from what is to be in reality. It can also be criticized because the use of self-reported measures can be a source of common method variance and response set tendencies (Spector, 2006). A second source of data is desirable for the variables defined in this study with the exception of the self-efficacy construct because it is conceptualized as a self-reported measure. A method, for example based on observations can provide more objective data on different competencies exhibited by students. In doing so, more accurate and better interpretations of the findings can be achieved.

The fifth limitation has to do with the fact that the study was conducted only in one university. Respondents from other universities may have different views on the issues involved in entrepreneurial ventures. It is reasonable to expect that other institutions of higher education use instructional approaches that differ from the one

proposed in this dissertation. Students being educated at these institutions may be lead to have different perceptions on what competencies are crucial for entrepreneurship and how they can be developed during the course of an educational intervention.

5.3.2 Implications of the Dissertation

In this section, we elaborate on some of the implications of our findings for entrepreneurship education and future research.

5.3.2.1. Implications for Entrepreneurship Education

Educating students for exploiting their capabilities to an entrepreneurially-oriented career has become a major impetus of entrepreneurship education. Courses in entrepreneurship education are now emphasizing the centrality of students in the learning process. This means that students have become important actors in the design and implementation of a learning project and teachers are asked to assume the role of facilitators instead of merely disseminators of information (Bird, 2002). Also, students are seen as active individuals that gain experience from their activities and learn by doing while interacting with their peers at developing such activities (Lobler, 2006). Although the extant literature does not explicitly points out, the changes that are mentioned above can be seen as a paradigmatic shift to a constructivist view of education.

However, three considerations are important for a widespread use of the constructivist perspective in entrepreneurship education. First, educators need to acknowledge the constructivist principles as to have a common view of education and to have a close connection between these principles and the activities to be

implemented in their teaching. Second, we suggest that the learning experiences, as in- and out-class activities, have to be designed to involve real-world situations similar to those included in the intervention proposed in the dissertation. By doing so, students are encouraged to enhance their problem-solving skills and to self-reflect on their strengths and weaknesses. The third consideration is that entrepreneurship education should focus attention on competency development. In this regard, the concept of a competency is useful in facilitating the design and implementation of instructional methods. This term can also help identify which competencies and at what level they need to be addressed to better prepare students for a future entrepreneurial career.

5.3.2.2. Implications for Future Research

One of the implications that we would like to highlight refers to the relevance of having a conceptual framework for empirically testing the effectiveness of the proposed intervention. Although we found initial evidence that a constructivist instructional approach positively influences the development of entrepreneurial competencies in students, this impact was not as high as we expected. By giving individuals a considerable amount of practice in specific skills, they not only become more skillful but also more confident in their learning abilities (Bruner, 1983). Therefore, an important direction for future research is to explore whether a longer exposition of students to an educational intervention similar to the one proposed here can be more effective. In this commitment, we suggest the use of the instruments used in the dissertation as tools to assess students' learning in terms of the competencies of interest. It is also recommended that other studies make a further development of these instruments in order to expand the assessment to other competencies that were not included in the present study such as decision making, innovative thinking and team work.

The second implication refers to our methodological choice in measuring each of the variables of interest. Although the instruments used in the dissertation facilitated the data gathering in measuring the effectiveness of the intervention, most of the measures were based on self-reports. Self-reporting can be a source of socially desirable answers which, in turn, may introduce common method variance (CMV) (Spector, 2006). Therefore, a direction for future research is to refine the instruments in order to collect more reliable data by controlling for possible problems of CMV. In this respect, it is advisable to consider reverse scored items as an attempt to control for social desirability. To facilitate respondents' answers, it is recommended to improve the layout of the instruments by using numbers for each of the values of the scale, which was not used in the present dissertation.

As most of the measures are based on self-reports, it is also recommended to validate the results by using an alternative method as the behavioral event interview (BEI). As this method requires the assistance of well trained interviewers, considerable amount of time and economic resources may be needed depending on the number of interviewees. BEI can provide reliable information of what people actually do in critical incidents they have faced (Spencer and Spencer, 1993). Thus, the BEI method is helpful because the researcher can get behind what people say they do to find out what indeed they do. Although this approach has been mainly used in investigating entrepreneurs' behavior, it can be extended to educational applications by clearly defining which competencies are to be assessed. For example, whether students self-report high in their opportunity identification competency, asking them about specific incidents will reveal how they have behaved toward the target goal. That is, through such incidents, it is possible to realize whether they indeed make a habit of scanning their environments as it may lead to new business opportunities (Kaish and Gilad, 1991). Having detailed description of specific incidents can also

show us whether students make use of different types of information about the environment where it is available in order to identify business opportunities (Busenitz, 1996).

Another alternative for measuring the effectiveness of the educational approach is the use of observation. According to Kirkpatrick (1999), a comprehensive evaluation requires that learners be monitored in order to observe their behavior and to determine what final results occurred due to the intervention. This means that we expect that students change their behavior in the positive direction as to apply what has been learned. From that behavioral response, we may anticipate observable result attributable to such intervention. Therefore, future research should consider the implementation of longitudinal designs to make a follow up of students who are exposed to entrepreneurship training. This will allow us to observe not only actual entrepreneurial behavior of students but also how many of them will indeed become entrepreneurs. By conducting a longitudinal study, we can also investigate who are more successful and what competencies make them so.

Another implication is associated to the fact that the present study was conducted in only one university; hence, generalization is an issue that opens avenues for further research. It is desirable to conduct research among students being educated in different universities both within a specific country and across countries. By doing so, researchers will count not only with a larger sample but also with information that may help find out the adequacy of a given educational method.

The present study is one of the first attempts to assess the effectiveness of a constructivist approach for teaching entrepreneurship. Although the empirical results indicate that this approach is a promising alternative for teaching entrepreneurship, more research is certainly needed to confirm the findings. Comparison with other

pedagogical approaches was not addressed in the dissertation; therefore, it is recommended to conduct experimental research in which one of the treatment conditions uses a constructivist approach and the other does not.

The final implication has to do with the design and delivery of the entrepreneurship course. More than ten professors were appointed to teach the course. All of these professors were exposed to similar training. The course was designed from different sources of inspiration and with the support and contribution of these professors. Each semester, they meet regularly or have discussion through virtual forums to discuss the progress and the issues involved in teaching the course. The professors are selected regardless of whether or not they own or have created an enterprise.

Although we believe that entrepreneurial experience is important for teaching an entrepreneurship course, there are other relevant aspects to be considered on their selection. These aspects are as follows: a) strong desire to teach the course, which means that the professor is led by the importance of teaching entrepreneurship as opposed to the interest of having a better income or getting a promotion; b) good communication skills and empathy with students; c) commitment to be entrepreneurial in teaching the course; and d) openness to be cooperative in sharing teaching materials and relevant information. Although flexibility is allowed, the professors are asked to adopt constructivist practices in teaching the course. In spite of these commonalities, possible differences may be encountered due to the professors' experience and personality characteristics.

Therefore, it is advisable to investigate the effect of having more than ten professors to teach the course along all the undergraduate programs. The dissertation did not include the suggested analysis due to the reduced number of students of each group who answered the questionnaires at pre-test and post-test.

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APPENDICES

SURVEY TO ACADEMICS EXPERTS IN THE FIELD OF ENTREPRENEURSHIP

Name of your Institution: _____ Date: ___ /___ / ____
Day Month Year

Your opinion about entrepreneurial competencies

1. The extant entrepreneurship literature has identified several competencies that are commonly exhibited by entrepreneurs when starting and running a venture. Accordingly, the following table provides a summary of relevant competencies although it should not be considered as an exhaustive list. Please, give your opinion regarding the competencies that entrepreneurs must possess to succeed in a business context, by rating each of them, from 1 "Low importance" to 5 "High importance."

	1 Low Importance	**2** Relatively low Importance	**3** Medium importance	**4** Relatively high importance	**5** High importance
Analytical thinking					
Decision making					
Coping with failure					
Identifying business opportunities					
Written communication					
Coping with stress					
Coping with uncertainties					
Innovative thinking					
Intuitive thinking					
Having a different view of the market					
Deal making and negotiation					
Evaluating business opportunities					
Identifying and solving problems					
Networking					
Calculated risk taking					
Team work					
Oral communication					

Note: If you have any suggestion about other competencies that has not been considered in the previous list, please include and rate them in the table below.

	1 Low Importance	**2** Relatively low Importance	**3** Medium importance	**4** Relatively high importance	**5** High importance
_____					
_____					

SURVEY TO ECUADORIAN ENTREPRENEURS

Date: ___ /___ / ____
Day Month Year

Personal Data:

Name: _____ **Date of birth**: ____ /____ / _____
Day Month Year

Gender: Male ____ Female ____

About your antecedents

1. Please, indicate your level of education (Mark with an X only the highest academic level)

Elementary education	
Secondary education	
Undergraduate level	
Graduate level	
PhD level	

Your opinion about entrepreneurial competencies

2. The extant entrepreneurship literature has identified several competencies that are commonly exhibited by entrepreneurs when starting and running a venture. Accordingly, the following table provides a summary of relevant competencies although it should not be considered as an exhaustive list. Please, give your opinion regarding the competencies that entrepreneurs must possess to succeed in a business context, by rating each of them, from 1 "Low importance" to 5 "High importance."

	1 Low Importance	**2** Relatively low Importance	**3** Medium importance	**4** Relatively high importance	**5** High importance
Analytical thinking					
Decision making					
Coping with failure					
Identifying business opportunities					
Written communication					
Coping with stress					
Coping with uncertainties					
Innovative thinking					
Intuitive thinking					
Having a different view of the market					
Deal making and negotiation					
Evaluating business opportunities					
Identifying and solving problems					
Networking					
Calculated risk taking					
Team work					
Oral communication					

Note: If you have any suggestion about other competencies that has not been considered in the previous list, please include and rate them in the table below.

	1 Low Importance	**2** Relatively low Importance	**3** Medium importance	**4** Relatively high importance	**5** High importance
_____					
_____					

3. For the list of competencies presented in question 1, please select **ONLY EIGHT** of them that you believe should be emphasized in entrepreneurship education at the undergraduate level. You can include within these eight competencies any of those that you added to the list initially provided.

Analytical thinking	
Decision making	
Team building	
Coping with failure	
Identifying business opportunities	
Written communication	
Coping with stress	
Coping with uncertainties	
Innovative thinking	
Intuitive thinking	
Having a different view of the market	
Deal making and negotiation	
Evaluating business opportunities	
Identifying and solving problems	
Networking	
Calculated risk taking	
Team work	
Oral communication	

4. Could you please indicate the rationale behind your selections?

……

……

……

STUDENTS' ANTECEDENTS

Personal Data

Name (Optional): _____

Student ID Number: _____ **Date of birth**: ____ /____ / _____
Day Month Year

Gender: Male ____ Female ____

About your antecedents

1. Do you know any person that has created his/her own company? (Do not include your parents)

Yes ☐ **No** ☐

2.

What is your mother's employment status?		What is your father's employment status?	
a. Unemployed	☐	a. Unemployed	☐
b. Own a business	☐	b. Own a business	☐
c. Working for a company	☐	c. Working for a company	☐
d. Working as an independent professional	☐	d. Working as an independent professional	☐

3. Has any of your relatives created his/her own company?

Yes ☐ **No** ☐

STUDENTS' REACTION

Date: ___ /___ /_____
Day Month Year

Personal Data

Name (Optional): _____ Student ID No.: _____

Evaluating the Entrepreneurship Course

With the purpose of having your appreciation about the entrepreneurship course, we need your inputs. Please, give us your impressions, comments, and suggestions that could assist us in reviewing the course for improvement. Rate each of the statements from 1 "Strongly disagree" to 5 "Strongly agree". A value of 3 is "Neither agree nor disagree".

Scale: From 1 "Strongly disagree" to 5 "Strongly agree"	**Value**
The course met my expectations	
The course content was relevant for my personal and/or professional development	
The course approach attracted my interest for the entrepreneurship topic	
The course agenda for activities and homework was appropriate	

What did you like the most of the course?

……..

……..

What did you dislike the most of the course?

……..

……..

Please, give us an overall rating of the course from 1 being "Very bad" to 5 the "Very good" ☐

Can you give us any suggestion on how to improve the course?

……

……

SHORT HYPOTHETICAL CASES

Date: ……/……../……..…
Day Month Year

Name (Optional) _____ Student ID Number: _____

For the following four hypothetical situations, please mark with an X to choose one of the alternative answers (a), (b), (c), (d) or (e) that best describes what you would do.

1. Put yourself in a hypothetical situation in which, besides you, local and international people are attending an important conference. This event is being held in two sessions with a break of ten minutes in between. During this break, you take one of the following actions:

a. You take a coffee and just wait alone for the start of the second part of the conference. ☐

b. You see a group of participants talking to each other about different topics related to the conference. Then, you get closer to listen to the conversation. ☐

c. After taking a coffee, you try to approach to other participants to introduce yourself to them and to exchange ideas and topics of interest. ☐

d. You prefer not to have a drink, instead to contact by phone or by internet to your friends to talk about the topics of the conference. ☐

e. You think that the conference is interesting although some topics were not clear for you and you prefer to wait until the end of the conference to get additional information. ☐

2. Assume that you are a business person and that one of your employees is a talent person and he/she demonstrates to have great knowledge and skills for the industry in which your business is. This employee is appreciated not only by you but also by his peers and clients. Despite of this, it has become evident that he/she is not happy with his/her position at the company, perhaps because he would like to be appointed to be the manager of one the three lines of the company's products. He/she has been demonstrating a lot of impatience and you have realized that something has to be done. What would you do in this case?

a. You would wait until he/she decides to leave the company because he/she may contaminate his/her peers with such attitude. ☐

b. You would offer him/her a good payment so that he/she would leave the company. ☐

c. You would offer to promote him/her to a management position and he/she would be responsible for the product line in which he/she is interested. ☐

d. You would support him/her so that he/she can begin his/her own business and you would give him/her the exclusivity for the product line that he/she is very interested in promoting. ☐

e. You would invite him/her to have a dinner together and to tell him/her that you really appreciate him/her because he/she is very committed to your company. ☐

3. In a small town three hours away from where your company is located, you have not introduced to the market the main product of your company. You are uncertain about the possibility of successfully introducing this product in the market. However, you know for certain that your company has enough capacity to meet the demand if the market accepts well that product. What would you do?

a. You would visit a representative of the Municipality for the industrial sector in which your business is in order to talk to him/her about the potential of this product. ☐

b. You would ask some of your providers whether they supply other producers of the region (the small town) with raw materials that are used to manufacture the product of your company in order to have a clear picture of your competitors. ☐

c. You would look for known entrepreneurs within the region (the small town) to ask them to sell your product as a complement of their product lines. ☐

d. You would look for a marketing expert within the region (the small town) to make a market research. ☐

e. You would hire young people to sell the product of your company in the small town. ☐

4. Assume that you are a business person in a small town that has a considerable number of small businesses. In this town, there is a lack of restaurants and places for lodging. You have noticed that your business colleagues are very disappointed because their providers are not able to comply with their business meetings due to the lack of restaurants and lodging. Therefore, these providers cannot make thorough visits to their clients because they cannot stay in that town for more than a few hours. What would you do?

a. You would initiate a public debate through the media in order to persuade local authorities that they should invest in restaurants and hotels. ☐

b. You would contact known people of the small town and you would ask them to discuss with various political leaders about the problem. ☐

c. You would suggest to your business colleagues of the small town so that the private sector together with the Municipality develop a project to build a restaurant and a hotel. ☐

d. You would try to get your business colleagues of the closest town involved in making businesses by offering food and lodging in order to meet the lack of these services. ☐

e. You would wait until local authorities get conscious of the importance of building a restaurant and a hotel. After that, you would support that project. ☐

STUDENTS' ENTREPRENEURIAL COMPETENCIES

Date: ___ /___ /_____
Day Month Year

Personal Data

Name (Optional): _____ Student ID No.: _____

About your self-perceived competencies

This section presents 14 statements related to entrepreneurial competencies that you may possess at a certain level. Please, indicate your level of agreement being **1 "Strongly disagree" and 7 "Strongly agree".** A value of 5 is neutral "Neither disagree nor agree." Please, work as quickly as possible, do not stop to think to deeply about any question, but mark down your first thought.

Scale: From 1 "Strongly disagree" to 7 "Strongly agree"

One of my greatest strengths is the ability:	**Value**
1A. To perceive unresolved problems that lead me to formulate a business idea	
2A. To apply own criteria to evaluate a business opportunity	
3A. To keep good relationship with others in a business context	
4A. To convincingly communicate my ideas orally and in writing	
5A. To make public presentations	
6A. To evaluate pros and cons of business ideas	
7A. To clearly present my ideas	
8A. To visualize opportunities that take advantage of changes in people's consumption habits	
9A. To evaluate business opportunities	
10A. To develop personal network of contacts	
11A. To identify unmet needs of people	
12A. To identify products or services that could be well accepted by people	
13A. To apply existing criteria to evaluate a business opportunity	
14A. To keep good interpersonal relations	

About your attitudes

Please, indicate your level of agreement with the following statements from 1 "Strongly disagree" to 7 "Strongly agree". A value of 5 is neutral "Neither disagree nor agree". Work as quickly as you can, do not stop to think to deeply about any question, but mark down your first thought. **Please answer all of the questions.**

	Value
1. I get my biggest thrills when I am able to make friends in a business context.	
2. I usually do my best effort when I have to make a deep evaluation of a business idea.	
3. I know that having a network of personal contacts is relevant for success in business.	
4. I believe that one key to success in business is to perceive unresolved problems within the context where I live.	
5. I always try to make friends with people who may be useful in giving me advice on a business idea.	
6. I believe the most important thing in selecting business associates is their communication ability.	
7. I do not mind spending a considerable amount of time making good relations with others.	
8. I believe that to succeed in business it is crucial to apply existing criteria for evaluating business opportunities.	
9. I get a sense of pride when I have made outstanding public presentations.	
10. I feel self-confident when I make contacts with successful business people.	
11. I feel bad when I have not been able to convincingly present my business ideas either orally or in writing.	
12. I feel good when I am able to visualize business opportunities.	
13. I believe that in the business world competent people must be good at verbally communicating their ideas.	
14. I feel good when I properly evaluate business opportunities.	
15. I frequently do my best effort to express my ideas either orally or in writing as persuasive as possible.	
16. I think that a key to succeed in business is to visualize opportunities that take advantage of changes in people's consumption habits.	
17. I feel disappointed when I am not able to make a network of personal contacts.	
18. I always make my best effort to convincingly present my business ideas to others.	
19. I believe that making an appropriate evaluation of a business idea is crucial to success in business.	
20. I always make a conscientious effort to apply own criteria in evaluating a business idea.	
21. I usually spend a lot of time trying to make quality presentations of my business ideas to potential investors.	
22. I feel good when I have worked hard to make a due evaluation of a business idea.	
23. I feel proud when I look at the results I have achieved in my pursuit of exploiting a business idea.	
24. I usually seek out colleagues who are helpful in my pursuit of a business idea.	
25. I feel disappointed when I am not able to visualize business ideas.	
26. I believe that to succeed in business a person must be able to clearly communicate his/her ideas.	
27. I usually spend a considerable amount of time to evaluate pros and cons of a business idea.	
28. I believe that to succeed in business it is important to get along with your business associates.	
29. I think that to succeed in business these days you must precisely perceive unmet needs of people.	
30. I believe it is crucial for success to be able to assess pros and cons of a business idea.	
31. I often sacrifice personal comfort in order to identify business opportunities.	
32. I believe that to become successful in business a person must spend some time developing new personal contacts.	
33. I usually do not give up looking for information that help develop products or services that could be well accepted by people.	
34. I get my biggest thrills when I am able to identify unmet needs of people.	
35. I do not mind spending a considerable amount of time trying to visualize business ideas.	
36. I feel disappointed when I am not able to clearly present my ideas.	

STUDENTS' ENTREPRENEURIAL SELF-EFFICACY

Date: ___ /___ /_____
Day Month Year

Personal Data

Name (Optional): _____ Student ID No.: _____

About your self-efficacy beliefs

Please, think on the tasks involved in the process of creating a new company and then consider each of the following statements, which are related to the question: how capable do you believe you are in performing each of the following tasks? Rate these statements from 1 "Strongly disagree" to 7 "Strongly agree". A value of 5 is "Neither disagree nor agree". Work at a moderate pace, do not stop to think to deeply about any question, but mark down your first thought.

	Developing new product and market opportunities	**Value**
1.	I can see new market opportunities for new products and services.	
2.	I can discover new ways to improve existing products.	
3.	I can identify new areas for potential growth.	
4.	I can design products that solve current problems.	
5.	I can create products that fulfill customers' unmet needs.	
6.	I can bring product concepts to market in a timely manner.	
7.	I can determine what the business will look like.	
	Building an innovative environment	
8.	I can create a working environment that lets people be more their own boss.	
9.	I can develop a working environment that encourages people to try out something new.	
10.	I can encourage people to take initiatives and responsibilities for their ideas and decisions, regardless of outcome.	
11.	I can form partner or alliance relationship with others.	
	Initiating investor relationships	
12.	I can develop and maintain favorable relationships with potential investors.	
13.	I can develop relationships with key people who are connected to capital sources.	
14.	I can identify potential sources of funding for investment	
	Defining core purpose	
15.	I can articulate vision and values of the organization.	
16.	I can inspire others to embrace vision and values of the company.	
17.	I can formulate a set of actions in pursuit of opportunities.	
	Coping with unexpected challenges	
18.	I can work productively under continuous stress, pressure and conflict.	
19.	I can tolerate unexpected changes in business conditions	
20.	I can persist in the face of adversity	
	Developing critical human resources	
21.	I can recruit and train key employees.	
22.	I can develop contingency plans to backfill key technical staff	
23.	I can identify and build management teams.	

STUDENTS' ENTREPRENEURIAL INTENTIONS

Date: ___ /___ /_____
Day Month Year

Personal Data

Name (Optional): _____ Student ID No.: _____

About your entrepreneurial intentions

Please, Indicate your level of agreement with the following statements from 1 (Strongly disagree) to 7 (Strongly agree). A value of 5 is "Neither disagree nor agree". Mark with an **X** under the number of your choice.

	1	**2**	**3**	**4**	**5**	**6**	**7**
1. I'm ready to make anything to be an entrepreneur	☐	☐	☐	☐	☐	☐	☐
2. My professional goal is becoming an entrepreneur	☐	☐	☐	☐	☐	☐	☐
3. I will make every effort to start and run my own firm	☐	☐	☐	☐	☐	☐	☐
4. I'm determined to create a firm in the future	☐	☐	☐	☐	☐	☐	☐
5. I have very seriously thought in starting a firm	☐	☐	☐	☐	☐	☐	☐
6. I've got the firm intention to start a company some day	☐	☐	☐	☐	☐	☐	☐

IMPORTANT: Please, consider a time period of 5 years after graduating from the university for each of the statements above.

EDUCATIONAL INTERVENTION

Current section is intended to present a summary of content, activities and approach of the entrepreneurship course that served as the educational intervention.

Content, Activities and Approach

The extant literature stresses that entrepreneurship education requires a strong experiential component (Tracey and Phillips, 2007) and that learning is grounded in direct experience (DeFillippi and Ornstein, 2003). The entrepreneurship course is consistent with these assertions in that students are expected to learn for competency building when they are given a substantial amount of practice in realistic contexts. Accordingly, a major part of the entrepreneurship course offers students a variety of learning experiences that mimic real-world situations, which aligns with the constructivist perspective in that learning is essentially active (Abbott and Ryan, 1999). As a practical example of the constructivist perspective, the course follows an action-oriented approach. This method is in line with the writings of Revans (1982) who theorized that learning is the result of the interaction between programmed instruction and the spontaneous questioning that takes place from the interpretation of experience. Under this pedagogical approach, students are encouraged to perform a number of activities aimed at instilling in them the development of competencies for entrepreneurship.

Although the proposed course covers several topics related to entrepreneurship, such as the process of commercializing an innovation and property right issues, this summary makes emphasis on the following components: 1) Creativity and its link to the innovation process; 2) Identification and evaluation of a business opportunity; 3) Business models and development of a venture plan.

The first component aims at stimulating creativity and reviewing techniques for idea generation. Students are asked to exercise several activities, either individually or in teams, in order to let them understand what creativity is about, why it is important for innovation, what some of barriers are for creativity, and what can make a person think more creatively. As a practical application for entrepreneurship, a challenging assignment is given to students in which they are requested to add value to an object that has no commercial value at the start of the exercise. From previous activities, they are aware of techniques such as brainstorming and scamper that can be used to stimulate idea generation. As students work in groups, each member is inquired to generate ideas by adding value to the given object in order to create an innovative product or service. As a result, they have to select the best two ideas in each group, indicating the cost and price of the final product or service to be offered. As a wrap up, a plenary session follows to let students and the facilitator discuss about what can be learned from the exercise.

The second component introduces students into the opportunity recognition process followed by an examination of how a potential opportunity can be evaluated. The third component takes students into the meaning of a business concept and how it is developed into a viable business model. This is carried out by the development of a preliminary business plan, which is called a venture plan. Relevant concepts examined in these two components of the course are: value proposition of an innovation, customer understanding, industry and competition analysis, marketing strategies and marketing mix, business models and venture planning.

To get understanding of the opportunity recognition process and the steps to be followed for its exploitation, students are given the possibility to practice through a variety of learning experiences. As they go through all the activities involved, students can increase their knowledge and skill competencies for entrepreneurship.

Also, their perceptions of desirability for entrepreneurship may be improved by making them to reflect that this activity is a valuable alternative and socially acceptable and that it can be personally rewarding work.

In addition to one video and four cases used in the second component for analysis and discussion and four videos and three cases in the third component, three activities are central to achieve learning for competency building. They are intended to expose students to direct experiences with realistic situations. The first is a role-playing game/competition – namely "Buyers and Sellers". As explained in Section 3.3.2.2 (*Structure, Content, and Teaching Approach*), this activity is useful to confront students' ideas on designing features of a product against customer's underlying needs that have to be discovered. That is, students are challenged to become aware of the importance of knowing what problems people have, what their needs are, how they are currently meeting those needs, and how the new proposition can meet customers' needs better than the competitors' method. These issues are crucial for entrepreneurial activity as they may lead to the dicovery and exploitation of business opportunities (Lindsay and Craig, 2002).

Similar to the "Buyers and Sellers" activity, students are exposed to active experimentation by actually starting a business which is called "The Mini-enterprise." For this learning experience, they are asked to work in teams of four or five students enrolled in the course. Basic instructions are provided to students not to use class time, nor to run any illegal business, nor to cause any disturbance at the university. The mini-enterprise is run for about a week. As the teams compete for a prize, their goal is to get the higher net profits. It is important to mention that the revenues from running the mini-enterprise are granted to non-profit organizations (NPO). In so doing, students are allowed to make their own selection of the NPO to which they want to donate their revenues. In preparation for starting and running the

mini-enterprise, students are asked to present a written report one week in advance. In this report, they have to indicate the product or service to be offered and their estimations regarding the expected profits. Students are permitted to use whatever resource they can get from any source. However, whether they have to pay for any material used to manufacture the product or to offer the service, this will become part of their operating costs.

The third main activity is the term project in which students have to develop a preliminary business plan. Working on this project is useful for students as they are confronted with the difficulty of conducting market research with limited resources, which is usually the case of entrepreneurs (Hisrich and Peters, 2002; Sarasvathy, 2001). Moreover, it provides an opportunity for peer consulting as each group is allowed to give feedback and ideas to others while developing their projects (Tracey and Phillips, 2007). This is possible because students are assigned to present the progress of their work in the class session that follows the one where the underlying concepts were discussed. While developing a preliminary business plan can become to some extent a mechanical process, it exposes students to the challenges, difficulties and uncertainty involved in founding and building a venture.

In summary, through the brief description of the instructional approach suggested in the dissertation, we wanted to emphasis the relevance of the constructivist perspective for entrepreneurship education. The constructivist approach fits into current trends of entrepreneurship education in the sense that it requires a strong experiential component (Tracey and Phillips, 2007). This, in turn, encourages educators to create learning experiences to enable students to be prepared for the demanding and changing world of today's knowledge society.