TEACHING ENTREPRENEURSHIP TO NON-BUSINESS STUDENTS: INSIGHTS FROM TWO DUTCH UNIVERSITIES

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1. INTRODUCTION

Together with a growing appreciation of the relevance of entrepreneurship for society, interest in teaching entrepreneurship has risen significantly. Although some still believe that 'entrepreneurship can't be taught', a wide variety of experiences and studies prove differently. However, there still is a lot of confusion about what it actually entails: teaching entrepreneurship.

Today, entrepreneurship is widely taught at various stages and levels of education (see for some Dutch examples www.lerenondernemen.nl). Although we appreciate the potential value of entrepreneurship education at all levels, in this chapter we focus on entrepreneurship programs at academic institutes. Teaching entrepreneurship at the academic level is particularly relevant for several reasons. First, ventures founded by highly educated entrepreneurs tend to be more innovative, experience higher growth levels and survival rates, and are more often involved in international activities (The European Observatory, 1995; Ching & Ellis, 2004). Ergo, stimulating and teaching entrepreneurship among the higher educated has positive consequences for society in general. Second, teaching entrepreneurship at an academic level stimulates entrepreneurship research and raises our

knowledge level about entrepreneurship both as a research object and as a career domain. This in turn, leads to improved policy-making and better entrepreneurship curricula at all levels of education.

We argue that entrepreneurship is and also should be taught following two different approaches: (1) entrepreneurship as a profession, and (2) entrepreneurship as a field of science. Depending on variables such as type of student and educational level, these two approaches should be represented in specific entrepreneurship courses and programs. Building on this dichotomy we may distinguish between several forms of entrepreneurship education in academic institutes[1]:

(a) Majors and PhD's in entrepreneurship, where the focus is on entrepreneurship as a field of science (theory and research) with some attention for entrepreneurship as a profession;

(b) Minors in entrepreneurship directed at business students at the bachelor or masters level, where the focus is on entrepreneurship as a profession with some attention for entrepreneurship as a field of science;

(c) Minors and electives in entrepreneurship targeted at non-business students at the bachelor's, master's and Ph.D. level, again with a focus on entrepreneurship as a profession and some attention for the field of scientific research.

In this chapter, we limit the discussion to this latter form, i.e. teaching entrepreneurship minors and electives to non-business bachelor and master students at academic institutes, a subject which is still scarcely researched (Hynes, 1996). Recently, Standish-Kuon and Rice (2002) put forward that introducing engineering and science students to entrepreneurship is still poorly understood, while even less is known about teaching entrepreneurship in non-technical disciplines such as nursing, law and educational sciences.

We examine how entrepreneurship programs can be geared towards stimulating non-business students, in various disciplines, to consider an entrepreneurial career through startup or intrapreneurial activities. We will scrutinize what essential ingredients should be incorporated in a program catered towards non-business students. To that end, we first briefly describe the history and current state of entrepreneurship education. Next, we present a theoretical model developed by Van Der Veen and Wakkee (2004) that depicts entrepreneurship as a process aimed at the pursuit of opportunities. This model allows for a systematic analysis of the entrepreneurial process aimed at the identification of elements to be included in entrepreneurship courses for non-business students. The analysis leads to a framework that can be used as a tool to construct or evaluate entrepreneurship courses or programs.

To illustrate our arguments, we discuss and evaluate the way entrepreneurship has been taught to non-business students at two Dutch academic institutes; one technical university and one classical university. We will end this chapter by summarizing our main points and the lessons that can be learned from the experiences in the Netherlands. We will also point out some areas in which further research is needed.

[1] Higher Education Institutes (HEI) fall in two categories: academic universities (universities) and professional universities (also called colleges or higher vocational training institutes, or in Dutch 'HBO' institutes)

2 ENTREPRENEURSHIP EDUCATION: WHAT WE DO FOR NON-BUSINESS STUDENTS

Since the first entrepreneurship class — that was supposedly held in the U.S. in 1947 —, the academic discipline of entrepreneurship has grown consistently. This is apparent from the number of courses, supplementary infrastructure and publications on the topic, as well as from the increase in endowed positions and dedicated centers (Katz, 1991; Gorman, Hanlon & King, 1997; Kuratko, 2003). Until the early 1990's, entrepreneurship education largely took place in the U.S., while Europe was lagging behind (The European Observatory, 1995). Yet, in the past decade in Europe the number of entrepreneurship courses and other entrepreneurship-related activities has sky rocketed, and is expected to grow further the coming years (Cockx, Vocht, Heylen & Van Bockstaele, 2000; EFMD, 2004). Watkins and Stone (1999), for instance, report that in 1997, 45% of all institutes in the UK offered a complete entrepreneurship program, while 68% of the universities offered at least one course in entrepreneurship. Unfortunately, similar Dutch data are not available. Yet, we know that all thirteen Dutch academic universities offer at least one entrepreneurship class, three of which offer one or more complete entrepreneurship programs, two of which will feature as case studies in this chapter. At a recent national meeting on entrepreneurship education (Dutch Flemish Entrepreneurship Academy (NVOA), April 7th 2005, Utrecht), eight of these thirteen institutes presented their activities, which at least indicate that entrepreneurship education receives ample attention in a majority of the Dutch universities.

The attention for, and the rising number of entrepreneurship programs is not surprising considering the attributed role of entrepreneurship in economic growth (Ministry of Economic Affairs, 2002; Carree & Thurik, 2003; Kuratko, 2003; UNIDO, 2005), the creation of jobs (Hynes, 1996) and the strong connection between entrepreneurship and innovation (Jack & Andersson, 1999; Ching & Ellis, 2004). Scholars and practitioners have also pointed towards the increased need for entrepreneurial employees to enable intrapreneurship in established firms (Kuratko, Montagno & Hornsby 1990; Hornsby, Naffziger, Kuratko & Montagno, 1993; Hornsby, Kuratko & Montagno, 1999; Hayton, 2004). In addition to this scientific evidence, the last decade has shown a growing appreciation of entrepreneurship by the general public and government; in the Netherlands this has been a very striking development (Bosma, Stigter & Wennekes, 2002).

When looking at the current state of the field, it seems that the majority of entrepreneurship programs are being offered at faculties of business administration and economics. As a result most of these programs are targeted at business students and are not open to non-business students (Levie, 1999; NVOA, 2005). A survey conducted several years ago in the UK, showed that only 25% of all students taking entrepreneurship courses were non-business students, even though non-business students comprise almost 90% of the student population (Levie, 1999). Nevertheless, there is strong evidence that more and more programs are now being set up to educate non-business students in the field of entrepreneurship (Cockx et al., 2000; Streeter, Jaquette & Hovis, 2002; Standish-Kuon & Rice, 2002; Kuratko, 2003). For instance, in a European study of Cockx et al. (2000), about two-thirds of the higher education institutes offered entrepreneurship courses to business students, while a third to half of the institutes offered these courses to non-business students. Moreover, entrepreneurship courses

were found to be compulsory for non-business students in six to ten percent of the institutes. Even considering the fact that the sample was strongly biased towards institutes known for their involvement in entrepreneurial education, these numbers are quite high.

This expansion towards non-business students seems to make good sense. For several reasons, non-business students offer a potentially very interesting target group for entrepreneurship programs. First, non-business students account for the majority of the student-population (Levie, 1999), and as such they are a vast pool of potential entrepreneurs to-be. Second, non-business students have several entrepreneurship-enhancing characteristics that business students do not have. Most notably they possess domain specific knowledge that is considered important for the recognition of business opportunities (e.g. Shane, 2000). We will elaborate on the importance of domain specific knowledge in section 3.2. A third factor enhancing the relevance of entrepreneurship education for non-business students is their lack of awareness of the potential for business start-up as a career choice (Hynes, 1996; Birch & Clements, 2004). Awareness is a variable that can be influenced relatively easily through education. Indeed, when being introduced to the field (possibly for a first time) non-business students' intention to start a venture might be affected more strongly than that of business students because they have not considered an entrepreneurial career before (Krueger, Reilly & Carsrud, 2000). Entrepreneurship educationalso serves to motivate potential entrepreneurs and helps to ensure a critical mass of inflow of ideas and entrepreneurs into the community (Otto, 1999). A study in Sweden found that the number of (actual) entrepreneurs from a university with a three-year undergraduate programme for "Innovation Engineers" was twice that of other technical universities without such a programme (Andren & Uudelepp, 1996). Finally, non-business students, and especially those with an engineering background, are likely to end up at positions in innovation and new product development. As Charney and Libecap (2003) demonstrate, teaching these individuals how to behave entrepreneurial is critical to the innovativeness and growth potential of established organizations.

In the Netherlands the growing attention for teaching entrepreneurship to non-business students seems to be partially caused by the abundance of government sponsored support and incubation programs such as Technopartner (www.technopartner.nl). These programs are typically directed at professionals or researchers with a non-business background who are interested in starting new ventures in specialized markets that require domain specific knowledge. Most of these initiatives have sought to establish linkages and relationships with specialists at the universities. This in turn has added to the increased attention for the need to provide entrepreneurship education to non-business students.

We may conclude that a rising number of higher education institutes offer entrepreneurship programs or courses to non-business students, and they have good reasons to do so. Yet, it is still largely unknown what the best approach is. In the next section we will propose a theory-based model that could help educators to develop and evaluate such programs.

3. TEACHING ENTREPRENEURSHIP

When thinking about entrepreneurship programs, our first interest goes to the actual content of the teaching program; what topics are taught and what teaching methods are being used? In addition to this 'development of intellectual content', entrepreneurship departments also put effort in related activities, such as gaining institutional acceptance, engaging students and alumni, building relationships with the business community, and showcasing their successes (Standish-Kuon & Rice, 2002). Although interesting, these other activities are beyond the scope of this chapter.

The field of entrepreneurship is studied and taught by a very hetereogeneous group of scholars who unfortunately still lack a common paradigm or integrative framework (cf. Shane and Venkataraman 2000; Morris, Kuratko & Schindehutte, 2001). Since the content of an entrepreneurship course will be largely determined by the teacher's perception of what entrepreneurship really means, considerable variation in content exists among entrepreneurship courses (Sexton & Bowman, 1984; Henry, Hill & Leitch, 2003). Three main types of entrepreneurship courses may be distinguished. The first type of entrepreneurship courses deals with the start-up of new business (e.g. Gartner, 1985). Such courses will typically use standard textbooks such as Bygrave (1994), Stevenson, Roberts, Grousbeck and Bhidé (1999), Dollinger (2003), Kuratko and Hodgetts (2004), and Baron and Shane (2005). These books define entrepreneurship as a process, but narrow it down to the sources and discovering of ideas and the process of opportunity evaluation, writing a business plan, accessing resources, start-up, and managing growth. To date, this type of courses is predominant (Gnyawali & Fogel, 1994; Cockx et al., 2000; NVAO, 2005). Yet, in their review of entrepreneurship research, Van Der Veen and Wakkee (2004) show that this approach is too limited and perhaps even outdated. Most contemporary theoretical and empirical studies in entrepreneurship take a broader view on entrepreneurship and focus on the pursuit of opportunities rather than on new venture creation as such, and therefore include for example intrapreneurship. The second type of courses do focus on entrepreneurship as a process of pursuing opportunities that may take place in different contexts, only one of which is the business start-up (Hornsby, Naffziger, Kuratko & Montago, 1993; Hornsby, Kuratko & Montagno, 1999; Brush et al., 2003). To our knowledge, none of the widely known textbooks choose for this approach. A third category consists of 'entrepreneurship' courses focusing on small business management Whereas the other two approaches are more concerned with the early stages of the entrepreneurial process, this third approach is more related to the managing the existing firm and managing growth. A good example of a book used in this type of course is Scarborough and Zimmerer's 2004 textbook. From the discussions amongst Dutch and Flemish entrepreneurship scholars at the recent meeting of the NVAO (2005) it seems that at least in the Netherlands this broader view on entrepreneurship has not yet filtered through to the bulk of entrepreneurship education.

The few existing entrepreneurship programs that are organized around the pursuit of opportunities are mainly at the PhD level. Several PhD programs in entrepreneurship (that are largely targeted at business students) have built their curricula on the pursuit of opportunities approach. Examples are the Entrepreneurship Ph.D. Program offered at the Jönköping International Business School in Sweden (www.jibs.se) and the program described by Brush et al. (2003). Further examples can be found at http://eweb.slu.edu/phdlist.htm. Also, a number of courses directed at Ph.D. students in

non-business disciplines reflect the focus on opportunities. An example would be the course Science to Market as offered to Biomedical Ph.D. students at the Dutch University of Groningen (http://www.rug.nl/guide/education/generalcourses/courses/sciencemarket). The focus on the pursuit of opportunities at the Ph.D. level is not surprising. It is to be expected that PhD programs are more closely linked to recent developments in the literature then masters and bachelors programs are (cf. Brush et al., 2003). Moreover, PhD students in engineering and science-related domains will often build on opportunities that they have discovered during their doctoral research. As a result, it is only logical to build on those in the entrepreneurship program.

In addition to being more strongly based in recent literature than the restricted start-up view on entrepreneurship (e.g. EFMD, 2004), the opportunity-based view has some other important advantages. These advantages are mainly caused by the fact that the focus is on the **process of entrepreneurship** instead of on the **entrepreneur as a person**. As a result, the pursuit of opportunities approach broadens the domain beyond the formation of new businesses, and allows for the inclusion of entrepreneurial behavior in various settings such as existing commercial companies, universities, and (non-) governmental organizations. Second, by focusing on the process rather than the person, entrepreneurship is no longer seen as something a person has to be born with, but rather as something teachable and thus attainable for a large group of interested individuals (Bygrave, 1994; EFMD, 2004). This perspective on entrepreneurship (1) as a process and (2) broader then just start-ups, will be adopted throughout the remainder of this chapter. However, our main argument will also be usefull for programs and courses that choose to focus on start-ups only, since the pursuit of opportunities will still be the central process. Entrepreneurship as a pursuit of opportunities process is further explained in the next section.

3.1 The entrepreneurial process

As discussed above, current entrepreneurship research and textbooks (largely agree on defining entrepreneurship as a process aimed at the pursuit of opportunities. In their seminal articles, Shane and Venkataraman (2000, 2001) write about the process of discovering, evaluating and exploiting opportunities. Based on an extensive literature review, Van Der Veen and Wakkee (2004) propose somewhat different stages: (1) opportunity recognition (including both discovery and evaluation, and including many feedback loops, see for example De Koning, 1999), (2) preparation for exploitation and (3) opportunity exploitation, which ultimately leads to value creation (see Figure 1).

Van Der Veen and Wakkee use the label opportunity recognition rather than discovery because this term is dominantly used in the literature (Singh 2000). During the opportunity recognition process, the entrepreneur develops an initial idea into a viable business opportunity by mentally matching attainable tangible and intangible resources such as production facilities, the required knowledge and human resources, with perceived market needs. During the preparation stage, the business opportunity is translated in a concrete business concept that should lead to future exchange with the market. The business concept incorporates all ingredients that are necessary to enable this exchange. One of the most important steps in this process is the development of a resource base (see for example Brush, Greene, Hart & Haller, 2001; Dollinger, 2003). Also, the creation of a (new) organization (Gartner,

1985; Bruyat & Julien, 2001), the development of a network (e.g. Greve, 1995), the development of products, and the development of a business plan have to take place at this stage. When the preparation process has lead to the creation of marketable products (goods or services), exchange processes between the firm and its customers begin to take place. At any point during the preparation process, the entrepreneur may realize that an appropriate resource base to exploit the opportunity is not viable. Likewise, the demand for the product or service may turn out to be insufficient for profitable exploitation. In these cases, the business concept may be revised or even abandoned (Herron & Sapienza, 1992).

Throughout the actual opportunity exploitation process the exchange with the market will rise to a higher level. The entrepreneur continues to update the opportunity by adding new or improved goods and services to the market and / or by improving its internal operations. This leads to the creation of value in terms of financial gain, innovation, more choice for customers, increased knowledge, etcetera (Autio, Sapienza & Almedia, 2000). The creation of value can be regarded as the outcome of the entrepreneurial process (Zahra & Dess, 2001). During the value-creation process the venture becomes more and more established and day-to-day management activities become increasingly important.

The two large arrows in Figure 1indicate that, although the process appears to be linear and sequential, in fact it is dynamic and iterative (Bygrave & Hofer, 1991; Ropo & Hunt, 1995). It is dynamic in the sense that new ventures evolve over time. As the process unfolds, changing circumstances may require actions to alter or reconsider certain decisions. It is holistic because the course of their evolution is influenced by and sensitive to a system of external variables including the number of competitors, the needs of future customers et cetera that interact to influence outcomes (Bygrave & Hofer, 1991).

-------Insert Figure 1 here ----------

To complete the picture, the pursuit-of-opportunities model includes two additional determinants of the entrepreneurial process: the entrepreneur and his or her network. The entrepreneurial process is opportunity-based, yet the entrepreneur drives the process: initiating and directing it from the original idea to exploitation. One of the most significant differences between this model and the process presented by Shane and Venkataraman (2000) concerns the addition of the network as a main influencing factor throughout the process. By including this network variable the model reflects the notion that entrepreneurship does not take place in isolation but is embedded in a social context. In fact, through interactions with the network the pursuit of opportunities is channeled, directed, facilitated and constrained (Aldrich & Zimmer, 1986; Elfring & Hulsink, 2003), and therefore including the network in the model is essential. Throughout the process at different stages, different parts of the network are activated to accommodate different needs (Greve, 1995; Elfring & Hulsink, 2003; Van Der Veen & Wakkee, 2004).

In order to successfully complete each of the three stages, an entrepreneur-to-be needs to have a certain level of entrepreneurial awareness and possess entrepreneurial attitudes, skills and knowledge.

Awareness of entrepreneurship as a career option is a prerequisite for entrepreneurial behavior (Bosma, Stigter & Wennekers, 2002). As will be discussed in more detail in the following sections, awareness also refers to awareness or 'alertness' to opportunities (e.g. Kirzner, 1973) and awareness of relevant network partners (Wakkee & Van Der Veen, 2004). The development of positive attitudes, knowledge and skills are the main building blocks of professional education (Gorman et al., 1997; Bechard & Toulouse, 1998; Jones-Evans, Williams & Deacon, 2000; Wallin, 2003). In the case of entrepreneurship education[2], attitudes are important as they drive the entrepreneurial process and have proven to be a major predictor of entrepreneurial intentions (Van Gelderen, Brand, Van Praag, Ombach & Bodewes, 2003). Knowledge and skills to use knowledge are needed to recognize and exploit the opportunity successfully, by setting up and managing the relevant activities (Bosma et al., 2002). The next paragraphs will discuss the three stages of the pursuit-of-opportunities model in relation to stimulating awareness and teaching relevant entrepreneurial attitudes, knowledge and skills to non-business students. The main points will later be integrated in a framework for evaluating entrepreneurship programs for non-business students.

3.2 Teaching opportunity recognition to non-business students

Although opportunity recognition is only the first step in the entrepreneurial process, we expect the specific needs of non-business students to be most divergent from the needs of business students in this first and crucial stage. We have two arguments to support this.

First, non-business students possess domain specific knowledge from their chosen field of education, which directs the type of opportunities they will recognize. While generally all entrepreneurs tap into their personal and everyday-life to come up with new ideas, non-business students have the advantage of a specific field of knowledge (related to their education) that may provide innovative ideas for new businesses. For example, engineers (technical non-business students) deal with technological developments and innovation on a daily basis (Drucker, 1985; Fayolle, 1999), giving them a clear advantage over other students. Likewise, non-technical students possess field specific professional expertise that will more or less automatically determine the domain in which they recognize opportunities, e.g. legal advise for law students or specific translation services for language students. Business students in turn may not be able to recognize opportunities directly from their education; i.e. they have no 'logical product or service domain'.

Second, non-business students have no or limited prior knowledge of managerial and business related topics, and of the entrepreneurial process. As a result they might be less or differently aware of their own entrepreneurial possibilities. Also, the choice for a particular study is typically influenced by different personal interests, character traits, cognitive elements, and skills. As a result non-business students are expected to enter the opportunity recognition process and thus an entrepreneurial career in a specific way (Paffen, 2004).

[2] Clearly, when teaching entrepreneurship as a field of research, development of knowledge of entrepreneurship and scientific methodologies for studying entrepreneurial phenomena should be the main focus of the program. Although students of entrepreneurship as a scientific domain should be aware of the importance and roles of certain skills, attitudes and awareness, these students to not necessarily have to develop these.

From the literature we know that the 'search' for a new venture idea can be motivated in roughly two ways (Koller, 1988; Bhave, 1994). First, the wish to start a new (internal) venture may precede the discovery of an idea. As Herron and Sapienza (1992) explain, the motivation to search for opportunities may result from an intolerable level of dissatisfaction arising from for example job loss or a lack of money, or in the case of corporate entrepreneurship an increase in competition. In other words, the entrepreneur actively finds a problem to solve and the new business activities are the answer. Second, the recognition of a gap in the market may precede the entrepreneur's wish to start new venture activities (Bhave, 1994). So, the entrepreneur identifies an opportunity and reacts by providing a solution to an existing need. By choosing a particular education, we can assume that non-business students are more interested in this particular field than in general business. This interest and the accompanying domain knowledge may provide a solid base for specific product/service opportunities. This in turn suggests that for these students, the desire to exploit the specific opportunity (i.e. a (technological) discovery of their own hand) might be a stronger motivation than the drive to start a new venture. Business students on the other hand may be more interested in founding a venture per se.

These arguments and the nature of the opportunity recognition process have several implications for teaching. First, in terms of awareness and understanding of the entrepreneurial process, we have to differentiate between compulsory courses offered to all non-business students in a particular program and courses offered as electives for non-business students. Compulsory courses will have to devote ample attention to creating awareness of entrepreneurship as a career alternative. In elective courses, self-selection will lead to a higher level of entrepreneurial awareness to start with. Both groups, however, need to be made aware that entrepreneurship refers to more than starting your own business, and includes recognizing opportunities in other contexts. Second, in relation to opportunity recognition, developing the right attitudes towards entrepreneurship should also be part of the curriculum. After all, discovering an initial idea is not sufficient. Entrepreneurs must be dedicated and motivated enough to continue the development of their idea into a full-fledged business opportunity, which may take considerable time and energy. Having a positive attitude towards entrepreneurship is therefore crucial. Such positive attitudes can be stimulated best by addressing the range of positive effects of entrepreneurship on the individual entrepreneur (such as personal development, potential wealth, freedom etc), the company (in case of intrapreneurship) and society (Lucas & Cooper, 2004).

When teaching opportunity recognition to non-business students, educators should realize they may – or even should – build on the domain specific knowledge that the students have acquired during other courses. However, as knowledge and experience alone are not enough for the recognition of opportunities, educators should also stimulate alertness (Kirzner, 1973) and intentions to discover opportunities. After all, if there is no intention, new pieces of information will be ignored and will not be used to discover opportunities (Bhave, 1994, Wiklund, 1998). Therefore, educators need to train students to link new information to their prior knowledge and experience-base in such a way that they will indeed learn to discover new opportunities. Although some authors (e.g. Casson, 1982) have argued that this ability is largely innate, we believe this skill can be developed up to a certain level. For instance, Lumpkin, Hills and Shrader (2001), Lucas and Cooper (2004) and Wakkee and Van Der Veen

(2004) suggest that like creativity, alertness can be enhanced by training (for instance through brainstorming or mind mapping in relation to business courses).

Further, in our view educators need to devote attention to the role of networking in recognizing opportunities. Networks are important for recognizing opportunities in three ways: First, they are the source of new ideas. De Koning (1999, 2000) demonstrates that weak ties provide information about new technologies and are thus a source of ideas. Weak ties often operate in other social circles than the entrepreneur and are more likely to possess information that is new and relevant to the entrepreneur (Granovetter, 1973) and therefore lead to new ideas or opportunities. Von Hippel (1988) and Singh (2000) both found that strong ties, e.g. to customers and suppliers, can also form an important source of ideas. Second they provide feedback and additional information during the development of ideas into opportunities (De Koning, 1999). Both strong and weak ties provide entrepreneurs with access to additional knowledge, feedback, moral and practical support (Birley 1985, Greve 1995). Von Hippel (1988) argues that effective innovation derives from active awareness of changing user needs and sometimes from direct user demands or solutions (Moss Kanter, 1988; Rothwell, 1992; Tidd, Bessant & Pavitt, 1997). Therefore using such network contacts smartly facilitates the development of the opportunity by giving directions in terms of products, applications and markets in the making. Third network contacts provide (moral) support and advice that helps the entrepreneur to continue the process when faced with setbacks and disappointments.

Although networks are equally important to business and non-business students, non-business students are probably less aware of the availability of for instance institutional network contacts such as the Chamber of Commerce and Incubator Centers and what these can do for entrepreneurs (to-be). Also, we expect that many non-business students do not know how they can 'use' domain specific actors in relation to opportunity recognition. For instance, one of their professors might be able to introduce them to potential lead users, or existing ventures in the market might be willing to provide information that enables them to develop an opportunity further. Therefore, entrepreneurship programs for non-business students should preferably include an introduction to the (institutionalized) support network and trainings to develop network skills.

To summarize the above, in order to facilitate non-business entrepreneurship students to successfully go through the first stage of the pursuit-of-opportunity model, the curriculum should address the following issues: (1) stimulating awareness of entrepreneurship as a career alternative either in new ventures or in established firms; (2) facilitating the development of positive attitudes towards entrepreneurship to increase the desire and commitment to act upon initial ideas and develop these into business opportunities that are exploited later; (3) facilitating the development of the knowledge and skills to use prior domain specific knowledge to raise entrepreneurial alertness; (4) developing the knowledge and skills for networking to enable opportunity recognition.

3.3 Teaching preparation for exploitation to non business students

At some point during or after the opportunity recognition process, entrepreneurs have to decide whether or not they will try to exploit this opportunity. When the answer is yes, the entrepreneur(s) will have to make commitments to the venture and start preparations for the actual exploitation. Wepositthat

also in this second stage the specific background of non-business students affects how entrepreneurship preparation should be taught.

First, as argued in the previous section, non-business students may not be interested in starting a new venture per se. Therefore it is worthwhile to teach non-business students alternative ways to organise the exploitation of their ideas.

Therefore, at this stage, non-business students should be made aware of alternative ways to organize the exploitation of their ideas. These alternative ways include team start-ups (e.g., Laukkanen, 2000; Shepard & Krueger, 2002), corporate venturing (Kuratko & Hodgetts, 2004), and the possibility of taking over existing companies (e.g. Bygrave, 1994). Particularly interesting is pointing out the benefits of an entrepreneurial team, for instance the combination of an 'opportunity-motivated' entrepreneur (i.e. non-business background) and a 'business ownership-motivated' entrepreneur (i.e. business background). Usually such entrepreneurs possess different knowledge and skills and different types of networks that can lead to synergetic combinations that allow for successful venturing. Taking over an existing business (if possible including some of the incumbent management) rather than founding a new venture might be particularly interesting for non-business students. Since they will often lack knowledge of and affinity with management per se, a take-over enables them to set up (domain-related) operations relatively quickly is discussed at length in Bygrave's Portable MBA in Entrepreneurship (Bygrave, 1994; Stevenson, 1999).

Research shows that in the Netherlands, in the next five years more than 100.000 'older' entrepreneurs (from a total of 640.000 firms with at least one employee) want to sell their existing ventures and retire (CBS www.statline.nl). This means that in the near future, take-over candidates are abundant and affordable (even for starting entrepreneurs who would still need some external funding). Therefore, we argue that entrepreneurship courses should discuss this option seriously.

To create awareness for the different contexts in which the exploitation can be organized, teachers could for example bring in entrepreneurs that exploit opportunities through start-ups, team start-ups, corporate venturing, and business take-over to act as role models and tell the students about the benefits and drawbacks of each of these contexts, both in terms of the social and motivational aspects (i.e. a team start might be less lonely) and of success rates (Vyakarnam, Jacobs & Handelberg, 1997).

Further, while in the opportunity recognition stage domain-specific knowledge is relevant, during the preparation stage, general business and management knowledge gains in importance. Business students will have prior knowledge in these areas through earlier courses when entering an entrepreneurship program, or alternatively they will follow such courses parallel to the entrepreneurship courses. Non-business students will have to obtain and develop such general management and business knowledge as part of their entrepreneurship program. Therefore, entrepreneurship education for non-business students should incorporate relevant fields at an introductory level, topics including general management, marketing, and finance.

Training of specific skills in relation to identifying and obtaining access to particular relevant resources that are located within or outside the organization should also be a part of the courses in this stage. In the context of team start-ups, corporate venturing or business take-over, team building skills

and skills that enable the non-business student to convince various stakeholders (supervisors, colleagues, banks etcetera) of the value of their opportunities should be part of the curriculum as well. To this end further training of communication and networking skills will be essential.

Networking helps entrepreneurs in developing the opportunities into marketable products and it may provide the entrepreneur with the required resources. De Koning, (1999) suggests that strong ties are particularly important in getting these resources, as strong ties are more motivated to help the entrepreneur than the weak ties and provide entrepreneurs with (access to) resources at a below market price as a result of a stronger relationship. Non-business students might know where to find contacts that help them develop the technical aspects of their products, as these are active in the same professional domain. However, they might be less knowledgeable about potential resource providers and people who help them with the marketing of their product. Also, non-business students might lack negotiating skills needed for gaining access to resources at a (be) low (market) price. Therefore, curricula should focus on how to develop and use a network to gain access to resources. In addition to creating an organization and building a resource-base, students should also learn to transform their perceived opportunity into a concrete offering. The offering consists of the products or service in combination with the way it is presented to the market (marketing mix). When dealing with non-business students the focus on the opportunity might lead to extensive R&D activities as the 'discoverer-entrepreneur' continues to improve their product rather than bringing it to the market. As a result, such an entrepreneur to-be may not be able to build the bridge to the market and move into exploitation. Therefore programs directed at technical students need to provide the knowledge and skills to evaluate the extent to which the offering is complete and good enough for the market. Co-development with customers may be a fruitful approach since it forces the entrepreneur to remain problem-oriented. Bringing entrepreneurs into the classroom that, for this reason, did not succeed in building the bridge to the market can be a helpful tool in addition to specific case-based assignments on this topic.

In addition to building an organization, creating a resource base and developing the eventual 'offering', at this stage of the entrepreneurial process it is also highly important to convince a wide range of stakeholders of the (potential future) value of the opportunity. A business plan can be an excellent tool for this. This business plan often seems to be positioned as the core topic or assignment of entrepreneurship courses or programs (Karlsson, 2005). This is not surprising considering that it is often the minimal requirement to obtain financing (Kuratko & Hodgetts, 2001). Students typically have to create just one single business plan. However, research (e.g. Mason & Stark, 2002) shows that in fact entrepreneurs should prepare different types of business plans for different audiences e.g. a plan targeted at investors should include sound financial planning, while a business plan directed at lead customers or R&D partners should highlight the functionalities and value of the products-in-the-making. Although it will be unlikely that entrepreneurs indeed create multiple business plans during startup, we argue that students should at least practice writing plans for specific audiences.

To summarize, we argue that as regards the opportunity preparation stage, entrepreneurship education for non-business students should focus on (1) creating awareness of and positive attitudes towards different contexts (solo-start-up, team start-up, corporate venturing, business take-over) in

which organizations can be created for exploiting opportunities; (2) developing the knowledge and skills to build an organization in different contexts including team work, negotiation skills, and networking skills; (3) developing fundamental knowledge and skills of management, marketing, organization and finance and; (4) how to write a business plan targeted at different audiences.

3.4 Teaching opportunity exploitation to non-business students

According to an EFER survey (2004) current entrepreneurship education focuses on business creation (and the development of the business plan) and little on managing and growing an enterprise. As a result, few entrepreneurship programs address the process of exploitation and value creation. Rather, and probably unjustly, these issues are considered part of regular management courses. However, early exploitation and managing growth might be particularly complex for non-business students and thus deserves attention. In this section we will examine what kind of awareness, attitudes, knowledge and skills need to be developed in relation to this exploitation stage. Important clues for what might be relevant can be found in examples from small business management courses that are offered at many business schools (in some cases these courses are offered under the label of entrepreneurship courses to business students e.g. using Scarborough and Zimmerer's, 2004 textbook). Small business management courses usually neglect the recognition of opportunities and the creation of organization but focus on exploitation. Supposing that non-business students are predominantly motivated by the opportunity and less by business ownership, entrepreneurship courses should make students aware of the possibility of hiring management. Newly appointed managers can be made responsible for running the venture on a day to day basis, while the founders can focus on their own specialty (i.e. develop the domain specific opportunity further).

In addition the curriculum should focus on making non-business students aware of their advantages in dealing with customers or potential users as compared to business students. Their domain specific knowledge enables them to better understand the actual needs of the customers. Consequently they can engage in joint product development, they will be better able to recognize when 'technical' or other developments in their field allow for or require updates or improvements of their current offerings and to use customers and suppliers as sources of ideas (Von Hippel, 1988). Making them aware of their potential competitive advantage will add to the non-business students' confidence and thus to the likelihood of entrepreneurial activity.

Recent studies suggest that in the Netherlands there are relatively few high growth companies in comparison to many other countries. Moreover, the growth rate of the high growth firms is lower than in other countries (Ehrhardt et al., 2004). It seems that this lack of growth is partially due to a lack of growth orientation and even a preference for staying small (Van Der Sijde, Van Karnebeek & Van Benthem, 2002). As shown by Wiklund (1998) growth is more strongly related to motivation than knowledge. Growth, in its turn has a strong relation to performance. Therefore, it is somewhat surprising to find that very few classes address the issue of firm growth. A desire to stay small does not have to be a problem when it is for the right reasons (less red tape and overhead, control, etcetera). However, when lack of growth is due to fear and lack of knowledge, this is regrettable and should be overcome. In our perspective, entrepreneurship courses should address the issue of growth and seek to

develop favorable attitudes towards growth. We expect that showing the positive effects of growth in combination with the previously addressed issue of hiring management might be one way of increasing both awareness of and positive attitudes towards growth.

In addition to awareness and having the right attitudes, knowledge and skills remain important during exploitation. Non-business students might have a disadvantage compared to business students in relation to relevant general management knowledge and skills for exploiting the opportunity because of lack of previous education or even lack of interest. Teaching opportunity exploitation to non-business students should therefore focus on managing (ongoing) operations as well as continued awareness of innovation and changes in the market that may create challenges or new opportunities for their venture.

In relation to growth, entrepreneurship courses will have to enhance development of specific knowledge and skills as well. This may include topics related to identifying, obtaining and managing financial investments, human resources, innovation and R&D (Ehrhardt, Van Gelderen, De Jong, Ten Klooster, & Kuipers, 2004). Further, theoretical knowledge and skills in relation to daily management should also be addressed. Useful could be literature study, lectures and practical assignments including traineeships. Finally, the courses should also address the issue of continued entrepreneurial behavior and remaining alert to new (related or unrelated) opportunities (Churchill & Muzyka, 1994). Topics such as change management and leadership belong in these courses as well. Again lectures provided by experienced entrepreneurs and assignments and course work may prove useful.

To summarize the above, in relation to teaching exploitation of opportunities a number of issues deserve specific attention: (1) stimulating awareness of the possibilities of hiring external management; (2) enhancing students' awareness of their own competitive advantage, based on their domain specific knowledge when it comes to dealing with customers; (3) enhancing awareness and a positive attitude towards growth; (4) developing knowledge and skills in relation to identifying and attracting additional resources to enable growth; (5) development of knowledge and skills in relation to the management of small ventures and (6) creating of awareness, knowledge and skills in relation to remaining entrepreneurial, alert to new opportunities, change management and leadership.

In the following section we will present two cases of entrepreneurship minors targeted at non-business students in the Netherlands. We will discuss to what extent these programs incorporate the issues discussed above.

4. LESSONS FROM EXPERIENCES IN THE NETHERLANDS

4.1 Entrepreneurial education in the Dutch context

In the previous section we presented our view on what entrepreneurship education for non-business students should entail. In the following sections we discuss two cases from the Universities of Twente and Groningen that illustrate the current situation in the Netherlands with respect to teaching entrepreneurship to non-business students at the bachelor's level.

As an introduction to these cases, this paragraph provides some general background on the status and level of entrepreneurship in the Netherlands. Table 1 shows some numbers, using the Total Early-stage Entrepreneurial Activity (TEA) index (the percentage of the population involved in setting

up a company or leading a company not older then 2.5 years). The TEA-index in the Netherlands is somewhat below EU-average; in 2004 7.9% of the Dutch population was involved in entrepreneurial activity, against 7.9% at EU-level. The U.S. had an index of just over 11%, and Peru of 40% (the highest in this study) The average age of people involved in TEA is rather high as compared to the EU and US (39, 37.5 and 37 respectively). Higher educated people in the Netherlands are about twice as often involved in entrepreneurship as lower educated people, i.e. TEA-index of 7.2 versus 3.6% (Hessels, Bosma & Wennekers, 2005; EIM). During the last decade the appreciation of entrepreneurs and entrepreneurship has risen in the Netherlands and is expected to rise further in the coming years (Bosma et al., 2002; EIM, 2004).

----------Insert Table 1 about here ----------

Interestingly, Dutch academic entrepreneurs are very critical about the contribution of their study to their current profession (Bosma et al. 2002). According to them, the educational system is too much focused on theoretical knowledge and transferring knowledge rather than on the development of positive attitudes and skills. This rather negative view might be due to the fact that entrepreneurship education in the Netherlands is fairly recent and that most institutes are still searching for the right balance between academic content and practical use. Although most universities offer courses and programs (NVOA, 2005), and a number of universities have appointed professors in related fields like SME management or have established endowed chairs (such as the Biopartner professors), by the end of 2004, there were still no full-professors in entrepreneurship in the Netherlands. Fortunately, the situation is changing rapidly with a growing number of researchers, teachers and Ph.D. students in the area of entrepreneurship. These scholars have taken many initiatives to improve the offer in entrepreneurship programs and courses. Two of these initiatives will be highlighted in the following paragraphs.

4.2 Introduction to two cases

The decision to select the cases from Twente and Groningen is based on two reasons. First, there is the practical reason of gaining access to the data; all authors were involved in one of these cases. Second, considerable variation exists between the cases. In Twente entrepreneurship education is mainly provided to non-business students in technological areas such as electrical engineering and computer science[3], whereas in Groningen most non-business students enrolling in the entrepreneurship program have a background in alpha and gamma sciences like the social sciences (including psychology, sociology), and arts ('letteren'). Further, the institutional environment of both universities is very different. The University of Twente positions itself as an entrepreneurial university and has an elaborate infrastructure to stimulate academic entrepreneurship. The University of Groningen, on the

[3] It should be noted that students from communication and education science have also enrolled in the minor program in Twente.

other hand, presents itself as a classical university and demonstrates little overt support for academic entrepreneurship.

4.3 An academic minor for engineering students

The University of Twente is a relatively young university in the eastern part of the Netherlands. It was founded in 1961 to counter the economic decline in the region after the demise of the textile industry. While being mainly a technical university, the University of Twente currently offers programs in both technical areas and non-technical sciences in six different faculties namely: Behavioral Sciences; Business, Public Administration and Technology; Electrical Engineering, Mathematics and Computer Science; Engineering Technology; and Science and Technology. In 2003 approximately 7000 students were enrolled in the University's bachelors, masters and Ph.D. programs, while almost 2700 employees were working at the university (www.utwente.nl).

Entrepreneurship has been an important element in the policy of the University of Twente since the beginning of the 1980's. This dedication resulted in the creation of the TOP program (Temporary Entrepreneurship Positions) for the support of new ventures created by (former) students and employees from the University (e.g. Groen et al., 2004; Van Tilburg, Van Der Sijde, Molero & Casado, 2004), the development of several courses including the course 'Becoming an entrepreneur' at the TSM Business School, and incorporation of the topic in a variety of courses. In 2000 this dedication resulted in the establishment of a Minor program in entrepreneurship that is offered by the research institute NIKOS (Dutch Institute for Knowledge Intensive Entrepreneurship) at the faculty of Business, Public Administration and Technology. This Minor was set up as an opportunity for non-business students to broaden their scope by getting well acquainted with the subject of entrepreneurship, which is very different from their graduation subject. The curriculum was organized around a three-category framework for describing different aspects of entrepreneurship education: education for, through and about enterprise (Gibb, 1989). Education *for* enterprise seeks to stimulate students to think about starting their own venture as a career option and prepares them for the start-up. Education *through* enterprise concerns developing entrepreneurial (and managerial) competencies in students, and prepare them for the demands of a career in business. Education *about* enterprise aims to inform students about the nature of small enterprise and/in its context and focuses on understanding entrepreneurship and commerce (Van Der Sijde & Ridder, *forthcoming*).

After only admitting students from a small number of schools in the first two years, in the academic year 2003/ 2004 students from 12 different schools/ faculties[4] participated in the program. At this moment, the majority of the students enrolled in the minor are engineering students, yet some students are studying behavioral science (e.g. education science and communication). Also, business-majors are recently being allowed to participate in the entrepreneurship minor as well. Although all students jointly participate in most courses, these business-students have to follow an alternative track that is geared towards their advanced theoretical background in relation to business and management.

[4] Including business information technology; public administration and public policy; civil engineering; chemical engineering; electrical engineering; computer science; Industrial engineering and management; Applied communication science; telematics; applied physics; educational science and technology; mechanical engineering

Theoretical perspective, and outline of the Minor in Entrepreneurship

In the first four editions of the Minor program, 76 students have completed the course (Van Der Sijde et al., 2004; Van Der Sijde & Ridder, *forthcoming*). The opportunity-based process view on entrepreneurship (Van Der Veen & Wakkee, 2004) as described above has been adopted widely by the teachers of the minor in entrepreneurship. The consequence of this adoption was that the original textbook by Scarborough and Zimmerer's Effective Small Business Management an entrepreneurial approach (2004) had to be replaced. In order to give the entrepreneurial process an even more prominent position in the curriculum, the main textbook became "*New Venture Creation: Entrepreneurship for the 21st Century*" by Timmons and Spinelli and (for the marketing course) "*The Business Idea; the early stages of Entrepreneurship*" by Søren Hougaard. It is yet to be evaluated if these books suffice and if they will continue be used in the coming years

For non-business students the different courses introduces the fundamentals of business management and continues to examine in further detail the theories, concepts, methods and schools of thought in this area. Although the minor does not include separate courses on recognizing opportunities or on entrepreneurial networking, these topics are incorporated implicitly and explicitly in each of the courses. In total the Minor has a workload of 560 hours. During the first stage of the program students are taught the basics of entrepreneurship in a series of 6 classes. After that the advanced level program *about* entrepreneurship is offered which includes the modules entrepreneurship basics, marketing, finance and business law. In these modules teachers, entrepreneurs and experts present the current schools of thought regarding their application in an entrepreneurship context. In the first four editions these courses were complemented with a course called 'theoretical aspects of entrepreneurship' (now called Entrepreneurship in SME's). In this course the emphasis is on 'about' (theory and cases) and 'through' (assignment) entrepreneurship' (Van Der Sijde & Ridder, *forthcoming*). The theoretical topics discussed in this course include innovation, entrepreneurial networking, and entrepreneurial growth. The topics were selected because they were considered as necessary and important for students who are going to work in a company setting; they were not dealt with in the other courses and; they provided references for the cases and assignments. The second part of this course is more practical in nature and is taught on the basis of real-life cases from entrepreneurs who present their own experiences with entrepreneurial careers, merger and acquisitions, market introduction of new products and corporate entrepreneurship.

The Minor ends with a practical training module that can either be 'Becoming an entrepreneur' or 'Managing an SME'. In the former of these, the ultimate goal is drawing up a realistic business plan. A panel of experts, for example entrepreneurs, accountants and consultants, evaluate the business plans. This approach has multiple functions (Groen, et al. 2003):

1. Via the business plan the student shows that the acquired knowledge on entrepreneurship can be put into practice.
2. The business plan is also the instrument to evaluate the student's knowledge on legal issues and financial management. The student has to explicitly address these topics in his/her

business in the plan. The teacher separately grades the legal and financial paragraph in the business plan.

3. Furthermore this course provides an opportunity for developing and practicing several skills needed by entrepreneurs, such as sales-, negotiation- and presentation skills.

In the latter course, students act as personal assistants / consultants for owner-managers of SME's, who are developing their business plan during this course. This provides a unique opportunity to put theory into practice. Writing a report reflecting on this experience is part of the assessment.

The content of each of these courses addresses the lack of knowledge and experience in the field of business and management and aims at enabling the students to incorporate their previous domain specific knowledge (based on their major-topic) into the assignments (Van Der Sijde et al., 2004). Most students did indeed generate their ideas for opportunities from their 'major' subjects as is shown from the overview provided in Table 2.

----------Insert Table 2 about here ----------

Evaluation of the Minor in Entrepreneurship

Based on the experiences from the Minor in Entrepreneurship so far, a number of observations can be made. To begin with, the Minor has grown each year in terms of the number of students enrolled. The first three editions, this growth was mainly driven by the number of faculties that allowed their students to enroll in the Minor program. However, the fourth and fifth year the program continued to grow without an increase in the number of 'participating' faculties. Feedback from students suggests this growth is largely caused by word-of-mouth promotion by enthusiastic minor-alumni. Further growth is expected for the coming years. The students and faculty members who have participated in the program have been very enthusiastic about the setup of the Minor as has become apparent from the evaluation forms the students have to complete at the end of the course. Further, we agree with the conclusions of Van Der Sijde and Ridder (*forthcoming*) who state that the minor is innovative and potentially successful because it combines the three approaches to entrepreneurship (*for, about, through*) into one. The course connects education (the actual courses), outreach (interaction with the real business community) and contributes to the research activities of the faculty teaching the Minor (see Nikos, 2005; Groen et al., 2005); this is according to Watkins and Stone (1999) an important prerequisite for a successful and sustainable program (see also Van Der Sijde, Kekale & Goddard, 2002).

4.4 Alpha and Gamma students meet Entrepreneurship at the University of Groningen

The University of Groningen (RuG) is a 'classical' university (founded in 1614) encompassing a broad array of faculties, i.e. Management and Organization, Economics, Theology, Arts, Medical Sciences, Behavioral and Social Sciences, Law, Spatial Sciences, Philosophy, and Mathematical and Natural Sciences. In 2003, the University enrolled just over 21.000 students and employed ca. 6000 staff (annual report RuG, 2003, www.rug.nl). As said, the RuG has separate and independent Faculties for Economics, and Management and Organization. Generally speaking, however, they both mainly offer what we would label 'Business programs'.

During the 1980s and 90s, both faculties started electives on small business and entrepreneurship. When a local business club sponsored the institution of a special chair in Small Business Management at the Faculty of Economics, a limited offer of non-compulsory courses was developed. These courses paid much attention to entrepreneurial skills; students could write a start-up plan, a business plan, and or start-up a 'real enterprise' within a nationwide project 'mini-enterprises' (cf. Bosma et al. 2002). In 1998, a first coherent Small Business & Entrepreneurship (SB&E) program was developed for graduate students of both faculties. This program was much more an academic program involving the transfer of advanced theoretical knowledge and applying it in various research settings. In the same period, staff research expanded, mainly in the areas of business start-ups and small business management.

In the first period, with only non-compulsory and skills-oriented courses, students from other non-business faculties such as Law incidentally joined these courses, which rendered no major problems. However, as the graduate program was developed and introduced, non-business students encountered difficulties when they were interested in the subject. First, course prerequisites hindered admittance to most courses, and second, the content of the courses became more abstract and research oriented which was not what these students were looking for. Around that time, the RuG introduced a specific type of undergraduate courses, aimed at students from 'foreign' faculties to acquaint students with the topics and scientific habitus of other academic disciplines. When a small subsidy came available for education development, staff responsible for the SB&E program decided to develop a specific course '*Innovative Entrepreneurship'* to serve interested non-business students. The approach followed was a so-called 'magnet' approach, i.e. a university wide entrepreneurship program offered by a central entrepreneurship group. A study by Streeter (2002) showed that over 50% of U.S. universities with a university wide entrepreneurship program follow this model. As will be discussed below, the course has only been taught once, since the faculty board decided to withdraw it after the first year.

Preparation, outline and evaluation of the course

As said, the new course was developed by SB&E staff. Since the extra funds to develop the course were limited, it was decided to make efficient use of elements of existing courses. In order to decide on the actual content and teaching methods, an exploratory, qualitative survey was held among staff, student councilors, and students of all faculties (although some staff denied cooperation, for example at the Medical Faculty[5]). Results indicated that students could be expected from mainly the following fields: Law, Medicine (dentists, GPs), Geography, ICT, and Arts (mainly languages). The main objectives of the course were:

- Raising awareness of and improving attitude towards entrepreneurship

[5] The Medical Faculty has a tradition of independence and acquired an exemption from the student obligation to follow an elective (among which Innovative Entrepreneurship) at a 'foreign' faculty. Moreover, this faculty prefers to develop projects in-house, e.g. it is involved in the PhD course 'Science to the Market' which was mentioned in section 3, in which no academic entrepreneurship staff is involved.

- Providing necessary theoretical foundation of entrepreneurship and management and organization
- Developing entrepreneurial skills

Innovative Entrepreneurship became a bachelor elective with a workload of 160 hours. The chosen outline of the course was as follows:

- Classes, consisting of both lectures and working groups
- Topic specific assignments (individual and small groups)
- Developing and writing a business plan (start-up phase)
- Presenting the business plan at the 'business challenge' to an outside board
- Written theoretical exam

Following the main program components distinguished earlier in this chapter (awareness, attitude, skills and knowledge) the course can be described as follows. Students from a varied non-business background were taught by a team of SB&E-staff complemented with guest lecturers from the business and institutional community. In this way students were confronted with an array of role models thus stimulating awareness and a positive attitude towards entrepreneurship in general. By showing statistical material about the number of entrepreneurs and the contribution of entrepreneurship to society and individual development, the attitude towards entrepreneurship was further developed. An important role in this was one of the assignments aimed at discovering and appreciating the students' individual entrepreneurial qualities. The remainder of the assignments was aimed at developing the entrepreneurial skills of the students. Focus was on communication skills (within the group, class, teachers and external board) and business plan development and writing skills. Last, but certainly not least, a thorough basis of knowledge about entrepreneurship as a theoretical concept, and its links with business and management theory was included in the course. To this end, the selected book was not a how-to-do-book (which would probably be preferred by a part of the students) but a general book with a sound mixture of theory and application. The teaching faculty opted for Kirby's book, '*Entrepreneurship*' (Kirby, 2003). This book gave a backbone to the course and made it possible to end the program with a serious written examination. Teaching staff used the theoretical lectures to present some examples of recent research in the field, to acquaint the students with the scientific habitus of the business departments.

Evaluation

We will briefly discuss the experiences of both students and staff with the *Innovative Entrepreneurship* course. The first year, the course attracted 14 students who were all included in a brief evaluation survey. The students were very enthusiastic about the course. Since they had no background whatsoever in the business field, they felt they were really introduced to a new, interesting, and potentially fruitful area. Being able to use the acquired knowledge in an assignment that required much effort and involved external experts was something most students had not experienced earlier in their studies. Two of the students actually started their own business within months after completing the

course. The staff involved was also mainly positive about the course; students were curious and prepared to put in the effort needed to complete the course successfully. However, they also had some points for improvement. First, the background of the students was not as expected. Half the students came from the social sciences (seven), complemented with students who studied Languages, Biology, and Geography. Had this be known, examples and guest lectures would have been better geared towards the actual audience. Furthermore, the limited budget available to develop the course hindered individual staff to put the desired effort in aligning their contributions. Finally, although students had been working on their business plans enthusiastically, the quality of the plans was mediocre. It was striking to the teaching team that none of the teams made use of its domain-specific knowledge (perhaps with one exception, a group of social sciences students who wanted to open a social club for the elderly). The remaining groups chose for safe ideas such as opening an art shop, or developing a website for finding a domestic aid. Although such general opportunities might of course lead to successful ventures, they are easily imitated and not very competitive. After this evaluation, staff had no clear ideas yet how to improve these shortcomings. Unfortunately, the need to do this even disappeared when the faculty board decided to discontinue the course due to the relatively small number of students (in its first year the course did not reach its break even point).

In the next section *Innovative Entrepreneurship* and the *Minor in Entrepreneurship* from Twente will be evaluated more systematically using the process model and guidelines developed in this chapter.

4.5 Lessons to be learned

On the basis of the pursuit-of-opportunity model we can draw a number of lessons with regard to the two entrepreneurship programs as described above. The lessons can be used to evaluate these and other courses on entrepreneurship as a profession.

Starting at the beginning of the process, the first lesson involves the initial idea and the recognition of opportunities. In Groningen, there has been no obligation for students to use domain specific ideas in their business plans. Although in Twente, students are not obliged to draw on their domain-specific background either, at least they are stimulated to use their domain specific knowledge in doing their assignments. Despite the fact that students in Twente still call for increased attention for idea generation, the outcomes have shown that most students come up with ideas and opportunities that are related to their Major-topic.

Regarding preparation for exploitation, both the programs in Groningen and Twente addressed the issue of building resource bases. However, when it comes to the creation of an organization, the focus clearly has been on starting a new venture (either alone or in teams). Based on our model, more attention should be directed at the possibilities of corporate entrepreneurship and taking over existing ventures as a vehicle for exploiting the opportunity. We consider this particularly relevant in the context of teaching entrepreneurship to non-business students because of their limited knowledge and experience in management.

With regards to exploitation, both programs offer basic business management knowledge and skills that are required for running a small venture. In Twente marketing, finance and business law receive much attention and seem to be considered important areas of knowledge and skills needed to run the new venture. Although these topics may indeed be important, we think that they do not belong to the heart of entrepreneurship and thus should not use up too much room in the entrepreneurship program.

Far less attention seems to be devoted to growth. We conclude that entrepreneurship courses should address the issue of growth more explicitly and should try to develop positive attitudes towards growth and provide the students with knowledge and skills that are needed to grow their venture through alternative pathways (co-operation with other ventures, attracting financial investments, hiring management, et cetera).

Finally, with respect to networking, the findings indicate that in Groningen there has been no pressure on the students to practice networking to the full. In Twente, networking is stimulated through encouraging the formation of teams for the preparation of the business plans in the course 'Becoming an Entrepreneur', and through introducing entrepreneurs as guest lecturers into the classroom who talk extensively about the importance of networking. We argue that by stimulating the formation of teams, a larger share of students might decide to indeed pursue an entrepreneurial career as it can compensate for weaknesses in particular areas and make enterprising a less-lonely profession. A focus on networks will enhance the student's confidence in seeking various kinds of support throughout the entrepreneurial process making them more likely to continue their venture (Elfring & Hulsink, 2003).

The main points that we have made at the end of paragraphs 3.2 through 3.4 are listed in the first column of Table 3. Together they form a framework that can be used to evaluate or develop entrepreneurship programs for non-business students. The framework is applied to the two cases, showing how the different elements (stages and influences) of the process model have been incorporated in the two programs. This overview demonstrates that the Groningen course strongly focuses on stage 1 and 2 of the entrepreneurial process, and puts relatively much emphasis on knowledge instead of skills. The minor program in Twente, that of course has more room in its curriculum, can be characterized by devoting attention to each of the three stages, but with a stronger focus on preparation and exploitation than on opportunity recognition. In Twente, the academic nature of the program is strictly protected, but knowledge and skills receive almost equal attention. Raising awareness and securing positive attitudes is done both in the entrepreneurship program and at the University level through putting entrepreneurship central in the University's mission.

----------Insert Table 3 about here ----------

In addition we can also learn several more general lessons from the illustrative cases. First, the small group of students proved to be beneficiary to the interaction and general quality of the classes in both programs. However, contemporary budgeting systems may prevent such courses as long as outside sponsoring is not available as was shown in the Groningen-case. We will come back to the issue of funding in section 5.1.

Second, most students from non-business faculties have no idea of the concept of entrepreneurship, its possibilities for them personally, and the scientific habitus in the business field. In Groningen, most students admitted to have enrolled in the course "out of curiosity". This implies that attaining goals like raising awareness and improving attitude are relatively easily met. However, to create a larger pool of students, it is important that there is sufficient attention for the topic of entrepreneurship throughout the university. In Twente, the initial awareness is likely to be higher as a result of the continuous attention for entrepreneurship in the University's mission and as a result of the abundance of entrepreneurial support programs such as TOP, the University Student Enterprise Initiative (USE), and presence of successful (former) student-entrepreneurs who act as role models

Further, students from non-business faculties have little to no business-related knowledge. Also, they have had little or no contact with outside experts. In order to successfully practice entrepreneurship skills and being able to understand entrepreneurship theory, basic management and strategy knowledge has to be included in the program. At the same time, students should be trained in seeking advice and assistance and in developing co-operations to overcome their lack of knowledge and skills in these areas. In Twente, new teaching cases and experiments involving a variety of regional business cases are expected to further improve and update both teaching methods and examination (Groen et al. 2003). In our perspective, entrepreneurship minors should keep their focus on topics that are at the heart of entrepreneurship: i.e. the pursuit of opportunities. Although understandable, we feel that (too) much attention for topics such as general management and marketing limits the available time for what it is all about: learning to recognise and exploit opportunities.

5. DISCUSSION AND CONCLUSION

5.1 Discussion

Entrepreneurship education for non-business students has recently gained increasing attention from educators and policy makers. Yet, so far little is known about how courses and programs should be developed in such a way that non-business students are stimulated to pursue a career in entrepreneurship and set up and grow successful companies.

We conclude that programs and courses directed at teaching entrepreneurship as a profession to non-business students can be divided into three groups. The first group defines entrepreneurship as starting up new businesses, while the second group has a broader view, i.e. entrepreneurship as the pursuit of opportunities. In this chapter, we have argued that the latter approach is to be preferred. To that end, we presented a model of the entrepreneurial process (as developed by Van Der Veen & Wakkee, 2004). According to this model, entrepreneurship begins with the development of an idea which needs to be developed into an opportunity for business (opportunity recognition), which in turn needs to be prepared for exploitation, which in the end leads to value creation. This process is driven by the entrepreneur but strongly affected by the network (Aldrich & Zimmer, 1986; Elfring & Hulsink, 2003). We argue that when such a process view is adopted, it becomes possible to develop or evaluate

programs and courses in such a way that all relevant subject areas are covered and that a program is catered towards the specific needs and capabilities of this specific target group.

By adopting the pursuit of opportunities as the central focus, entrepreneurship is no longer limited to business start-ups but expanded to different contexts, including intrapreneurship and entrepreneurship in the non-profit sector. This is important considering that many organizations are in need of entrepreneurial employees to remain innovative (Hornsby et al., 1993, Kuratko et al., 1990). Further, by focusing on the entire process, students will not only learn to found a business – which is a rather short-term view- but also how to manage, develop and grow their venture. This is especially important considering the limited managerial experience and knowledge of non-business students. Furthermore, growing organizations are generally more beneficial to society than simple start-ups. In the Netherlands data show that firm growth has lagged and should be improved (Ehrhardt et al., 2004).

Finally, by focusing on the opportunity rather than the start-up, students can learn to benefit from their prior knowledge (Shane, 2000). This domain specific knowledge is highly developed in non-business students through their Major-subject. This particular prior knowledge is likely to provide them with specific advantages in all three stages of the pursuit-of-opportunities process. Thus, in our opinion, the focus on opportunity will enable non-business students to profit from their competitive advantage.

To illustrate how this model can be used to evaluate existing courses in terms of appropriateness for different groups of students and for teaching entrepreneurship beyond new venture creation, and to what extent these ideas are presently incorporated in entrepreneurship education for non-business students in the Netherlands, we have presented two case-examples. These cases from the University of Twente and the University of Groningen were different in several respects. First, the background of the students is different. Whereas most students in Twente have a science and technology background, the students in Groningen are enrolled in alpha and gamma programs. Considering the importance of prior knowledge during the opportunity recognition process, this would suggest that the difference in student background should have implications for the programs in terms of for instance the type of guest lecturers that are invited and cases to be discussed in the classroom.

When we compare the programs and their outcomes, the most notable conclusion is that students from the University of Twente seem to be better able to use their prior domain specific knowledge than those in Groningen. Our explanation is that at Twente there is much more attention at the institutional level for academic entrepreneurship, both in education and in commercialization of research outcomes. As argued, it seems that the presence of highly successful support programs like USE and TOP have resulted in a ‘me-too’ and ‘can-do’ attitudes amongst a relatively large group of students. Although a critical mass of successful academic spin-offs and student entrepreneurship may be difficult to achieve, showcasing of successful entrepreneurial efforts from Groningen might be necessary to develop a similar entrepreneurial spirit there.

Another explanation might be that in Twente opportunity recognition and entrepreneurial networking take a more prominent position in the entrepreneurship education than in Groningen. These concepts are consequently dealt with in most of the courses of the Minor by means of articles and textbooks used and by bringing successful entrepreneurs into the classroom. Similar activities might be

undertaken in Groningen. For this to work well it is important to know the background of the students, in the Groningen case this background was not as expected. Probably this problem would have diminished if the course had not been withdrawn, and student enrollment would have had the time to stabilize.

With respect to the role of the entrepreneur it is clear that in both programs entrepreneurship is considered a skill or talent that can be developed (up to a certain level) rather than an innate characteristic. Yet, both programs seem to reach only parts of the student population, thus limiting the pool of potential future entrepreneurs. In Twente, male students and students from knowledge-intensive sciences were overrepresented; targeting softer sciences such as communication and educational sciences might lead to a greater influx of female students (Van Hoof, 2004). In Groningen one of the eight non-business faculties (i.e. social science) supplied half of the students for the entrepreneurship course.

Finally, we wonder to what extent the students in Groningen and Twente entered the programs with different intentions. It might well be that the large number of (student) entrepreneurs at the campus inspired the students in Twente to really consider entrepreneurship as a career alternative, while for the students in Groningen it might have been mere curiosity. Also the technical background of most students in Twente might have made it easier to come up with ideas for opportunities. It does not seem surprising that it is easier to come up with a 'product' when you have knowledge in the field of computer science than when you are a psychologist. After all there is much more attention for entrepreneurial activities in the former industry, than for the latter. The abundant examples in the media can create a 'me-too' effect and also provide a starting point in the search for good ideas. Also, the fact that psychologists, lawyers and the like are typically portrayed as professionals, rather than as entrepreneurs will most likely explain why many of them do not perceive of themselves as (potential) entrepreneurs.

5.2 Conclusion and needs for further research

From previous research, policy demands and the case-examples we conclude that it makes good sense to develop entrepreneurship-education programs that are directed specifically at non-business students. The reason for this is that these groups have very different knowledge and experiences and possibly different attitudes towards entrepreneurship, which provides them with different strengths and weaknesses, and thus with different opportunities for entrepreneurship. As argued previously these differences will be most apparent in the first stage of the entrepreneurial process: opportunity recognition.

We should also recognize that due to these differences non-business students and business students both have several distinct advantages and disadvantages when it comes to recognizing, preparing and exploiting opportunities. This would suggest that providing an environment that leads to cooperation between business and non-business students could lead to more and more successful entrepreneurial activities. Even when some courses are developed specifically for non-business students and others developed specifically for business students, joint classroom activities and exercises may not only make both groups of students aware of their own strength and weaknesses, it

might also lead to more cooperation between the two groups. Previous research shows that companies founded by teams are more likely to be successful (Carter, Gartner & Reynolds, 1996; Bamford, Dean & McDougall, 2000), especially when these teams are heterogeneous in nature.

Second, we conclude that the model of Van Der Veen and Wakkee (2004) is very well applicable to compare and evaluate entrepreneurship programs in relation to their original goal. By looking at the model educators can determine to what extent their program covers the different stages of the entrepreneurial process and thus provides the students with sufficient insights to be able to not just become an owner-manager but to pursue opportunities from their initial discovery onwards. Clearly, other entrepreneurship models might also be useful; yet, this model is well grounded in the contemporary literature of entrepreneurship research. Further, the model is relatively simple to use and provides a complete overview of the process. As such it can provide the starting point for developing curricula by indicating which subjects and topics should be addressed and how the courses should be adapted to the target group. The fact that exploiting an opportunity (i.e. commercializing a 'discovery') is not the same as starting or running a venture should also be incorporated in the design of the courses. This can be achieved by addressing alternative means of exploitation such as taking over existing ventures or hiring managers. By presenting entrepreneurship as a process, teachers can show that it is not limited to a specific context (new businesses) but that entrepreneurship applies to a variety of organizational contexts. Further, this approach assumes that entrepreneurship is teachable rather than innate.

Although the general content of the courses may be the same for students with different non-business backgrounds, by stimulating their students to apply their domain specific knowledge, teachers may enhance the effectiveness of the program. The use of examples and role models in the form of entrepreneurs from a variety of backgrounds is one way to do this; using literature pointing to the importance of prior knowledge (e.g. Shane, 2000), would be another.

Experience from existing entrepreneurship programs in the Netherlands has shown that teaching entrepreneurship to non-business students means setting up special curricula. Non-business students typically need to be made familiar with the field of management in addition to the specific concepts and theories of entrepreneurship, which of course is not necessary for business students. Similar, non-business students will typically have particular experiences and skills on which the entrepreneurship courses have to build. To enhance this, it seems that creating connections between the entrepreneurship courses and the courses taught in the regular program of the students might add to the value of the curriculum. For instance not only could the teachers in the entrepreneurship program stimulate students to use their domain specific knowledge in recognizing opportunities, teachers in the regular (major) program could also stimulate the students in thinking about the entrepreneurial opportunities and implications they can envisage from the knowledge and skills developed in their courses. Setting up some form of coordination between the different programs might therefore be necessary. Yet, when involving too many disciplines such coordination might be difficult, especially if the entrepreneurship course is taught through a maze model (Streeter et al. 2002).

The choice between a maze and a radiant model concerns the issue of where entrepreneurship courses should find their home within academic universities (Streeter et al., 2002). The most common

situation in the U.S. (and most likely also in Europe) is the maze model. In this model, which is also applied in Twente and Groningen, entrepreneurship courses are developed and taught by one (central) department or faculty, usually a business school or entrepreneurship center. These courses are then offered to students from al the university's faculties. Alternatively, entrepreneurship courses might also be offered by individual faculties or departments to the students at these particular faculties (radiant model). This model was used in the example of the Science to the Market program as is offered at the Biomedical Faculty in Groningen. The maze and radiant models have their own merits and drawbacks and a choice for either one of these models is likely to be influenced by structural factors like how curricula are financed. The example from Groningen showed that despite enthusiasm from the participating students, the Innovative Entrepreneurship program had to be abandoned, as it did not yield sufficient income. Considering the fact that in the Netherlands external sponsoring is not really an option, program directors, teachers and scholars need to come up with alternative means and methods to be able to continue the development of entrepreneurship courses.

5.2 Limitations

Non-business students are a large and significant pool of potential entrepreneurs. Nevertheless so far, this group of students has largely been ignored or neglected in studies and debates on entrepreneurship education. Their specific knowledge backgrounds and motivations call for developing programs that are different from the programs for business students. The major contribution of this chapter has been to provide a theory-based tool to develop and compare entrepreneurship programs directed at non-business students.

However, as any study our investigation has a number of limitations. First, in the introduction we mentioned that we would focus on subjects and methods that should be included in entrepreneurship programs. We have addressed the subjects that we consider relevant in the form of topics and areas of knowledge. The methods were discussed on the basis of examples of teaching methods like bringing in guest lecturers to act as role models, the use of outside experts, traineeships and/or cases. Further research into the issue of teaching entrepreneurship to non-business students might also address the more general teaching philosophies behind the different courses and assignments.

In this paper we have evaluated and discussed two cases of entrepreneurship programs directed at non-business students on the basis of the process-model. These cases should be considered only as illustrations and examples of the present situation in the Netherlands and the application of our model. Findings cannot simply be generalized to other programs in the Netherlands or abroad. To enhance the understanding of how entrepreneurship should be taught to non-business students, further research would be necessary. Preferably this research should include a larger sample of courses from different countries and examine the programs at a more detailed level. Only then can we consider evaluation of specific courses (e.g. Becoming an Entrepreneur) rather than programs, and also of the teaching methods that are being used.

This chapter is not only limited by the extent of the empirical analysis but also in scope. We have decided to focus specifically on entrepreneurship courses for non-business students at academic

universities. Clearly this is not the only level of education where entrepreneurship is being taught. Specifically, in Europe a large number of professional universities offer entrepreneurship courses and programs. A comparison between the academic and professional courses and programs will most likely lead to further insight in how to design the most 'optimal' programs.

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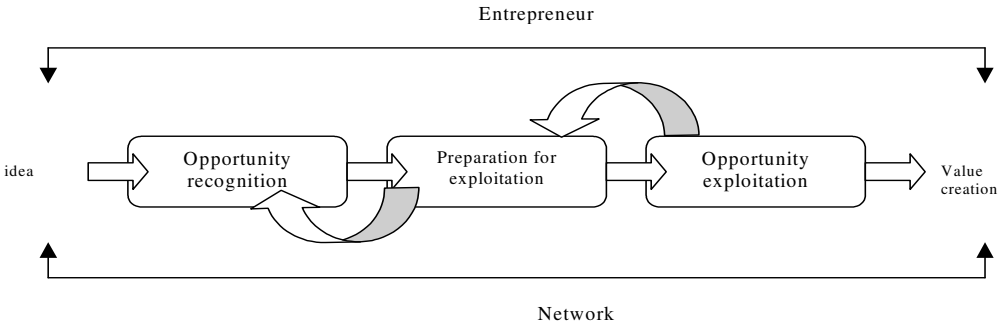
Figure 1 Entrepreneurship as a pursuit of opportunities.



Source: adapted from Van Der Veen and Wakkee, 2004.

Table 1 **Characteristics of Dutch Entrepreneurs, percentages are TEA-indexes[1] unless indicated otherwise.**

	Netherlands	Other countries	
TEA index among total population (2004)	7,9%	EU average	7,9%
		US	about 11%
		Highest in study: Peru	40%
		Lowest in study: Japan	about 1%
Average age of people involved in TEA2004)	39 years	EU average	37.5 years
		US	37 years
		Highest in study: Denmark and UK	40 years
		Lowest in study: Portugal	32 years

[1] TEA-index: the percentage of the population involved in setting up a company or leading a company not older then 2,5 years.

Source: Hessels, Bosma & Wennekers, 2005; EIM.

Table 2 **Short indication of business plans produced for Becoming an Entrepreneur (Van Der Sijde et. al., 2004).**

Year	Topics business plans	
2000-2001	• Animated product with a high educational value • Communication advice • Virtual take away • Consultancy for safety and environment	• Intermediary for Internet services • Efficiency in the catering industry • Student Union shop • Student entrepreneur portal • Personalized products • Radio station
2001-2002	• Motorbike taxi service • Mobile ICT consultancy • Delivery service • Technical Services at home • Business and IT service	• Examination construction and consultancy • Intermediary for IT services delivered by students
2002-2003	• CaRe-mail • Stimulearn • De computer-doctor • The children's bookstore • Grandma cooks dinner • Brocksystems • Networks solutions	• Students solutions Twente • Monito • Automotive consulting • Emocion tuning • Keep IT Simple software • New Vision Solutions

Table 3 A framework for evaluating entrepreneurship programs for non-business students, applied to two Dutch cases.

Framework			**Application to two cases**	
Stage in the entrepreneurial process		Professional attitudes, skills and knowledge to be taught	Incorporated in Minor in Entrepreneurship (Case 1: Twente)	Incorporated in Innovative Entrepreneurship (Case 2: RuG)
1st	Opportunity recognition	1. awareness of entrepreneurship as a career alternative in new ventures or in established firms;	1. Yes, mostly for start-ups but increasing attention for intra-preneurship	1. Yes, but only start-ups
		2. positive attitudes towards entrepreneurship	2. Yes, via guest lecturers, assignments, and lecture content and more generally by including entrepreneurship in the mission of the university and through ample support for entrepreneurs.	2. Yes, via lectures, guest lecturers, and assignments
		3. knowledge and skills to use prior domain specific knowledge to raise entrepreneurial alertness;	3. Yes, via guest lecturers and assignments, stimulating team work on business plans.	3. Limited; business plans lack in this respect
		4. knowledge and skills for networking	4. Yes, but more attention is needed to actually introduce students in relevant domain specific and institutional networks	4. Limited; business plans lack in this respect
2nd	Preparation of opportunity	1. awareness and positive attitudes towards different contexts (solo-start-up, team start-up, corporate venturing, business take over).	1. Limited; mostly solo and team	1. No.
		2. knowledge and skills to build an organization in different contexts including team work, negotiation skills, and networking skills	2. Limited through literature and assignment but little practice to develop skills	2. No
		3. knowledge and skills of management, marketing and finance	3. Knowledge, Yes; Skills not compulsory, but possibilities for co-operating in Becoming an Entrepreneur or to co-operate with entrepreneurs for the course Management of SME's.	3. Knowledge in prescribed book, readings, lectures and written exam. No skills.
		4. how to write a business plan targeted at different audiences.	4. Yes, through Becoming and Entrepreneur, Management of SME's and smaller assignments	4. Business plan yes. But only to the audience of potential investors ('outside experts').

3rd	Exploitation of opportunity	1. Stimulating awareness of the possibilities of hiring external management;	1. Hardly	1. No
		2. Enhancing students' awareness of their own competitive advantage, based on their domain specific knowledge when it comes to dealing with customers;	2. Limited as shown from business plans	2. No
		3. Enhancing awareness and a positive attitude towards growth;	3.Limited in prescribed textbook, readings and lectures	3. Limited in prescribed textbook, readings and lectures
		4. Knowledge and skills in relation to identifying and attracting additional resources to enable growth.	4. Yes, through assignments and presentations for audiences of institutional network members and other entrepreneurs. (business plan competition)	4. No
		5. knowledge and skills in relation to the management of small ventures	5. Yes through Financial Management in SME's;; Theoretical Aspects of Entrepreneurship; Marketing Oriented Entrepreneurship Legal aspects of management in SME's	5. Limited in prescribed textbook, readings and lectures.
		6. Awareness, knowledge and skills in relation to remaining entrepreneurial, alert to new opportunities, change management and leadership.	6. Limited in prescribed textbook, readings and lectures.	6. Limited in prescribed textbook, readings and lectures.