Title: Personalizing Entrepreneurial Learning: a pedagogy for facilitating the Know Why

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Abstract

As the global diffusion of entrepreneurship education continues, along with increasing investment in, and expectations of, educational initiatives, it has become important to articulate what we are teaching and why, along with the specifics of where, how, and to whom. Yet, despite a growing consensus about what constitute the entrepreneurial activities and competencies required to start a new venture, there has been little agreement regarding the content of entrepreneurship education, or how learning should be delivered (Honig, Davidsson, and Karlsson 2005; Bygrave 2007; Edelman, Manolova, and Brush 2008; Mwasalwiba 2010).

Clearly, the purpose of any education, the 'why' for the teacher, shapes the content, the 'what', and the method, the 'how'. But what about the personal 'how' and 'why' for the learner? Sarasvathy's theory of effectuation (Sarasvathy 2001, 2008) has led educators to consider how an entrepreneur's personal resources and resourcefulness can and should alter their how. Scholars are now sharing pedagogical approaches for motivating that type of learning (Ollila and Williams Middleton 2011; Gibb 2011; Kyrö 2008; Fletcher and Watson 2007). However, little research has addressed the personal why for the entrepreneurial learner (Rae 2005; Rigg and O'Dwyer 2012).

In this paper, we seek to fill this gap by exploring how entrepreneurship educators can facilitate the personalized learning to develop the Know Why for nascent entrepreneurs in the process of becoming entrepreneurial. We combine theories of entrepreneurship practice, education, and learning to propose a model for entrepreneurial Know Why. We utilize a case study of an entrepreneurship program applying a learning-through-venture-creation approach to identify a pedagogical approach in which learning entrepreneurial Know Why is facilitated. Thus the purpose of this paper is twofold: to contribute to the theory of entrepreneurial learning; and to contribute to the pedagogy for entrepreneurship, by explaining the meaning and significance of the entrepreneurial Know Why and by describing an educational approach that facilitates its development.

Keywords: nascent entrepreneurs, entrepreneurial learning, entrepreneurial education, know why.

INTRODUCTION

The question of how to educate people for entrepreneurship has become a topic of considerable discussion and debate (Dickson, Solomon, and Weaver 2008; Edwards and Muir 2012; Martín-Cruz et al. 2012). Entrepreneurial education intends to prepare individuals for engagement in an entrepreneurial process (one could say an entrepreneurial career), thus requiring development of entrepreneurial competency (Chang and Rieple 2013; Mitchelmore and Rowley 2010; Morris et al. 2013; Rasmussen, Mosey, and Wright 2011). Competency is defined as the knowledge, skills, attitudes, values and behavior that affect the willingness and ability to perform a profession (Brophy and Kiely 2002; Rankin 2004). In this paper we address competency development from the perspective of the learner, and equate knowledge, skills and attitudes (values and behavior) to a framework of entrepreneurial Know What, Know How and Know Why[1], aligning with Winterton's taxonomy distinguishing cognition, function and person (Winterton 2002), and Johannisson's taxonomy of entrepreneurial competencies (Johannisson 1991). We pay particular attention to the individual's own 'Know Why' (as this associates to attitudes, values and behavior) as few researchers have explicitly addressed the process of developing self-knowledge in sparking and sustaining entrepreneurial activity (Dickson, Solomon, and Weaver 2008; Politis 2005). To address this neglect of Know Why, we investigate a European university of technology employing a venture creation (Ollila and Williams Middleton 2011) or method (Neck and Greene 2011) approach to entrepreneurship education.

A recent review of entrepreneurial teaching methods illustrates the complexity and incongruence of entrepreneurship education, with various methods fulfilling various objectives and blurred demarcation between objectives (Mwasalwiba 2010). The review found that most entrepreneurship education addressed knowledge *about* entrepreneurship in general or *about* the entrepreneurial process of starting a new venture, while fewer programs provided knowledge specifically *for* engaging in the process (Mwasalwiba 2010). Despite their differences, the pedagogical practices identified by Mwasalwiba all amount to teaching the entrepreneurial what and how, both of which represent valuable parts of an entrepreneurial education.

The entrepreneurial what to know, or 'Know What' for the learner, is understood as the cognitive knowledge the individuals develops about what to do in order to perform entrepreneurship (Kyrö 2008; Nutley, Walter, and Davies 2003). The entrepreneurial how to do things, or 'Know How' for the learner,

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[1] Throughout the paper, the terms Know What, Know How and Know Why will be used, but these are to be understood as having the prefix 'entrepreneurial', which is left off for space and ease of reading.

addresses both functional knowledge (which steps to take to achieve an outcome) as well as functional capabilities specific to the individual (how 'I' effectively put knowledge into practice) (Nutley, Walter, and Davies 2003). However, Know What and the functional 'steps to take' part of Know How can be considered as more generic, in the sense that the knowledge required can be conveyed independent of the individual learner. Knowledge about how to do something, particularly how to do something well, can also involve knowledge specific to the person, and is often also discussed in terms of skill. We will address the way in which we relate entrepreneurial skill to Know How and Know Why in following sections.

Building from the practice of so-called expert entrepreneurs, a discussion of alternative and more personalized processes for new venture creation is provided through Sarasvathy's (2008, 2001) theory of effectuation. Effectuation suggests that entrepreneurs consider what means they have, including who they are (their own personal qualities), who they know, and what they know (their capabilities) in order to make decisions as they engage in a process of entrepreneurship. This heuristic builds from logics of identity, action and commitment (Sarasvathy and Dew 2005), that allow the entrepreneur to make decisions based on one's own means and perception of what is do-able. Read et al. (2011) argue that assessing do-ability involves not only (external) market analysis (determining feasibility and value) but also personal value analysis, in which the entrepreneur needs to ask herself 'Do I want to do this?'. Developing along with this more particularized version of the entrepreneurial how and who has been research on pedagogical approaches for facilitating personalized learning of the Know How (Greenberg, McKone-Sweet, and Wilson 2011; Neck and Greene 2011).

Rae's body of work devoted to formulating a theory of entrepreneurial learning (Rae 2010, 2006, 2005, 2004, 2002; Rae and Carswell 2001; Rae 2000), provides a useful foundation for approaching what we see as the neglected Know Why. Rae (2005) identifies three major themes of entrepreneurial learning: individuals develop themselves personally and socially as entrepreneurs, they learn from context, and they negotiate their enterprise to establish legitimacy. Distinct from the predominant work on entrepreneurial education, Rae' work puts the individual in the center of the learning process. Few researchers have positioned to investigate the way in which Know Why can be facilitated in formal learning environments. Thus, even with guidance from both research on the phenomena of entrepreneurship and the growing literature on entrepreneurial pedagogy, we do not yet fully comprehend what combination of knowledge the individual utilizes to engage in and persevere through the entrepreneurial process (Carrier 2005; Hannon 2005; Rae and Carswell 2001; West III, Gatewood, and Shaver 2009).

This paper aims to contribute to our understanding of entrepreneurial thought and action by addressing the way in which the nascent entrepreneur learns to know why he or she is (persisting in) taking entrepreneurial action. To achieve this, we first present a conceptual framework of knowledge for entrepreneurial action (Figure 1), including not only the entrepreneurial cognition, functional knowledge and capabilities or skill (labeled as Know What and Know How), but also the individual's own understanding for why she engages and persists in taking entrepreneurial action (which we label as Know Why). This framework is then used to understand what part of what the nascent entrepreneur learns may be delivered through the content about a subject area and what part of the learning may be reflectively developed through engagement into the process. We offer a pedagogical approach allowing nascent entrepreneurs to develop knowledge for achieving entrepreneurial action within a formal learning environment, summarized in Table 1. For the purpose of this paper, we define nascent entrepreneurs as those individuals who enroll in entrepreneurial educational programs, engage in entrepreneurial activities (as defined by PSED and other studies) but have not yet created new ventures.

The paper has four major sections. The first is the theoretical discussion of the literature on entrepreneurial education and entrepreneurial learning, culminating in our definition of the concept of Know Why (presented relative to Know What and Know How). The second section presents a case study including discussion of the method, context, and outcomes, stemming from an ethnographic analysis of a leading entrepreneurial program, located at a European university of technology, in which new ventures are created as part of the core curriculum in a Masters of Science program. Section three presents a description of the pedagogical approach for developing Know Why along with the challenges it poses for students, educators and institutions. Analysis was used to identify how generic and personal aspects of the program enable nascent entrepreneurs to develop not just the Know What and Know How but more importantly, their own Know Why needed to engage in entrepreneurial action. Finally, we conclude with a discussion of the limitations and implications of this study. It is also important to note that while is not our objective to fundamentally address pedagogical theories, we of course recognize that personalized learning is not new, but rather stems from progressive forms of education (Egan 2008; Labaree 2005). We will not expand into the discussion on personalized learning at the broad educational level, as this is beyond the scope of this paper.

ENTREPRENEURIAL EDUCATION AND LEARNING

Having tentatively agreed that entrepreneurship can be taught (Carrier 2005; Charney, Libecap, and Gary 2000; Henry, Hill, and Leitch 2005, 2005), the field of entrepreneurship education is now addressing the questions of what should be

taught and how content should be delivered (Bechard and Gregoire 2005; Carrier 2005). One significant skein of this discussion identifies two distinct pedagogical goals: learning about the phenomenon of entrepreneurship and learning to become an entrepreneur (Mwasalwiba 2010; Rasmussen and Sørheim 2006). Bennett (2006) differentiates these interpretations as 'passive' and 'active', where the latter are generally used to train individuals to act entrepreneurially, and thus often employ an action-based approach (Bennett 2006; Jones and Iredale 2006; Leitch and Harrison 1999; Rasmussen and Sørheim 2006). Like theory-based approaches, an action-based approach to entrepreneurship education allows the learner to gain knowledge and understanding of what and who is important when attempting to act entrepreneurially, but adds to this, how one's own actions can and perhaps should be carried out in order to achieve the desired effect. At the extreme of such action approaches are entrepreneurial programs in which new ventures are created and used as the core learning vessel of the education (Lackéus and Williams Middleton in press).

One way in which researchers have attempted to address the practical aspects of the entrepreneurial process, emphasizing perhaps more specifically the Know How, is through introduction of business models and concepts for new venture creation processes. Recent practical guides to starting a new venture popularized as the lean startup model (Blank and Dorf 2012; Blank 2005; Ries 2011) suggest that pedagogies like the one described here are valuable, if not necessary, for preparing the nascent entrepreneur for the experience. Starting from the definition of a startup as "a human institution designed to create new products and services under conditions of extreme uncertainty" (Ries 2011, p. 8), this approach acknowledges the importance of "tacit elements, like practices, experiences, specific mind-sets, and company cultures" (Thoring and Müller 2012). Based on these environmental characteristics, the lean startup model recommends both an iterative process of engaging with the customer early to learn from them and teams that are comfortable with ambiguity and uncertainty.

Another significant discussion in the field addresses the question of whether the desired outcomes of entrepreneurial education should be broader than just starting new businesses (Glancey and McQuaid 2000; Kirby 2003; Lackéus 2013; Rae 1997; Swedberg 2000). Kirby (2007) has suggested that entrepreneurial education should be designed:

> "to develop in its students the attributes and behaviour of the enterprising or entrepreneurial person. Such people do not just know about how to create new ventures, or even possess the functional tools to enable them to do so. Instead, they are equipped with a set of personal attitudes and competences that enable them to see opportunities and bring them to fruition" (Kirby 2007, p. 22)

This perspective hints at education facilitating the development of entrepreneurial knowledge more personalized to the individual.

Similarly, Rae argues that entrepreneurial education needs to go beyond Know What and Know How, stating that "the skills traditionally taught in business schools are essential but not sufficient to make a successful entrepreneur" (1997, p. 199). We agree with Rae's position and argue here that developing the Know Why is the critical learning that is missing from most entrepreneurship education. Rae's work on the learning process of mid-career entrepreneurs (Rae 2000, 2002, 2004, 2005, 2006; Rae and Carswell 2001) changed the perspective on the development of entrepreneurial competency to include emphasis on the individual's learning, in line with more progressivist approaches to educational philosophy (Labaree 2005; Lackéus 2013; Tynjälä 1999). This perspective allowed him to conceptualize a learning experience that would vary as a result of context, as well as an individual's personal and social development, and negotiation with critical others (Rae 2005). As Rae states, entrepreneurial education should involve "interacting socially to initiate, organise and manage ventures" (Rae, 2005, p. 324).

As early as 2000, Rae outlined four main questions regarding entrepreneurial learning: 1) how does the sense of personal identity change as individuals enact entrepreneurial behaviors? 2) how do people learn to work in entrepreneurial ways, 3) what theories of entrepreneurship can be drawn from people's accounts and sense-making of their experiences, and 4) is it possible to develop a useful conceptual model of entrepreneurial learning, which may inform and be used by both entrepreneurs and educators? Most educators and many scholars (Blenker et al. 2008; Kirby 2007; Mäkimurto–Koivumaa and Puhakka 2013; Pittaway and Edwards 2012) would agree that these are critical questions. However, it has been 12 years since Rae posed them, and little has been written addressing these questions, particularly in regards to the relationship between learning and education which enables the individual to build self-understanding for why she engages and persists in an entrepreneurial process.

Scholars working with nascent entrepreneurs in the context of new venture creation programs (see for example Barr et al. 2009; Boocock, Frank, and Warren 2009; Janssen and Bacq 2010 among others) have similarly pointed to the need to incorporate into the learning, the personal reasoning individuals need to make the choices and decisions vital to their own entrepreneurial development and situation (Krueger 2009, 2007). The application and use of contextual and experiential information (for example educations based on experiential learning (Kolb 1984)) may result in only focusing on action and outcomes. As a result, more personal learning, sensemaking and development of self-awareness that

comes through reflection and emotive responses (Boud, Keogh, and Walker 1985; Kyrö 2008) could be neglected.

Another compelling and practical justification for personalized learning comes from Sarasvathy and her colleagues (Read et al. 2011; Sarasvathy 2008; Sarasvathy and Dew 2005; Sarasvathy 2001), who has proposed that the entrepreneur, rather than using a known process to meet given ends, instead might create various possible ends based on the means available to her – a thinking framework and set of heuristics Sarasvathy defines as effectuation. Sarasvathy and colleagues emphasize that the stimulus for taking action begins with the entrepreneur's own understanding of who she is and what and who she knows – a set of knowledge specific to herself which provides a logic of control over resources available (Sarasvathy and Dew 2005). Like Sarasvathy and others, we subscribe to the view that opportunity is subjective and that most environments do not lend themselves to objective validation of which aspects deserve the most attention. While the main focus of Sarasvathy's research has developed from expert entrepreneurs, we see a direct relevance for nascent entrepreneurs who, facing the requirement of "learning how to do new things, how to create," (Hjorth and Johannisson 2007, p. 46), must rely on themselves to resolve goal ambiguity and isotropy. Like expert entrepreneurs, they must ask and answer the questions of "who am I?" and "what do I want to do with what I have?" in order to be able to answer "do I want to do this?".

The effectual approach has been developed further in pedagogical research literature as compared to theoretical literature. For example, Neck and Greene recognize the "diversity of entrepreneurial motivations and desired outcomes or definitions of success" (2011, p. 61), and propose that the foundation for their espoused method of educating for entrepreneurship is that "each student understands how he or she views the entrepreneurial world and his or her place in it" (2011, p. 62). Neck (2011) and her colleagues in Greenberg et al. (2011) elaborate the creation logic and methods used by entrepreneurs and offer pedagogical approaches to educating students for entrepreneurial leadership. Their perspective centers on the recognition that entrepreneurial education's mandate is to "develop leaders who are not paralyzed by emerging or unknowable facets of the world, where reliable and relevant data are not yet available" (Greenberg, McKone-Sweet, and Wilson 2011, p. xi); i.e. individuals capable of operating and making decisions within uncertain or ambiguous environments.

There is a substantial value-based component in doing entrepreneurship, requiring the development of self-awareness for why one chooses to engage in the entrepreneurial process. While most action-based learning in entrepreneurship has focused on doing the what, and some the how,

another appropriate and arguably critical approach to fostering entrepreneurial learning is concerned with the learner's own Know Why.

ENTREPRENEURIAL KNOW WHAT, KNOW HOW, AND KNOW WHY

We have proposed that the knowledge *for* entrepreneurial action can be categorized as the Know What, Know How, and Know Why. The knowledge an individual needs about what to do to create a new venture, we call the Know What; the knowledge an individual needs for performing the actions is the Know How; and the knowledge that an individual needs to understand and legitimize her own entrepreneurial action we term the Know Why. In Figure 1, we present a conceptual framework which outlines the knowledge necessary to develop nascent entrepreneurs for entrepreneurial action.

Figure 1. Knowledge Framework for Entrepreneurial Action

Generic	Knowledge about entrepreneurial concepts Knowledge of the activities typical to an entrepreneurial process	Tools and guidelines for entrepreneurial action Simulation of entrepreneurship	
		Immersion in entrepreneurship Demonstration of competency in entrepreneurship	Applying own means to entrepreneurial process with belief that achievement is possible Sensemaking of own entrepreneurial competency
Personal			
	Know what Knowledge of what needs to be done	Know how Knowledge for performing entrepreneurial activities	Know why Knowledge that sustains personal engagement and legitimizes action

The Know What is now fairly well established through large scale studies as a set of 26 actions important for venture creation (Gartner and Carter 2003) and subsequently been grouped by Liao and Welsch (2008) into four categories: planning activities, establishing legitimacy, resource combination and market behavior. The Know What is essentially generic to new venture creation, in that the knowledge can be conveyed independent of the individual learner. It is through learning the Know How and the Know Why that the individual becomes aware of, reacts to, or even creates the many contextual contingencies that shape what the entrepreneur can, should and will do. The Know How and the Know Why are tailored to the person: her situation and her particular make-up of capabilities, limitations, attitudes, and values.

Know How is knowledge of the process through which entrepreneurial activities are carried out. Know How includes the steps to take in creating a new venture, the sequence in which these are typically or ideally done, and the approaches that adapt the generic process to the specific context and the individual characteristics of the person navigating the process. The personalized approach involves knowledge of how to carry out the steps in the most efficient and effective means possible, given the skills, strengths and values, among other particularities, of the individual. A certain amount of literature has aimed to describe knowledge regarding how to carry out an entrepreneurial process in terms of entrepreneurial skill (for example, Chang and Rieple 2013; Kutzhanova, Lyons, and Lichtenstein 2009; Lichtenstein and Lyons 1996; Smith, Schallenkamp, and Eichholz 2007). Building from Lichtenstein and Lyons (1996), Chang and Rieple (2013) present meta-categories of skills for entrepreneurial action, listed as technical, management, entrepreneurship and personal maturity, each of which having four or more specified skills. There work illustrates the range between what we understand as more functional and specifically personal skills and thus associate to Know How and Know Why respectively. Our understanding stems from Johannisson's taxonomy of entrepreneurial competencies (Johannisson 1991), where he includes learning 'who' and 'when' sub-categories of how. Skill is associated to 'Know-How' such that skills can be defined relative to a particular vocation, while Johannisson's Know-Who' and 'Know-When' address social skills and insight, which can be seen as associated more specifically to the person. Chang and Rieple (2013) link the more personal skills to more complex learning stimulants involving interaction with stakeholders and heightening of emotional exposure.

Know Why asks 'why should I start up or persist in this new venture?' – in the vernacular, 'what's in it for me?' We define Know Why as the personal logic, encompassing both reason and emotion, which enables the individual to act entrepreneurially, and specifically, to create new ventures. The

Know Why provides the self-understanding and decision to do the what and the how, stemming from an understanding that entrepreneurial logic is intuitive and holistic (Johannisson 1991). For the nascent entrepreneur, development of Know Why involves cycles of thought and action (including feeling). Much of what has been written regarding that the way in which entrepreneurs think typically focuses on the sizing up of the opportunity. In our framework, this type of thinking is part of Know What and Know How. Clearly, knowing why one is pursuing entrepreneurial action requires one to assess the task and environmental requirements, constraints, and resources in the situation. But as McMullen and Shepherd (2006) have argued, what is more important to entrepreneurial action is how the entrepreneur translates a specific opportunity assessment into a more personal decision about its merits and challenges "for me."

'Thought' refers to both the specific cognitive task, as well as the reflection "why am I pursuing an entrepreneurial career?" This mental processing engages the relationship between thinking and feeling (Baron 2008), as nascents ponder questions of identity (Hytti 2003), legitimacy (Suchman 1995), and personal attitudes and values. Krueger and others (Krueger 2007; Mitchell et al. 2007) emphasize that thinking about oneself relative to the entrepreneurial situation rests on deep personal attitudes and values. We are referring here to more fundamental factors than what is typically addressed in motivation literature. Such fundamental attitudes, values or incentives might include for example: wanting to test ones' own abilities, believing there is substantial money to be made, wanting to have autonomy, ensuring a decent living, proving one's worth, or making an impact on society.

Being able to answer 'why' questions regarding both specific new venture creation and general pursuit of entrepreneurial activity requires not only recognizing one's own purpose, but also a tacit assessment of what will be needed to accomplish objectives, ranging from the need to do more market research, to project and meet funding needs, or even to delegate more to others. The evaluation of the environment may include consideration of what market, technological or regulatory/policy conditions or trends might help or hinder one's own progress *in relation to the personal strengths, weaknesses, etc*. In Rae's theory (2005), the former is the application of contextual learning. In our conceptualization, the latter part of the assessment – in relation to one's own personal strengths and weaknesses – is the application of the Know Why. For example, in the case of a consultant's industry report, market share information might be considered relative to the one's own skill in sales. As Sarasvathy and colleagues (Read et al. 2011; Sarasvathy 2008; Sarasvathy and Dew 2005; Sarasvathy 2001) have suggested, it also includes identification of available resources with added consideration of one's personal capability to access

additional resources through paths stemming from initially identified resources. These assessments can be based on one's own opinion as well as external influences, such as the opinion of others, societal norms and biases, various political or economic incentives and disincentives. Clearly, this part of developing the Know Why is fraught with bias and emotion.

With regard to emotion or feeling, one may feel confident, afraid, defensive, excited, exhilarated, worried, inadequate, etc. Based on our observations and following the work on self-monitoring (Markus and Kitayama 1991), we believe that people who can think about these emotional reactions as part of their self-assessment, are likelier to overcome the negative feelings by balancing them with other data on the self in order to arrive at a conclusion of willingness to act entrepreneurially. This comparison of self to situation, in our view, contributes to self-efficacy (Bandura 1997). It is also a form of internal legitimization, whereby the individual becomes persuaded of his/her own capability to meet the challenges posed by the opportunity identified.

While much of this developmental process is internal to the individual, even those periods of reflection are shaped by dialogue with others. Clearly, legitimacy can only be truly granted through interaction (Suchman, 1995), and as Rae (2005), among others (Down 2006; Smith 2011; Warren 2004; Williams Middleton 2013), have proposed, learning to be an entrepreneur involves the emergence of an identity which must be negotiated with critical stakeholders. This social aspect of Know Why is the articulation of the personal logic, and the personal reasoning which supports the logic. At its most essential, this is voicing what one has said to oneself: "I want or intend to do this, I can do this, I am the right person to do this".

Not every entrepreneur articulates this personal conviction aloud. Indeed, we would not expect experienced entrepreneurs typically to act with such obvious consideration of the Know What, Know How and Know Why, as they are likely guided by knowledge structures such as expert scripts based on both prior knowledge and experience (Baron and Henry 2006; Mitchell 2005; Mitchell and Chesteen 1995). However, individuals new to entrepreneurship must acquire the same cognitive structures through experience and by developing their own knowledge bases. We propose here that this articulation of conviction is a critical step for nascent entrepreneurs as well as for small business owners pursuing growth opportunities or indeed any entrepreneurial person who is seeking resources or collaborators. This behavior translates self-efficacy into external legitimacy. Some researchers have presented this as the negotiated narrative entrepreneurs use to establish their role (Rae 2005; Watson 2009).

Next, we will use framework presented (Figure 1) to explicate an existing educational program that prepares nascents for entrepreneurial action by engaging in a process that creates new ventures. This analysis contributes the pedagogical approach for designing and delivering both generic and personal learning.

DEVELOPING ENTREPRENEURIAL KNOW WHY: A CASE STUDY

In order to capture in depth the dynamics of both the entrepreneurial environment and of the learning of nascent entrepreneurs, this study was based on the principles of insider action research described by Coughlan (Coghlan 2007; Coghlan and Brannick 2005). This approach facilitates the development of theoretical insight along with its ongoing use to enhance organizational capability, providing a methodology for studying action as it occurs. Insider action research also allows unique access to information that outsiders would not have access to due to subjects' sensitivity, trust between subjects and researchers, and broad awareness of context. As Argyris (1991) pointed out, use of this approach allows researchers to capture both the espoused-theories and the theories in action of their subjects. Traditional methodological perspectives critique insider action research as limited due to the proximity of the researcher to the data, minimizing ability of objective evaluation. However, others (Eisenhardt 1989; Yin 1994) have argued that single case study research is appropriate to the development of new theoretical understanding of complex phenomena, and this was our purpose.

Data were collected in the daily conduct of the entrepreneurial program. The primary data were participant observations and written documentation. The observations were selected from multiple arenas, including but not limited to: classroom activities, interactions within the program, staff meetings, school meetings, and specialized development conversations. One of the researchers has been acting as core staff at the program for nearly a decade.

CONTEXT

The program studied in this case is located at a European university of technology which delivers undergraduate, graduate and doctoral education across 17 departments ranging from engineering and science to industrial management and architecture. The university has been described as an entrepreneurial university in research investigating entrepreneurial activity rates in a set of institutions including Stanford University and Massachusetts Institute of Technology (McQueen and Wallmark 1984, 1982). The program has received external acclaim for developing entrepreneurial competency, including being distinguished as the country's leading education for entrepreneurship, and publications regarding the

approaches used for achieving these objectives (Berggren 2011; Lindholm Dahlstrand and Berggren 2010; Lundqvist and Williams-Middleton 2008; Ollila and Williams Middleton 2013; Rasmussen and Sørheim 2006; Rasmussen, Moen, and Gulbrandsen 2006; Williams Middleton 2013; Åstebro, Bazzazian, and Braguinsky 2012).

The program design is organized into the following core components 1) a master-level program situated in a European educational institution focused on technology; 2) a pre-incubator managing recruitment of ideas for incubation (often from institutional researchers), providing business advice/council, and financing initial seed-investment into the ventures; 3) a venture team made of a student team and a role-set of associated shareholders and stakeholders; and 4) an entrepreneurial network including alumni, researchers, professionals, investors, etc. operating within a regional/national innovation system (Lundqvist and Williams-Middleton 2008). These four components are intertwined into the combined educational and venture creation approach (Ollila and Williams Middleton 2011).

The program has experienced four evolutionary stages, described in Appendix A. Changes developed as a result of faculty reflection and student feedback. For example, the length of the program was expanded in order to facilitate time for more action and more reflection. A critical design change from the first to second version of the program was the creation of a pre-incubator to enable actual funding of and legal advising to the venture teams, as well as to legitimize the venture creation as more than just an academic exercise. Student diversity, in terms of educational as well as cultural background, has increased through the various stages of the program.

Students are recruited from different educational backgrounds as an attempt to increase alternative perspectives upon a business idea, provide complementary competences to support the business ideas, and to encourage peer-to-peer learning. Initially in the first version, differentiation was across different engineering disciplines, but this expanded to a broader mix of students with backgrounds not only from technology and natural sciences, but also business, economics, law, and sometimes even liberal arts. However, recruitment and selection is still bounded by certain limitations, due to the needs of technology-based idea development. Student diversity creates an enriched cognitive environment in which each student can draw benefits, including opportunities for peer-to-peer learning through exchange of ideas, various means of analysis, and different perspectives upon problems and solutions, providing a more comprehensive basis for decision making. Application to the program requires

that individuals communicate their motivation towards engaging in and learning about venture creation, which is considered to signify intention.

Except for the first years of the program, all versions have included a preparatory period (either a half or full academic year). Upon acceptance, students enter this more traditional period of training and development before incubating a venture in the final year of the program. This initial period provides foundational material such as strategy, modelling, and tools for start-up companies. In the latest version (Version 4), the additional second term of the first year includes a required idea evaluation course, where student teams evaluate the feasibility of real-innovations, as well as elective courses.

The final year of the education is called the "incubation year". The students start working with an early stage technological idea and systematically go through a venture creation process, with the ultimate goal of incorporation, should the idea-based venture prove commercially viable. Student teams of two to three individuals are provided a novel idea, most often stemming from university research, and allocated an equity option, in the case of incorporation. The students are supported by a network of stakeholders and shareholders. Shareholder representatives form a board that meets regularly with the student team during the incubation year in order to steer recommendations regarding the venture. While company formation does not occur in every case, the intention is always to provide value at some level. There are essentially three alternatives to incorporation of a venture into a company: non-commercial development, re-start, or termination. This illustrates the 'realness' of the educational environment, in that learning through entrepreneurship includes not only the learning by engaging the process of developing an idea into a business, but also learning from testing the viability of the idea as a business, and re-starting again when the idea 'fails'.

OUTCOMES

The program provides insight into critical junctures (Vohora, Wright, and Lockett 2004) during the nascent process, and facilitating the development of entrepreneurial competence, as the environment produces newly incorporated firms on a yearly basis. Between January 1997 and June 2011, a total of 304 graduates have been educated through the program, equating to 104 venture teams. 148 ideas have been incubated through the pedagogic design utilizing the venture teams, leading to the one of the four alternatives described above, i.e. incorporation, non-commercial development, re-start or termination[2]. As of end of

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[2] 40 venture teams (38%) were involved with at least one termination and re-start, thus evaluating a new idea as a venture.

year 2011, a total of 50 companies had been incorporated, of which 40 were still in existence, representing an 80% survival rate of incorporated ventures (see Appendix A for details). An additional 3 were in a stage of non-commercial development, with an additional 11 ideas incubated during the program's incubation year 2011-2012.

Clear quantifiable results of the education are that there are 50 incorporated ventures, in which several of the graduates are or have been employed. In a study of university-based start-ups stemming from the nation's 21 university technology-based incubators, between 1995 to 2005, companies developed through this educational program were responsible for 27% of total revenue of all the incubated start-ups (Lundqvist in press). In addition to the measure of new venture creation, the program also demonstrates development of entrepreneurial competence (Lackéus 2013). The main way of accounting for this is through the 304 graduates of the program.

Alumni are found to be practicing entrepreneurship in many different capacities. For example, in nearly all of the 50 incorporated ventures, at least one of the students involved during the educational period became a founder-employee in the venture when incorporated.   Another means of recognizing entrepreneurial competence is through companies founded by alumni, after graduation from the program Again, this is more difficult to quantify because of the challenges of tracking alumni over time, but nonetheless prominent examples have arisen, including an alumni company recently listed as one of the 33 hottest young technical companies in the country in 2012, and another alumni, the CEO of an independently formed company, listed as the 2012 'Super-talent of the Year', in the nation's leading business journal. Finally, in a recent alumni survey, the majority of respondents (total 121, thus representing 40% of the entire alumni base) identified themselves working in an entrepreneurial capacity. 64.3% of respondents agreed or strongly agreed that they had the knowledge, skill and experience required to start a new business, and 88.4% agreed or strongly agreed that they had the knowledge, skill and experience required to start a new initiative within an existing organization. Finally, alumni explain their understanding of what it takes to act entrepreneurially in response to an open ended question (presented in Appendix B). Common themes brought forward by the alumni include: identifying and/or pursuing opportunities, taking initiative, 'value' creation (beyond wealth creation), such as societal contribution or being creative, curious and flexible.   A few respondents also mention the importance of perseverance.

A PEDAGOGICAL APPROACH TO DEVELOPING KNOW WHY

Embeddedness in this environment over several years allowed the researchers to recognize that Know Why can in fact be facilitated, though this has been partially triggered by external 'interventions'. Due to the explicit outcomes generated, the program is regularly visited by other institutions interested in learning about the design and delivery of the pedagogy, often with the stated desire to replicate the approach in their own institutions. During these visits, information about our educational objectives, models, environments, and curriculum are shared, and we do our best to answer in detail any questions regarding the program and associated components. Yet when these conversations end, we often feel that we failed to communicate the essence of what we, as educators, are doing, and what we observe our students achieving. Driven by this, we came to recognize that we had to go beyond the explicit educational design and delivery of our program to excavate the implicit design and delivery for developing Know Why.

Heinonen argues that "learning to become entrepreneurial represent individual decisions that are always more or less subjective" (2007, p. 313). We found that not only were we shaping the education to develop Know What and Know How in a more general capacity, but that in the venture creation segments of the program, we were developing the personalized learning for entrepreneurial action, and that numerous nuances of our pedagogy were directed at developing what we have come to call Know Why. Analyzing the case allowed us to identify how both generic and personal aspects of the pedagogical approach that enable nascent entrepreneurs to develop not only Know What and Know How, but more importantly Know Why needed to enable and facilitate entrepreneurial action. We present components of the design and delivery which contributing to knowledge for entrepreneurial action in Table 1.

In the following sections, we discuss Table 1 in more detail, to illustrate the specific features of a program for learning Know Why, building upon Know What and Know How. We will explain how the different methods facilitate the personal and social emergence, contextual learning, and negotiated experiences which contribute to entrepreneurial learning centered on the individual.

Table 1. A Pedagogical Approach to Facilitating Knowledge for Entrepreneurial Action

	Generic (Know What and How)	Personal (Know How and Why)
Design	Recruit and select a diverse set of students with ambition to practice entrepreneurship	Faculty facilitate pluralistic perspective; responses to students start with 'it depends'
	Design courses which address the planning, establishing legitimacy, resource combination and market behavior activities associated to starting a business (for ex. 26 PSED activities)	Staged individual decision points at which input or choice is made about the venture idea, venture team, norm structure, engagement of additional stakeholders
	Sequence knowledge distribution and development to follow the common life-cycle of venture creation (conception, gestation, infancy and adolescence)	Designated time and space for reflection (individual and team), including discussion of stress and frustration due to educational and contextual demands
	Iteration of knowledge development in increasingly complex and context specific scenarios	Team-based work facilitates complementary individual contributions to collective work – no one needs to be good at everything
	Interactive (student-teacher, peer-to-peer, student-alumni/coach/advisor) and team-based learning inside and outside the classroom	Interactive format both encourages and requires students to develop and articulate personal reasoning
	Evaluation system based on achievement of learning objective rather than academic grades	Evaluation categories signal "good enough" and intend to recognize a 'set' of competencies, building upon individual's strengths
Delivery	Simulating starting up a venture/business	Engagement in real-life venture creation
	Required delivery of a portfolio of assignments regarding: opportunity identification and evaluation, team framework and routines, technology and market analysis, business planning, financial reporting and investment applications, stakeholder analysis, negotiation, etc.	Diversity of content and action facilitates students acquiring and adapting knowledge that fits their own values and motives; teams delegate different tasks, roles, responsibilities to members
	Presentation events: business pitches to internal/external stakeholders, venture presentations to internal/external actors, business plan competitions, etc.	Ambiguity of language and format of assignments cause the student to be creative and guided by her own values and motives and/or to engage in negotiation of assignment format and content
	Planned written/oral feedback on deliverables	Students are both required and encouraged to examine, explain and discuss their own thoughts, feelings and actions in order to develop personalized reasoning for entrepreneurial action
	Classroom discussion and role-plays	
	Suggest that individuals keep diaries or journals	Coaching sessions with faculty/advisors involving inquiry/advocacy and feedback

DESIGN (CREATING AN ENTREPRENEURIAL WORLD)

The general framework of our program mirrors the general knowledge for conducting any business, with more entrepreneurial-specific knowledge more fully addressed in the final 'incubation' year of the program. Thus, the foundation of the design is a series of courses which address the knowledge of what needs to be done for a typical entrepreneurial process: planning, establishing legitimacy, combining resources and marketing behavior. The design follows the lifecycle of an entrepreneurial firm: opportunity identification and development, design and management of the delivery system, growth and change. Consistent with other action-based pedagogies, this approach allows business competencies and functional skills to be integrated into innovations, products, ventures and market offerings. The explicit design thus presents functional concepts, tools and techniques on a "just-in-time" basis facilitating the processes of problem solving, opportunity development, decision making and action planning. These together facilitate the individuals learning the generic Know What and Know How for entrepreneurial action.

Knowledge for action is developed through simulation in the first year. For example, several of our first year assignments ask students to assess a business situation and make a business-level decision that reconciles recommendations from both a purely marketing analysis and a purely financial analysis. These functional skill-sets are defined relative to the general activities of the start-up process. However, faculty illustrate that most often there is not 'one' answer; that responses often 'depend' on situational circumstances which influence what decision can/should be taken. This becomes explicitly apparent as iterations of core concepts are made increasingly complex and contextual. Finally students are emerged in the actual venture creation process in the second year, in order to learn knowledge for action through contextualized learning.

Another way in which Know Why is facilitated through design is by infusing 'selection' and 'choice' into the design. This starts in the very initial steps of the program, where students need to self-select into a program that they feel 'fits' them. The admissions process has multiple stages during which students must iterate why they want to attend the program, their expectations of the program, as well as what value they will contribute to the program. At the same time, the faculty and staff of the program use these phases to question applicants about their self-awareness, motivation and perseverance to engage in a team-based action-based venture-creation process. These iterations illustrate that the program is not a 'teacher delivering knowledge' pedagogy, but rather an 'engaged learner' pedagogy, where the student must contribute to guiding the knowledge developed. The theme of engagement and choice spans through the

entirety of the program, as students make decisions about which ideas to bring into the incubation year and which teammates they would prefer to work with, including reasoning for their preference, as well as which advisors and financiers to bring into their teams. Personalized choices occur in parallel with the more common place business decisions regarding market segments, distribution models, etc. The continual use of selection and choice engages the student in processes of personal and social emergence contributing to construction of their new 'provisional' identity (Ibarra 1999) as an entrepreneur (Williams Middleton 2013).

The program has pioneered ways to evaluate learning outcomes that are not easy to assess with traditional approaches like written examinations. Our assessment of most learning is based on the application of skills and reflection in action (Schön 1987; Schön 1984, 1983). Many assignments call for the application of skill-sets to real problems where there is no "answer sheet" and, in fact, no correct answers, only better and worse solutions. This necessitates a grading system that emphasizes the value of broad learning over deep, and the recognition that in most business contexts and especially entrepreneurial ones, 'good enough' is a more useful rubric than 'perfect' or 'complete'.

Our design also includes non-graded mechanisms that provide critical links between learning objectives and venture activities, such as: advisory meetings with outsiders who review and reflect upon how students prepare and execute their business activities, while students test their ability to communicate strategic direction of the venture to a board; alumni interaction; meetings for peer to peer learning and sharing of best practice across ventures in process; and development talks in which group dynamics, venture dynamics, learning, well-being and other challenges put forward by either the students or by the educator are focused upon. These talks are non-graded in order to provide a safe and open forum (the level of openness determine by the students and student teams themselves), for discussing and dealing with issues facing them. This illustrates learning facilitated through negotiated experience.

This curriculum, the action assignments, and the activities associated with it, including extracurricular activities, are acknowledged to be too much for any single student to take in. Upon excavating our implicit intent here, we see that we do this to allow the students to find and use what matters most to them. We do it to let them apply their own values, attitudes, and capabilities to make this determination because this allows them to personalize Know What and Know How and develop their Know Why. Taken as a whole, this pedagogical approach resembles teaching novice swimmers to learn to swim in the sea. They are taken to, and told to dive into, the deep water with other 'animals' in the 'ecosystem';

but there are lifeguards, swimming coaches, and a waiting boat. They get relevant experience in a new and surprising environment and are left to independently match their physical capabilities, learned strokes and their breathing to the demands of that environment. But, someone is there to watch over so they do not drown. If the generic concept is 'taking the plunge', the personal aspect is akin to being pulled out of that water once the individual has actually been in the water. Our approach pulls the students out of those experiences of entrepreneurial action into a reflective space. In this space, they are assigned to make sense of their actions and their experience. This sensemaking stimulates personal and social emergence, contextual learning, and negotiated experience as the reasoning around what is experienced must be 'accepted' by others.

For example, one entrepreneur we know, pressed to answer 'why' he had pursued the start-up of a company that developed software for the trucking industry, responded after some stages of inquiry by saying that ultimately he had wanted to demonstrate that "nerds can do worthwhile things in the world." In another example, a group of nascent entrepreneurs working on a bioscience-based venture were discussing the value basis of the venture, leading one student to say that she was much less motivated to work on a venture that was strictly profit oriented compared to a venture that had a primary purpose of improving health care and quality of life, i.e. a moral value. As these two examples indicate, in an entrepreneurial educational context, one's purpose is often discovered in conversation with critical others, such that the personal logic becomes evident to the individual only once they had been asked a purpose-oriented question: 'why are you doing this?'

The stress and frustration with the demands of the program format, and particularly the uncertainty of incubating a real venture in the final year, require a mechanism for release of pressure that builds up. Faculty and staff act as sounding boards for individual students as well as teams. The program also has elected student representatives who share student sentiment as a whole with the staff. This design, explicit and implicit, is the structural framework for providing Know What and Know How and some aspects of Know Why. The delivery facilitates each individual gaining and adapting entrepreneurial learning to fit them.

DELIVERY (FACILITATING ENTREPRENEURIAL LEARNING)

While design criteria provide an important foundation for facilitating entrepreneurial learning, it is really through the interactive delivery that this learning emerges. Our delivery involves iterative cycles of experience, reflection and dialogue, facilitating the personal and social emergence, contextual learning

and negotiated experiences which Rae (2005) reported contributes to entrepreneurial learning. These iterations occur several times throughout the program, as the students put into practice the content of entrepreneurship through their own Know How and Know Why. The reader will note overlap between the design presented above and the action section of delivery. This is because is not possible to completely extricate the Know What and the Know How in the pedagogy for delivering knowledge *for* entrepreneurship; when nascents are acting entrepreneurially, guided by the delivery, the two develop simultaneously. However, in the following paragraphs, we discuss the ways in which the more personal Know How and Know Why are facilitated through required and encouraged action.

Delivery requires and encourages students to apply knowledge through written reflection assignments, oral reflection in the classroom, oral discussion and debate in the classroom and while working in the venture. These cycles of presentation, dialogue, and feedback with peers, faculty and key stakeholders facilitate reflection in action (Schön 1983) that elicit implicit motivations, internal debate, and assessment of skills relative to entrepreneurial demands, which enhances self-efficacy. The program utilizes simulations, role-plays, and workshops around the actual venture to stimulate open exchange between students and student teams. Class discussion typically initiates around specific entrepreneurial topic, where students discuss knowledge about a concept or a method – Know What and Know How. Faculty members emphasize and encourage the importance of contributing: class participation is required, but must be thought through and built upon preparation material and rationalized in the classroom. Added to this is an emphasis on being able to propose and support a point of view, communicated in a way that is well formulated. Faculty are chosen for both their content expertise, but also for their ability to facilitate pluralistic discussion, bringing forward multiple perspectives, as well as engage with students both inside and outside of the classroom in order to further develop reflection upon classroom discussion. Faculty are to facilitate dialogues which develop: broad and specific knowledge, ability to see how these connect, and the individual capability to reorganize this knowledge in order to develop ways to offer value to particular markets, arenas, etc. And beyond this, drawn-out reflection should facilitate the student to reason around how she acts.

This type of learning provides engagement in, and monitoring of, an entrepreneurial process. Once students 'take the plunge', they go through real entrepreneurial and business activities in order to learn-by-doing (Cope 2005) to gain contextual learning. With our specific assignments, we require them to do the work of an entrepreneur. For example, they may be required to develop a marketing plan for the product or service they have developed, or they may be

asked to develop an elevator pitch to attract funding for this same product or service or they may be assigned to develop projected cash flows for the new entity. Beyond a few parameters (e.g., "a three-minute pitch," "a 10-page PowerPoint deck," etc.), we deliberately leave the specifics of these assignments vague in terms of our expectations. We do this to simulate the entrepreneurial world with its uncertainties, ambiguities, and risks, for two purposes. First, we do it this way to give them practice in operating in such places; second, and more importantly, this approach causes them to create their own paths as well as their own ends. We believe that this helps them develop their own Know How and Know Why. Like Sarasvathy's (2008) effectuation, they tend to start with 'who am I?' and 'what do I know or have that I can use to accomplish this task?' They use their own answers to shape a process that works for them, developing approaches to these tasks that they can execute with their own capabilities and that fits their own attitudes and values. But, because these are often based on being 'pulled out of the water', they are negotiating their experience as they reflect and sense-make.

Consider the following example: Jennifer considers her assignment to create and deliver an elevator pitch for her idea about a non-profit organization that will provide the infrastructure and marketing to link customers, retail stores, and social organizations to transform the change from a bill paid by the customer into a credit to be used by the social organization to purchase much needed supplies from the retailer. Taking stock of her resources, Jennifer knows she lacks the software development skills needed to realize her vision, as well as the capital to pay for these, so she will have to create a pitch that persuades her audience that this is viable despite these shortcomings. Because she can't even say, at this point, where these resources will come from, she will have to draw on her passion for this goal and her ability to create both pictures and words that ignite a similar passion in her audience. Her PowerPoint presentation and speech are unlike any one else's, but she wins the competition among her classmates and in the final presentation also wins faculty mentors and the support of funding agencies who will help her acquire the resources she lacks. Jennifer has acted to accomplish the entrepreneurial task by fitting a generic process of opportunity identification and development to her own values, attitudes and capabilities. She has developed a creative approach and learned how to be resourceful.

We observe that requiring students to articulate their reasoning and their own logic for taking entrepreneurial action in writing and conversation causes them to develop their reasoning to be more persuasive and thus to articulate their self-efficacy and develop external legitimacy in the role of entrepreneur. It is also important that reasoning is delivered not only to internal actors (namely faculty and peers, who potentially have a shared understanding)

but also to various external actors. These actors come with alternative perspectives, stemming from their own needs or intentions (for example a financier will have an investment perspective; a potential partner may have a particular market or geographical segment perspective). This again requires a negotiating process in order to gain legitimacy.

The process often starts with a specific assignment like a reflection report (though with extremely challenging action requirements, they often begin to do sensemaking immediately after in their conversations with each other). Here the student is asked to think about her experience, including what she did, how she did it, how she felt about the experience and what she has learned as a result. Often this type of assignment includes a requirement for discussion about these reflections with teammates or another classmate, along with a report of the learning from these dialogues. There is also a requirement for each student to meet once with a faculty coach one on one to discuss these reflections, and each team working together to develop a new venture is required to have group development talks with faculty coaches. The team-based format of the program makes it likely that there will also be extra-curricular discussions of these reflections with close associates who have shared the same experience. The cultural norm of student-centric learning at the program makes it likely that there will also be extra-curricular reflective conversations between students and faculty members.

As the student reflects while acting as a nascent entrepreneur, she becomes a "reflective practitioner" (Schön 1983). She observes her own actions, thought processes, and emotional reactions and is expected to consider what those tell her about herself, particularly relative to the role she is trying to achieve (that of 'entrepreneur'). She is asked to evaluate herself relative to the task and to discuss what she has learned from both the experience and the reflection. In articulating these reflections, she engages in dialogue which provides new input to her learning. This dialogue creates the stimulus to re-examine her values, motives, strengths and weaknesses relative to the entrepreneurial action, and is thus highly personal.

One important and unusual aspect of our pedagogy is that in each of the above faculty-student talk activities, as well as the extracurricular conversations, we are deliberately flexible about the time, space, focus and language chosen by the students for such talks. We respond to student initiatives and alter our terms and allow them to use their own because we see this as their taking control of their own development, taking responsibility to reshape the situation so that it fits who they are. This is again to emphasize the personal and

to facilitate developing the student's Know How and Know Why as their own learning for entrepreneurial action.

The described activities and experiences inside or outside the classroom facilitate the students' shaping of their Know How and development of their Know Why. As discussed, some parts of Know How ought to be made specific to the situation and to the person enacting it in order to be effectively utilized in an entrepreneurial endeavor. But the acting and sensemaking of Know Why are part of the student. Building their awareness of their Know Why over time, they slowly personalize their learning. They identify their strengths and learn what they can intuitively rely on to help them manage the entrepreneurial task and apply in other settings.   Through action observed, they see strengths in others that they have not recognized consciously or unconsciously in themselves but can then see or develop.

To facilitate and guide their development of Know Why and to ensure that this happens, we ask for observable evidence of it. Of course, it is not easy to define what that evidence should be because it is so specific to the individual. What we do in this communication of personalization phase is to ask for articulation of the reflection and sensemaking process as well as its outcome. We have a variety of assignments that require the description of the cognitive and emotional experiences of the entrepreneurial action phase and of the resulting state of self-knowledge. Such assignments help them evaluate personalized knowledge for action relating to their attitudes, values, and capabilities.

CHALLENGES

Pedagogy that develops the 'what' of entrepreneurship faces its own set of challenges, including the question of impact on entrepreneurial intention and behavior. Students who learn *about* entrepreneurship do not necessarily proceed into entrepreneurial careers, or if they do, they may quickly discover a world that they are not prepared for and/or do not prefer to be in. The pedagogical approach we have presented here faces another set of challenges, at both the faculty and the institutional levels.

In traditional educational approaches, the educator is the transmitter of knowledge, and the students the receivers. Delivery is a linear connection between two sets of individuals. The role of a faculty member is to organize and present the knowledge to the student. While some struggle to enact this role effectively, the range of transmission possibilities is rather narrow; teaching includes: program and curricular design, along with creating syllabi, assignments, and evaluation; facilitating includes: coaching, feedback, and dialogue, and

learning is delivered through multiple arenas and from multiple actors. Faculty must play the dual roles of educator and facilitator, managing cycles of transmitting, advising, and facilitating knowledge development that, at times can seem contradictory, to both the student and to the teacher. The 'educator' becomes a 'facilitator' by providing access to and guiding use of resources in order to enable students to act more independently and take responsibility for their own development and strategic understanding. Capability the latter role is not commonly developed in faculty and the cognitive and emotional demands of a facilitation role are not often discussed. Balancing the two is a challenge acknowledged by those doing this work in practice but rarely discussed in literature about educating entrepreneurs.

The action-based approach that facilitates Know Why, along with the dual role of faculty in such programs, also creates a challenge related to the rights and responsibilities of both teacher and student. There will be as many learning experiences as there are students, but faculty can be challenged to facilitate these to a level desired by the students or to fit these to an institutional measurement standard. As such, both faculty and students may need to make compromises. Students may need to work to find the appropriate boundary for responsibility for their own learning. Leading students to this recognition is not easy, painless or quick. However, this is seen as part of the social emergence and negotiating process when developing Know Why.

A related challenge for faculty in such pedagogies is the assessment responsibility. As faculty, our observations of students allow us to recognize the specific learning that will be critical for a student's development and success, but we are limited in our ability to motivate such changes, especially when these are significant personal qualities of behavior or thought. Also, as discussed above relative to the student experience, we cannot evaluate whether or not critical insights have developed until these are communicated or demonstrated to us. Even then, we can only assess them to the extent that the knowledge is convincingly articulated (as this is how we judge it to be valid or legitimate).

It has no doubt become obvious in our discussion above that this set of teaching challenges lead to a set of institutional challenges as well. To make the point succinctly, this type of education is costly. It is time consuming and emotionally demanding of faculty and staff. To deliver it requires a commitment to investment. This in turn requires difficult and conflict-potential debates about resource allocation both within the institutions and society as well. This pedagogy is also institutionally risky. Because developing the Know Why has not been an explicit part of educational purposes in the field, the approach we advocate here has not been a readily recognized or legitimized form of the education of

entrepreneurs. And even if this situation changes, the return on any educational investment is normally expected to occur within finite timeframes and according to pre-determined milestones. One way to measure the effectiveness of our program would be by comparing the pedagogical design and delivery with other essentially identical programs with similar pedagogical elements, as well as comparable programs which lack the 'Know Why', as a control. However, given differences in contexts, this might not provide useful data. We could also discontinue the elements that contribute to the Know Why for a period and run a contrast, however we feel this would be akin to denying a control group a beneficial drug in the interests of scientific experiment, and we are thus unwilling to do this. Instead, we would like to argue that the best evidence for the value of these investments is the institutional success we have experienced as reported by our alumni and external reviewers. New businesses are being created and alumni report ongoing entrepreneurial activity due to a knowledge framework they developed in our programs. We are experimenting with some approaches to this measurement process as continuing research. For example, a third-party currently collects the company incorporation and employment data, but has not tracked this systematically over time, which is a change that needs to be introduced. The alumni survey will also be scientifically validated and become part of our ongoing measurement efforts.

The final institutional challenge we perceive, as insiders, is the risk of refining such unique and successful pedagogy to deliver more of the explicit knowledge of Know What and Know How in a cost-effective manner without sacrificing the also critical but often implicit pedagogy that develops Know Why. Change is evitable, and the future of all higher education looks far less predictable than it has been. Social pressures to do more with less are valid considerations. We worry that Know Why is at risk of being seen and treated as a luxury we can't afford, whereas it may just be the most critical ingredient to creating more entrepreneurial societies.

CONCLUSIONS

In this paper, we have implicitly suggested that there is a need to shift perspective in our research focus from teaching entrepreneurship to learning entrepreneurship. Entrepreneurial theory has identified the proven knowledge necessary for entrepreneurship and, in applying this knowledge to education, that research provides clear objectives which can be constructed and delivered in a classroom setting. These lessons are generic to the process, i.e., it is not knowledge that is dependent upon the individual per se. However, learning theory tells us that the knowledge for actually taking entrepreneurial action requires the engagement of the individual and thus requires learning that is specific to the individual. That is,

the individual must develop Know How and Know Why that propels her through the learning process. Our paper has asked and attempted to answer the question 'what part of what the individual (nascent entrepreneur) learns is delivered through the expertise of the teacher about a subject area and what part of the learning is reflectively developed through engagement into the process – action and reaction to counter-effects of action – that allows the individual to survive or even succeed in an entrepreneurial process?'. Through this, we have sought to stimulate discussion of this neglected aspect of entrepreneurship education, the learner's needs and motives for such knowledge development. We integrated theories of entrepreneurial learning with the research on entrepreneurship to develop a framework of entrepreneurial knowledge, adding the critical piece of Know Why from the learner's perspective.   We developed the concept of the Know Why based both on theory and empirical observations from a case study. The case study allowed us to present the pedagogical design and delivery that develops the full spectrum of entrepreneurial knowledge, but in particular it allowed us to focus on the specific features of the design and delivery that facilitate the development of Know Why - the iterative cycles of experience, reflection, and dialogue. We also discussed several of the challenges experienced by students, faculty and institutions intending to apply and achieve such learning.

This paper presented a single case study in a specific institution. Its conclusions are based on the embedded researchers who observed the human interaction within the program's educational environment, one of whom was also a staff member. This approach enabled us to capture the in-depth dynamics and tacit, culturally shared understandings likely to be unobservable or indiscernible by outsiders (Brannick and Coghlan 2007; Coghlan 2007). Such an approach, of course, subjects us to insider bias and limits the potential generalize-ability of the "findings." Our confidence that entrepreneurial competency is developed in this program is based on two sets of outcome measures: alumni self-perception survey and reports collected by an independent entity on new venture creation, incorporation and survival as well as employment position. The survey used was not scientifically validated but the data from it corroborates the third party data on entrepreneurial activity.

Future research should include a scientifically validated survey as well as other empirical tests of the value of developing Know Why which would contribute considerably to building and sustaining support for such pedagogies. For example, it would be useful to know if there are individual or social differences in the degree of reflection and in the degree of relationship between reflection and entrepreneurial action. As this case study explored the learning of nascent entrepreneurs in a technical university, it would useful to test their learning process against that of other nascent entrepreneurs in other settings.

All entrepreneurship programs have a design and learning objectives directed at teaching Know What and Know How. The traditional approach has delivered knowledge *about* the 'what' and the 'how'. Action-based approaches typically focus on developing knowledge *for* or *in* by putting students into the process, enabling nascent entrepreneurs to develop specific Know How to some degree by tailoring the generic process to their own capabilities and attitudes. Often action-based programs entail some exposure to the entrepreneurial world of uncertainty, ambiguity, and evolving contextual demands. Such approaches also tacitly create the opportunity for students to develop some part of Know Why. We have argued here that educators consider going beyond Know What and Know How to incorporate pedagogical methods that develop Know Why.

Appendix A. General Data for Venture Creation Program, 1997-2011

Version	Description	Grad. Year	No. of Students	Venture Teams	Ideas Eval-uated	Ventures Incorporated (surviving)
1: 1997 to 2000	1 year masters (native language) with students recruited from the university only. A project-based pedagogy matches teams with ideas from the university environment for potential commercial development.	1997	12	4	5	3 (2)
		1998	15	5	6	1 (1)
		1999	18	5	7	1 (0)
		2000	15	5	5	1 (0)
2: 2001 to 2004	1½ year masters (native language) with students recruited nationally. After ½ year of preparatory courses, a venture-based pedagogy is used to incubate teams with ideas for potential incorporation. A pre-incubator specially designed to partner with the program provides seed financing.	2001	23	7	8	6 (4)
		2002	16	5	8	4 (4)
		2003	21	6	8	5 (3)
		2004	20	6	7	4 (4)
3: 2005 to 2007	1½ year masters expands to include a life-science specific 'track' (previously only general technology). The first ½ year is restructured to be a 'business creation laboratory', simulating venture creation using university-based ideas.	2005	20	7	13	5 (3)
		2006	34	12	15	5 (5)
		2007	30	11	19	5 (4)
4: 2009 to 2011[a]	2 year masters (English), students recruited internationally. Additional ½ year is an elective-period (2nd half of 1st year). Teams are formed at the end of 1st year, allowing for initiation of venture activities during the summer break.	2009	19	8	13	5 (5)
		2010	35	12	18	5 (5)
		2011	26	11	16	*in progress*
Totals			**304**	**104**	**148**	**50 (40)**

[a] Due to the expansion to a 2 year masters, there was no graduating class of 2008.

Appendix B. Alumni responses to survey question: *What does it mean to act entrepreneurially?*

What does it mean to act entrepreneurially?
Always considering and looking for new opportunities to create more business
For me it's being opportunistic and see opportunities. It's also about being persistent and firm and never give up. It's also about being positive towards new things
Take risks to achieve new/better business. Risks could mean to try novel methods/technology/business models in existing or new markets.
Creating value and developing new business
To me it means to not hesitate to drive initiatives for improvements and innovations despite not getting support from your immediate surroundings. It also contains a degree of circumventing obstacles and finding your way to your objectives even if it is not the most straightforward path.
Pursuing the realization of ideas. Trying to find ways to make the world a little better.
In constant chase of business opportunities
Putting thoughts into action.
Grab opportunities not be afraid of "being on your own", never give up, being patient, sell, sell, sell and quite often without having anything concrete to demonstrate
Taking the lead identify opportunities getting things done dare to explore new ways
See opportunities where many other would see problems
Acting on opportunity and continuous adaption to circumstances
Business First.
Think outside the box and that nothing is impossible
to see opportunities in most situations and to try to make good use of them
Always try to find a way of creating more value for your customers and being able to capture some of that value for yourself
Make use of opportunities as they arise and not to be afraid of change.
To think outside the box to see the not yet seen and to execute what you believe in without ever looking back.
To realize dreams and ideas and create value out of it. To allocate the resources needed and engage people to do their best.
Constantly look for opportunities meet up with new people and places turn problems into benefits celebrate goals achieved and move forward when facing obstacles.
To me it means seeing opportunities and act on them in a most profitable way.
See opportunities and do something about them.
Meaningless theory. These are things you cannot learn in a school.
Thinking outside the box and then quantify the value of the thoughts.
To have a curious and inquisitive mindset regarding possible business opportunities in one's life and the will to act upon those opportunities.
Be creative challenge common knowledge and procedures have drive and energy
Think outside the box drive innovation
To seize opportunities that arise and make something useful of them. To turn intangibles into tangibles.
Willingness to explore new opportunities.

To explore opportunities.
To take initiatives come up with new ideas and do something with them don't let anything stop you find opportunities of solutions to problems in your everyday life.
Find new ways of solving problems and to see opportunities in challenges and a world of changes. Also try to change the system or bending rules not only acting within the traditional set up.
To take an idea into action that changes the current status.
Be creative do things and actually make things happen solve problems get the big picture as well as the details.
To look for and see opportunities and/or demands around you and to think of solutions to these problems/needs. But to be an entrepreneur you should also take action. One additional thing is to create needs or demands for something that isn't there yet!
Finding and implementing better solutions through analysis creativity and hard work
explore new possibilities creative thinking and strong acting driving creation/change
To see the business opportunity where others don't; With other small means achieve progress; Questions questions, questions; Driven
Hard question....to be willing to risk your own well-being; to see possibilities when other see pit-falls; to act instead of thinking and thinking and thinking
To create new things or improve existing ones
Good question! For me it is about not being stuck in a role. Being entrepreneurial for me is being able to adapt to different situations. Sometimes expected sometimes unexpected. Also I find it strongly related to having to learn many sides of a business not necessarily being the expert in every field, but know how to look for the knowledge you don´t have. An urge to move forward.
To actively pursue opportunities that have a chance to evolve into a strengthened situation for a project/team/venture/research/society.
Challenge established systems and thinking and focus on value creation
Going your own way and finding new solutions to improve our society.
To me it means many different things such as working independently, creatively and knowing that YOU are responsible for your assignments/projects no one else will do it for you, therefore it is up to you how you perform at your job. It also means that you DO things, not just say things. Anyone can sell in a concept, but few people can actually execute that concept/idea.
To plan and act according to my own desired outcome of a situation especially concerning professional goals but just as well to personal goals as well. It means to create the circumstances rather than to let circumstances rule the day.
Being able to develop and implement creative (or out of the ordinary) ideas
Analyzing mindset questioning facts seeing non yet existing opportunities, outside-the-box thinking, etc.
Thinking outside the box visionary motivated and driven by a vision
thinking strategically moving fast and breaking things
To see how value can be created from mere ideas to plan for it and then make it happen.
To find new ways of solving problems. To be creative and see things from new angle.
To take initiatives is a natural action for someone with an entrepreneurial mindset. To try to think up new ways of doing things.
Being able to find solutions to problems people care about and earn respect/recognition/money for presenting that solution.
To take initiative and find solutions/think in a new way.
Finding opportunities and pursuing them. It could also be activities that do not include business. Creating visions and get people involved in following them.
Seize the opportunity and make something out of it

Being able to identify ideas and value them from different stakeholders perspective e.g. it can be from decisions regarding what to put up on the homepage to come up with new functions that can be valuable for potential customers. To me it also involves taking risks - both economical and personal.
think outside the box focus on capitalizing on ideas finding potential in opportunities and threats
See possibilities and act on them
To dare to do new things, walk new paths, do things without neither perfect information nor preparation.
To look for opportunities ALL the time; Have a drive and transfer the same drive to people around you; Motivate others; Be able to plan execute and sell my ideas to people in my organizations; Dare to Swing Big
For me to act entrepreneurially is to look for more effective and better ways of doing something to identify something and be able to see what others don't and to find possible different uses of something existing which other will desire to use just that they didn't know it. To be able to identify new relationships that could be fruitful for both parties
To act entrepreneurially to me is to strive forward regardless of obstacles that occur be open and positive against new ideas and approaches get things done not just talk about it i.e. make it happen.
I have become more result oriented wanting action. I am seeing opportunities where others see problems to a larger extent than before. I am not neglecting risks but I can be aware of them and act anyway I guess I dare more than before. Networking it is great to have experienced that I can connect people to make things happen.
Find new ways of doing things and understand how I can interlink different things to create new products and services. One could say that thinking outside the box is a cliché but I definitely think that it is part of being entrepreneurial.
To see opportunities and encounter them with action
See opportunities and take them
Being creative in finding solutions and pursuing these ideas
Focus on business opportunities while being flexible in everything
See opportunities where someone else sees a problem and reach goals with a great drive and risk taking.
To think outside the box trying to improve already established processes being proactive risk taker
Taking more initiative which creates impact for society and my surroundings even though it consumes more energy then you have. Trying to encourage people who have ideas and make them believe that they can do it. Finally learn to live happily with a lousy salary :)

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