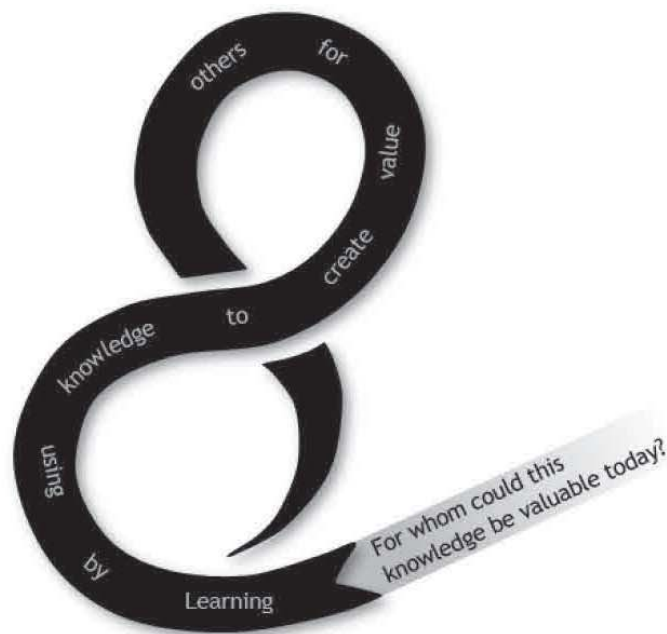




CHALMERS



Value Creation as Educational Practice

- Towards a new Educational Philosophy
grounded in Entrepreneurship?

MARTIN LACKÉUS

Division of Entrepreneurship and Strategy
Department of Technology Management and Economics
CHALMERS UNIVERSITY OF TECHNOLOGY
Gothenburg, Sweden 2016

The role of entrepreneurship as a major engine for innovation, economic growth and job creation has made policymakers argue for infusing entrepreneurship into all levels of education. It is argued that citizens must develop their entrepreneurial skills in order to cope with our increasingly globalized, fast-paced and uncertain world. Making the leap of faith from entrepreneurship into education is however rife with challenges and failures. To address the challenges, the purpose of this thesis is to articulate a new educational philosophy grounded in entrepreneurship, letting teachers use value creation as a stepping stone between entrepreneurship and education.

An educational philosophy grounded in entrepreneurship has been defined in this thesis as letting students learn by using their competencies to create value for others. It was developed through a five-year action research process. Nine empirical studies on all levels of education were drawn from, involving a few hundred primary, secondary, tertiary and continuing education teachers, around 2000 students and around 100 different educational institutions in three European countries. A number of methodological developments were made in the research process, such as a new "proxy" theory of assessing entrepreneurial education, a mobile app based experience sampling informed interview technique and two frameworks for emotional events and entrepreneurial competencies.

This could be the first attempt that has been made to propose an educational philosophy grounded in entrepreneurship. Questions explored in order to qualify it included why educational philosophy is important when infusing entrepreneurship into education and what is new with an educational philosophy grounded in entrepreneurship. Compared to existing educational philosophies such as traditional, progressive and experiential education, it can contribute with a purposeful movement between often unconnected and opposing philosophical positions rather than being yet another flag on the philosophical playing field of education.

MARTIN LACKÉUS

THESIS FOR THE DEGREE OF DOCTOR OF ENGINEERING

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Cover:

Revised and simplified version of the figure on page 69 in the kappa of this doctoral thesis, illustrating how entrepreneurship guides the movement between opposing philosophical positions. The cyclical eight-shape shows how entrepreneurship provides teachers with the culture / “music” to a philosophically boundary-spanning movement / “dance” that their students can learn from.

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ABSTRACT

Purpose

The role of entrepreneurship as a major engine for innovation, economic growth and job creation has made policymakers argue for infusing entrepreneurship into all levels of education. It is argued that citizens must develop their entrepreneurial skills in order to cope with our increasingly globalized, fast-paced and uncertain world. Making the leap of faith from entrepreneurship into education is however rife with challenges and failures. Most attempts have resulted in isolated initiatives impacting only a small number of interested students on higher levels of education. Common challenges to wider adoption are lack of definitional clarity around what exactly signifies “entrepreneurial” education, impeding organizational structures, lack of resources, assessment difficulties and fear of capitalism. To address these challenges, the purpose of this thesis is to articulate and qualify a tentatively new educational philosophy grounded in entrepreneurship, allowing teachers to use value creation as a stepping stone between entrepreneurship and education when attempting to infuse entrepreneurship into education.

Result

An educational philosophy grounded in entrepreneurship has been defined in this thesis as letting students learn through creating value for others, giving teachers prescriptive advice on *what*, *how* and *why* issues in education. This is inherently entrepreneurial in its reliance on a widespread view of entrepreneurship as being about new value creation for others and constituted by a set of teachable entrepreneurial methods. The resulting process is rich with interaction between people and triggers a multitude of emotional learning events, allowing for more engaged students and deeper learning of entrepreneurial as well as subject specific knowledge, skills and attitudes.

Method

The tentatively new educational philosophy proposed here was developed through an abductive five-year action research process of constant iterations between theory and practice. A total of nine empirical studies on all levels of education were drawn from, involving a few hundred primary, secondary, tertiary and continuing education teachers, around 2000 students and around 100 different educational institutions in three European countries. Two main action research cycles were conducted, each spanning 3-4 years in time. Theory from entrepreneurship and education guided the research, as well as theory from fields such as psychology, philosophy, anthropology, economics and methodology. A number of methodological developments were made in the research process, such as a new “proxy” theory of assessing entrepreneurial education, a mobile app based experience sampling informed interview technique and analytical frameworks for key emotional events and entrepreneurial competencies.

Novelty

This is the first attempt that has been made to propose an educational philosophy grounded in entrepreneurship. Questions explored in order to qualify it included why educational philosophy is important when infusing entrepreneurship into education and what is new with an educational philosophy grounded in entrepreneurship. Compared to existing educational philosophies such as traditional, progressive and experiential education, it can contribute with a purposeful movement between often unconnected and opposing philosophical positions rather than being yet another flag on the philosophical playing field of education. Whether this makes it an entirely new educational philosophy or merely a novel combination of established ones remains to be determined.

Limitations

Some important challenges and limitations with the proposed educational philosophy have emerged. It could be viewed as too excluding to view entrepreneurial education as being solely about education that includes value creation attempts. Asking students to focus on knowledge that can be useful for others could also be viewed as an overly utilitarian emphasis. The interdisciplinary challenge of bridging the two very different scholarly fields of education and entrepreneurship was also shown to be significant. It remains to be seen whether value creation as a stepping stone will allow scholars and practitioners to keep their feet dry when attempting to infuse entrepreneurship into education.

Keywords: Entrepreneurship, Value Creation, Education, Educational Philosophy, Assessment.

LIST OF PUBLICATIONS

This thesis is based on the following papers:

- i. Lackéus, M., Williams Middleton, K. 2015. Venture Creation Programs – Bridging Entrepreneurship Education and Technology Transfer. Published in *Education + Training*, Vol. 57 No. 1, pp. 48-73.
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- v. Lackéus, M. 2015. Entrepreneurship in Education – What, Why, When, How. Background paper published by *OECD Publishing, Paris*.
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*Martin Lackéus,
Göteborg, April 21, 2016*

To my wife, Karin

&

To our children

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1 Introduction

Entrepreneurship is seen as a major engine for innovation, economic growth and job creation (Wong et al., 2005; OECD, 2015), with entrepreneurial competencies highly sought after by policy-makers and practitioners (Hofer et al., 2010). Competencies deemed entrepreneurial include knowledge about how entrepreneurs create value; skills in marketing, resource acquisition and opportunity identification; and attitudes such as entrepreneurial passion, self-efficacy, proactiveness and tenacity (Fisher et al., 2008). There is today widespread consensus among scholars that entrepreneurial competencies are not something people are only born with but can be significantly developed over the course of people's lives (Neck et al., 2014; Ramoglou, 2013; Rae et al., 2012; Hindle, 2007; Fayolle, 2007). This has drawn the attention of policy-makers to the potential role of educational institutions, advocating for infusing entrepreneurship into all levels of education from preschool to university and continuing education (European Commission, 2012; Ball, 1989; Hofer and Delaney, 2010; Mahieu, 2006; Volkmann et al., 2009; Valerio et al., 2014). In addition to the stated importance for society of such infusion in terms of alleged resulting innovation and growth, it is also often pictured as a necessity for the individual. The common argument is that citizens must develop their entrepreneurial competencies in order to cope with our increasingly globalized, fast-paced and uncertain world (Surlmont, 2007; Gibb, 2002; Jones and Iredale, 2010).

1.1 Challenges in infusing entrepreneurship into education

Making the leap of faith from entrepreneurship into education is however rife with challenges and failures. Most attempts to infuse entrepreneurship into education have resulted in isolated courses or programs on secondary and higher education level where those very few students¹ who volunteer get to learn *about* entrepreneurship, viewed narrowly as starting a business and becoming an *entrepreneur* (Pittaway and Edwards, 2012). A broader view of learning *through* entrepreneurship, where entrepreneurial processes are embedded into existing curriculum structures for the purpose of making people more *entrepreneurial*, is arguably more relevant to all students and is often advocated by policy-makers. It has however had significant difficulties spreading from policy into practice. Common challenges are lack of definitional clarity, impeding organizational structures, lack of resources, assessment difficulties and fear of capitalism (Johannisson, 2010; Surlmont, 2007; Sagar, 2013; Komulainen et al., 2011). Impact so far is limited if at all knowable, given that most evaluation focus is on narrow outcomes in terms of how many people start (or contemplate starting) a business after their education (see for example Chatzichristou et al., 2015).

When faced with the policy-makers' desire to infuse entrepreneurship into education, most teachers willingly agree that instilling passion, self-efficacy, proactiveness and tenacity into students is indeed worthwhile and important. Their problem is rather to distinguish and appreciate the inherently *entrepreneurial* aspect of such attempts in relation to other change initiatives. Many teachers state that they already have a focus on skills and attitudes now labeled "entrepreneurial" (Holmgren et al., 2005; Berglund and Holmgren, 2007). Similarities in

¹ In this thesis the term "student" is used for learners on all levels of education, in line with U.S. English.

advocated “entrepreneurial” educational practices are indeed striking with the well-known progressive education principles, often described as active, process-based, collaborative, self-directed and experiential approaches to education (Dewey, 1938; Labaree, 2005; Tynjälä, 1999). While having shaped how we talk about education, progressive education remains more marginal in terms of what teachers do (Labaree, 2005; Cuban, 2007; Carr, 2009). This is primarily due to the inherent complexity teachers encounter when trying to connect theoretical curriculum content to each student’s own unique experience (Smith and Ragan, 1999; Dewey, 1938; Darling-Hammond, 2012). Traditional education principles relying on transmitting inert knowledge to passive learners have largely prevailed across centuries due to their relative easiness of implementation, consisting of standardized content and learning outcomes easy to measure (Labaree, 2005; Dewey, 1938). Teachers trying to infuse entrepreneurship into their daily work risk ending up in a challenging cause together with the marginal progressive approaches, currently limited to a minority of teachers and to specialized schools inspired by John Dewey, Maria Montessori and Rudolf Steiner.

1.2 The potential role of educational philosophy

The impact of teachers’ philosophical belief systems (i.e. epistemology, ontology and axiology) upon their teaching styles and course designs is arguably strong but not always acknowledged (Ardalan, 2008; Beatty et al., 2009). Dewey (1938) has stated that overcoming the destructive battle between traditional and progressive education requires “a well thought-out philosophy” (p.21) constituting a plan for *what* to do, *how* to do it and *why*. Educational philosophy can indeed be defined in such practical terms, constituting a written articulation of a thoughtful and coherent description and justification of an educational practice (Burbules, 2000, p.4). Far from being a topic merely for detached philosophers, many schools today ask potential teachers to articulate their own personal teaching philosophy as a formal part of the recruitment process (O’Neal et al., 2007; Goodyear and Allchin, 1998). Educational philosophy is also an important subject in the education of prospective teachers, providing help to think more clearly about their future worklife (Darling-Hammond, 2012; Frankena, 2003). Some common educational philosophies available today giving advice on *what*, *how* and *why* issues in education include letting students learn from reading and repetition of content (traditionalism or essentialism, see Englund, 2000; Apps, 1973) or from problem-solving and experimenting in authentic projects (progressivism, see Apps, 1973; Dewey, 1938).

Educational philosophy scholars have acknowledged an inability of schools to prepare their students for today’s increasingly complex and uncertain society, aggravated by the declining ability of foundational theories to predict and guide practice (Blake et al., 2008, p.8-12; Noddings, 2007, p.80). As a response to this, Kyrö (2005) has anticipated an emerging entrepreneurship-based educational philosophy to be established, supporting students in developing their risk-taking and creative abilities. This is however not the current focus of educational philosophers; in a recent ten-year content analysis of articles in leading philosophy of education journals there was no mention of the word entrepreneurship (Hayden, 2012). This leaves those teachers wanting to infuse entrepreneurship into their teaching in the awkward situation of either having to invent their own personal teaching philosophy apt for the task, or resort to existing educational philosophies, arguably lacking a firm grounding in the field of entrepreneurship and adding to the confusion. This is further aggravated by entrepreneurship

and education being very different scholarly fields, where few if any people possess the required dual expertise to articulate an educational philosophy that can guide teachers (Béchar and Grégoire, 2005). A few entrepreneurship scholars have identified the importance of educational philosophy when infusing entrepreneurship into education (Hannon, 2006; Gibb, 2011; Taatila, 2010; Hindle, 2007; Kyrö, 2005), but no attempt has yet been made to propose a coherent and practically applicable educational philosophy firmly grounded in entrepreneurship. This means that current and future teachers are given little philosophical support in the task of developing young people's entrepreneurial competencies required in today's globalized, complex and uncertain world, despite the increasing policy pressure to do so. Instead teachers are often interpreting such policy pressure as a covert introduction of capitalist and neoliberal values into education, leading to confusion, resistance and mistrust towards policy-makers (Komulainen et al., 2011; Korhonen et al., 2012; Berglund, 2013; Johannisson, 2010).

1.3 Purpose and research questions

In an attempt to remedy the many challenges of infusing entrepreneurship into education, the research leading up to this thesis started out by drawing on a small number of promising but marginal examples in Europe and USA where students learn through creating real-life value to stakeholders outside their program (Janssen and Bacq, 2010; Barr et al., 2009; Thursby et al., 2009; Ollila and Williams-Middleton, 2011; Meyer et al., 2011; Lockyer and Adams, 2014). The strong impact not only on developed entrepreneurial competencies but also on student motivation in general and deep learning also of competencies unrelated to entrepreneurship triggered the emerging articulation of a hypothesis that *value creation* could perhaps be a stepping stone when infusing entrepreneurship into education. An emerging educational philosophy was abductively developed from this point, tentatively offering teachers wanting to infuse entrepreneurship into education some new prescriptive answers to the issues of *what* to do, *how* to do it and *why*.

This led to the purpose of this thesis being to qualify a tentatively new educational philosophy grounded in the field of entrepreneurship, building on a view of entrepreneurship as new value creation. Value can take many forms such as economic, social, emotional, cultural or historical value. Such a view of entrepreneurship represents a quite different kind of stepping stone compared to viewing it as a specific kind of learning, often used when trying to infuse entrepreneurship into education. Qualification of the tentatively new educational philosophy is done in two dimensions (two research questions - RQs):

1. Why is educational philosophy important when infusing entrepreneurship into education?
2. What is new with an educational philosophy grounded in the field of entrepreneurship?

This thesis draws on abductive work in that it has involved simultaneous development of theoretical framework, empirical fieldwork and case analysis (cf. Dubois and Gadde, 2002). With its focus on what "might be", Peirce (1998, p.216) has stated that abduction is "the only logical operation which introduces any new idea", in contrast to induction which outlines what "actually is" and deduction which outlines what "must be". Perceived usefulness (RQ1) and novelty (RQ2) of an educational philosophy does however not imply that any effects on learning have been proven or that the philosophy has reached widespread use in practice among teachers.

Providing evidence of its effectiveness in terms of student learning and spreading it into practice rather constitutes work that lies ahead and is not part of the purpose of this thesis, see Figure 1.

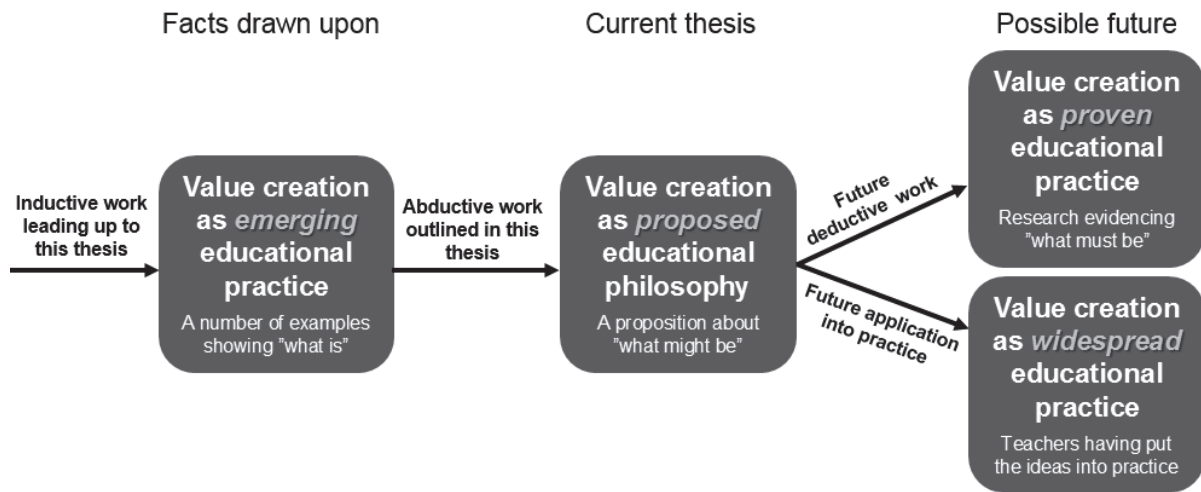


Figure 1. Illustration of the focus of this thesis. Focus of this thesis is related to past and future work.

A practically oriented educational philosophy is inescapably prescriptive in that it constitutes written formulations about what teachers should do, how they should do it and related justifications (Burbules, 2000). This means that any *newly* articulated educational philosophy can be little more than a conceptual proposition requiring testing in practice to see if and when its application leads to desirable learning outcomes with acceptable levels of complexity, resource need and adverse effects. While the educational philosophy articulated in this thesis is empirically informed in many respects by drawing from multiple levels of entrepreneurship related educational practice, it is still an early and primarily conceptual attempt to build an entrepreneurship grounded educational philosophy. Future application of it in educational practice are needed in order to assess any assumed merits.

The purpose here is not to replace existing educational philosophies, but rather to complement and empower them. Furthermore, it is not the purpose here to take a stance in whether or not infusing entrepreneurship into education is the right thing to do, neither stand-alone nor in relation to other potentially worthwhile aims and initiatives one might consider. Such issues are primarily for educational policymakers, managers and teachers to contemplate and decide upon. The scholarly issue explored here is rather to qualify an articulated educational philosophy potentially useful *if* one has decided to try infusing entrepreneurship into education.

This thesis proceeds as follows. In chapter 2, a selection of scholarly fields and subfields will be described and related to the purpose explored here. Entrepreneurship and education constitute the two main scholarly fields of this thesis, and value creation represents a tentative stepping stone in between them. Chapter 3 describes the methodology in terms of the process and applied methods leading up to articulating a tentatively new educational philosophy. In chapter 4 the six appended papers are summarized and related to the purpose of this thesis. Chapter 5 contains an attempt to articulate a tentatively new educational philosophy. In chapter 6 this is discussed in relation to the qualification purpose of this thesis, leading up to implications, limitations and future work. Conclusions are outlined in chapter 7.

2 Theory

In this chapter some key theoretical aspects of entrepreneurship as a scholarly field are first described in section 2.1. Focus is on entrepreneurship viewed as new value creation, a deliberate choice based on its perceived relevance as a stepping stone when infusing entrepreneurship into education. This leads up to the section 2.2 where the stepping stone itself is examined in terms of literature on value and its creation. Value creation is reviewed with an explicit aim to form a pluralistic yet integrated foundation for later discussions, arguably necessary in order to do its assumed job as a stepping stone between the two very different fields of entrepreneurship and education. Finally section 2.3 describes some key theoretical aspects of education, constituting the target field of infusion where entrepreneurship is assumed to be capable of impacting student learning and engagement, provided that teachers are supported by the tentatively new educational philosophy articulated in chapter 5. This third section is concluded with an outline of the current state of education and entrepreneurial education, in order to establish a baseline serving as a contrast to the usefulness and novelty claims and implications articulated and discussed in chapter 6.

2.1 Entrepreneurship

The field of entrepreneurship is multifaceted and interdisciplinary. Some adjacent scholarly fields interacting with entrepreneurship include innovation, strategy, psychology, sociology, politics and the complementary focus of this thesis – education (Edward Elgar, 2015). This section will focus on a subset of aspects in entrepreneurship; those deemed able to contribute the most to solidifying value creation as a stepping stone when infusing entrepreneurship into education. First, definitional issues of entrepreneurship lead to the educationally useful view of defining entrepreneurship as individuals creating new value. Then, some methods that are often recommended for nascent entrepreneurs illustrate how entrepreneurship is currently being practiced and prescribed, allowing for transfer of such methods into education. This is followed by outlining entrepreneurial competencies, explored as a way to bridge between the two domains of entrepreneurship and education. The relational and inherently interpersonal nature of entrepreneurship is explored due to its far-reaching implications for human learning. The commonly stated aversion in education to capitalist and individualist values makes it necessary here to explore altruistic and collectivist notions of entrepreneurship, drawing on entrepreneurial motivation theory to infuse engagement into education. Finally, research on how entrepreneurs learn can inform research on how students could learn more entrepreneurially and how they could develop entrepreneurial competencies.

2.1.1 Defining entrepreneurship

Early entrepreneurship research mainly treated the role entrepreneurs play in the economy, signifying a “What is entrepreneurship?” and “Who is an entrepreneur?” focus (Fayolle, 2007). Schumpeter (1934) famously explored how entrepreneurs introduce new innovations leading to the ‘creative destruction’ of previously dominant practices and associated corporations. Fayolle (2007, p.31) explains how economists have pictured the entrepreneur to assume four different roles in the economic system; “ ‘risk-taker/risk-manager’ (Cantillon, Say, Knight), ‘innovator’ (Schumpeter), ‘alert seeker of opportunities’ (Hayek, Mises, Kirzner) or, finally, that of ‘coordinator of limited resources’ (Casson).”. This led into a trait based focus among

entrepreneurship scholars in the 1960s through to the 1980s (see for example McClelland, 1987), trying to uncover genetical and sociological differences between entrepreneurs and non-entrepreneurs. Entrepreneurs were ascribed innate traits possessed from birth or acquired in early childhood such as strong internal locus of control, tolerance for ambiguity, desire for autonomy, self-confidence and tenacity (Morris et al., 2012).

In the 1990s, research focus shifted from a “Who?” focus to instead study entrepreneurial processes and behaviors, i.e. a “How is entrepreneurship done?” focus. The traits approach was deemed unsuccessful by most scholars, causing insurmountable problems in defining, explaining and predicting entrepreneurship, and was thus largely abandoned (Neck and Greene, 2011; Fayolle, 2007; Morris et al., 2012; Gartner, 1989). Currently there are three main research strands in process-based entrepreneurship research, studying entrepreneurship as (1) the creation of new organizations, (2) as the discovery or creation of opportunities or (3) as the creation of new value (Fayolle, 2007).

The organization creation strand has been led by Gartner (1989, p.62), stating that “Entrepreneurship is the creation of new organizations”. This led him and his followers to study how new organizations are created and which roles individuals take in the process, rather than trying to explore who is an entrepreneur. In the opportunities strand, a currently dominant view was first articulated by Shane and Venkataraman (2000, p.218), stating that entrepreneurship can be defined as “the nexus of two phenomena: the presence of lucrative opportunities and the presence of enterprising individuals” (see also Shane, 2003). This strand of research has however been hampered by the elusive concept of “opportunity”, stated to be lacking theoretical precision (Davidsson, 2015; Dimov, 2011) and constituting a source of problematic trait-based views of entrepreneurship as something mysterious that heroic individuals do (Cardon et al., 2005; Morris et al., 2012; Ramoglou, 2013). Finally, new value creation was proposed as a useful focus for advancing entrepreneurship research in a seminal article by Bruyat and Julien (2001), a research strand we focus more specifically on in the following section.

2.1.2 Entrepreneurship as new value creation

The new value creation strand has a long history in entrepreneurship research, with roots in work by Cantillon (1755) and Say (1803). In more recent times it has been articulated by Ronstadt (1984, p. 28), who defined entrepreneurship as “the dynamic process of creating incremental wealth”. Gartner (1990) has also empirically identified new value creation as a main focus of entrepreneurship in the subjective views of entrepreneurship researchers, business leaders and politicians. The value creation perspective to entrepreneurship was further developed by Bruyat (1993), who proposed a definition based on two dimensions; novelty of the value created and resulting impact of the process on the individual. Bruyat presented this as a dialogic core of entrepreneurship, i.e. a dialog between the individual and the new value created. The individual creates new value and is at the same time impacted by the process. The more novel the value created and the more impact the process has on the individual, the more people tend to describe it as entrepreneurship (cf. Bruyat, 1993, p. 69). Such a view implies that entrepreneurship is as much about the change and learning that the individual entrepreneur experiences by interacting with the environment as the change and new value creation the entrepreneur causes through his/her actions.

To relate to the purpose of this thesis, a trait-based view of entrepreneurship could be regarded as a passive strategy in society, stipulating a wait for the “right” person to arrive, equipped with the traits necessary to create new value for society. The opportunity-based view of entrepreneurship is arguably almost as passive, in that any individual can assume the role of entrepreneur if and when the “right” circumstances magically present themselves in the shape of an elusive “opportunity” one should stay alert to. Such passive views on entrepreneurship implying a wait for the right person or the right circumstance to arrive are arguably poor foundations for educational interventions. Organization creation and value creation views of entrepreneurship are more active, in that anyone can be asked to write a business plan, start a company or try to create new value for others. This makes them more useful in educational settings, allowing for a clear call to students to “Write a business plan”, “Start a mini company” or “Create something valuable for someone”, rather than vague advice to students such as “Be more like this”, or “Stay alert to any opportunity”. But the educative value of writing a business plan has been questioned by many (Honig, 2004; Jones and Penaluna, 2013; Neck and Greene, 2011). Further, asking students to create a new real-life organization as formal part of their education is both rare and administratively complex (Lackéus, 2013a), and does not integrate well into existing curriculum for most teachers. Therefore, the new value creation focus constitutes the least complex of the two active approaches, and constitutes the main theoretical and definitional basis of this thesis. It is arguably the definition with the highest chance of making a contribution to education with its strong focus on personal development and learning.

According to Bruyat and Julien (2001), value creation requires interaction with the surrounding environment, leading to the individual influencing and being influenced by a networked community in dynamic ways. The dialogic system of the individual and the value created is therefore an open system. This means that a number of interaction centric aspects of entrepreneurship are important here. If value creation is to be a reliable stepping stone when infusing entrepreneurship into education, we therefore need to underpin and solidify the concept of value creation with some interactional aspects grounded in entrepreneurship; methods for entrepreneurial interaction, competencies necessary when interacting entrepreneurially, the entrepreneurial interactions themselves, the partly altruistic nature of entrepreneurial interactions and finally the learning that comes from entrepreneurial interaction. There are arguably more aspects that can contribute with solidifying value creation as a stepping stone, but space is limited also in a doctoral thesis, so emphasis will be placed on these interactional aspects deemed to be the most important ones for the purpose of this thesis.

2.1.2.1 Entrepreneurial methods

It has been stated that the currently prevailing research paradigm in entrepreneurship focusing on descriptive processes championed by often heroic entrepreneurs is about to be complemented by a more prescriptive paradigm of developing methods and practices that can be put to work by anyone in unpredictable, non-linear and idiosyncratic entrepreneurial processes of value creation (Sarasvathy and Venkataraman, 2011; Neck and Greene, 2011; Neck et al., 2014). Increasing research effort has been directed towards the design and engineering of “pragmatic tools and mechanisms” that can “serve (creative) action by entrepreneurs and their stakeholders” (van Burg and Romme, 2014, p.371-372). The outcome of this research paradigm so far includes strategies and methods such as bricolage (Baker and

Nelson, 2005), effectuation (Sarasvathy, 2001), systematic experimentation (Ries, 2010; Blank and Dorf, 2012), disciplined entrepreneurship (Sull, 2004) and discovery driven planning (McGrath and MacMillan, 1995). Common characteristics of such methods include an iterative nature of the process, emphasis on stakeholder interaction, collaborative co-creation of artifacts, constant evaluation of process outcomes and an emphasis on learning from failure (Mansoori et al., 2015; Mansoori, 2016).

Venkataraman et al. (2012, p.23) state that this development is “both practically relevant and pedagogically useful”. In line with this, I posit that a prescriptive research paradigm in entrepreneurship can be highly relevant in the prescriptive task of developing a tentatively new educational philosophy grounded in entrepreneurship as new value creation. Prescriptive tools and methods from the field of entrepreneurship could be transferred to educational settings, constituting a much needed support when infusing entrepreneurship into education. The roots of such endeavors in design and engineering traditions (van Burg and Romme, 2014; Venkataraman et al., 2012) also help explain how a new educational philosophy could emerge from research conducted at an engineering school.

2.1.2.2 Entrepreneurial competencies

The competencies that individuals need in order to successfully develop an idea into a thriving business are often termed *entrepreneurial* competencies (Rasmussen et al., 2011; Markman, 2007; Man, 2007; Mitchelmore and Rowley, 2010; Bird, 1995). Burgoyne (1989, p.57) defines competency as “the willingness and ability to perform a task”. Sanchez (2011, p.241) defines competencies as “a cluster of related knowledge, traits, attitudes and skills that affect a major part of one’s job; that correlate with performance on the job; that can be measured against well-accepted standards; and that can be improved via training and development” (ibid, p.241). Man et al. (2002, p.124) define entrepreneurial competencies as the “total ability of the entrepreneur to perform a job successfully”.

Entrepreneurial competencies has been a key concept in the research leading up to this thesis due to its ability to bridge between the two fields of entrepreneurship and education. A knowledge, skills and attitudes (KSA) framework has been developed in order to be able to capture instances of developed entrepreneurial competencies (see appended papers 2, 3 and 5). The conceptualization of human willingness and ability into a KSA framework is common and often deemed useful in educational settings, but requires caution of its simplifying implications (Fisher et al., 2008; Oganisjana and Koke, 2012). Many aspects of competencies are tacit, context dependent and deeply personal and cannot fully be captured by a simple KSA heuristic (Le Deist and Winterton, 2005). I posit that entrepreneurial competencies operationalized through a KSA framework constitutes a lens through which we can increase our understanding of entrepreneurial thought, action and emotion, both in the field of entrepreneurship and in the very different field of education where development of competencies is a common focus. It thereby facilitates the bridging between two very different fields. It also connects to the purpose of this thesis in terms of connecting to those competencies that policy-makers aim to develop in their citizens through infusing entrepreneurship into education.

2.1.2.3 Entrepreneurial interactions

While still a neglected theme in entrepreneurship research, there is ample indication that interpersonal interaction is at the core of entrepreneurship (Sarasvathy and Venkataraman, 2011; Goss, 2005a; York et al., 2013). The creation of new value that characterizes entrepreneurship according to Bruyat and Julien (2001) is primarily directed towards others in society. Creating a venture can thus be viewed as a process of intense interaction with external stakeholders in society such as customers, suppliers and partners, searching for new value creation opportunities. Further, most if not all entrepreneurship methods outlined in section 2.1.3 prescribe the entrepreneur to interact with external stakeholders, either in an experimental or in a transformational manner (cf. Mansoori et al., 2015). Experimental in terms of conducting experiments where opportunity hypotheses are tested in numerous discussions with external stakeholders (Blank and Dorf, 2012; Ries, 2010; Sull, 2004; McGrath and MacMillan, 1995). Transformational in terms of an iterative process of co-creation with a set of self-selected or randomly available external stakeholders (Read et al., 2009; Baker and Nelson, 2005). The entrepreneurial competencies view also stipulates interpersonal interaction to be at the core of entrepreneurship. Many inherently interpersonal competencies are often deemed entrepreneurial, such as marketing, persuasion, listening, dealing with customers and managing people (cf. Fisher et al., 2008).

2.1.2.4 Entrepreneurial altruism

The assumption that helping others is always motivated by some kind of self-benefit, if ever so subtle, is deeply ingrained in our society (Piliavin and Charng, 1990). The high-profiled prevalence of largely altruistic and potentially self-hurting behavior for the benefit of others by the likes of Mahatma Gandhi, Oskar Schindler and Mother Teresa has not changed this perception (Batson et al., 2008). In entrepreneurship, altruistic value creation has even been given its own subdomain, apparently viewed as a rare oddity. The more altruistic the entrepreneur is, the more it is labeled as an exception in terms of *social* entrepreneurship (Tan et al., 2005). Entrepreneurs creating value for their customers are thus primarily viewed as engaging in this activity as a secondary means in order to achieve the primary end of creating wealth for themselves. This is in line with the common view of capitalism as an instrument exploiting selfish behavior for the purpose of maximizing public good (Vogel, 1991). Had it not been for the indirect value that entrepreneurs create for society in terms of innovation, economic growth and job creation, entrepreneurs might not have been elevated to the status as heroes they currently enjoy in the view of policymakers and much of the general public (Perren and Jennings, 2005; Ogbor, 2000).

Viewing genuine helping behavior as an exception or a mere means to self-benefit can however be seen as a pessimistic view of humanity and perhaps also neglects and underestimates some core human values such as creativity, empathy, humanism, communitarianism and strive for a meaningful life (Batson et al., 2008; Frankl, 1985; Feldman and Snyder, 2005; Deuchar, 2007; Baumeister et al., 2012). In entrepreneurship literature there is also ample evidence of a more collectivist side to entrepreneurship. Schumpeter proposed the joy of creating to be a key motive for entrepreneurs (Goss, 2005b). Morris et al. (2012) have outlined some common entrepreneurial motives such as improving the community, experiencing a sense of meaningfulness with others, finding a higher purpose in life and changing the world for the

better. Spinosa et al. (1999, p.43) leaned on political writer George Gilder to state that there are “three essential entrepreneurial virtues: giving, humility, and commitment.”. While such a view of entrepreneurial forms of capitalism is not uncontested (Himmelstein, 1981), it cannot be ruled out that some entrepreneurs are motivated by such factors. There is also a research strand focusing on entrepreneurship as an inherently collective activity, contributing with emphasis on teamwork and community-based activity (Drakopoulou Dodd and Anderson, 2007; Sarasvathy et al., 2009). Given a common critique of attempts to infuse entrepreneurship into education being viewed as covert capitalist initiatives (Komulainen et al., 2011; Johannisson, 2010), a collectivist and altruistic side of entrepreneurship is important to draw on when developing a tentatively new educational philosophy grounded in entrepreneurship. Taking advantage of links between entrepreneurship, economics and sociology through the unifying concept of value creation, we will continue the review of collectivism versus individualism in section 2.2, looking at economic and sociological conceptions of value creation more in-depth.

2.1.2.5 Entrepreneurial learning

We will now turn to an aspect of entrepreneurship that is perhaps the most common to focus on when attempting to infuse entrepreneurship into education; that of viewing entrepreneurship as a particular form of learning. According to Smilor (1997), entrepreneurs are exceptional learners. To successfully manage change and challenge status quo, they have to incessantly learn from customers, suppliers, competitors, employees and associates. They also have to learn from experience, from doing, from what works and from what doesn’t work. A few scholars have set out to empirically explore how entrepreneurs learn. Cope and Watts (2000) found that entrepreneurs learn from critical episodes consisting of multiple critical and emotional learning events, and that the most powerful learning comes from the entrepreneurs’ own painful mistakes. While negative initially, the outcome in terms of learning and personal development was described as very positive. Rae (2005) explored empirically how people develop their own identity as entrepreneurs by taking action in a community they choose, tentatively assuming the role as an entrepreneur in collaboration with partners, customers, investors and others. They make sense of this process by developing a resulting new life-story about themselves. This story is constantly revised and told to themselves and to others, such as family, friends and colleagues, resulting in changed identity, self-image and relationship to others.

In general, entrepreneurial learning scholars are in agreement that entrepreneurship can only be learned through own experience (Minniti and Bygrave, 2001; Politis, 2005; Young and Sexton, 1997; Dalley and Hamilton, 2000). Cope states that knowledge about how to be entrepreneurial “can only be acquired through learning-by-doing or direct observation” (Cope, 2005, p.381). Such insights into how entrepreneurs learn are however not easily transferred to education. They leave teachers wanting to infuse entrepreneurship into education with the difficult task of finding answers to the question: *Learning-by-doing-what?* It is unclear in existing literature what students should do to feel emotionally engaged in a relevant community of practice where they can make mistakes they will regret but can learn from. Some adopt a view that if teachers assume an entrepreneurial attitude it will then allow them to design a multitude of entrepreneurial education practices to apply on their students, and that it is not the role of scholars to prescribe any entrepreneurial methods over the head of teachers (Falk-Lundqvist et al., 2014). I posit that applying an entrepreneurial learning focus without any clear and

actionable recommendations on philosophical or practical level when infusing entrepreneurship into education is problematic, and could perhaps even be viewed as a tautological call for learning-by-learning. This thesis takes a different position through its focus on learning-by-creating-value.

To summarize, Figure 2 outlines some key aspects of importance for a view of entrepreneurship as new value creation if it is to be solid enough to be used as a stepping stone when infusing entrepreneurship into education.

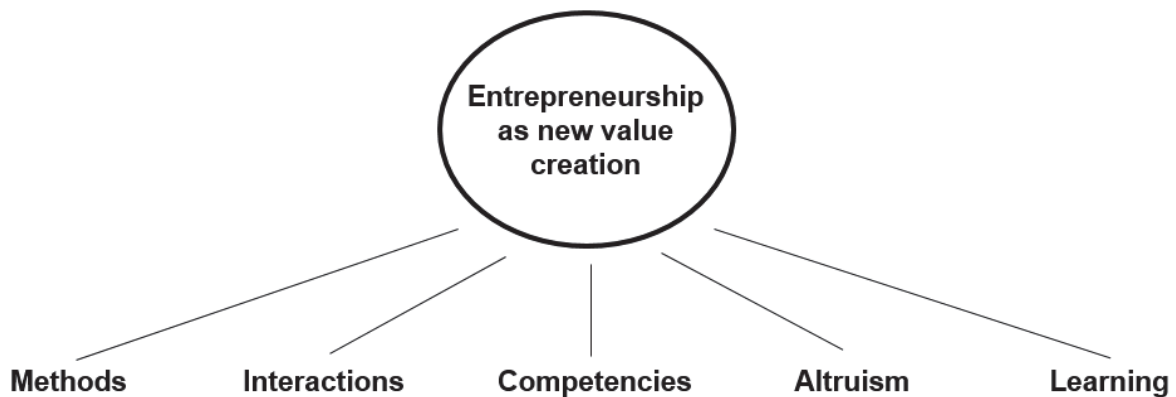


Figure 2. Five key aspects of entrepreneurship solidifying entrepreneurship as new value creation. Entrepreneurial methods, interactions, competencies, altruism and learning pictured to solidify entrepreneurship as new value creation, a stepping stone for infusing entrepreneurship into education.

2.2 Value creation

We will now turn to value creation, the intended facilitating step between entrepreneurship and education. In order for such a step to be capable of connecting between two very different fields, there arguably is a need to have a comprehensive understanding of it. The main proponents of the value creation strand in entrepreneurship research have however not provided much guidance on the deeper meaning of value and its creation. In their seminal article on entrepreneurship as new value creation, Bruyat and Julien (2001, p.170) merely stated that they did “not need to take up this old (and somewhat outmoded) debate”. Fayolle (2007, p.46) has at least hinted that value “relates to exchanges between market players at prices determined by the market”. Hindle (2010, p.610) has outlined a more pluralistic but equally brief view by stating that “new value may take many forms: economic, social, monetary, ecological, mental, physical, etc”. While these views on value might be enough when studying entrepreneurship in isolation, they are unlikely to give teachers and other key educational stakeholders enough guidance when the purpose is to infuse entrepreneurship as new value creation into education. This review of value creation therefore needs to venture outside the field of entrepreneurship.

This literature review starts with an overview of singular and plural conceptions of value. The roots of singular conceptions will be traced to 18:th century economic thought, and the roots of plural conceptions will be traced to 20:th century sociological thought. These two differing perspectives on value will be summarized and integrated into a value creation framework useful for the purpose of this thesis, specifying a number of complementary views of what is valuable. This framework then also represents a return to the field of entrepreneurship through its summary of five main kinds of value creation anchored in sociological and economic theory.

2.2.1 Value versus values

The term “value creation” could easily lead associations to the domain of economics. Among classical economists such as Marx (1867), Smith (1776) and Ricardo (1817) there was consensus around a framework of three phases that value progresses; production (or creation), circulation (or trade / exchange) and consumption (or use / destruction) of value (Mirowski, 1991, p.143). But value is more elusive as a concept than such simple frameworks can make us believe. Sociology scholars have assumed a more pluralistic view of value. In fact, discussions around value could be viewed as divided between economists and sociologists, illustrated by the example of Parson’s Pact, a deal struck between different departments at Harvard University in the middle of the 20:th century: “You, economists, study value; we, the sociologists, will study values” (Stark, 2011, p.7). Such a division between singular and plural views of value is ultimately a question of degrees of commensurability, calculability and comparability between different more or less incommensurable kinds of value (Kornberger et al., 2015; Kjellberg et al., 2013).

A singular and standardized measure of value is often viewed as a requirement for scientific calculations, for example in economics where such calculations are used to mathematically determine prices and predict markets. But in any attempt to arrive at a singular notion of value there is a logically necessary but at the same time detrimental assumption around assumed stability and conservation of value that leads to major difficulties and inconsistencies (Mirowski, 1991). This makes modern economic theories apt for treating mature markets where focus is on routine value creation, prices, consumption and situations of equilibrium, but at the same time less useful for analyzing entrepreneurial value creation, innovation, co-creation and production (Lopdrup-Hjorth, 2013; Mirowski, 1991; Prahalad and Ramaswamy, 2004; Benkler, 2006). Narrow economic value calculations also marginalize and silence other values such as fairness, ecology, equality and the common good (Lopdrup-Hjorth, 2013; Kjellberg et al., 2013). Economic sociologist Stark (2011, p.6) asks some illustrative questions:

“What counts? Each of us confronts this question on a daily basis. Faced with decisions involving incommensurable frameworks – work versus family life, career opportunities versus loyalty to friends or attachment to a locality, vacations versus investments for retirement, and so on – we ask ourselves what really counts. What is valuable, and by what measures?”

Stark (2011) draws on Dewey (1939) to point out the dangers of separating the intellectual from the emotive through dichotomies such as value versus values, economy versus society, calculation versus judgment, estimate versus esteem, or costly versus dear. Both Stark and Dewey state that such separations lead to flawed assumptions around human action and valuation. Stark points to the fact that the term “worth” is a bridging term in that it has both an economic and a moral meaning. While semantics is not offering a solution, it helps illustrating and making us aware of the many false dichotomies at play here. Other bridging terms such as, “socioeconomics” and “wikinomics” have been proposed to describe new arenas and forms of value creation in today’s society characterized by openness, sharing, co-creation and global networking defying singular categorizations of value (Bollier and Pavlovich, 2008; Tapscott and Williams, 2008). Still, the literature is largely organized around the two main different

conceptions of value versus values, so integration will need to wait until towards the end of this section.

2.2.2 Value according to economists – a singular view

A common basis for economic views of value is the assumption of *homo oeconomicus*, i.e. that humans are strictly rational in their daily utility calculations, always aiming to optimize (or at least satisfy) their own interests (Hirshleifer, 1985; Lemke, 2001; Lindenberg, 1990; Ghoshal, 2005). A well-quoted passage in a seminal book by the founder of modern economics Adam Smith (1776, p.7) illustrates this well: “It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their own interest”. Such a utilitarian position was also developed by Bentham (1776, p.ii) who stated that what is deemed valuable should be guided by people’s perceived pleasures and pains, and that society therefore should strive for “the greatest happiness for the greatest number”. Economists have conceptualized value in at least three main different ways; as subjective utility perceived by a consumer, as an objective substance inherent in valuable artifacts and as a creation process where ability to create value is determined by various circumstances.

2.2.2.1 Neoclassical and neoliberal economics – value as subjective utility

Neoclassical economics studies supply and demand under the assumption that markets consist of rational individuals maximizing their own benefit (or their firm’s). Neoliberalism is neoclassical economics turned into politics, asserting that society maximizes well-being of the collective by letting each individual maximize own benefit (Harvey, 2005). Neoclassical and neoliberal economics both take a similar position to value as that expressed by Smith and Bentham above; what is valuable is simply up to the recipient of value to determine – the utility-maximizing consumer exerting her freedom of choice. Here the term used is not “value”, but instead “utility”, semantically and conceptually in line with Bentham’s utilitarianism. This represents a subjective view of value (Meynhardt and Von Müller, 2014), and was introduced in the 1870:s by Walras (1874), Menger (1871) and Jevons (1871). These theories of value were all, independent of each other, inspired by new discoveries in physics around field energy equations (Mirowski, 1991). They allowed for solving the puzzling discrepancy between the “natural” (i.e. objective) value of goods and fluctuating market prices (Meynhardt and Von Müller, 2014). The solution was simply to say that the market value *is* the value of goods, illustrated in mathematical terms as a force field of differing levels of utility, and that there is no such thing as a “natural” value of goods. The use of field equations also allowed for unprecedented mathematical precision and complexity in economic calculations of utility, opening up for new levels of analysis, explanation and prediction.

2.2.2.2 Classical economics – value as objective substance

The term “classical economics” refers to ideas developed by a small but influential group of classical economists in the 18:th and 19:th centuries. A key theme in classical economics was the substance-based value theories developed by Quesnay (1758), Smith (1776), Ricardo (1817) and Marx (1867). These now largely abandoned value theories all stated that the “natural” value of goods was determined by some objectively identifiable substance used for its production, such as corn, stock or labor time (Mirowski, 1991). The shift in the 1870:s away from such objective substance theories of value was so abrupt that the term “value” was deemed too

ambiguous, unscientific and dangerous, and therefore abandoned and delegated to “the dustbin of history by mainstream economics” (Lopdrup-Hjorth, 2013, p.179). The resulting emphasis on demand (i.e. utility) and consequent neglect of supply (i.e. value creation) however led to significant limitations in ability to explain phenomena pertaining to *creation* of new value (Mirowski, 1991), which is a key topic of this dissertation. Therefore the concept of value has nevertheless been chosen as a key term here. But still, advice from Jevons (1871) to be mindful of the difference between exchange value and use value needs to be taken into account.

2.2.2.3 Strategic management – value creation as strategic capability

A practitioner oriented scholarly field that currently uses the term “value” is that of strategic management of firms. Normann and Ramirez (1993, p.65) start a seminal article in the field by stating that “Strategy is the art of creating value”. Ever since Porter (1985) introduced the idea of analyzing a firm’s “value chain”, i.e. the chain of activities that generate value for a firm’s customers, the term value has been widely used by strategic management scholars and practitioners alike (Lopdrup-Hjorth, 2013). According to strategic management literature there are a number of more or less tangible factors determining a firm’s value creation capacity; activities (Porter, 1985), resources (Wernerfelt, 1984), core competencies (Hamel and Prahalad, 1990), social networks for co-creation (Normann and Ramirez, 1993), dynamic capabilities and intellectual assets (Teece et al., 1997). All these attempts to explore where value comes from could be interpreted as an unexpected revival of certain ideas from classical economics, since they all try to trace the journey of value through the production system in a manner similar to the abandoned substance value theories (Lopdrup-Hjorth, 2013). Noteworthy here is that under the co-creation logic the linear framework of production, exchange and consumption of value falls apart to some extent. In today’s global, digital and networked society it has become increasingly difficult to tell producers of value apart from consumers of value. Facebook is a particular example of this in that the website’s “customers” are actually producing billions of hours of unpaid labor work in order to allow for value to be created for Facebook’s paying (i.e. primary) customers – the advertisers (Fuchs, 2012). Another example is the outsourcing of production of financial services to the customers through use of web platforms (Benkler, 2006).

A recent literature strand in the strategic management field has explored the impact of two different kinds of value creation in firms; (1) routine value creation in terms of efficient production of what customers want today and (2) explorative value creation in terms of innovating future offerings that customers don’t even know they want yet. It has been shown that firms that are “ambidextrous”, i.e. those firms that manage to focus simultaneously on routine and explorative value creation, are more innovative, perform better financially, grow faster and survive longer (O’Reilly and Tushman, 2013). Taking into account the particularly strong link of explorative value creation to learning (Raisch and Birkinshaw, 2008) and to entrepreneurial competencies (O’Reilly and Tushman, 2004), it could be a useful distinction when considering a tentatively new educational philosophy based on value creation.

2.2.3 Value according to sociologists – a pluralistic view

A common basis for sociological views of value is the assumption of *homo sociologicus*, i.e. that humans are socializing, role-playing, volitional, meaning-seeking and docile individuals acting not only on self-interest but also on advice, social status, norms and values they perceive

in society (Simon, 1993; Lindenberg, 1990; Fehr and Gintis, 2007; Gemici, 2008). Sociological views on value are more pluralistic than economic views and are therefore more difficult to summarize. This section will therefore necessarily be an arbitrary selection of value frameworks, included based on their utility for the purpose of this thesis and their ability to give a few complementary perspectives on pluralistic value theory. Three frameworks have been taken from three different but somewhat overlapping fields; economic sociology, behavioral economics and psychology. Given that the incentive structures of society's current education systems are primarily organized around individual perspectives, the frameworks presented here are all individually focused. But they all take collectivity into account by illuminating how and why different sociological dimensions are valued by the individual.

2.2.3.1 Economic sociology – six orders of worth

Economic sociology is the study of sociological perspectives on economic phenomena (Smelser and Swedberg, 2005). A key argument in the field is that markets need to be viewed as embedded in society (Polanyi, 1944; Granovetter, 1985). Polanyi claimed that any attempt to disembed markets from society will have disastrous consequences, and that such attempts will trigger dangerous countermovements such as authoritarianism and fascism (Gemici, 2008; Smelser and Swedberg, 2005; Harvey, 2005). This has positioned economic sociology as an attack on both neoclassical and neoliberal views, united as they are in their view of the free and rational *homo oeconomicus* outlined above (Swedberg, 1997; Peck, 2008; Smelser and Swedberg, 2005). Stark (2000, p.2) leans on White (1981) to take this argument even further, stating that markets “are not simply *embedded in* social relations, they *are* social relations”, implying an impossibility of separating the intellectual from the emotional and moral. Economic sociology has advanced not only through sociologists' work (Swedberg, 1990). Some economists who have made attempts to integrate the two fields of economics and sociology include Sen (1999), Becker (1978), Arrow (1962) and Akerlof (1970). Amartya Sen for example has stated that “we should not fall into the trap of presuming that the assumption of pure self-interest is, in any sense, more elementary than assuming other values” (Ben-Ner and Putterman, 1999, p. xii).

Boltanski and Thévenot (2006) have developed one of the main theoretical frameworks for value analysis in economic sociology. The framework consists of six different “orders of worth”, labeled “worlds” of value (Jagd, 2011). In the *world of inspiration* it is qualities such as creativity, imagination and passion that are valued. A prime example of a firm successfully focusing here is Apple Computer (Boivin and Roch, 2006). In the *industrial world* what is valued is productivity, predictability and performance. The *market world* celebrates competition, rationality and desire for scarce goods and self-benefit. In the *domestic world*, worth is determined by hierarchies and relationships between people and associated esteem and reputation. Key determinants here are traditions, social dependencies and loyalties. The *world of fame* positions value in the number of people that grant their recognition through reliance on “appearance, stardom and superficiality” (Boivin and Roch, 2006, p.411). Finally, the *civic world* encapsulates collective common good values such as fairness, democracy and solidarity. According to Boltanski and Thévenot (2006), people's actions and valuations are simultaneously justified and legitimized through all six worlds, but to varying degrees

depending on each situation. Still, each world has its own metrics, measurement instruments and reifications. These six worlds are shown in Figure 3 below.

2.2.3.2 Behavioral economics – five consumer values

Behavioral economics combines economics with other fields that empirically study human behavior, primarily psychology but also other fields (Wilkinson and Klaes, 2012; Kahneman, 2003; Weber and Dawes, 2010). A pioneer in this field was Nobel laureate Herbert Simon, who modified the rationality assumption underlying neoclassical economics by stating that rationality is “bounded” (i.e. limited) by lack of information, limitations in human cognitive power and the presence of multiple and shifting personal wants (Simon, 2000). According to Simon (1993; 2005) humans respond to this by carefully listening to others’ advice, constantly learning in social settings and internalizing rules of thumb (i.e. heuristics) that can be used for future decisions on which actions to take. This results in behavior that at times appears altruistic, i.e. helping others with no expected reciprocity, thereby deviating from the mainstream economic assumption of self-optimizing behavior. Whether it is, in fact, altruistic or a future-oriented, dynamic and “intelligent” form of subtle egoism is a question often discussed by scholars (Batson et al., 2008; Simon, 2005; Axelrod and Hamilton, 1981). In general, a key topic in behavioral economics is the issue of non-egoistic preferences, triggering a need to empirically study “how real people actually behave and decide” (Weber and Dawes, 2010, p.91).

A widely applied value framework in behavioral economics has been developed by Sheth, Newman and Gross (1991). They took consumer decisions as a starting point of empirical analysis and ended up with five different values influencing consumer choice; functional, emotional, epistemic, social and conditional value. *Functional value* refers to consumers’ perceived utility in terms of product function or performance. *Emotional value* stems from a capacity of products to arouse feelings that consumers value. *Epistemic value* is based on consumers’ curiosity, novelty and desire to learn. *Social value* is derived from utility related to consumers’ participation in groups. Examples include jewellery, clothing, gifts and cars that convey a desirable image to others (Sheth et al., 1991, p.161). Finally, *conditional value* depends on needs that arise out of situations such as seasons and cultural events, where consumers would otherwise be at odds with the situation they find themselves in. With its focus on how consumers choose between alternative products, this framework arguably aligns more with the singular view of a self-serving *homo oeconomicus*. Still, the framework illustrates how multiple values are combined by consumers to form perceptions of utility. These five values are shown in Figure 3 below.

2.2.3.3 Psychology – five perspectives on what humans value

Motivation and well-being theories stemming from psychological research constitute one possible starting point in an investigation of what humans find valuable. It is also particularly relevant for this thesis, given the impact that student motivation can have on learning (Boekaerts, 2010; Snow et al., 1996). Fiske (2008) has synthesized the vast literature on motivational research into a framework consisting of five different perspectives. According to Fiske, human motives differ depending on whether we (1) study patients on the psychoanalytic couch, (2) examine our own consciousness, (3) watch students in the classroom, (4) use the

computer as a metaphor for cognitive understanding or (5) study group members in a collective. On the psychoanalytic couch people appear hedonistically self-focused on maximizing pleasure and avoiding pain, in line with utilitarian economics. When studying people's conscious experiences they appear optimistic, future-oriented, trust-based and focused on functional potential to get things done, i.e. an emphasis on the emotional enjoyment and flow inherent in human valued activity. In the classroom the clear-cut incentives in a constructed learning environment make for behavioristic motives based on students' expectance to achieve a goal and the perceived value of achieving it. When using the computer as a metaphor for researching human cognition, scientists have studied mental and social aspects of how people process information in order to reach a coherent understanding, i.e. aiming to reach a harmonious experience free from individual and collective dissonance and disjuncture. When studying groups the motives for belonging to a social collective seem endless, ranging from surviving, reproducing and conforming to collectively acting, understanding and sympathizing.

Another value framework anchored in psychology has been developed by Seligman (2012), consisting of five measurable elements of subjective well-being; positive emotion, engagement, relationships, meaning and achievement. *Positive emotion* is interpreted as a mood induced by a pleasant life. *Engagement* is interpreted as being in "flow", being completely absorbed by a task and losing track of time. *Relationships* is interpreted as meaningful experiences shared with other people, often in close and long-term relationships. *Meaning* is interpreted as belonging to and serving something that is bigger than the self, often despite its sometimes detrimental impact on other elements in the framework. *Achievement* (or accomplishment) is interpreted as achieving one's goals solely for their own sake, isolated from any eventual resulting impact on the four other elements of the framework, i.e. winning just for the sake of winning.

Yet another theory anchored in psychological well-being research is the logotherapy theory by Frankl (1985), emphasizing humans' strive for meaning, in contrast to Freud who emphasized will to pleasure and Nietzsche who emphasized will to power (Frankl, 1985, p.99). Finally, recent work by Metz (2009) and Baumeister et al. (2012) has emphasized two main and only partly overlapping sources of human well-being; happiness and meaningfulness. Baumeister et al. (2012) showed empirically that happiness is primarily self-oriented and associated to being a taker, whereas meaningfulness is primarily others-oriented and associated to being a giver. The varying perspectives of motivation and well-being outlined here are summarized in Table 1. Based on this summary, and for the purpose of this thesis, five resulting kinds of value creation are articulated. These five kinds of value creation are also shown in Figure 3 below. An extensive discussion on the different psychological value theories outlined in Table 1 and their relationship to entrepreneurial education can be found in appended paper 6 of this thesis.

Table 1. Five different kinds of value creation. These five kinds of value creation constitute a summary of psychological research on human motivation and well-being.

Focus	Motivation theory (Fiske, 2008)	Well-being theory (Seligman, 2012)	Will to... (Frankl, 1985)	Resulting kind of value creation
Primarily “happiness for oneself” oriented factors (Metz, 2009; Baumeister et al., 2012)				
Self-analysis	Psychoanalytic couch based hedonistic self-focus	Positive emotion	...pleasure	Economic / subsistence value creation
Goal / power	Expectancy-value theories of goal prediction and control	Achievement	...power	Historical / pride / power value creation
Primarily “meaningfulness with others” oriented factors (Metz, 2009; Baumeister et al., 2012)				
Action-taking	Conscious focus on future-oriented functional action	Engagement / flow	...meaning	Personal / pshychological value creation
Belongingness	Coordinated and interdependent teamwork and relationships	Relationships	...meaning	Relational / social value creation
Processing	Mental / social processes of reaching coherent understanding	Meaningfulness	...meaning	Equalizing / harmony / cultural value creation

2.2.4 Summarizing into an integrative view of value

The literature review undertaken here has shown how difficult it is to disentangle an egoistic focus on doing well for oneself from an altruistic focus on doing good for others. It is arguably more fruitful to see them as “two primal, separate standing, yet complementary forces found in all things” as the idea of yin and yang in Chinese thinking suggests (Chen et al., 2010, p.175). Further, according to Dewey (1939), Polanyi (1944) and Stark (2011), disembedding and dichotomizing self-oriented value creation from others-oriented value creation is a detrimental and dangerous path to take. Therefore in order to form a more integrative foundation for later discussions on value rather than the dualistic Parson’s Pact based view found in the literature reviewed here, Figure 3 graphically summarizes how the three pluralistic perspectives on value discussed in section 2.2.3 integrate with the singular perspective on value discussed in section 2.2.2. Five different kinds of value creation are illustrated in Figure 3, arguably constituting a possible and useful summary for the purpose of this thesis. All five kinds of value creation are pictured as relying on a common integrated core of value for oneself *and* for others.

The five kinds are labeled as follows; economic, enjoyment, social, harmony and influence value creation. *Economic value creation* could be viewed as primarily self-oriented attempts to create value for oneself by delivering what others want. In entrepreneurship literature this is a very common view of value creation (Korsgaard and Anderson, 2011). *Enjoyment value creation* could be viewed as value creation just for the pure joy / fun of it. Schumpeter proposed this to be an important value for people acting entrepreneurially (Goss, 2005b). *Social value creation* could be viewed as an others-oriented kind of value creation focused on making other people more happy or relieving their suffering. This parallels to social entrepreneurship, a major theme in entrepreneurship research (Tan et al., 2005). *Harmony value creation* could be viewed as value creation that makes more sense as a whole, culturally or in relation to collective values such as fairness, ecology, equality and the common good. While a quest for harmony is perhaps not a common theme in entrepreneurship research, it has been proposed as a useful and theoretically well-grounded view of entrepreneurship for educational purposes (Blenker et al., 2012). *Influence value creation* could be viewed as creating value in order to increase one’s influence, power or historical legacy. Such a view of entrepreneurship as societal change

through economic or political history-making has been proposed in an influential book by Spinoza et al. (1999).

While value creation arguably could be graphically summarized as consisting of more, less or indeed other kinds of prototypic value, Figure 3 nevertheless illustrates the many kinds of value creation that entrepreneurship can contribute with to educational practice. Figure 3 also illustrates Polanyi's (1944) general point around the shortcomings of an economic and disembedded view of value, impacting the infusion of entrepreneurship in education. Teachers could be encouraged to draw from many different kinds of value creation when making the leap from entrepreneurship to education, stepping on a stone consisting of multiple perspectives. In line with the view put forward by Boltanski and Thévenot (2006), it is recommended to view every entrepreneurial value creation activity in education as simultaneously containing the entire stepping stone, i.e. all five kinds of value articulated here, albeit present to a varying degree for different people and in different situations. In one single day of the life of a business or student entrepreneur all five kinds of value could arguably be present, with the emphasis changing hour by hour or even minute by minute depending on how the day unfolds.

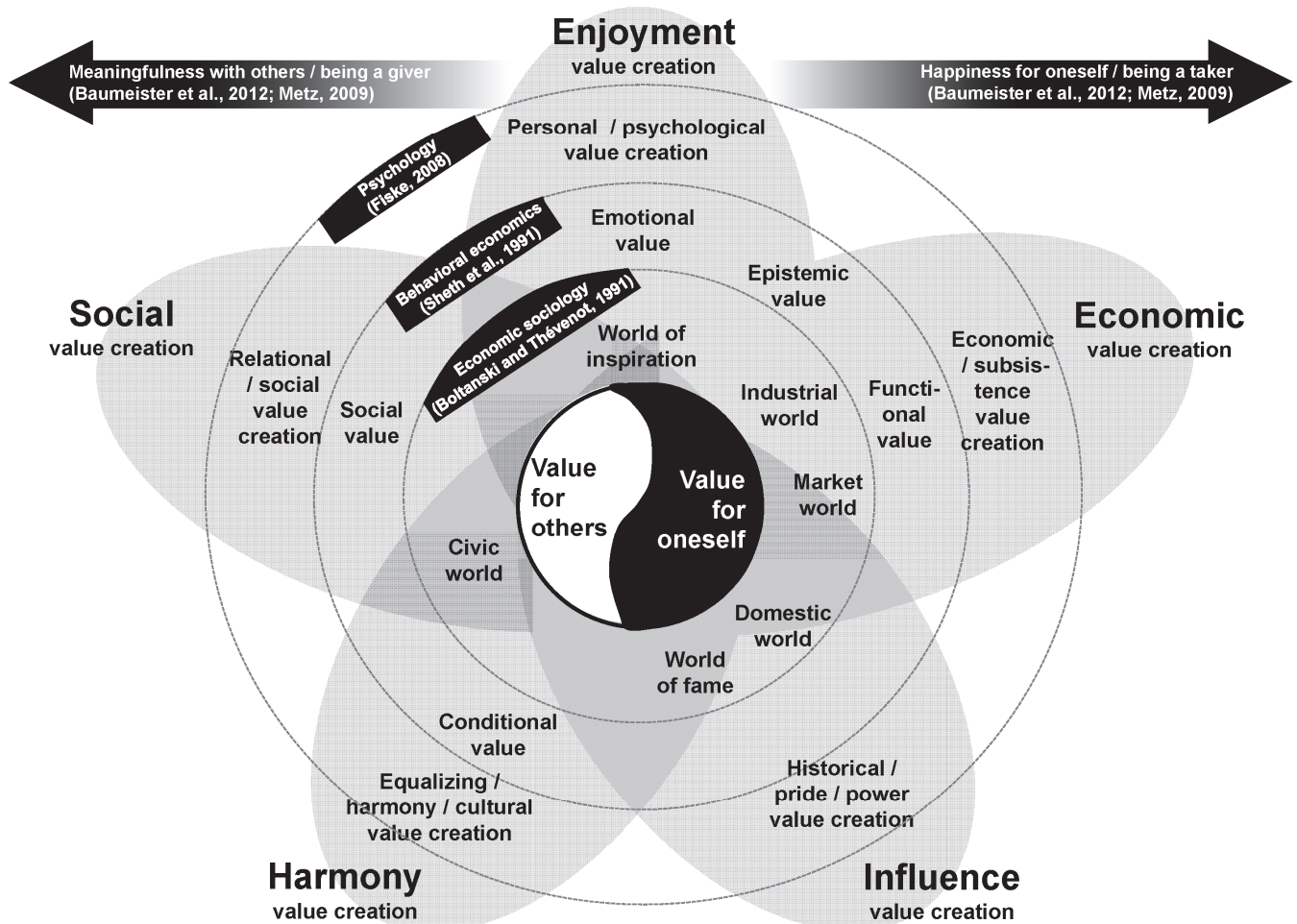


Figure 3. A singular stepping stone of value creation consisting of five different perspectives. Three pluralistic perspectives of value are integrated with a singular economic perspective of value. The five resulting kinds of value are positioned in a force field ranging from meaningfulness to happiness.

2.3 Education

We will now turn to education, constituting the target field of the previously discussed infusion attempts. Given the purpose of qualifying a tentatively new educational philosophy giving prescriptive answers to *what*, *how* and *why* questions in education, this review starts by outlining some key philosophy of education literature and concepts. Then some common educational philosophies are outlined, summarized as a philosophical playing field of education to be used in further discussions. The key role of educational evaluation in any attempt to spread educational ideas is briefly discussed as a backdrop to the articulation (chapter 5) and qualification (chapter 6) oriented discussions that will follow. Finally, the current state of education and entrepreneurial education is delineated in order to form a baseline for the qualification purpose of this thesis.

Jarvis has defined education as “any institutionalized and planned series of incidents, having a humanistic basis, directed towards the participants’ learning and understanding” (Jarvis, 2010, p.41). He further outlines three main kinds of learning; formal learning, non-formal learning and informal learning. Formal learning is defined as any education and training occurring in an educational institution, and is the focus of this thesis. Non-formal learning rather occurs at the workplace or in the community. Informal learning refers to the everyday self-directed learning that we undertake individually or in a group. This means that learning is a wider concept than education, in that “education is but one system through which we learn” (Jarvis, 2010, p.41).

Differing views of learning profoundly impact education. Applying the common view among the public of learning as passive reception of knowledge results in a very different educational system from that where learning is viewed as a process of learners constructing their own personal understanding through experience (Ernest, 1995; Jarvis, 2006). Both these endpoints are today very much alive in discussions about learning and education, and both have their merits (Sfard, 1998). Educational implications of such differing beliefs about learning are treated at length in the scholarly field of philosophy of education, to which we now turn. A multitude of philosophical positions will be outlined briefly, and three main positions deemed to be particularly relevant to the purpose of this thesis will be described more in-depth; traditional, progressive and experiential education.

2.3.1 Philosophy of education as a scholarly field

A recurring theme among scholars in philosophy of education is to discuss how the field can be defined and delimited (Noddings, 2007; Burbules, 2000; Chambliss, 2009). No consensus has been reached, and the field is instead characterized by its eclectic and interdisciplinary nature, covering a wide variety of issues such as the nature and aims of education, politics around schooling and educational implications of key themes such as ethics, feminism, multiculturalism, values and power (Chambliss, 2009; Burbules and Raybeck, 2003). Three main reasons for engaging in philosophy of education are outlined by Burbules and Raybeck (2003); prescriptive work, analytical work and critical work.

2.3.1.1 *Prescriptive work in philosophy of education*

Prescriptive work is the oldest tradition in the field, practiced by writers such as Plato, Locke, Rousseau, Dewey and Freire. Here the purpose is to “offer a philosophically defended conception of what the aims and activities of teaching ought to be” (Burbules and Raybeck,

2003, p.1881). What is deemed to be *philosophical* has been defined by Curren (2008, p.2) as when a set of beliefs are applied to educational practice, making it a field for “rigorous normative inquiry”. This is fundamentally a question of beliefs around epistemology (i.e. What is knowledge?), ontology (i.e. What is real?) and axiology (i.e. What is valuable? What is education good for?). Normative endeavors to propose answers to such philosophical questions result in particular views on a number of key *what*, *how* and *why* issues in education, such as “what education should be, what dispositions it should cultivate, why it ought to cultivate them, how and in whom it should do so, and what forms it should take” (Frankena, 2003, p.1878-1879). A related stream of work is the “isms” approach to philosophy of education, stating that a philosophical position such as realism, idealism or pragmatism has practical implications for education (Burbules, 2000; Burbules and Raybeck, 2003).

2.3.1.2 Analytical work in philosophy of education

Analytical work is a tradition in philosophy of education that gained momentum in the 1950s primarily in native English speaking countries, aiming to reach conceptual clarity around terminology used and conditions to be met in education (Burbules and Raybeck, 2003). It can be seen as a reaction to the “isms” approach, regarding such work as sloppy and too practice oriented (Burbules, 2000). It can also be seen as a reaction more specifically against progressivism and child-centered education, attempting to uncover the vagueness underlying its key slogans and clichés (Burbules, 2000). The analytical tradition is deeply anti-prescriptive and nonpartisan, leaving the task of educational choices to others and instead assuming the role of referee in the constant dialogues between perspective takers. For decades it was viewed as the only “true” activity pertaining to philosophy of education. Examples of key contributions include Peters (1970) work on what we mean with education, Hirst (1974) work on what constitutes knowledge and Scheffler’s (1973) work on how to define teaching.

2.3.1.3 Critical work in philosophy of education

Critical work gained ground in the 1980s when scholars illustrated the analytical tradition’s omission of key themes such as class, race, gender and power. Such critical work was frequently influenced by trends and works outside philosophy of education, particularly postmodernist and critical scholars such as Lyotard, Derrida, Foucault and others. Work by Lyotard on knowledge (1984) triggered educational philosophers to reconsider what counts as knowledge in a pluralistic and multicultural society and try to sketch out implications of this for educational practice (Pring, 2010). Noddings (2007) leaned on Derrida’s (1978) call to “let others be” to highlight the analytical objectivists’ neglect of traditional female values in education such as care, compassion and connection. Critical work is thus mainly a relatively new tradition in philosophy of education, aiming to expose misconceptions and oppressive dominant forces in society impacting education in general and disadvantaged groups in particular (Burbules and Raybeck, 2003).

As a parallel of such critical work to the topic of this thesis, infusing entrepreneurship into education has been critiqued based on Foucault’s (1988) work on “governmentality”, i.e. the external governing of people through help from their own mentality. Some scholars are describing the infusion of entrepreneurship into education as a way to covertly govern citizens

from within through inculcation of powerful purposive entrepreneurial ideals (Petersen and O'Flynn, 2007; Berglund, 2013; Down, 2009; Komulainen et al., 2011).

Given the aim here of qualifying a tentatively new educational philosophy grounded in entrepreneurship, the main emphasis of this thesis is on prescriptive work. But there are also links in this thesis to analytical and critical traditions of philosophy of education. In line with an analytical tradition, infusing entrepreneurship into education could benefit from clarity both in definitions and aims, currently short in supply (Sagar, 2013). And in line with a critical tradition, infusing entrepreneurship into education could also contribute with perspectives beneficial to disadvantaged groups such as those students who don't thrive under the currently dominant educational philosophies (Roth and Lee, 2007; Dewey, 1938; Noddings, 2007).

2.3.2 Educational philosophies as prescriptive propositions

While the aim of this thesis is not to propose a new “ism”, the tentatively new educational philosophy proposed here will need to be contrasted to some major existing prescriptive philosophies of education. Terminology used in existing literature is far from unified. Some scholars view the issue primarily from a learning perspective, outlining different *learning* philosophies, theories, models or paradigms (Kyrö, 2005; Jarvis, 2006; Kolb, 1984; Engeström, 2009; Vygotsky, 1978). Others view it from a predominantly educational perspective, describing different *educational* philosophies, theories, models or paradigms (Mezirow, 1991; Dewey, 1934; Noddings, 2007; Egan, 2002; Rousseau, 1762/2003). While it is clearly beyond the scope of this thesis to give a comprehensive outline of major educational philosophies throughout the history of learning and education, Table 2 outlines some enumerations of major philosophical positions for the purpose of illustrating the lack of terminological unity in the field as well as illustrating the spurious connections between learning and education. The term that will be used in this thesis to discuss different major philosophical positions is “educational philosophy”, by which I mean a belief based and coherent set of articulated prescriptive propositions offering normative advice to primarily teachers on the *what* to do, *how* to do it and *why* questions discussed in section 1.2 and section 2.3.1.1. Such a singular articulation of an educational philosophy can then spur an infinite number of different versions of educational practice, depending on each context, content, student age, culture, tradition and organization. An educational philosophy thus becomes a singular guiding star that can guide teachers in designing and implementing a multitude of educational practices, either by itself or in combination with other educational philosophies.

I posit that there are three educational philosophies that are particularly important to take into account and contrast with when qualifying a tentatively new educational philosophy grounded in entrepreneurship; traditional, progressive and experiential education. Traditional education is an educational philosophy that is frequently put in opposition to the infusion of entrepreneurship into education (Gibb, 1993; Johnson, 1988; Kirby, 2004). Progressive education is an educational philosophy often stated to be similar to how entrepreneurs learn (Löbler, 2006; Pepin, 2012; Fletcher, 2007). Experiential education leans on learning-by-doing, which many entrepreneurship scholars argue is the only way to develop entrepreneurial competencies (Cope, 2005; Politis, 2005; Minniti and Bygrave, 2001; Young and Sexton, 1997). These three educational philosophies are outlined in further detail in sections 2.3.3-2.3.5.

Given that many terms in the eclectic collection in Table 2 are similar or even in some cases regarded as synonyms to traditional, progressive or experiential education, a focus in this thesis on these three main educational philosophies arguably represents a heuristic that captures many of the inherent philosophical contradictions and oppositions of relevance when infusing entrepreneurship into education. But it needs to be remembered that it is a simplification that some philosophers of education would argue opens up for ambiguity, sloppiness and over-promise (Burbules, 2000).

Table 2. Enumeration of “isms” and approaches to learning and education. *A number of examples of enumerations of “isms” and approaches in terms of educational philosophies, instructional theories, and learning kinds / paradigms, illustrating a lack of terminological unity in the field.*

Author(s)	Unifying term used	Enumeration
Reigeluth and Carr-Chellman (2009)	Instructional theories	<ul style="list-style-type: none"> • Direct instruction • Discussion teaching • Experiential learning • Problem-based learning • Instructional simulations
Gutek (1997)	Philosophies of education	<ul style="list-style-type: none"> • Idealism • Realism / Theistic realism • Naturalism • Pragmatism • Existentialism
Apps (1973)	Educational philosophies	<ul style="list-style-type: none"> • Essentialism • Perennialism • Progressivism • Reconstructionism • Existentialism
Englund (2000)	Educational philosophies	<ul style="list-style-type: none"> • Traditionalism (essentialism and perennialism) • Progressivism • Reconstructionism • Neopragmatism
Heron (2009)	Kinds of learning	<ul style="list-style-type: none"> • Experiential • Presentational • Propositional • Practical
Kyrö (2005)	Learning paradigms	<ul style="list-style-type: none"> • Behaviorism • Cognitivism • Constructivism • Postmodernism / entrepreneurialism

2.3.3 Traditional education

Traditional education has been described as a teacher centered approach. It answers the *what* to do question of education by prescribing to let students learn by reading, memorizing, repeating, reciting and being given whole class instruction (Cuban, 2007; Apps, 1973). Some influential scholars in traditional education are Thorndike (1932), Skinner (1953) and Bagley (1934). Critics have lamented its alleged focus on authoritarian transmission of standardized knowledge to passive and unmotivated students leading to superficial understanding (Dewey, 1938; Labaree, 2012; Tynjälä, 1999). Still, the arguments in favor of traditional education have allowed it to remain dominant in practice in many schools around the world (Labaree, 2005).

According to the many supporters of traditional education, the answer to the *why* question it contributes with includes allowing for setting high academic standards for basic knowledge and skills that all students should acquire, making standardized tests possible that could hold students and schools accountable, facilitating effective organization of educational institutions, providing students with much needed explicit guidance and leaning on robust empirical evidence proving its superiority (Archer and Hughes, 2011; Labaree, 2005; Cuban, 2009; Rosenshine, 2009; Kirschner et al., 2006).

Previous attempts in educational change illustrate that any new educational philosophy needs to prove its ability to measure learning progress, to support the development of core curriculum knowledge, to display a feasibility in terms of organizing the educational institution and to supply explicit guidance to both teachers and students (Elmore, 1996). Therefore, in order to be adopted in practice, an educational philosophy grounded in entrepreneurship arguably also needs to be able to contribute to the strengths of traditional education.

2.3.4 Progressive education

Progressive education has been described as a student centered approach. It answers the *what* to do question of education by prescribing to let students learn by working in projects, solving authentic problems in teamwork characterized by social, active and self-directed learning (Labaree, 2012; Dewey, 1938; Tynjälä, 1999; Jonassen and Land, 2000). Key scholars include Comenius (1657), Rousseau (1762/2003), Dewey (1938), Kilpatrick (1918), Montessori (1912), Jonassen (1999) and Kohn (2000). The most influential of them has been Dewey, who co-founded the underpinning philosophical movement of pragmatism together with James (1907) and Peirce (1878) more than a century ago. Dewey's emphasis on learning through experience leaned philosophically on pragmatism's focus on practical consequences and reject of theoretical "truths" (Roberts, 2012). Progressive education is today often labeled constructivist education, but with similar recommendations (Cuban, 2007). Critics argue that progressive education is unproven, too vague, neglects the legacy of traditions and academic canon, makes measurement of educational progress impossible, devalues moral and character education in favor of nihilism and opens up for careless experimentation by teachers leading to damaged kids (Edmondson, 2014; Labaree, 2005; Egan, 2008; Ernest, 1995). The typical answers to the *why* question of progressive education revolve around more active and engaged learners, better alignment with the process of how people learn, more humanistic and democratic forms of education, opportunities to learn from social interaction and a focus on students' own interests and discoveries (Tynjälä, 1999; Labaree, 2012; Dewey, 1938). What progressive education does particularly well according to Jonassen (1999) is to develop conceptual and strategic thinking in ill-structured knowledge domains. Still, progressive education is today regarded as a challenge for teachers, having indeed shaped how we talk about education but much less what teachers do in practice (Labaree, 2005).

Progressive education is the most common underpinning educational philosophy when trying to infuse entrepreneurship into education. While not widely acknowledged, some entrepreneurship scholars have discussed this (Fletcher, 2007; Pepin, 2012; Mueller, 2012; Löbner, 2006; Kyrö, 2005). Entrepreneurship viewed as learning certainly shows many similarities with progressive education principles, such as active and engaged people (students

or entrepreneurs) pursuing their own interests, making discoveries in self-directed learning processes rife with social interaction. This however means that critics will be prone to categorize the infusion of entrepreneurship into education as a progressive education project, exposing such an endeavor to the risk of facing similar challenges (Labaree, 2005; Elmore, 1996; Egan, 2002).

2.3.5 Experiential education

Experiential education has been described as a field-based approach. It answers the *what* to do question of education by prescribing to let students learn by becoming immersed in settings outside the classroom, lecture hall or school building. Some labels often used include outdoor or adventure education, service learning and environmental education (Roberts, 2012). In outdoor education students learn from adventurous outdoor activities such as hiking, climbing, ropes courses and wilderness expeditions (McKenzie, 2003; Roberts, 2012). In service learning students learn through providing service to people outside the educational institution, either as volunteers, through internships or in community service placements (Furco, 1996). While environmental education frequently takes place in the field, it is rather defined by the intended learning outcomes of environmentally aware students (Adkins and Simmons, 2002).

While sharing some philosophical roots with progressive education in drawing from Dewey (1938), experiential education could still be argued to constitute a distinct educational philosophy with its emphasis on field-based learning. Learning from direct experience in the field arguably goes beyond active and problem-based teamwork and inquiry conducted in the classroom. A key difference between progressive education and experiential education has been elaborated by Yorks and Kasl (2002). They state that Dewey's progressivism represents an intellectual account of learning as cognitive meaning-making of collaborative action. This is positioned against a phenomenological account of learning as felt encounter, drawing on Heron (1992) who emphasized the importance of affective dimensions to learning. A main theme on the *why* question of experiential education thus connects to the key role that emotion and motivation plays in human learning (Postle, 1993; Roberts, 2012; Boekaerts, 2010). Jarvis (2010) states that human learning in general leans on experiences of disjuncture, defined as the resulting gap between our expectations of the world and what we are actually confronted with. Such a disjuncture leads to an emotional disharmony that motivates us to learn. Being in harmony is then described by Jarvis as a non-learning situation. The study of emotions in learning is a small but growing field of educational research (Pekrun, 2005; Jarvis, 2006; Dirkx, 2001; Hargreaves, 1998; Zembylas, 2005), arguably with potential to further support teachers wanting to infuse entrepreneurship into education.

Experiential education is often related to experiential or action learning for adults and its main scholars Kolb (1984), Knowles (1978), Revans (1983), Schön (1983) and Jarvis (2006). A widespread learning model is Kolb's experiential learning cycle, see figure 4. It has however been difficult to transfer this adult learning focused model to education, due to difficulties with assessing and certifying content knowledge, lack of empirical evidence for its effectiveness in education and challenges in organizing such a learning process in an institutional context (Seaman, 2008; Jarvis, 2006; Holman et al., 1997). Seaman (2008, p.15) concludes that "the pattern of 'experience-reflect-learn' might be considered an ideology of experiential learning

rather than a philosophy or a theory of experiential learning”. He instead asks for theories of learning that take social and cultural contexts more into account. In line with this, Holman et al. (1997) call for theories that view learning as a culturally mediated experience taking into account the constant interplay between reflection and action rather than separating them into discrete steps in a flawed cycle of learning. I will later argue that entrepreneurship could potentially contribute with such cultural and mediational perspectives (see section 6.1.2.4 and appended paper 4).

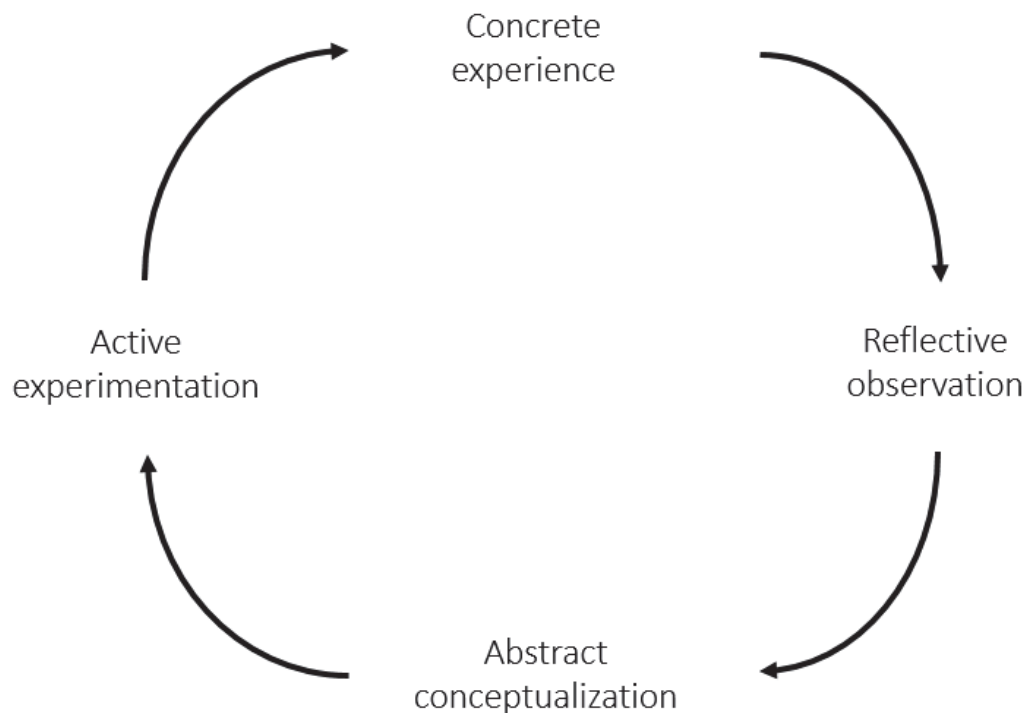


Figure 4. Kolb's experiential learning cycle. The model pictures experiential learning as the tension between four different modes of learning, and was inspired largely by Lewin and Dewey. (Kolb, 1984).

Many of the insights from the field of experiential education can be connected to the infusion of entrepreneurship into education. Some commonalities between experiential education and entrepreneurship include the criticality of emotional events, the emphasis on opening the door to learn from the world outside and the practice of learning through creating some valuable service or product in a community.

2.3.6 Classroom education

The opposite position to experiential education conducted in the field could be stated to be classroom-based education. This is however not an educational philosophy explicitly articulated by scholars despite its benefits to care, to assessment and to organization. Perhaps this is due to the ubiquity of classrooms in education, being largely taken for granted and at times termed as “traditional” education. But classroom activity is a singular answer to the *what* to do question of education that can take many forms, from traditional education based lecturing to progressive education based self-directed teamwork. Answers to the *why* question of education arguably include ease of assessment and organization, as well as a certain protection from the complexity and perils of the outside world. I posit that it is different from the other

three educational philosophies outlined in sections 2.3.3-2.3.5. Books can be read outside of the classroom, lectures can take place in the field and project work can take place outside the classroom. The traditional versus progressive education dualism could thus be viewed as largely orthogonal to the classroom versus experiential education dualism. This is illustrated in Figure 5, and constitutes what I here label the philosophical playing field of education. The tentatively new educational philosophy grounded in entrepreneurship articulated in chapter 5 and qualified in chapter 6 will later be contrasted to this playing field. As stated earlier, such a reliance on “isms” represents a simplification that some philosophers of education perhaps would frown upon. Still, there is a need to contrast a tentatively new educational philosophy to existing major educational philosophies and practices that teachers are familiar with. It can also illustrate possibilities to leverage the strengths of existing educational philosophies.

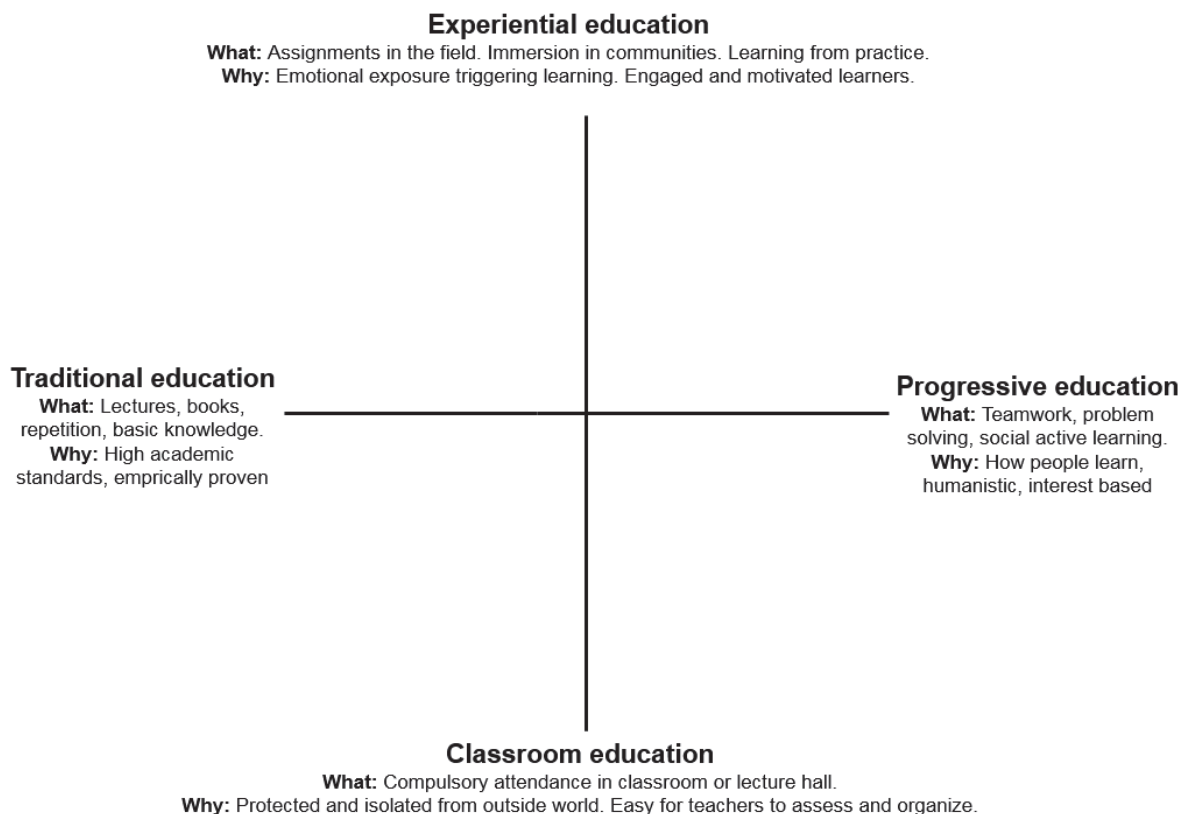


Figure 5. The philosophical playing field of education. Three common educational philosophies contrasted to classroom based education. These four different philosophical positions constitute two sets of orthogonal dualisms, together forming a playing field of educational philosophies.

2.3.7 Evaluation of education

It has been argued that tangible evidence of positive learning outcomes is a requirement for an educational idea to reach wider adoption (Löbner, 2006; Elmore, 1996). The difficulty to provide such evidence could explain many of the challenges in progressive education so far (Labaree, 2005), leaving unanswered the question of whether it just doesn’t work so well or if the stated effects have not yet been possible to prove quantitatively, i.e. according to the paradigm that the general public arguably applies when evaluating what “works” in education (Porter, 1996). Furthermore, there is significant disagreement among scholars as to how educational evidence should be produced (Noddings, 2007). Some argue for large-scale

rigorous randomized controlled trials involving comparison between a treatment group and a control group. This is often termed the “evidence based” or “gold standard” approach to educational assessment (Slavin, 2002). Others claim that such a quantitative search for cause-effect relations so common in natural sciences is largely inappropriate in education where beliefs, hopes and reasons of intentional individuals lead to contextual and largely non-causal practices (Biesta, 2007; Olson, 2004). Pring (2010, p.121) has stated that “there can be no straightforward causal connection between the teacher’s intervention and the learning outcomes” due to the complexity of education, the many interacting elements and the infinite amount of possible interpretations by students. The debate continues, but the winning side has so far belonged to those who can present simple quantitative numbers showing what is often perceived by the public as “facts” about what “works” (Labaree, 2005). This could be explained by the two common human fallacies of resorting to reification and ranking when faced with the task of managing complexity and diversity (Gould, 1996).

Despite the numerous challenges in assessment, there is thus a need for any new educational philosophy to be coupled with a way to evaluate its effectiveness in terms of learning outcomes in order to be useful and adopted in education. Teachers need to be able to evaluate impact on student learning in quantitative terms. Principals and other managers need to be able to determine whether a new initiative has been put to use in class and how it has impacted student learning. This need also applies to an entrepreneurship grounded educational philosophy.

An increasingly popular approach to teacher assessment has been termed *formative assessment*, i.e. a teacher- or student-directed feedback process that establishes where students are in their learning, where they are going and what needs to be done to get them there (Black and Wiliam, 2009; Sadler, 1989; Bloom et al., 1971). Feedback plays a key role in formative assessment, both teacher feedback to students and student feedback to teachers, allowing teachers to revise their teaching in accordance to levels of understanding reached by students (Hattie and Timperley, 2007; Gamlem and Smith, 2013). Formative assessment is arguably easier to apply in classroom based education than in field-based experiential education due to differences in distance between teacher and student. Activities taking place in the classroom are easier for teachers to give and take formative feedback on than activities taking place in the field. Opening the door to the world outside the educational institution therefore impacts the possibility for teachers to rely on formative assessment. Thus, if a tentatively new educational philosophy grounded in entrepreneurship requires students to leave the building, it also requires functional ways to assess the learning process formatively, especially since many of the desired learning outcomes cannot be assessed through a standardized test at the end of the course module. Appended papers 2 and 3 contribute with some new perspectives here, as they outline and apply a novel emotion based approach and an app based instrument used to formatively assess entrepreneurial education. This represents a step towards an increased ability to evaluate and assess the tentatively new educational philosophy articulated and qualified here.

2.3.8 The current state in education

Whenever proposing new ideas on how education could be changed to a different state, it is useful to consider the baseline from which any change would take place. The current state of educational practice has been described as stability surrounded by change (Elmore, 1996).

Recurring waves of change effort have for centuries hit educational institutions worldwide, most of whom have failed to get past the door to the classroom (Fullan, 2007; Cuban, 1990; Kliebard, 1988; Harris, 2003). Initiatives have emanated from a wide variety of different stakeholders, such as policymakers, public entities, researchers, philosophers, lobby organizations, teacher / student associations, private corporations, wealthy individuals and many others. While the aims, doctrines and methods have varied widely, the initiatives have shared a common ambition to change what teachers do in their daily practice. But instead of leading to change, they primarily seem to have produced a protective layer against change, leading to a situation where “[t]he core of schooling remains relatively stable in the face of often massive changes in the structure around it” (Elmore, 1996, p.15). Key protective layers include teacher resistance to change, lack of incentives for change, ontological difficulties in evaluation of what “works” and educational institutions protecting the classroom from the ebb and flow of recurring educational reform (Elmore, 1996; Cuban, 2007; Cuban, 1990; Olson, 2004; Biesta, 2007).

2.3.8.1 Teachers hugging the middle

Across centuries however, the changes are clearly discernible. Cuban (2007) has traced a slow but clear trend since late 19:th century towards more and more informal and progressive education, visible in teacher clothing, furniture placement, teacher attitudes towards students, student grouping and classroom activities. From the 1980s and onwards, classroom practice could be characterized as a hybrid between traditional and progressive education, albeit with increasing emphasis on traditional education as the students grow older. Today the two-pronged discourse of traditional versus progressive education is seldom found in either of its different pure forms in classrooms. Rather, many teachers have opted for a strategy Cuban (2007) labels “hugging the middle”, where teachers every day struggle to combine a widespread belief in progressive education values with the requirements put upon them by traditional education in terms of performative policies emphasizing standards, accountability and testing. Today’s educational practice thus requires teachers to be able to manage the educational dilemma of combining the rigidity and rationality of traditional education with the vagueness and individuation of progressive education. Such hybridization is however “far from formulaic” (Darling-Hammond, 2012, p.40), and Kliebard (1988, p.146) has estimated that “[e]ven in its heyday, then, something like two-thirds of all classrooms in the United States were left untouched by the tenets of the child-centered movement”. So while many teachers indeed are able to combine largely incommensurable philosophical positions in education (cf. Sfard, 1998), even more teachers are arguably still struggling with this dilemma, or have simply given in to the simplicity, face validity, forcefulness and pervasiveness of traditional education.

2.3.8.2 From educational philosophy to instructional design to educational practice

As a transitional step from singular educational philosophies to plural educational practices, the educational philosophies outlined in section 2.3 could be viewed as basic ingredients for a number of prototypic instructional designs (Smith and Ragan, 1999), or teaching “recipes” (Stenhouse, 1975), see Figure 6. Teachers draw from these recipes in their daily combinatory work of teaching. For example, content based teaching such as a lecture series is primarily combined from traditional education and classroom education. Thematic project work such as a cross-curricular theme week is primarily combined from classroom education and progressive

education. Spectator based field education such as a visit to a museum is primarily combined from traditional education and experiential education. Active participant based field education such as a ropes course in the forest is primarily combined from experiential education and progressive education.

Each teaching recipe constitutes a specific set of answers to the question of *how* to do education in practice, representing differing design recommendations on what to do before, during and after an educational intervention in terms of preparations, delivery and evaluation (Smith and Ragan, 1999). While many teaching recipes are well described in curriculum theory, the actual act (or art) of combining and hybridizing these recipes is currently largely up to each individual teacher, an expertise that I posit is seldom acknowledged by proponents of any one educational philosophy or recipe. What often happens is that a teaching recipe is used and argued for in isolation, leading to dichotomization and conflict.

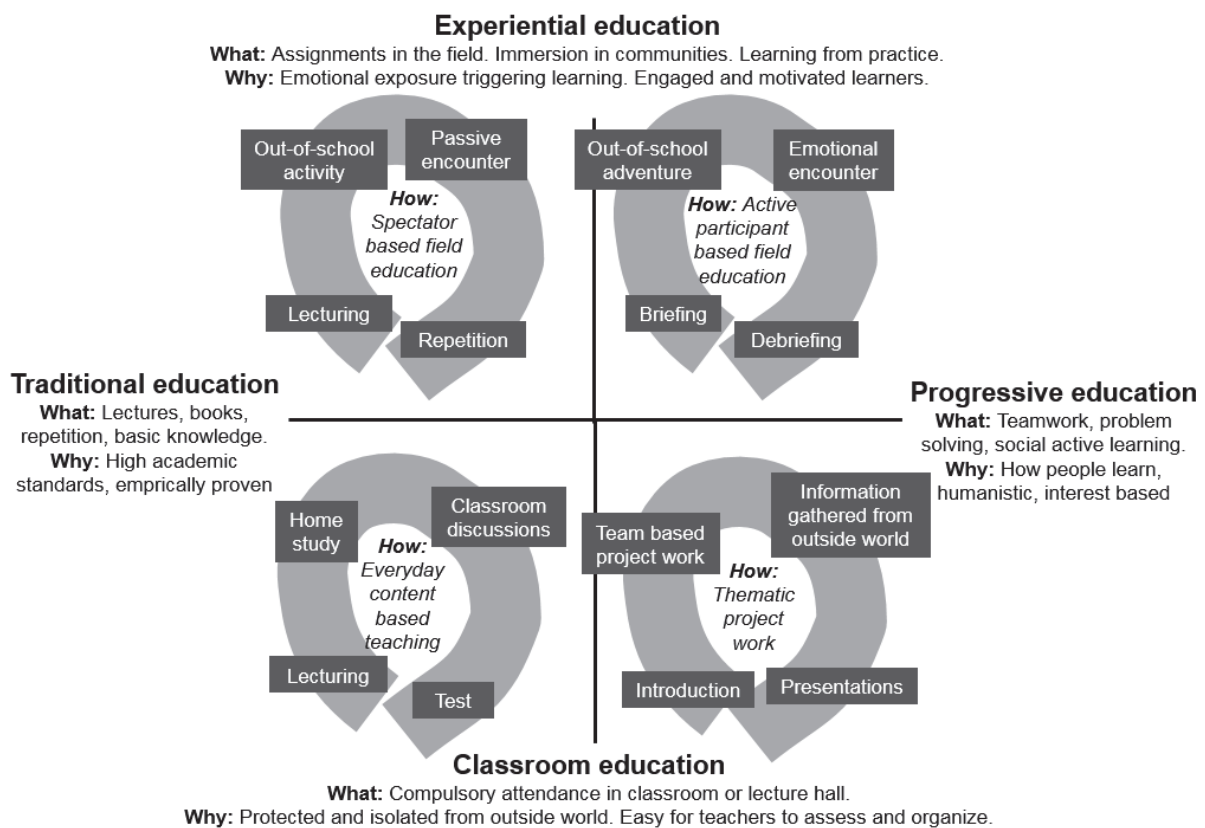


Figure 6. Four different examples of common teaching “recipes”. Different emphasis in how educational philosophies are combined leads to different kinds of teaching recipes. They are sometimes combined into hybrid teaching practices, and other times used in isolation.

Connecting to the purpose of this thesis, I will later illustrate how a tentatively new educational philosophy grounded in entrepreneurship could perhaps remedy the current situation by giving teachers support in their combining of different philosophies and recipes such as those outlined in Figure 6. As it is now, teachers lack not only an educational philosophy grounded in entrepreneurship in general but also more specifically some teaching recipes stipulating *how* to do in practice when trying to infuse entrepreneurship into education. We will now look at how this paucity has shaped the infusion of entrepreneurship into education.

2.3.9 The current state in entrepreneurial education

In an attempt to unify the educational field of entrepreneurship, the term entrepreneurial education has been proposed (Erkkilä, 2000). This term includes the more narrow term *entrepreneurship education*, defined as developing competencies specific to setting up a new venture or business, as well as the wider term *enterprise education* defined more broadly as developing competencies necessary to generate and realize ideas (QAA, 2012; Pittaway et al., 2011; Pittaway and Cope, 2007a). Entrepreneurial education is often categorized into the three approaches of teaching *about*, *for*, and *through* entrepreneurship (Johnson, 1988; O'Connor, 2012; Heinonen and Hytti, 2010). Teaching *about* entrepreneurship means a content-laden and theoretical approach aiming to give a general understanding of the phenomenon. It is the most common approach in higher education institutions (Mwasalwiba, 2010). Teaching *for* entrepreneurship means an occupationally oriented approach aimed at giving budding entrepreneurs the requisite knowledge and skills. These two approaches are relevant primarily to a subset of students on secondary and higher levels of education and represent a narrow definition of entrepreneurship as starting a company and becoming an entrepreneur (Mahieu, 2006). The third approach, teaching *through* entrepreneurship, means a process based and often experiential approach where students go through an actual entrepreneurial learning process (Kyrö, 2005). This approach often leans on a wider definition of entrepreneurship including not only individuals starting companies but also anyone creating financial, cultural or social value (Moberg et al., 2012). This allows for entrepreneurship to be integrated into other subjects in general education, connecting entrepreneurial characteristics, processes and experiences to the core curriculum. Here focus is on personal development, creativity, self-reliance, initiative taking, action orientation, i.e. becoming entrepreneurial (Mahieu, 2006). This approach can thus be relevant to all students and on all levels of education (see for example Smith et al., 2006; Handscombe et al., 2008). It is however rare in practice due to its perceived higher cost than traditional approaches and misalignment with dominant educational philosophies in many educational institutions (Smith et al., 2006; Mwasalwiba, 2010; Ardalan, 2008). The current state in entrepreneurial education with its two conflicting definitions and three different approaches is far from the coherent set of articulated prescriptive propositions discussed in section 2.3.2, thus offering little normative advice to teachers on *what* to do.

2.3.9.1 Some stated reasons for entrepreneurial education

The most common reason that researchers and experts promote entrepreneurial education is that entrepreneurship is seen as a major engine for economic growth and job creation (Wong et al., 2005). Entrepreneurial education is also frequently seen as a response to the increasingly globalized, uncertain and complex world we live in, requiring all people and organizations in society to be increasingly equipped with entrepreneurial competencies (Gibb, 2002). Besides the common economic development and job creation related reasons to promote entrepreneurial education, there is also a less common but increasing emphasis on the effects entrepreneurial activities can have on students' as well as employees' perceived relevancy, engagement and motivation in both education (Surlmont, 2007) and in work life (Amabile and Kramer, 2011). Finally, the role entrepreneurship can play in taking on important societal challenges (Rae, 2010) has positioned entrepreneurial education as a means to empower people and organizations to create social value for the public good (Volkman et al., 2009; Austin et al.,

2006). The strong emphasis on economic success and job creation has indeed propelled entrepreneurial education to a prominent position on higher education level, but not as an integrated teaching practice for all students on all levels. So far the main focus has been on elective courses and programs for a few upper secondary education and university students already possessing some degree of entrepreneurial passion and thus self-selecting into entrepreneurial education (Mwasalwiba, 2010). Thus, also the *why* question of the current entrepreneurial education discourse lacks coherence.

2.3.9.2 Evidence of impact

In line with the emphasis on economic impact, research on the effects of entrepreneurial education has primarily leaned on a narrow definition of entrepreneurship. The commonly desired outcome of an educational intervention is that the students sooner or later end up creating new companies that are growing and creating jobs. Almost no research has been conducted on educational interventions using a wider definition of entrepreneurship, assessing the resulting student engagement and learning (for some exceptions, see Moberg, 2014a; Nakkula et al., 2004). Furthermore, there are also some major methodological challenges in the assessment of entrepreneurial education, such as self-selection bias, difficulties in establishing causation between an intervention and resulting entrepreneurial behavior, and the long time gap between intervention and impact. These challenges have led to a situation where meta studies show that the quantitative evidence base for the impact of entrepreneurial education is largely inconclusive (Bae et al., 2014; Lautenschläger and Haase, 2011; Martin et al., 2013).

Qualitative case studies discussing the impact of entrepreneurial education are common, often taking the form of a self-assessment based single case study where the teachers responsible for the course or program outline what they did and how it worked for those involved (Warhuus and Basaiawmoit, 2014; Pittaway and Cope, 2007a). Such studies frequently lack a deeper decontextualization, categorization or contrasting of learners' own experiences to other relevant educational environments within or outside the entrepreneurial domain. Another common kind of study is the political or marketing oriented multiple case study, describing a number of different purposively sampled entrepreneurship programs or courses that in one way or another support the cause of the organization that conducted the study (OECD, 2009; Chatzichristou et al., 2015; Greene et al., 2015). Comparative case studies performed by less biased people who are not themselves financing or managing the courses or programs studied are however very rare (for some exceptions see Rasmussen and Sørheim, 2006; Warhuus and Basaiawmoit, 2014). This results in a situation where also the qualitative evidence base for the impact of entrepreneurial education is largely inconclusive through its lack of generalizability, robustness and trustworthiness.

2.3.9.3 Challenges to adoption

There are currently a number of challenges to infusing entrepreneurship into education. We will now focus more specifically on five main challenges; lack of definitional clarity, impeding organizational structures, lack of resources, assessment difficulties and fear of capitalism.

The field of entrepreneurial education lacks a philosophically grounded definition and classification of educational practices deemed “entrepreneurial” (Fayolle, 2013). Attempts to define the field are often done through enumeration of example teaching practices such as case

studies, simulations, business plan creation, film and drama production, project work, presentations / pitching, games, competitions, setting up real-life ventures, study visits, role plays, interviews with entrepreneurs, internships, mentoring, etcetera (Mwasalwiba, 2010; Kuratko, 2005; Jones and Iredale, 2010). This corresponds to a lack of coherent answers to the *what* and *how* questions of education, and has resulted in many practitioners having difficulties distinguishing the field from others (Sagar, 2013). A common question is whether entrepreneurial education is just a new label on previously advocated teaching practices, or if there is indeed a novel and relevant contribution that entrepreneurship can make to the educational domain. The important task of managing such confusion requires connecting tightly between entrepreneurship and education, a topic that is poorly understood today (Fayolle, 2013).

Even if teachers are often alone in the classroom with their students, their teaching practices are impacted by a number of organization related factors such as colleagues, school management, incentive structures, assessment practices and organizational culture. Sagar (2012) has uncovered a number of challenges impacting teachers' ability to adopt entrepreneurial education, such as lack of clear and supportive goals from management, unflexible time schedules for class, demotivating scepticism from colleagues and lack of much needed professional development. Robinson and Shumar (2014) have also pointed out the incompatibility between entrepreneurial education and the currently strong "performativity" culture in educational institutions of measuring "externally defined performance indicators" of alleged educational success (Priestley et al., 2012, p.87). This means that even if teachers want to infuse entrepreneurship into education, there are thus a number of organizational factors that will limit the issue of *how* to make it happen in practice.

Empirical research has shown that a lack of different kinds of resources is a common hurdle to diffusing entrepreneurial education (Surlmont, 2007; Mwasalwiba, 2010; Smith et al., 2006; Sagar et al., 2012; Berglund and Holmgren, 2013; Lack  us et al., 2011). Resources that are lacking include time for teacher training, teacher planning and student coaching, as well as resources for stakeholder management resulting from a teaching practice that involves external stakeholders. Also student time is a scarce resource illustrated in the challenge of what to remove when adding something new (Elmore, 1996). This adds to the challenge of *how* to succeed in infusing entrepreneurship into education.

A lack of convincing evidence of desirable impact in terms of student learning signifies a key challenge to any educational change initiative in general (Elmore, 1996), and consequently also to the adoption of entrepreneurial education. Section 2.3.9.2 above illustrates that this assessment challenge consists of two key issues; (1) the methodological issue of designing studies that are robust and unbiased, and (2) the strategic issue of studying legitimate reasons to infuse entrepreneurship into education. Many of the existing impact studies neither focus on factors that teachers find important nor employ a method that yields trustworthy and robust findings (Moberg, 2014a; Rosendahl Huber et al., 2012; Martin et al., 2013). Consequently, many teachers reason that what might perhaps be good for the economy long-term is not necessarily good for student learning short-term, thereby dismissing entrepreneurial education as an experiment they prefer not to be part of. The assessment difficulties of entrepreneurial education also impact teachers in their daily work of attempting to infuse entrepreneurship into

education. Assessing students is mandatory in today's performativity based educational institutions (Robinson and Shumar, 2014), and tolerance for teaching practices that are difficult to assess is therefore low. In sum the assessment challenge leads to problems both in the question of *how* to infuse entrepreneurial education and in the more general question of *why* infusing something that lacks convincing evidence.

Entrepreneurial education has been stated to promote capitalism through its alleged connections to neoliberalism (Erkkilä, 2000, p.124-126). Neoliberalism celebrates market mechanisms through privatization, competition through the exercise of 'freedom of choice' and self-sufficient individuals taking own responsibility for their life's necessities (Castree, 2010). When entrepreneurship is infused into education with its discourse of empowering students to take initiatives and see opportunities, teachers often react strongly and negatively on what they perceive as an attempt to turn their students into capitalists (Berglund and Holmgren, 2013). This leans on a popular and simplified view among teachers of entrepreneurs as egoistic, heroic and individualistic individuals (Korhonen et al., 2012; Ogbor, 2000). This is in line with a view of humans as *homo oeconomicus*, which was discussed at length in section 2.2. This means that infusing entrepreneurship into education often results in a value clash between economic and humanistic values, leading to significant challenges and resistance among teachers, questioning *why* they should adopt something that clashes with their values (Johannisson, 2010).

It is evident that teachers aiming to infuse entrepreneurship into education frequently run into a plethora of challenges. These challenges are all related to confusion around the key questions of *what* to do, *how* to do it and *why*. While existing educational philosophies outlined here have indeed provided coherent sets of prescriptive answers to these questions, these answers are arguably not connected to entrepreneurship in general or to new value creation in particular, nor to any of the key entrepreneurial aspects described here such as entrepreneurial methods, entrepreneurial interactions with external stakeholders, entrepreneurial altruism in terms of doing something good for someone else or entrepreneurial learning through emotional events. The existing educational philosophies, particularly experiential and progressive education, rather seem to cause more confusion than remedy for teachers wanting to infuse entrepreneurship into education. Teachers are made to believe that any activity which is active, team-based or self-directed is thereby entrepreneurial, or that any kind of study visit outside the own school building is entrepreneurial. This is further aggravated by enumeration based definitions of entrepreneurial education consisting of a large number of progressive and experiential education practices with few obvious generic features related to or grounded in entrepreneurship apart from business plan writing and venture creation. All this calls for a new educational philosophy grounded in entrepreneurship that can provide teachers who want to infuse entrepreneurship into education with clarity, guidance and entrepreneurship grounded support in terms of answers to the questions of *what* to do, *how* to do it and *why*. We will now look at the methods and resulting papers that preceded the articulation of such an educational philosophy.

3 Methodology

3.1 Research philosophy and approach

Social science in general and educational research in particular suffer from a divide between objective and subjective research philosophies (Pring, 2010; Sayer, 2010). A rigorous and allegedly objective search for “truth” and general laws through quantitative surveys and systematic observation is often put against a qualitative examination of the subjective viewpoints that individuals express when trying to make sense of their own unique and context dependent experience. Examples of the objectivist tradition include the evidence based movement in educational research, trying to uncover what “works” through randomized controlled trials inspired by methods used in medical research. It has received strong support and funding worldwide in the last couple of decades, but also heavy critique from leading education scholars (Slavin, 2002; Olson, 2004; Reeves, 2011; Biesta, 2007; Noddings, 2007; Cuban, 2009). Examples of the subjectivist tradition include small-scale phenomenological work applying single case study and interview techniques to explore beliefs and interpretations of individuals acting in unique situations. While indeed capable of providing interesting results, such research is seldom generalizable beyond the studied environment and often fails to guide practitioners and policymakers due to its small scale and fragmented nature (Pring, 2010). This leads to a situation where attempts to quantify the subjective and meaning-laden experience of education are deemed absolutely necessary by some and absolutely unacceptable by others.

In this thesis the position I have adopted in order to try to remedy this challenge is best illustrated by the term “critical realism” as outlined by Bhaskar (1979), Little (1991) and Sayer (2010). While Bhaskar is the initiator of the critical realism movement, Sayer’s account of critical realism has been deemed the most detailed and comprehensive (Easton, 2010), and Little’s account of the key term “causal mechanisms” has been deemed particularly accessible (Hedström and Ylikoski, 2010). Critical realism could be viewed as an intermediate position between objectivist and subjectivist positions, thereby constituting a potential bridging research philosophy. The ontological position of critical realism is that there is indeed a reality independent of the observer, but that reality is nevertheless partly socially constructed and thereby not easily measurable (Easton, 2010). Emphasis is on lawlike regularities on a micro level, labeled “causal mechanisms”, impacting individual actions and interpretations in complex ways on micro level and thereby at times leading to more or less weak regularities observable on macro level. Instead of claiming that cause C led to effect E governed by a general macro level law, a causal mechanisms model stipulates that there is a series of causal mechanisms or events E_i leading from cause C to effect E (Little, 1991). Elster (1989) has described it as a method for opening up a black box to show “the cogs and wheels of an internal machinery” (Hedström and Ylikoski, 2010, p.51). The focus on studying such events stipulated by critical realism suits the research aims of this thesis well, given that entrepreneurship scholars have pointed at the critical role momentary emotional events play in entrepreneurial learning (Cope and Watts, 2000; Rae, 2013). It is also in line with recommendations by Edmondson and McManus (2007, p.1163) to focus on “coherent stories of experience” when a research area is in a nascent phase, which is arguably the case with entrepreneurial education.

Easton (2010) states that a suitable research approach for critical realists is to employ a pragmatism based process of abduction (Peirce, 1903). Peirce (1998, p.216) has claimed that abduction “is the only logical operation which introduces any new idea; for induction does nothing but determine a value and deduction merely evolves the necessary consequences of a pure hypothesis”. Dubois and Gadde (2002, p.554) have described abductive research as a process where “theoretical framework, empirical fieldwork, and case analysis evolve simultaneously”. Figure 7 is taken from the research plan compiled at the outset of this research in 2011. It illustrates the journey well, showing an arrow describing the process leading up to the articulation of a tentatively new educational philosophy grounded in entrepreneurship. The evolving analytical framework was reshaped many times throughout the process, representing “articulated preconceptions” (Dubois and Gadde, 2002, p.555) that were successively revised based on discoveries made through empirical fieldwork, analysis and theory-informed interpretation. The latest version of the analytical framework is outlined in chapter 5, presented as a tentatively new educational philosophy grounded in entrepreneurship as new value creation. It was thus abductively generated over a period of five years, based on many iterations between theory and practice. None of the appended papers articulate this process of abduction in a visible way. Such hiding of the actual abduction process has been explained by Dubois and Gadde (2014) to be necessary due to a reluctance among scholarly journals to accept manuscripts reporting a messy and non-linear research process.

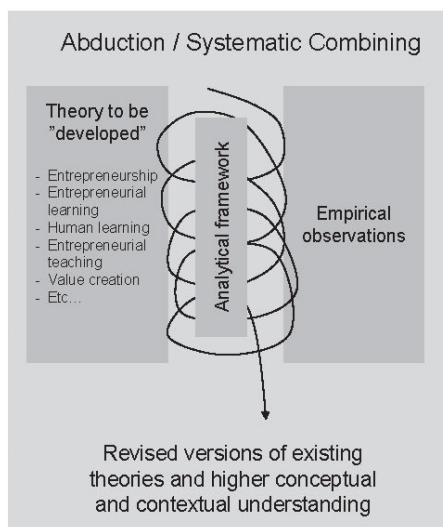


Figure 7. Abductive research based on developing an analytical framework. Iterations oscillate between theory and practice and result in multiple revisions of an analytical framework. Abduction and systematic combining are outlined further by Dubois and Gadde (2002; 2014).

3.2 Research strategy

The research strategy applied here can be described as mostly insider action research and to some extent case study research. Action research is when a researcher combines active participation in changing an organization to the better with using insights generated to add to scientific knowledge (Coghlan and Shani, 2014). The researcher can take part in the process as a full member of the organization or as a close collaboration partner to key change agents inside the organization. The insider status of the researcher in such endeavors can give a more natural access to data and allows for articulation of generalizable knowledge emerging from

experience. Such knowledge generation is often unavailable to outsiders due to its tacit, segmented and complex nature (Brannick and Coghlan, 2007; Pring, 2010).

According to Pring (2010), action research is particularly suitable in educational research since it takes into account the beliefs and values held by the practicing teachers testing out a hypothesized set of new design principles. Pring argues for setting up “laboratories” where teachers are part of the research process, in terms of searching for what “works” by formulating hypotheses, putting them to the test in their daily practice and successively reformulating them. Those hypotheses that survive a constant attempt to refute them by practicing teachers end up constituting the basis of a new theoretical foundation for teaching. Such an iterative search for what “works” is thus not viewed in terms of measurable outcomes on macro level as in the evidence based educational research tradition, but rather focuses on what “works” for teachers in practice on a micro level.

Action research is often undertaken in action-and-reflection cycles, allowing for theory and action to inform each other recurrently. According to Coghlan and Shani (2014), such research should be evaluated on its own terms rather than on terms stipulated by for example a positivist research paradigm. An action researcher needs to show how cycles were conducted in collaboration with others, how multiple sources of data were used for data collection, how theory and action informed each other, and how assumptions and interpretations continuously were tested for wider relevance throughout the project (Coghlan and Shani, 2014, p.526). Figure 8 outlines how the two main action research cycles leading up to this thesis were conducted. In Table 3 these action research cycles are related to some requirements of high quality action research outlined by Coghlan and Shani (2014).

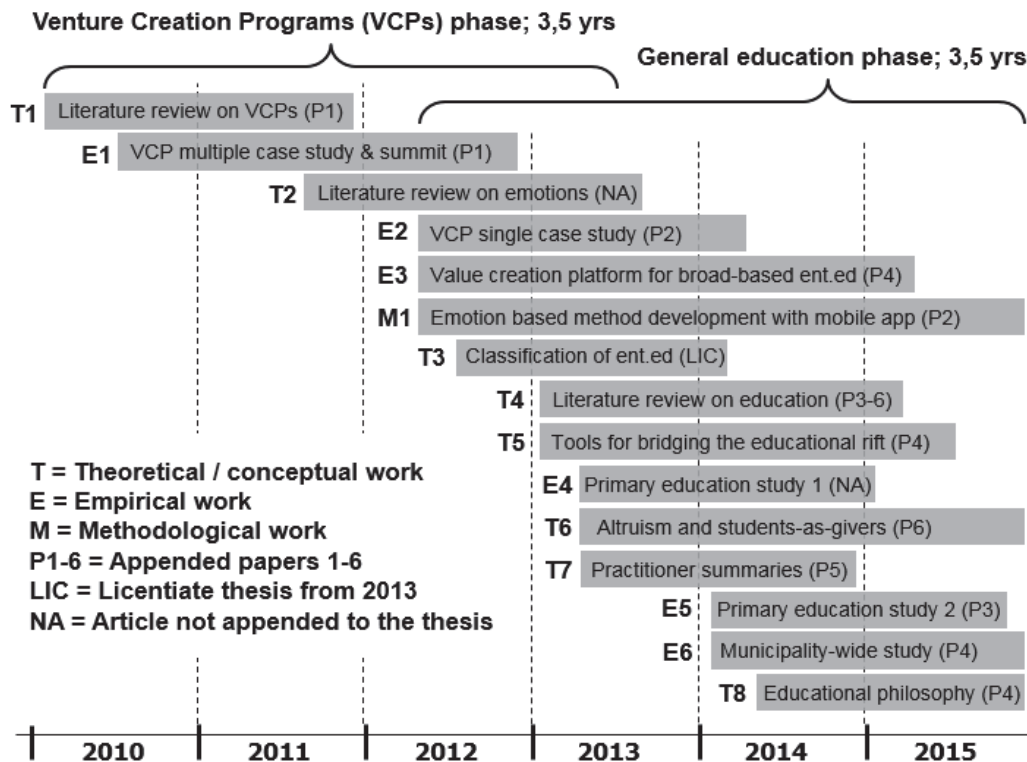


Figure 8. Gantt chart outlining steps taken in time. The chart outlines the scholarly journey leading up to the proposal of a tentatively new educational philosophy grounded in entrepreneurship.

Table 3. Some important quality aspects of the action research conducted. Different quality aspects of action research outlined by Coghlund and Shani (2014) are shown in column 1 and related to the two main action research cycles leading up to this thesis.

Key aspects	Research cycle 1 – VCPs	Research cycle 2 – general education
How were the action research cycles conducted?	Two empirical interventions were conducted, see E1-E2 in Figure 8. Students were followed during the full duration of two years at one of the VCPs. Teachers at 14 VCPs around the world were involved in various activities developing their programs while collecting data.	Four empirical interventions were conducted, see E3-E6 in Figure 8. In E3, E4 and E6 students were followed for the duration of 2-4 months of an educational intervention designed by a team involving one researcher. A control group of students was also followed in the E5 study for 3 months.
Which role did the researchers take in the collaboration?	The researchers were part of the faculty team at one of the VCPs studied in E1 and at the VCP studied in E2. One of the researchers was a former student at a VCP thus possessing deep insider knowledge, but also potential bias.	The researchers were part of the change team designing the educational interventions in E3, E4 and E6. They were assigned as external evaluators in the E5 study, thus not taking part of designing the educational intervention.
How was insider status achieved?	In E1, a two-day focus group meeting was held in Gothenburg in 2012 with key managers from 14 VCPs around the world, trying to develop the group's thinking around VCPs. In E2 the researcher was teacher and former student with deep program insights.	In E3, E4 and E6 a change team was set up involving a researcher and key change agents working at the organizations involved. E5 was not an action research study, but a case study.
How were multiple streams of data collected?	Interviews and focus group session with teachers at 14 VCPs. Longitudinal interviews with students at one VCP. Experience sampling from students at one VCP using a mobile app. Case descriptions written by 14 program managers, triggered by the researcher.	Interviews with change agents, students and teachers at E3-E6. Focus group sessions with students at E3. Interviews with parents at E4. Experience sampling from students at E3-E6 using a mobile app. Essay survey with four change agents at E6.
How did theory inform action and vice versa?	In E1, the selection of VCPs was based on a definition developed by the researchers of what a VCP is. This allowed for contrasting and co-development of programs previously unaware of each other. In E2, the longitudinal interviews helped students sense-make their experience of the VCP and change their actions accordingly.	In E3 and E6 the researcher's emerging understanding of the importance of value creation for learning informed the educational designs. In E4 the case was selected based on its strong emphasis on value creation based learning. E5 was not an action research study, and theory did not inform the sampling or the design of the interventions studied.
How were interpretations continuously tested and challenged in regards to an assumed broader relevance?	Interpretations were tested on participating students during 2012-14, and on key managers of 14 VCPs in 2012. A website was put online in 2012 and onwards listing all VCPs identified in the study and associated blog posts and articles (see www.vcplist.com), generating feedback from people in many countries around the world. In 2015 a survey was sent out to students at the VCP in E2 to test the idea of value creation based learning.	Three different practitioner papers (T7 in Figure 8) were written in 2013-14 to elicit reactions to the idea of value creation based learning. Two Youtube videos outlining key concepts were made in 2013-2015 that reached around 2500 viewers. Some 30 keynote speeches were held from 2013-15 where key concepts and ideas outlined in T3, T5, T6, T7 and T8 were tested. A blog was used to elicit feedback on interpretations (see www.vcplist.com/blog).

3.3 Action research cycle 1: Venture Creation Programs (VCPs)

The first action research cycle leading up to this thesis was focused on a particular kind of entrepreneurship education program labeled Venture Creation Program (VCP), and consisted of two empirical studies, E1 and E2 outlined in Figure 8. The purpose was to increase the understanding of how, when and why people develop their entrepreneurial competencies. A VCP was defined as a formal credit-giving educational program where a team of students is required by curriculum to try starting a real-life venture with the explicit intention to continue running the venture post graduation as lead entrepreneurs and co-owners (see appended paper 1, and also Williams Middleton, 2013). By definition it is thus the last formal step in the education system for students opting to continue running the newly founded business. Such a program balances on the border between formal entrepreneurial education and informal entrepreneurial learning, and can therefore contribute with new insights in both these spheres, given its rare dual characteristic of educational environment and real-life entrepreneurship experience. As it is the educational setting that artificially triggers real-life entrepreneurial activity and learning, with realistic emotional and financial ownership of the lead entrepreneurs, the causal mechanisms of how people develop entrepreneurial competencies can be studied in unique ways, perhaps even more so than when studying entrepreneurship as practice. VCPs thereby constitute a rare “clinical” laboratory environment (Schein, 1993; Pring, 2010), potentially giving insider access to a variety of key insights around entrepreneurial learning processes. These methodological aspects are further outlined in appended papers 1, 2 and 3.

3.3.1 A study of 14 entrepreneurship programs (study E1 in Figure 8)

In this study, the first step taken was to establish a working definition of a VCP. This definition was then used to identify 18 different VCPs in Europe, North America and Asia-Pacific through snowball sampling, previous research and internet resources. 14 VCPs agreed to attend a two-day focus group meeting in Sweden, with the dual purpose of establishing a network of VCP educators that could learn from each other and at the same time studying the programs searching for generalizable insights. All participants were asked to write a case description based on a provided template, resulting in a folder briefly presenting 14 different VCPs (Lackéus, 2012). A website was also put online outlining all programs identified in the study (see www.vcplist.com). In the next step, managers at 10 VCPs were interviewed in semi-structured interviews to uncover aspects of how VCPs contribute to bridging the gap between entrepreneurship education and technology transfer, see appended paper 1. Such a gap could be viewed as a particular instance of the theory versus practice gap explored in appended paper 4. Obstacles to establishing a VCP were also explored in this study, see conference paper by Lackéus et al. (2011).

3.3.2 An in-depth study of an entrepreneurship program (study E2 in Figure 8)

This study was initiated after the E1 study, aiming to further test previously developed assumptions and interpretations. A master program at Chalmers University of Technology in Sweden was selected for in-depth study due to its well-documented strong capacity to develop entrepreneurial competencies (Hofer et al., 2010; Rasmussen and Sørheim, 2006; Lindholm Dahlstrand and Berggren, 2010; Lundqvist, 2014; Lundqvist and Williams Middleton, 2008). This allowed for observing entrepreneurial competence development in its making, instead of

through hindsight. 14 students at the program were followed longitudinally for two years, equipped with a mobile app used to sample emotional events that students experienced due to the educational intervention. Multiple interviews were conducted with each student, focusing on recently experienced emotional events sampled with the app. The interviews were recorded, transcribed and analyzed using text coding software in order to link the reported critical and emotional learning events to students' developed entrepreneurial competencies. A total of 55 one-hour interviews were conducted, recorded and transcribed verbatim. An analysis of nine of these interviews resulted in appended paper 2, summarized in chapter 4.

3.4 A new method for linking teaching to learning outcomes

Study E2 resulted in the development of a new method for establishing causal relations between a teacher's intervention and students' resulting entrepreneurial learning. Key aspects of this method are briefly outlined below. Appended papers 2 and 3 contain more in-depth descriptions. The method was used in studies E3-E6 outlined in Figure 8. Given the long-standing debate on how to evaluate education and its implications on which educational approaches reach wider adoption, such a method could be useful also in other kinds of educational research.

3.4.1 The proxy theory

The proxy theory of assessing entrepreneurial education, developed through study E2, could be viewed as an application of a causal mechanisms perspective. It stipulates that emotional and critical learning events (i.e. causal mechanisms M_i) can constitute a proxy between an educational intervention (i.e. cause C) and the developed entrepreneurial competencies among students (i.e. effect E). First, strong links are empirically validated between typical emotional learning events and the resulting development of entrepreneurial competencies (see how in appended papers 2 and 3). Then, once such links are established, a general assessment strategy can take advantage of these established links. Instead of trying to assess the elusive entrepreneurial competencies, assessment efforts rather focus on measuring the prevalence of key emotional events among students. The resulting development of entrepreneurial competencies is assumed to happen, based on previously established empirical links. Measuring the prevalence of such emotional events is less complicated to manage for teachers and also more reliable than trying to use any of the available psychology based survey instruments for evaluation of entrepreneurial competencies. Challenges associated with such instruments are further outlined in appended paper 2.

As an example, a web of causal mechanisms was evidenced empirically and with high ecological validity in appended paper 2. It was shown how educationally induced interaction with the outside world, uncertainty in learning environment and a team approach triggered increased self-efficacy, uncertainty tolerance and self-insight respectively. While still exploratory research, the proxy theory of assessing entrepreneurial education has also been corroborated in an empirical study by Kjernald (2014).

3.4.2 An app informed interview technique linking teaching to learning

Building on the proxy theory, a mixed methods approach was first developed in study E2 and later applied in studies E3-E6 (see Figure 8). First, students' emotional events were captured in

the very moment they were experienced through a mini-survey in a mobile app tailored for the purpose. In study E2, each student reported on average 50 such emotional events over a period of 1-2 years. These survey responses were then used in two ways; as a sampling strategy to determine which students to interview and as a way to construct tailored interview templates for each interview. The first step allowed for selection of interviewees who had experiences relevant to the research conducted. The second step allowed interview discussions to be focused on emotional events that were known to have occurred, and that were of particular interest given the purpose of the research. Both of these methodological steps significantly increased the signal to noise ratio of interviews conducted. In each interview, students were first asked to give a detailed account of an emotional event they had reported in the app, and were then asked to outline in detail what they learned from it. Such entities of emotional events and their resulting learning outcomes were later harvested and quantitatively counted in the interview analysis phase. All interviews were recorded, transcribed and coded using two coding frameworks; one for emotional events and one for entrepreneurial competencies (frameworks are outlined in appended papers 2 and 3, and in Arpiainen et al., 2013). The most frequent links between emotional events and learning outcomes were deemed to constitute a generalizable pattern between emotional events and learning outcomes. The linkage backwards from emotional events to educational design was done logically in a quite straightforward process. Once the most powerful emotional events in terms of resulting learning had been identified it was evident which teacher interventions had triggered them (see for example Kjernald, 2014). See appended papers 2, 3 and 4 for details on the empirical studies. See also Lackéus and Sävétun (2014).

3.4.3 Spin-out of app instrument into a venture

Developing an app instrument tailored to the requirements of this research required financial and human resources not available at Chalmers University of Technology for such a purpose. After study E2 and E3, it was therefore decided to put further development of the app instrument in a spin-out venture started for this purpose, located at the Chalmers Innovation university incubator. The resulting app, branded under the name LoopMe, was then used in studies E4, E5 and E6 to generate data and guide interviews. A number of additional projects are planned and underway using the app instrument, both within and outside the field of entrepreneurial education.

The app instrument turned out to act as a system (cf. Von Bertalanffy, 1950), with input in terms of goals and themes, a dual process of teacher-student interaction and experiential evaluation instrument, and output in terms of personal and organizational development, see Figure 9. It turned out to have three different uses; as a research instrument, as a tool for educators and as a tool at work. In terms of research the system allowed users to share their daily experiences with people they trust (such as teachers, managers, etc) while at the same time opening up for researchers to get unique access to experiential and categorized data on critical emotional events, thought patterns and actual behaviors. In classrooms where the system was deployed, the many students involved acted as participant observers who notified the researcher of any significant events occurring in the classroom. In any given classroom where more than 10% of the students were active users of the app instrument, most events relevant for

the research purpose were reported through the app instrument by at least one student, allowing researchers to pinpoint people to interview coupled with relevant events to discuss with them.

For educators the system was used for formative assessment, teacher peer learning between colleagues, systematic quality work and impact evaluation. Teachers, teacher teams, school managers and educational change agents on multiple levels found new and innovative kinds of use for the system in their daily work. For students the system became an appreciated digital channel for sensitive discussions with their teachers as well as feedback to and from their teachers. A possibility to send information anonymously from students was included and appreciated by students. For people working at corporations the system turned out to be useful to facilitate a variety of different kinds of communication between the managers and the employees.

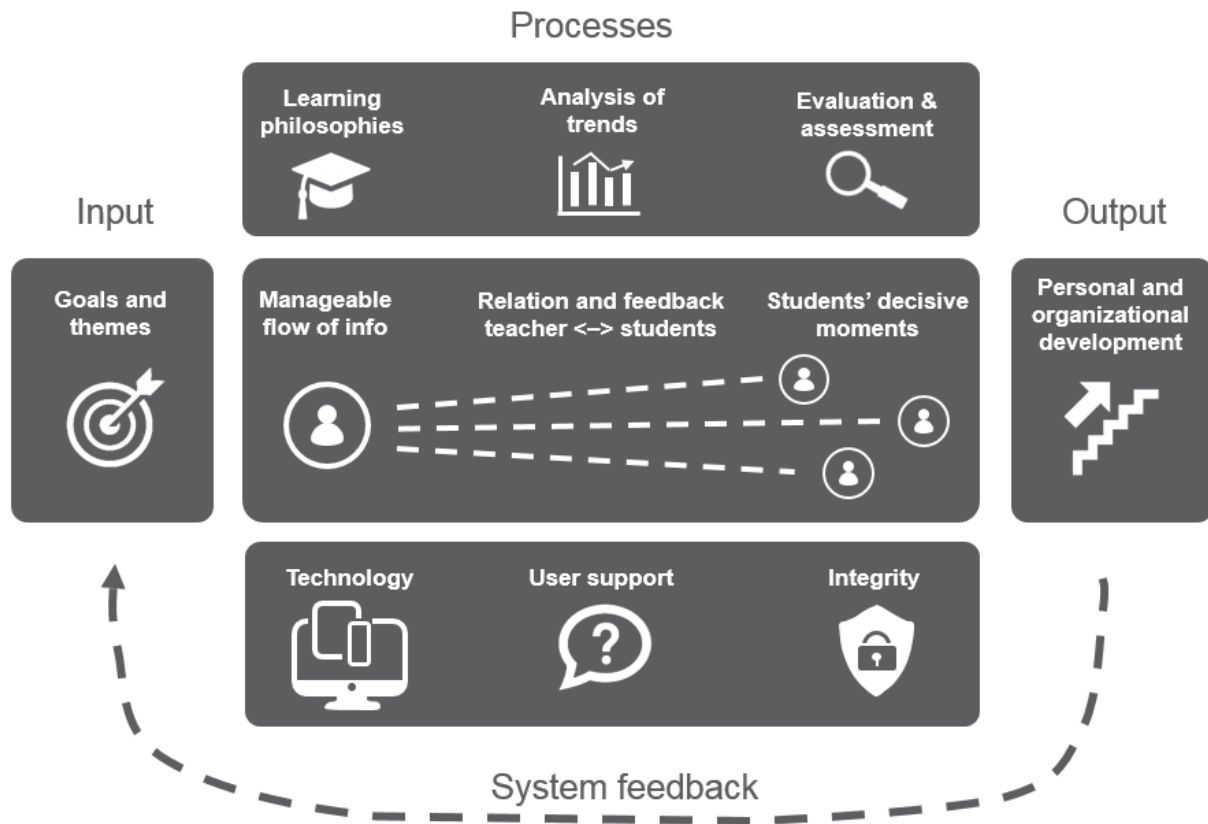


Figure 9. The app instrument “LoopMe” viewed as a system. Input consisted of goals and themes. Two processes consisted of relation between teachers and students as well as evaluation processes. Output consisted of personal and organizational development. The system turned out to be useful for research, for education and at workplaces.

3.5 Action research cycle 2: General education

The insights generated in action research cycle 1 on how entrepreneurial competencies can be developed through action-based entrepreneurial education informed the second action research cycle. Here focus was put on education more in general. Study E3 focused on university-wide entrepreneurial education (cf. West et al., 2009), both in terms of in-curricular and extra-curricular activities. Study E4 followed an existing value creation focused intervention in two lower secondary schools. Study E5 was a control group study to explore how entrepreneurship

had been infused into primary and lower secondary education in Sweden so far, not taking into account any findings generated in the research reported in this thesis. Study E6 was initiated in early 2014, is still on-going, and involves a municipality who is attempting a wide implementation at 130 primary and secondary schools of the tentatively new educational philosophy proposed here. The methods applied in each of these studies are briefly outlined below.

3.5.1 A new entrepreneurial education platform (study E3 in Figure 8)

In 2011 the Swedish non-profit foundation Drivhuset initiated the development of an entrepreneurial education platform to better inform their support activities towards student entrepreneurs. The author of this thesis was member of the project team developing the platform. It was designed as five one-day workshop sessions spread out across 2-3 months, complemented by value creation assignments towards key external stakeholders to be completed between each workshop. The platform was based on a careful selection of a dozen different entrepreneurship methods. Since the launch of the new educational platform in 2013, it has been used for supporting and educating around 2000 people in Sweden. Common participants have been student entrepreneurs, but the platform has also been used for supporting unemployed people, youth summer entrepreneurs and employees at private as well as public organizations. Data has been collected about participants on three different occasions, involving students at a performing arts school, students at an engineering school and unemployed people. The data collection method outlined in section 3.4 was applied, complemented with focus group interviews. While no paper focusing specifically on this study has yet been written, insights generated have informed the articulation of conceptual propositions outlined in appended paper 4. This study constitutes an early attempt to apply the tentatively new educational philosophy proposed in this thesis, in that participants were asked to iteratively test an increasingly elaborated value proposition to external stakeholders in between each of the five workshops.

3.5.2 A study of value creation in compulsory education (study E4 in Figure 8)

Study E4 was the first compulsory education application of the method outlined in section 3.4. Two different lower secondary schools participated in the study, one of which had an articulated strategy to be an entrepreneurial school. Students in both schools were given a group assignment to produce a radio program of one hour to be broadcast locally in their municipality, constituting an assignment to create something of value (a radio program) to people outside their school (listeners). Twelve students volunteered to participate in the study, and were all 13-14 years old. They were equipped with an app and asked to report any emotional events triggered by the assignment, resulting in a total of 33 app reports during the two months period of the intervention. Three one-hour app-informed interviews were made with seven of the students during and after the intervention, selected based on app reports deemed relevant for the purpose of the study. The 21 resulting interviews were recorded, transcribed and analyzed using the method outlined in section 3.4. Additional semi-structured interviews were made with the teachers and parents to three of the participating students, in order to corroborate findings. Findings were summarized in a Swedish report not appended to this paper (Lackéus and Sävetun, 2014). Just like in study E2, multiple links were found in study E4 between emotional events and developed entrepreneurial competencies. The short duration of the intervention in

study E4 compared to E2 resulted in a different set of links. Interaction with outside world and teamwork were found to be key emotional events triggering the development of a variety of entrepreneurial competencies.

3.5.3 A control group study in compulsory education (study E5 in Figure 8)

The dissemination of study E4 attracted interest from Swedish National Agency of Education, who then asked the research team to replicate the E4 study in a larger study comprising three different schools deemed to be particularly entrepreneurial, two on primary education level and one on lower secondary education level. 83 students aged 10-16 years old were equipped with a developed version of the emotional event app, generating a total of 1058 app reports. 25 of these students were selected for interviews based on where interesting app reports could be found illustrating strong emotional events related to educational interventions. These interviews were focused on issues raised in students' app reports and lasted for 45 minutes each. Given the finding of an almost complete lack of student interaction with the world outside school or any kind of value creation to external stakeholders in the studied learning environments, study E5 could be regarded as a control group study. It illustrated an absence of "entrepreneurial" education in Swedish compulsory education, if defined in accordance with entrepreneurship viewed as new value creation for others. However, some rare examples of value creation assignments still contributed with illustrative evidence of effects in terms of student learning and motivation. Results are outlined in appended paper 3.

3.5.4 Implementation of a new educational philosophy (study E6 in Figure 8)

In 2014 the local government of Sundsvall decided to initiate a project aiming to integrate entrepreneurship into the entire educational sector of Sundsvall, in line with requirements outlined in Sweden's national curriculum documents. The people responsible for the implementation project then initiated a collaboration with the author of this thesis, in order to apply the educational philosophy articulated in chapter 5 in all schools in Sundsvall. The tentatively new educational philosophy was chosen as the main strategy for infusing entrepreneurship into public education. The project managers also initiated a collaboration with Drivhuset (Study E3), using their entrepreneurial education platform to train key municipality stakeholders in value creation. As of 2015 the project is still in an early phase. Around 300 people have been educated through the Drivhuset educational platform, primarily employees such as school managers, principals and teachers. Eight specialists employed at the municipality are championing the process, and have received special training in theoretical as well as practical perspectives, and have also contributed significantly to the development of the tentatively new educational philosophy. Some 50 teachers have so far started practicing value creation assignments with their students, putting the number of students being explicitly involved to around a thousand so far.

Study E6 is a deeply action oriented research project, where the author of this thesis has been appointed "scientific leader" of the project. Insights generated have been documented in written form by the project managers over the course of the almost two years the project has been up and running. Two surveys have also been administered to four key change agents, asking them to reflect on the conceptual propositions outlined in appended paper 4. While no explicit write-up of this study has been made yet apart from appendix in appended paper 4, it constitutes an

early empirical validation of the tentatively new educational philosophy in terms of stakeholder engagement and buy-in among the many teachers, principals, school managers and students having been involved so far. The study has also significantly informed the articulation of the tentatively new educational philosophy described in chapter 5.

3.6 On-going studies

The empirical studies mentioned above are all reported in more or less detail in research papers appended to this thesis. In addition there are also three on-going studies that have not yet been documented in a research paper.

3.6.1 A European study of student value creation (study O1 in Table 4)

Study O1 is an action research study financed by European Union where three different schools in Sweden, Norway and Turkey are compared and contrasted. A total of around 20 teachers and 250 students 10-16 years old are involved. The teachers have been trained in value creation as educational philosophy and practice in early 2015. They have then designed a wide variety of value creation assignments for students, which are being put to practice in 2015-2016. The impact on students will be followed longitudinally for 1,5 years in 2015 and 2016 employing the app-based sampling and interviewing method outlined in section 3.4. Three waves of student interviews are planned.

3.6.2 A Swedish study of student value creation (study O2 in Table 4)

Study O2 is a multiple case study where some 50 teachers from eight different municipalities around Sweden were selected based on how well their current teaching activities are in line with value creation as educational philosophy as articulated in chapter 5. It is a continuation of study E5, and was commissioned in 2015 by Swedish National Agency for Education. Data from around 1000 students will be collected in late 2015 and early 2016 applying the app-based sampling and interviewing method outlined in section 3.4. The data will be analyzed in 2016.

3.6.3 A regional study of entrepreneurial education (study O3 in Table 4)

Study O3 is a multiple case study where data was collected in 2014-2015 employing the app-based sampling and interviewing method outlined in section 3.4. Participants were 100 students on lower secondary education level aged 12-15 years old, 44 students on upper secondary education level aged 15-17 years old and 17 students on tertiary education level aged 18 years or more. These students did a total of 1337 app reports in a period of three months. 53 of the students were interviewed, and 44 of these interviews were coded using the coding frameworks outlined in appended paper 3. This data is currently being analyzed.

To summarize empirical studies conducted or on-going and corresponding research strategy applied, Table 4 outlines four different kinds of empirical work related to four different levels of education, and shows how the three on-going studies (O1-O3) complement previous work (E1-E6). In Table 4 some related empirical work is also shown that has surfaced during the research endeavor. Some of it was inspired by this research and some work was conducted independently of this work.

Table 4. Four different kinds of empirical data on four different educational levels. The table summarizes the six reported studies E1-E6 and the three on-going studies O1-O3, relating them to which levels of education they span. The table also shows some work that was inspired to or identified as value creation in education during the research.

Kind of empirics	Compulsory education level (age 7-15)	Upper secondary education level (age 15-18)	Tertiary education level (age 18-)	Continuing education level
Action research empirics	<ul style="list-style-type: none"> • Study E5 and E6 • On-going study O1 	<ul style="list-style-type: none"> • Study E3 and E6 	<ul style="list-style-type: none"> • Study E1 and E2 	<ul style="list-style-type: none"> • Study E3
Case study empirics	<ul style="list-style-type: none"> • Study E4 • On-going study O2 • On-going study O3 	<ul style="list-style-type: none"> • On-going study O2 • On-going study O3 	<ul style="list-style-type: none"> • On-going study O3 	<ul style="list-style-type: none"> • On-going study O3
Empirics independently inspired by this research	<ul style="list-style-type: none"> • Municipalities of Varberg and Vaxjö • Ready Unlimited in UK 	-	<ul style="list-style-type: none"> • VCPs in Tromsö, Colorado and Lund 	-
Empirics independently showing similarities	<ul style="list-style-type: none"> • Some 15 examples around Sweden collected through a survey 	<ul style="list-style-type: none"> • Junior Achievement / Young Enterprise • Mini-Enterprise in Schools Project (MESP) 	<ul style="list-style-type: none"> • Team Academy, Finland • Network of VCPs around the world 	-

4 Summary of appended papers

In this chapter the six papers appended to this thesis are summarized. Papers 1 through 3 are empirical. Paper 4 is conceptual but leans heavily on abductive work involving three different empirical settings outlined in appendix. Paper 5 is a practitioner oriented paper. Paper 6 is conceptual.

Table 5. Appended papers. *A summary of the six papers appended to this thesis.*

No	Paper	Author(s)	Status	Subject / relevance	Type/role
1	Venture creation programs – bridging entrepreneurship education and technology transfer	Lackéus, M., Williams Middleton, K.,	Published 2015 in Education + Training, 57(1), p.48-73	Outlines ten cases of venture creation programs where the tentatively new educational philosophy was derived from.	Empirical paper / Equal author
2	An emotion based approach to assessing entrepreneurial education	Lackéus, M.	Published 2014 in International Journal of Management Education, 12(3), p.374-396	Outlines the methodology used for substantiating the tentatively new educational philosophy. Contributes with empirical evidence for the tentatively new educational philosophy.	Empirical paper / Sole author
3	How entrepreneurial is Swedish compulsory education?	Lackéus, M., Sävétun, C.	Submitted to Journal of the Learning Sciences	Contributes with empirical evidence for the tentatively new educational philosophy outside the higher education domain.	Empirical paper / First author
4	Bridging the traditional - progressive education rift through entrepreneurship	Lackéus, M., Lundqvist, M., Williams Middleton, K.,	Submitted to International Journal of Entrepreneurial Behavior & Research	Conceptual paper defining and theoretically substantiating the philosophy. Appendix 1 also contains three empirical cases the philosophy was developed from.	Conceptual paper / First author
5	Entrepreneurship in Education – What, Why, When, How	Lackéus, M.	Published 2015 by OECD as a background paper	Summarizes key ideas developed in the research process, allowing for external stakeholders to provide developmental feedback.	Summary paper / Sole author
6	Two flavors of entrepreneurial education	Lackéus, M.	Presented at RENT 2015 in Zagreb, Nov 19-20	Outlines the student-as-giver perspective which is central to the tentatively new educational philosophy.	Conceptual paper / Sole author

4.1 “Venture creation programs – bridging Entrepreneurship Education and Technology Transfer”

Appended paper 1 explores how university-based entrepreneurship programs, incorporating real-life venture creation into educational design and delivery, can bridge the gap between entrepreneurship education and technology transfer within the university environment. Based on a literature review and snowball sampling over a two-year period, 18 entrepreneurship education programs were identified as Venture Creation Programs (VCPs). Ten of these programs were selected for case study through interviews and participatory observation during a two-day workshop. Empirical findings were iteratively related to theory within entrepreneurship education and technology transfer. This paper is the first published multiple case study of VCPs.

4.1.1 Results

Findings illustrate bridging capabilities of VCPs across five common themes in the studied programs; a focus on experiential learning, interdisciplinarity, process-based curriculum, external network of resources and contribution to regional economic development. This illustrates the potential benefits of closer collaboration between entrepreneurship education and technology transfer in a university environment. The VCPs were found to create value for society through generation of new and growing start-ups, through an entrepreneurially equipped graduate population, and through ‘spin-through’ of innovative ideas taken from industry and infused into the university environment.

4.1.2 Relevance for thesis

The paper illustrates how VCPs can bridge a rift of multiple dualisms such as theory versus practice, reflection versus action, learning versus value creation and education versus real-world learning. It thus connects to appended paper 4 and its proposal to bridge an educational rift of problematic dualisms through the articulation of a tentatively new educational philosophy grounded in entrepreneurship. Appended paper 1 also contributes with empirical evidence from five different countries on two continents concerning the profound impact a value creation based educational practice can have on student engagement and learning. It thereby provides some answers to RQ1 in terms of usefulness of an educational philosophy grounded in entrepreneurship. The fact that VCPs were found to be very rare provide some guidance to RQ2 in terms of novelty of a deeply experiential value creation approach.

4.2 “An emotion based approach to assessing Entrepreneurial Education”

Appended paper 2 investigates links between emotional events and developed entrepreneurial competencies in a VCP. It represents a novel approach to assessing entrepreneurial education. A longitudinal design was applied following three engineering students during nine intensive months. Students were equipped with a mobile smartphone app used to report emotional events and critical learning events. Reports were followed up quarterly with semi-structured interviews. Links were identified through data analysis software NVIVO.

4.2.1 Results

Findings indicate a large number of links between emotional events and developed entrepreneurial competencies. Three kinds of emotional events strongly linked to developed entrepreneurial competencies were interaction with outside world, uncertainty and team-work. These emotional events were linked to formation of entrepreneurial identity, increased self-efficacy, increased uncertainty tolerance and increased self-insight. These links represent early empirical evidence for three effective design principles of entrepreneurial education, and can also be used as indirect measures in assessment. This study also confirms venture creation programs as a suitable laboratory environment for studying entrepreneurship as experience.

4.2.2 Relevance for thesis

The paper contains the first published description of the app-based mixed methods research approach developed by the author and later applied in other studies leading up to the articulation of a tentatively new educational philosophy. The paper also contributes with more in-depth

empirical evidence on how a value creation focused educational practice impacts students on a deeply personal level. This contributes to answering RQ1 in terms of the usefulness of value creation as educational philosophy. The importance of some key factors in value creation as educational philosophy are also derived empirically in this paper; interaction with outside world, teamwork, and uncertainty in learning environment triggered by risk of failure. This relates to RQ2 in terms of what is new with value creation as educational philosophy, since it allows for the mechanisms of value creation based learning to be contrasted to existing educational philosophies.

4.3 “How ‘entrepreneurial’ is Swedish compulsory education?”

Appended paper 3 investigates the impact of an entrepreneurial education initiative on compulsory education level led by Swedish National Agency for Education. A wide definition of entrepreneurship as new value creation was applied, aiming to make people more entrepreneurial rather than making them start a business. 83 students were followed for one semester in three Swedish compulsory schools with a long history of entrepreneurial education. The methodology outlined in section 3.4 was applied in this study, building on mobile app based experience sampling and interviews.

4.3.1 Results

The findings show that the three schools investigated here were not as “entrepreneurial” as anticipated and advertised, if “entrepreneurial” is defined as creating value for others. Nevertheless, a set of entrepreneurial education practices and principles were identified and developed. The study contributes with empirical evidence on causal mechanisms for how letting students interact with outside stakeholders and create value for others can increase engagement, perceived relevance and deep learning. When students get to present their work to others who value it and benefit from it, the resulting feelings involve pride, increased self-efficacy and passion leading to increased motivation and improved learning. If given time and opportunity to repeat this, the students increase their effort, learn more in-depth and enter a positive self-reinforcing cycle of learning. Findings also show that not even teachers that were well-informed in entrepreneurial education principles were fully aware of the power of such an interaction and value creation based educational practice.

4.3.2 Relevance for thesis

The paper contributes with relevant empirical evidence from a different level of education and employing a wider definition of entrepreneurship than in appended papers 1 and 2. It contributes with evidence on how rare entrepreneurial education is in compulsory schools in Sweden, if defined as letting students create value to people outside their group or teacher, thereby qualifying the need for a tentatively new educational philosophy grounded in entrepreneurship (RQ 1). It also contributes with empirical evidence on the impact that value creation as educational practice can have on student engagement and learning in those few instances of entrepreneurial education encountered in the study. Further, a novel abductively developed method of assessing entrepreneurial education was tested empirically in this study, applying the spider diagram outlined in section 5.3.4. This diagram has proven to be able to facilitate both teacher and scholarly assessment of practical applications of the educational philosophy proposed in this thesis. This diagram thus contributes to answering RQ 2 in terms of what is

new with value creation as educational practice. The paper also represents the most elaborate use so far of the emotional events based method outlined in section 3.4 for linking teaching interventions to learning outcomes.

4.4 “Bridging the traditional – progressive education rift through entrepreneurship”

Appended paper 4 conceptually draws from insights within the field of entrepreneurship to suggest a tentatively new educational philosophy – *learning through creating value for others* – and demonstrates how it can bridge the rift between traditional and progressive education. Such an educational philosophy can also be used to facilitate embedding entrepreneurship into general education. As manifestations of the educational philosophy, three entrepreneurial tools - Effectuation, Customer Development and Appreciative Inquiry - are shown to be capable of mitigating many of the challenges inherent in bridging traditional and progressive education, such as teacher complexity, lack of resources, assessment difficulties, and student disengagement. While presented as a conceptual paper, many of the ideas outlined have emerged through the authors’ active participation in empirical settings. Three of these settings are outlined in an appendix to the paper.

4.4.1 Results

The suggested educational philosophy was conceptually derived from commonalities among the three analyzed bridging tools. It was defined as teachers facilitating students’ use of curriculum knowledge and skills to learn by creating something of value to at least one person outside the ‘classroom’. It was illustrated how the tentatively new educational philosophy contributes to bridging the rift of traditional versus progressive education. It was also illustrated how this educational philosophy compares to some existing educational philosophies focused primarily on *learning-through* aspects but missing the *creating-value-for-others* aspects. Finally, it was proposed that the tentatively new educational philosophy allows for progressing beyond the common focus on teachers’ attitudes to entrepreneurship by outlining purposeful and manageable entrepreneurial activities that teachers can let students do, leading to increased student motivation, developed responsibility-taking and deeper learning.

4.4.2 Relevance for thesis

The paper constitutes the main conceptual outline of the tentatively new educational philosophy proposed in this thesis. While a conceptual paper, the paper’s appendix contains a detailed description of the three main action research settings where the abductive process of articulating the tentatively new educational philosophy took place. The paper also outlines three deliberately chosen entrepreneurial tools taken from the field of entrepreneurship, illustrating in considerable detail how the rift between traditional and progressive education can be bridged when teachers let students apply them in class. It further gives a detailed account of the educational rift as such, presented as consisting of five particularly challenging dualisms that teachers need to try bridging in their daily work. Finally, the paper outlines a Vygotskian psychological tools approach that has been instrumental in the abductive research process reported in this thesis. Being the paper where the tentatively new educational philosophy is qualified conceptually, this paper arguably contributes to answering both RQs of this thesis.

4.5 “Entrepreneurship in Education – What, Why, When, How”

Appended paper 5 clarifies some basic tenets of entrepreneurship in education, focusing on *what* it is, *why* it is relevant to society, *when* it is applied and *how* to do it in practice. It was written following a request from the entrepreneurship team at OECD’s Local Economic and Employment Development (LEED) program. The intended audience of the paper is practitioners in educational institutions, and the basis of this clarification attempt consists primarily of existing research in the domains of entrepreneurship, education, psychology and philosophy. Where research is scarce the author attempts to give some guidance based on own conducted research. The paper also outlines some future challenges and opportunities in entrepreneurial education.

4.5.1 Results

As a remedy to differing views of *what* entrepreneurial education is, the paper takes the stance that a common denominator is that all students can and should train their ability and willingness to create value for other people. In an attempt to address *why* infusing entrepreneurship into education is useful, a less discussed but highly interesting impact that entrepreneurship can have on education is the high levels of student motivation and engagement it can trigger, and also the resulting deep learning. To address the issue of *when* to do what, in terms of primary, secondary and tertiary education interventions, a unified progression model for entrepreneurial education is proposed. Finally, the *how* issue is addressed by proposing a focus on emotional activities that trigger the development of entrepreneurial competencies, and by outlining six different entrepreneurial methods that teachers can use.

4.5.2 Relevance for thesis

The paper was a key step in the action research methodology employed here in that it contains a practitioner oriented and succinct summary of many of the ideas leading up to the articulation of a tentatively new educational philosophy grounded in entrepreneurship. This allowed for testing and challenging some key developed preconceptions and interpretations (cf. Coghlan and Shani, 2014). The paper and its precursors (Lackéus, 2013b; Lackéus and Moberg, 2013) triggered a significant amount of feedback from both practitioners and other scholars in Sweden, Europe and USA, contributing in many ways to the development of the tentatively new educational philosophy put forward in this thesis. Such a circulation and public scrutiny of key ideas also adds to the substantiation of claims made in this thesis. This paper therefore addresses both RQs of this thesis by triggering a reaction from a wide range of stakeholders around perceived utility and novelty of value creation as educational philosophy and practice.

4.6 “Two flavors of entrepreneurial education”

Appended paper 6 explores two quite different goals of human activity outlined in well-being theory and motivation theory; happiness for oneself versus meaningfulness with others. It then relates them to different forms of entrepreneurial education. Two distinct prototypic flavors of entrepreneurial education are developed based on this, where one aims to produce empowered individuals maximizing their own happiness and wealth, and the other aims to produce creative citizens striving to instigate meaningful change for society even if it reduces their own happiness. Articulating such a difference is posited to be crucial for advancing the field of entrepreneurial education, often viewed by teachers as a way to covertly introduce capitalist

and neoliberal values into education. Neoliberalism celebrates free competition and enterprising individuals taking autonomous responsibility for their life, exercising their freedom to choose whichever path in life that optimizes their own happiness, wealth and self-esteem.

4.6.1 Results

The analysis shows that entrepreneurial education can indeed be perceived as a close companion to neoliberalism if it is designed in line with the stereotypic image of entrepreneurs as self-made lone male heroes building wealth for themselves. The analysis also shows that a do-good flavor of entrepreneurial education can be perceived as an antidote to the currently prevailing neoliberal values imposed upon teachers by today's education policy climate. By giving students assignments to learn by using their knowledge to create value to people outside the classroom, teachers can enjoy highly engaged and creative "students-as-givers" that acquire both entrepreneurial competencies and declarative knowledge more in-depth than they perhaps would in a one-sided "students-as-takers" culture.

4.6.2 Relevance for thesis

Due to the values clash often encountered when trying to infuse entrepreneurship into education, there is a need to ground the tentatively new educational philosophy proposed in this thesis firmly in a more altruistic and collectivist view of entrepreneurship. This paper served to develop such a grounding, and constituted a key step in developing the "student-as-giver" perspective from well-being and motivation literature. This paper also was a key step in adding the formulation "*to-others*" in the definition of the tentatively new educational philosophy articulated in chapter 5. The need for such an addition became obvious in the public testing of key ideas. People often tacitly assumed value creation to be primarily for oneself. Such a fallacy to always assume that people aim to create value primarily for themselves is perhaps an effect of today's neoliberal western society, and could be countered with a "student-as-giver" perspective. The paper thereby contributes to answering primarily RQ 2, but also illustrates the need for a new educational philosophy and practice emphasizing altruistic aspects of entrepreneurship, thereby answering to some extent also RQ 1.

5 Towards a new educational philosophy?

This chapter contains an attempt to articulate a tentatively new educational philosophy grounded in entrepreneurship as new value creation. The application of it in practice by teachers is so far limited, making this a primarily conceptual and prescriptive articulation attempt. This means that future will have to tell if more teachers will see reasons to apply it in their daily work, and what impact it can have in terms of student learning, motivation and other effects. This articulation can thus be seen as an early point in an unknown journey towards the future for this tentatively new educational philosophy. The division between chapters 5 and 6 is intended to be the difference between *articulation* (chapter 5) and *qualification* (chapter 6) of an educational philosophy. Chapter 5 therefore contains a prescriptive and stand-alone articulation in terms of *what* to do (section 5.1), *how* to do it (section 5.2), *why* (section 5.3), some challenges (section 5.4) and some empirical examples (section 5.5) of the tentatively new educational philosophy. This will then be followed by chapter 6 where the research questions are addressed, relating the articulated educational philosophy to the current state of education and entrepreneurial education.

5.1 Articulating a tentatively new educational philosophy – “what”

The definition presented here is the result of a five years long research process outlined in chapter 3. The working definition has been adjusted many times during the journey, and it will most likely need further revisioning. The current shape of the definition is found in Table 6, and consists of ten different elements outlining *what* to do. A shorter 6-word definition can be articulated as *learning-through-creating-value-for-others*, see further in appended paper 4. The *learning-through* part is covered by elements 1-3 in Table 6. The *creating-value* part is covered by elements 4-7 in Table 6. The *for-others* part is covered by elements 8-10 in Table 6. Any shortening however opens up for ambiguity, so simplification should be made with care. One key aspect missing in the shorter 6-word version is the novelty of the value created. According to Bruyat’s definition of entrepreneurship as *new* value creation, the level of novelty correlates with how likely it is that people will interpret any kind of value creation as entrepreneurship. Below each of the ten elements will be discussed briefly.

Table 6. Definition of value creation as educational philosophy. Ten elements constituting a defining of value creation as educational philosophy.

No	Definition	Explanation / clarification
<i>Learning-through...</i>		
1	Let students learn...	The purpose is learning. Value creation is the means.
2	...by applying their existing and future...	Existing before the course, or future as a result of course.
3	...competencies...	In- or extra-curricular knowledge, skills and attitudes.
<i>...creating value...</i>		
4	...to create...	This is a creative assignment.
5	...something...	A physical, intellectual or cultural artifact (ie human creation)
6	...preferably novel...	The more novel, the more it is deemed “entrepreneurship”.
7	...of value...	Value is subjective and intersubjective; decided by recipient.
<i>...for others.</i>		
8	...to at least one...	Someone(s) or something(s) capable of giving feedback.
9	...external stakeholder...	The more external, the more powerful but also the more scary.
10	...outside their group, class or school.	Three progression levels; in class, in school or outside school.

5.1.1 Let students learn...

It is an educational philosophy that is outlined, so the intended users are educational institutions where the main aim is to support teachers in improving student learning in meaningful ways. Some students will inevitably interpret the main goal to be new value creation, and that could certainly be acceptable as long as teachers always remember that the main aim is learning.

5.1.2 ...by applying their existing and future...

A key aim here is to bridge a rift of educational dualisms, such as theory versus practice or knowing versus doing (see section 2.3.8 and appended paper 4). It is therefore recommended to let the new value creation process be informed by existing and future competencies. Existing competencies can be the starting point for a student when a course or module starts. Future competencies can be those acquired as a direct result of the course or module, stipulated by course or program curriculum documents.

5.1.3 ...competencies...

As discussed in section 2.1.4, competencies can be operationalized through a Knowledge, Skills and Attitudes (KSA) framework. It is thus not only knowledge that can be put to use in a new value creation process, but also a student's skills and attitudes. The most developed version of a KSA framework in this research project can be found in appended paper 3. It contains both specifically entrepreneurial competencies and more generic competencies on the border between entrepreneurship and other domains.

5.1.4 ...to create...

Creation is central to this educational philosophy and to entrepreneurship in general. If something physical or intellectual is not created by the students, it is not categorized as applying the educational philosophy articulated here. This illustrates the inherent creativity dimension of entrepreneurial education focused on value creation.

5.1.5 ...something...

An outcome of human creation can be termed *artifact*. Hilpinen (2011) has defined artifact as anything physical or intellectual shaped by human art and workmanship, thus having one or many authors. This is differentiated from naturefacts (objects in nature) and biofacts or ecofacts (organic material not manipulated by humans). If there is no artifact involved having students as authors in an educational intervention, it is by definition not in accordance with the educational philosophy articulated here.

5.1.6 ...preferably novel...

In Bruyat's (1993) definition of entrepreneurship as new value creation, it was argued that the more novelty that is created and the more the process changes the individual, the more people will view it as being about entrepreneurship. Assessing novelty is then a resulting challenge. Creativity literature has stated that uniqueness needs to be assessed by others than the authors of an artifact, and that these others need to be part of a relevant community (Reid and Petocz, 2004). While novelty indeed is desirable, it should not be raised as too high of a hurdle to putting this educational philosophy to use. Novelty could also be interpreted as value creation activities that are new only to the student. Still, if students can be encouraged to create

something valuable that is also novel in the eyes of others, it will indeed spur increased emotional ownership and engagement.

5.1.7 ...of value...

Some kinds of value that can be considered here are derived from literature in section 2.2; enjoyment value, economic value, influence value, harmony value and social value. Many views of value and valuation stipulate that it is the recipient of value that subjectively evaluates whether value has been created or not. It is therefore up to the intended recipient of value to evaluate whether or not an artifact created by a student is valuable or not. It is important here to state that learning will occur regardless of the recipient's perception of value. It is thus not a requirement that value is successfully created, merely that a student *tries* to create a valuable artifact to an external stakeholder in a way that allows for an intersubjective evaluation to occur, and that the student has plausible reason to *believe* that the attempt to create value might succeed. This is the role of value creation as a stepping stone between entrepreneurship and education, connecting the education related aims of fostering student learning with an entrepreneurship related capacity to satisfy the student's search for meaning and relevancy.

5.1.8 ...to at least one...

For an intersubjective evaluation of an artifact to occur, a minimum of one external recipient of value is arguably required. It does not need to be a human, it can be an animal or even a plant. The recipient however needs to be capable of producing some kind of relatively swift feedback signifying whether value was perceived or not, and if so to what extent. Working towards more than one recipient of value can give a stronger emotional reaction for the student, but should perhaps not be put as a requirement given that it could discourage some students from trying.

5.1.9 ...external stakeholder...

While it is indeed difficult to separate value for oneself from value for others, as discussed in section 2.2, recommendations from entrepreneurial methods, findings from Vygotsky's tradition of social learning theory and the importance of emotional events for learning all stipulate that students should indeed try to create value for *others* than those who are considered to be authors of any artifact created (see further in sections 6.1.2.5-6.1.2.6). This means that in order for it to be a question of *entrepreneurial* education, the student or student team should not be considered as the primary recipient of value to their own value creation attempt. Further, in an educational setting the teacher should not be considered a recipient of value, since teachers could be considered to be indirect authors. After all, it is the teacher who has instigated the creation process by giving the students an assignment to create something of value.

5.1.10 ...outside their own group, class or school.

The recipient could be outside the group of authors but still within the same class or cohort. It would then involve external recipients that students feel comfortable with. It however at the same time limits the level of emotional engagement and deep learning that will occur. I therefore posit that it could be viewed as a good starting point, but that teachers should encourage their students to go outside this first step in subsequent value creation attempts. This step thus represents the first step of three in a progression towards more engaging but also more challenging recipients of value. One way to take a next step could be to let students create value

to people outside their own class but within the borders of their own educational institution. It could be older or younger students, it could be employees other than the teacher who is responsible for the value creation assignment. This is the second step of three in a progression towards increasingly engaging recipients of value. The most powerful but also most frightening stakeholder can be found outside the own educational institution. It could be anyone on the planet. The interaction could be analog in terms of a meeting in the street or at a workplace. It could be digital in terms of a phone call, an e-mail or any other communication channel. The infusion of information technology in schools and universities has made interaction with stakeholders outside the educational institution much easier now than in earlier years. This is the third and final step in a progression towards increasingly engaging recipients of value.

5.2 Putting value creation to use in educational practice – “how”

Having defined the proposed educational philosophy in terms of *what* to do, this section describes *how* to do it. It follows recommendations in instructional design theory to distinguish between preparations, process and outcome (Smith and Ragan, 1999), and to articulate a provisional specification of an educational idea allowing for it to be tested by teachers in practice (Stenhouse, 1975). Preparations consist of articulating an entrepreneurial task and providing students with entrepreneurial inputs. The process is an entrepreneurial process with its characteristic stakeholder interactions, uncertainty, risk for failure and emotional ownership for students. The output is divided into a dual short-term entrepreneurial output and a more long-term entrepreneurial impact. These aspects are shown in Figure 10 as well as in text below.

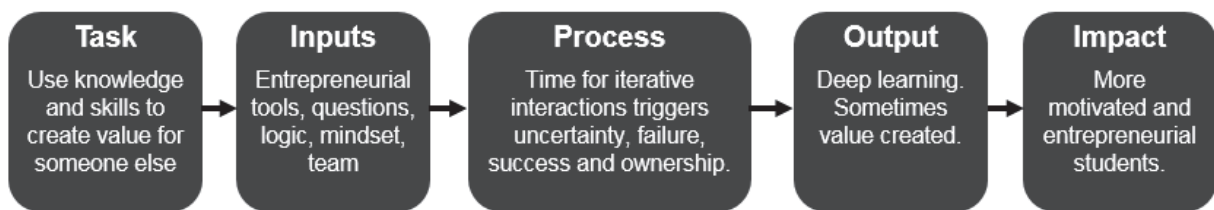


Figure 10. *How to do learning-through-creating-value-for-others.* The figure leans on instructional design theory to show how entrepreneurial task, entrepreneurial inputs, entrepreneurial process, entrepreneurial output and entrepreneurial impact are related.

5.2.1 Entrepreneurial task

A value creation assignment starts with outlining the task for the students. The students are given the task to use their competencies (current or future) to create something of value to someone else. Who is responsible for defining which competencies to use could vary; it could be the teacher completely dictating which competencies to use, it could be up to the student, or a combination thereof. Relating to the issue of what is “entrepreneurial” in entrepreneurial education, I draw on Bruyat (1993) to posit that the task outlined here is by definition entrepreneurial.

5.2.2 Entrepreneurial inputs

The next step is that the teacher puts students into teams using any pairing mechanism deemed suitable for the task. The teacher also supplies the students with some entrepreneurial tools, heuristics and questions that they can, or perhaps should, use. Inspiration for which ones to use can be taken from the field of entrepreneurship (see appended papers 4 and 5 for examples). At

this stage, students could benefit from teachers discussing what is considered to be an entrepreneurial mindset. Here, it is primarily the tools and methods that are inherently “entrepreneurial”, given that they were developed from what could plausibly be stated to be part of entrepreneurship theory and practice.

5.2.3 Entrepreneurial process

The value creation process is the core of an assignment in line with the educational philosophy proposed in this thesis. The purpose here is to let the students learn experientially by going through an actual entrepreneurial process of creating value to others. It is important to give students enough time to allow for multiple iterations in their value creation attempts. There should be enough time to imagine a desirable future as well as to learn from past attempts to create value. Here, uncertainty can be managed through iteratively trying over and over again. Time is also required to establish intersubjective relations with external stakeholders.

Teachers can assess the process based on emotional events such as sufficient number of external interactions per student, sufficient amount of teamwork interaction in terms of for example time or meeting frequency, sufficient opportunity for each student to present the resulting artifact that they create for outside stakeholders, or based on other events that empirically have shown to result in developed entrepreneurial competencies. Students need continuous formative assessment and feedback from teacher, peers and / or external stakeholders. A useful assessment format is to let students reflect around the emotional events they have experienced. These reflections can be read by the teacher and / or by peer students, who can then provide feedback. Here, students should always be required to connect their personal experiences to the theoretical knowledge and skills that constituted the starting point of the value creation process, as well as to key questions posed by the entrepreneurship methods applied. If this is not done, the teacher risks committing some of the usual faults that traditionally have been attributed to progressive education, see section 2.3.4.

5.2.4 Entrepreneurial output

The task, input and process outlined above lead up to an immediate dual output. The output of interest to the teacher is naturally the student learning, and is an output that can be expected to be produced more or less every time the process has been executed in reasonable accordance with the above given recommendations. But there is also an output in terms of value created for external stakeholders, which is much less certain to be produced but constitutes the inherently “entrepreneurial” dimension here. For the student this could be perceived as the main output, and an absence of it could trigger significant frustration and disappointment. This should however not be interpreted as a negative output for the teacher, since learning from failure has proven to be very powerful (see section 2.1.7). The teacher could need to explain this to the students, over and over again. It could also lead to low ratings given by the student in written evaluations of the educational intervention in question. This could pose a problem in the increasingly performativity oriented educational institutions of today (cf. Ball, 2003).

5.2.5 Entrepreneurial impact

The more long-term impact of applying the educational philosophy articulated here is more motivated and engaged students that also develop their entrepreneurial competencies. The

VCPs outlined in appended papers 1 and 2 illustrate these effects to a large extent, and give accounts of the causal mechanisms responsible for producing such impact. Appended paper 3 shows that similar effects can be expected also on other levels of education, and gives accounts of similar mechanisms at play. Based on these empirical studies, the generic logic seems to be that interactions with external stakeholders involving student value creation trigger a wide variety of emotional events, highly positive as well as highly negative, which in turn leads to a number of effects such as increased energy input, deeper learning, repeated efforts from the students and developed entrepreneurial competencies as well as more cognitive and curricular competencies. At its best, the proposed educational philosophy can trigger a positive and self-reinforcing cycle of deep learning, see appended papers 2,3 and 5. The inherently “entrepreneurial” aspect here is primarily the development of entrepreneurial competencies, given that many other methods could probably also produce powerful learning and reinforcing cycles of deep learning.

5.3 Some possibilities – “why”

Analysis conducted in appended paper 4 suggests a number of benefits of the proposed educational philosophy. The paper argues that it can contribute to bridging five different aspects of a rift between traditional and progressive education. These are outlined in Table 7.

Table 7. Bridging benefits of entrepreneurial education based on value creation. The table shows five different bridging capabilities of entrepreneurial education based on value creation as educational philosophy, allowing to bridge a rift between traditional and progressive education.

Traditional education	Entrepreneurial education as a bridge, based on value creation	Progressive education
<p>Simplicity Easy for teacher¹. Routinized¹. Scientific reductionist method⁹.</p> <p>Individual Learning through acquisition². Standardized content¹.</p> <p>Content Cognitive skills¹⁰. Linear¹¹. Subject matter¹².</p> <p>Detached Passive learners⁴. Value free³. Disengaged¹. Easy to assess⁸.</p> <p>Theory Inert knowledge¹³. Objective reality¹⁴. Material¹⁵. Timeless¹⁵.</p>	<p>Simplification Tool based. Succinct purpose of creating value which is easy to communicate.</p> <p>Responsibility-taking Tool derived questions that push students to dare to make a difference in society.</p> <p>Effectuation Theory and content used as the start and end points of a value creation process.</p> <p>Assessability Assessment of emotional events and reflective questions as stipulated by tools</p> <p>Applicability Let students test theories and concepts in practical value creation processes now.</p>	<p>Complexity Difficult for teacher¹. Unpredictable⁵. Entrepreneurial method⁶.</p> <p>Social Learning through participation². Unique experience¹³. Intersubjective⁴.</p> <p>Process Non-cognitive skills¹⁰. Iterative¹¹. Entrepreneurial competencies¹².</p> <p>Engaged Action-based⁷. Emotional learning⁵. Engagement⁴. Difficult to assess⁸.</p> <p>Practice Lived experience¹⁴. Co-creation¹⁶. Meaningful¹⁵. Cultural¹⁵. Realtime¹⁵.</p>
<p>1: Dewey (1938), 2: Sfard (1998), 3: Guba and Lincoln (1994), 4: Tynjälä (1999), 5: Woods (1993), 6: Sarasvathy and Venkataraman (2011), 7: Cotton (1991), 8: Labaree (2005), 9: Deshpande (1983), 10: Moberg (2014a), 11: Cunliffe (2011), 12: Fisher et al. (2008), 13: Egan (2002) 14: Weber (2004) 15: Latour (2014), 16: Ollila and Williams Middleton (2011)</p>		

5.3.1 Simplification – helping teachers let their students make a difference

Appended paper 4 shows how the educational philosophy proposed here could offer a simplification in terms of a starting point which is easy to understand and communicate for both teachers and students, and an end result which is easy to comprehend and assess for all parties involved, including those external to the formal educational system. It could also simplify and facilitate teachers' practice of progressive and experiential education, often perceived as attractive due to their student centric approaches but too complex to manage and too difficult and risky in terms of student assessment. Teachers can apply entrepreneurship methods to simplify the inherently complex and fuzzy learning processes of progressive and experiential education, and also counter some of their drawbacks such as vagueness, content deficit and lack of explicit student guidance. Entrepreneurship is an active scholarly and practical domain replete with tools, methods, models, checklists, quotes, recommendations, frameworks, logics and heuristics. Teachers can adapt this vast material to educational settings and give students proven, tangible and down-to-earth content and advice on how to plan, conduct and evaluate their value creation projects. Thereby a combination of a manageable *and* developmental learning process can perhaps be achieved in ways not possible with existing educational philosophies. It could allow for combining standardized task, tools and assessment with individualized learning processes and outcomes.

5.3.2 Responsibility-taking – making students make a difference in the world

Appended paper 6 outlines a student-as-giver culture that is in line with the educational philosophy proposed in this thesis. Students could be challenged to apply curriculum content and knowledge in socially responsible projects addressing key issues and problems. This requires a firm belief that students are capable of taking responsibility for the value creation process, the interaction with external stakeholders, and with identifying real-life issues as well as develop solutions to them. It also requires a conviction that students are indeed interested in prosocial and altruistic behavior when pushed beyond their comfort zone established by educational institutions treating them as students-as-takers in a prevailing consumer-oriented neoliberal culture. This requires a combination of caring with challenging, helping with pushing and an acceptance by teachers and students that negative emotions such as fear of failure, fear of rejection and fear of external interaction are a natural part of the learning process. A common assumption by teachers is that they have to come up with the ideas of what value to create and for whom. I posit that teachers can invite students to the creative processes of coming up with new purposes, new ideas for value creation and new ends, adding to the responsibility-taking of the students. These processes can also be supported by a multitude of entrepreneurship methods proven and widespread among practitioners. Adults often underestimate young people's capabilities once given the chance to accomplish a task if given appropriate tools and sufficient level of meaningfulness and ownership over the process, see further appended papers 1 and 2.

5.3.3 Effectuation – using means when making a difference

In appended papers 4 and 5, a key entrepreneurship method called effectuation is outlined in detail. Effectuation logic starts with the premise "What could be the effect of my available resources?", rather than focusing on "For what cause am I doing this?" applying causal logic

(Sarasvathy, 2001). This logic could be applied by teachers in order to combine content with process. Content outlined in standardized curriculum documents can be the starting point of a student centered individualized learning process, letting the students ask themselves “For whom could this knowledge be valuable?”. This logic is embedded in Figure 12. It could be viewed as a way for teachers and students to focus on what is available instead of lamenting the lack of resources required for a more progressive and experiential teaching approach. It could also be a way to let the teacher stay in control of which content is being worked with, without limiting the possible outcomes for the student in terms of how the content is applied in practice.

5.3.4 Assessability – measuring activities that make a difference

In appended paper 2 as well as in the licentiate thesis preceding this doctoral thesis (Lackéus, 2013a), an emotional activity based assessment strategy has been outlined. It could be used by teachers who need to assess what students learn from entrepreneurial education or by researchers wanting to assess the impact of any given entrepreneurial education intervention. For the purpose of qualifying a tentatively new educational philosophy, the teacher application is the primary area of interest. Probing for which emotional activities the students undertake could be a way to formatively assess and support the entrepreneurial learning process shown in Figure 10. Such assessment could also be applied in the planning phase for teachers. Any given plan for an educational intervention could be assessed based on which emotional events that it will likely trigger.

A heuristic for this purpose has been abductively developed in the second action research cycle of the research reported here, and is shown in Figure 11. Appended paper 3 utilizes this heuristic to assess the various teaching approaches encountered in that study. Table 9 shows how the heuristic corresponds to the theoretical perspectives outlined in chapter 2. The heuristic has been tested on around 400 teachers so far in 15 different settings across six different countries in Europe. It has been deemed useful to help them sense-make the tentatively new educational philosophy and try to design value creation based assignments for their students. A paper form has been developed and iteratively tested on many groups of teachers from different countries, containing seven simple questions around what value students are to create, to whom they are to create this value, what learning outcomes are likely to occur and how they plan to support and assess the students formatively.

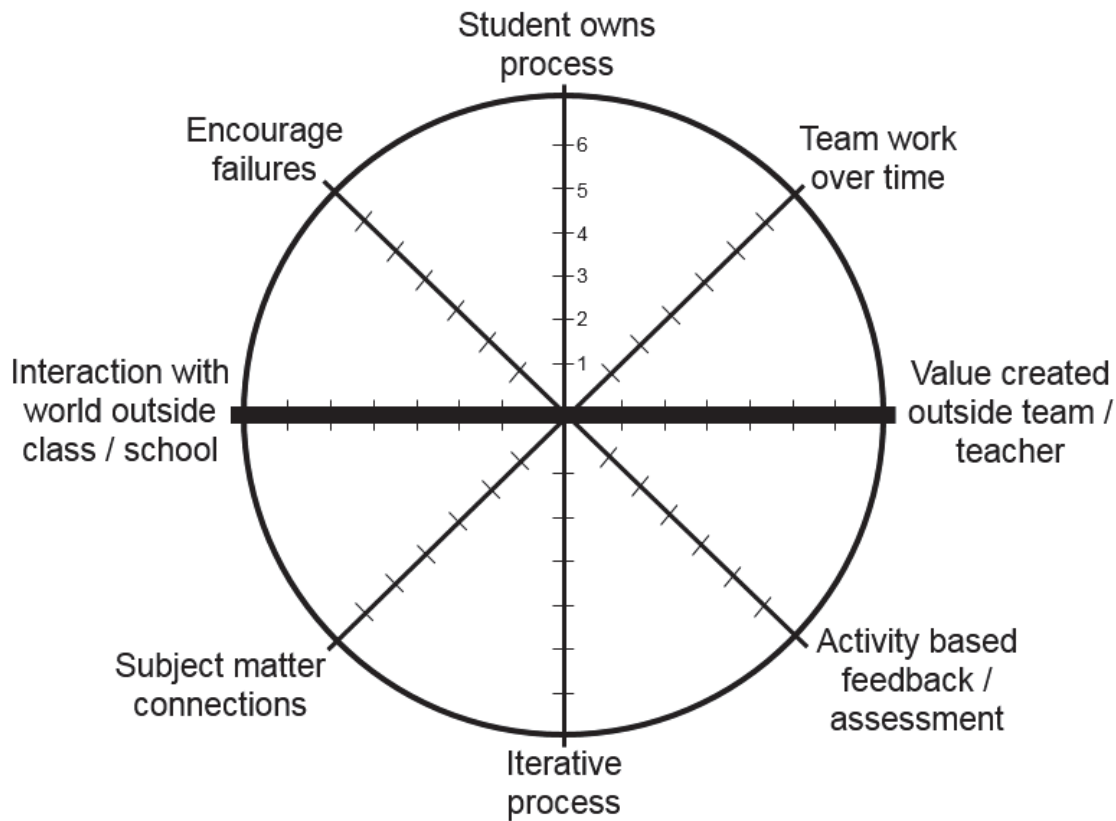


Figure 11. Spider diagram heuristic for assessment of entrepreneurial education. Spider diagram based on theory described in chapter 2. It has been applied by teachers in study E6, see appended paper 4, and in assessment research in study E5, see appended paper 3.

Table 8. Connection between theory dimensions and assessment heuristic. An outline of how the eight diagram dimensions in Figure 11 correspond to the different theoretical aspects outlined in chapter 2.

Theory dimension	Resulting assessment dimension for teachers
Entrepreneurship theory	
Entrepreneurial interactions	Interaction with world outside class / school
Entrepreneurial altruism	Value created outside team / teacher
Entrepreneurial learning	Student owns the process
Entrepreneurial methods	Iterative process
Education theory	
Traditional education / Learning-about	Subject matter connections
Progressive education / Learning-for	Team work over time
Experiential education / Learning-through	Encourage failure
Classroom education / Formative assessment	Activity based feedback / assessment

5.3.5 Applicability – putting theory to use now to see the difference it makes

In appended paper 4 the theory versus practice dualism is discussed and connected to epistemology. Differing views on what can be considered as knowledge are connected to the dualism between the objectivist view that there is an objective reality and the subjectivist view

that knowledge is constructed through lived experience. Sayer (2010) has proposed to manage this dualism by examining the “practical adequacy” of any theory in different contexts. Sayer argues that because of the increasingly uncertain, complex and social world we live in, more and more knowledge is contextual, lacking the universal lawlike regularities that natural sciences have made us accustomed to. I posit that this puts requirement on teachers to more frequently let students learn by testing the practical adequacy of theories in practice, and that such testing of theories and concepts in practical value creation processes can be supported by the field of entrepreneurship. It can provide a manageable task, a proven set of methods and an iterative process suitable for such learning activities. As an example, drawing on the call by Blank (2012) for entrepreneurs to leave the building and learn from their potential customers, students could be encouraged to leave the school building by viewing books and theories as mere hypotheses requiring testing in practice.

5.4 Some challenges

Having articulated *what* to do, *how* to do it and *why*, we will now outline some challenges that will likely hamper the process of putting the articulated educational philosophy into practice. Some basic practical issues concern whether teachers possess the competencies required to design and support value creation processes, whether students are capable of creating interesting enough value for external stakeholders for them to be willing to engage, and whether the external stakeholders are going to exploit the students if they indeed succeed to create value. This will be further discussed in section 6.4 on future work. But I posit that there are also three more fundamental cultural challenges impacting diffusion, that we now will turn to.

5.4.1 The teacher efficiency challenge

As outlined in section 2.3.8, one of the biggest and most important challenges in teaching is to balance between traditional and progressive education (Darling-Hammond, 2012). Many teachers find progressive and experiential education principles very attractive in theory, but have difficulties implementing them in practice due to the “impossible demands that its successful implementation placed on teachers” in terms of time, energy and talent (Smith and Ragan, 1999, p.295). Institutional pressure to be efficient also keeps them focused on traditional education ideals through their superior economies of scale when compared to individualized teaching adjusted to each student. This leads to a situation where they constantly are required to manage and bridge multiple “chronic educational dilemmas” (Labaree, 2012, p.157), such as bridging between traditional and progressive education, attempting to reach a hybrid equilibrium somewhere in the middle (Cuban, 2007). The expectations from the educational system, ingrained in its culture, will however constantly drag them away from such an equilibrium. Both towards time-efficient traditional education and towards separated progressive education grounded interventions such as thematic project work more or less disconnected from curricular subject matter. An educational philosophy facilitating bridging, as outlined in appended paper 4, could therefore arguably help many teachers achieve a higher level of teaching efficiency. I posit that entrepreneurial tools and an inherently entrepreneurial task can facilitate reaching the elusive progressive education dream of student centered learning while at the same time connecting to traditional education values, thereby contributing to increased teacher efficiency and allowing for a better work-life balance for teachers.

5.4.2 The summative assessment challenge

The cultural norm in education is currently emphasizing summative assessment in the form of exams and standardized national tests. Any teacher wanting to apply an emotional events based assessment method in the daily work will likely have to face the challenge of established cultural norms around assessment in its educational institution. Further, the empirical establishment of links between emotional events and learning outcomes is in an early stage, making it difficult for teachers to rely on such research when assuming that an emotional event will lead to the desired learning outcomes. If the empirical evidence base for this novel kind of assessment increases in the future, policy makers and school managers will likely have a key role of legitimizing and promoting such assessment practices on a wider scale. Emotional entrepreneurial events could then be used for activity-, question- and reflection-based formative assessment. ICT tools (the app instrument outlined in section 3.4.3 developed from this research and others) could be used to facilitate such assessment practices. While this short-term conflicts with summative and standardized assessment, future research and policy document changes could legitimate such approaches and alleviate this cultural challenge.

5.4.3 The students-as-takers challenge

As argued in appended paper 6, it is perhaps not so much entrepreneurial education that is bringing a neoliberal perspective built on *homo oeconomicus* into education, but rather that educational institutions are already largely embedded in a neoliberal society where the ideal is self-sufficient students exercising their right as consumers to choose whatever suits their own needs best (cf. Biesta, 2004). Any teacher asking students to take responsibility for societal problems and to learn from associated emotionally challenging assignments will likely run into some students strongly opposing such assignments. Students are so used to be self-serving takers that a call to become altruistic givers will likely not pass easily with all. Here, students could be allowed to learn to take collective responsibility by learning from meaningful acts of creation for the benefit of others. This would contribute to a cultural change from students-as-takers more towards students-as-givers, representing a move towards the left in the value creation framework in Figure 3, adding also more collectivist values in student mindsets.

5.5 Relation between practice, possibilities and challenges

Figure 12 shows the relationship between the process of learning-through-creating-value-for-others and its bridging possibilities as well as its cultural challenges. In the left section it is shown how a consisely articulated entrepreneurial task and entrepreneurial inputs help simplifying the teacher's job of balancing between conflicting educational philosophies. This then leads to alleviating the cultural challenge of teacher efficiency. The mid section in Figure 12 shows how effectuation can constitute a starting point of the entrepreneurial process. A process rife with emotional events and an associated opportunity to reflect on these events and relate them to theory leads to increased assessability, which then alleviates the cultural challenge inherent in a focus on summative assessment. This process can also be viewed as an opportunity to apply knowledge content in order to see for oneself the practical value of it. The right section in Figure 12 shows how entrepreneurial outputs and entrepreneurial impact lead to more responsible students taking action to help people in society. This then alleviates the cultural challenges of consumerism and students-as-takers.

To summarize the process, students start with a dual purpose of content based value creation to outside stakeholders, searching for responses to the entrepreneurial question: “For whom is this knowledge (and these skills) valuable today?”. Teachers then equip their students with entrepreneurial tools, a set of entrepreneurial questions, an entrepreneurial way of thinking, an idea of what the entrepreneurial mindset means and let them work in trustful teams, trying to find answers to the effectual question: “What effects can we create?”. If given enough time to interact iteratively with external stakeholders, students will then experience uncertainty and failure, but also success and pride, leading to emotional ownership. Such emotional events provide them with powerful feedback, increasing perceived meaningfulness and relevancy of education. Teachers follow up based on key activities completed and question based reflections, preferably through the help of ICT tools. In the end, students will have learned content in-depth and maybe some value will also have been created for external stakeholders, but maybe not. Looking back at their own role and at how theory and practice were connected, students get a lasting feeling of engagement, meaning and relevancy. They will also have become more entrepreneurial.

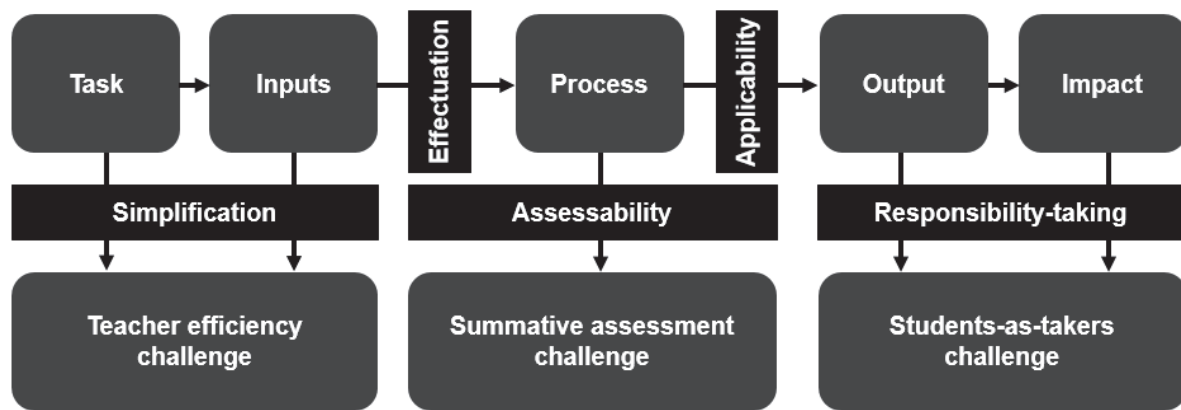


Figure 12. Value creation as educational practice related to its possibilities and challenges. *An entrepreneurial task and entrepreneurial inputs alleviate teacher efficiency challenges. An emotional events laden entrepreneurial process opens up for alternatives to summative assessment. Entrepreneurial output and impact leads to more responsible students.*

5.6 Some empirical examples

Many of the appended papers outline empirical examples of value creation as educational philosophy. Table 9 summarizes these and other examples, and relates them to a classification of action-based entrepreneurial education outlined on p.24 in appended paper 5, which first appeared in the licentiate thesis preceding this doctoral thesis (Lackéus, 2013a). This classification specifies four different approaches to action-based education; the creation approach, the value creation approach, the venture creation approach and the sustainable venture creation approach. In the creation approach students get to create artifacts. In the value creation approach these artifacts are considered valuable by an external stakeholder. In the venture creation approach students are expected to organize the value creation process in a venture. In the sustainable venture creation approach the aim is to keep the venture going after the end of the education if possible. No examples are given in Table 9 from the creation approach, since they by definition would not qualify as applying the educational philosophy articulated here.

Table 9. Different examples of value creation as formal part of education. Examples from three different classes of action-based education according to a classification of action-based entrepreneurial education (see appended paper 5).

Entity	Task	Impact
Sustainable Venture Creation examples		
Master program at Chalmers University with a total alumni base of 400 former students.	Create a real-life company based on some kind of technological invention, and with intention to incorporate.	Globally acclaimed. 8:th best incubator worldwide. Powerful learning. Significant value created. 75 companies started over 18 years.
Network of Venture Creation Programs. 20 university level programs identified worldwide. For a list see www.vcplis.com	Create a real-life company as part of curriculum, with intention to incorporate.	A high-profile but marginal program type. Many examples of powerful learning, some cases of significant value creation.
Venture creation examples		
Team Academy started in Finland. 600 university graduates across Finland. Emulated in 7 countries.	Run a class-wide company for the duration of a 1-3 year program, then liquidate it.	Recognized for educational excellence in Finland. Powerful learning, but also some level of value created.
Junior Achievement / Young Enterprise. Reaches 10 million students yearly in 120 countries.	Create a mini company, run it for 6-12 months, liquidate it.	The most well-studied example. Powerful learning primarily, but also value created later in life by alumni.
Value creation examples		
Drivhuset educational platform, Sweden. 2000 people trained so far; students, unemployed, youths, firms.	Attend five workshops. Iterate a value proposition with external stakeholders. Final pitch with audience.	Powerful learning primarily. Value created is marginal during workshops, but later value creation is triggered, especially among participants who already run or start a company.
City of Sundsvall , Sweden. 250 people trained so far. Pilot projects. Will roll-out on 130 schools.	Integration of value creation as educational philosophy in all schools across the city.	Early stage project. Significant buy-in into the educational philosophy. Main site of action research for the author.
City of Varberg , Sweden. 20 teachers trained. Pilot projects on-going.	Integration of value creation as educational philosophy in all schools across the city.	Early stage project. Significant buy-in into the educational philosophy. National TV highlighted a project.
Ready Unlimited , United Kingdom. Average 300 teachers and trainee teachers a year involved from schools across UK.	Integration of value creation as educational philosophy in professional learning and coaching for school teachers.	Teachers reporting more student engagement, higher quality learning and improved achievement. Improved connections between schools and their community/the outside world.
Teachers in Karlskoga , Sweden. Value creation example received through a survey circulated on social media.	Students of age 12 produced text and video for a local museum about Nobel.	Students learned Swedish, English in a more engaging way, and simultaneously developed their entrepreneurial competencies.
Teacher in Strängnäs , Sweden. Value creation example received through a survey circulated on social media.	Students of age 14 contacted local hospitals to produce pearls and textile bags to children with cancer.	Students learned needle work in a more engaging way, and simultaneously developed their entrepreneurial competencies.
Teacher in Gothenburg , Sweden. Value creation example received through a survey circulated on social media.	Students of age 15 produced and marketed a cookery book with 48 recipes in 11 languages from 22 countries.	Students learned home economics, Swedish, English and other languages, and simultaneously developed their entrepreneurial competencies.
Teacher in Söderhamn , Sweden. Value creation example emerging from study E5, see appended paper 3.	Students of age 15 working in teams to give a theater play in English every week for a year, to classmates and to others.	Students learned English in an engaging way, and simultaneously developed their entrepreneurial competencies.
Teachers in Istanbul , Turkey. Value creation example emerging from study O1.	Students of age 12-14 teach newly arrived Syrian refugees Turkish.	Students learn Turkish in an engaging way, and simultaneously develop their entrepreneurial competencies.

6 Discussion

In this chapter we will first in section 6.1 revisit the purpose of this thesis and try to develop answers to the two research questions designed to qualify the tentatively new educational philosophy articulated in the previous chapter. Then in section 6.2 we will draw implications of these answers. Section 6.3 discusses some associated limitations and challenges. In section 6.4 we will finally discuss short-term and long-term future work.

6.1 Qualifying a tentatively new educational philosophy

6.1.1 RQ1 - Why is educational philosophy important when infusing entrepreneurship into education?

The short answer to why an educational philosophy grounded in entrepreneurship could help the infusion of entrepreneurship into education is that it could alleviate the challenges associated to such endeavors. For those who want to infuse entrepreneurship into education but struggle with the challenges, the educational philosophy articulated in chapter 5 could arguably provide some useful answers to *what* to do, *how* to do it and *why*. Applying these answers in practice could however trigger new kinds of challenges that might then continue to hamper adoption of entrepreneurial education. We will now briefly discuss how the educational philosophy articulated in chapter 5 could alleviate the challenges of infusing entrepreneurship into education, and also speculate around some challenges that might nevertheless remain.

In terms of *what* to do, chapter 5 provides some answers to the issue of what to *infuse*, potentially alleviating the lack of definitional clarity in entrepreneurial education through an emphasis on entrepreneurship viewed as new value creation. Chapter 5 also provides some answers to what to *plan for* and what to *let others do*. This potentially alleviates challenges with organizational structures and lack of resources for school managers and policymakers. They get new and simplifying grounds and a potential guiding star for their work in managing and training for the infusion of entrepreneurship into education. Chapter 5 also helps the issue of what *not* to do when infusing entrepreneurship into education by articulating clear inclusion and exclusion criteria for entrepreneurial education. The following clarifying questions could for example be asked by people attempting to infuse entrepreneurship into education: “Are the students required to attempt to create value for external stakeholders?”, “Have the students been instructed to ask themselves the question: For whom is this knowledge valuable today?”, “Is the starting point competencies?” and “Is some kind of artifact created?”. If a principal repeatedly started to ask such questions to all teachers in a school it might even be enough to get a whole-school implementation started.

In terms of *how* to do it, chapter 5 provides some answers to how to *implement* the articulated educational philosophy, potentially alleviating organizational challenges around how members of an educational organization are supposed to be able to infuse entrepreneurship into education. It also provides some answers to how to *assess* the implementation process, in terms of impact assessment, educational change effectiveness and student learning, thereby alleviating multiple assessment difficulties through a focus on assessing the prevalence of key emotional events.

In terms of *why*, chapter 5 provides some answers to the challenge around reluctance from teachers to infuse capitalist values into education. A stepping stone consisting of many different

kinds of value creation rather than solely economic value creation (see Figure 3 in section 2.2) has been proposed. Chapter 5 also articulates goals of entrepreneurial education focused on deep learning and student motivation, arguably being more in line with teacher priorities. These aspects could add to the legitimacy of infusion attempts, thereby alleviating organizational challenges and fear of capitalism.

But as helpful as all of this might seem, chapter 5 does not tell us much about *what* practitioners will actually do when putting the educational philosophy articulated in into practice, *how* they will do it, and how this might overlap and interact with existing educational philosophies and practices. As a parallel, the idea of progressive education has triggered significant confusion and misuse throughout its long history, even causing Dewey to repeatedly complain about misuse of his ideas (Labaree, 2005). Also, the mere usefulness of a tentatively new educational philosophy will likely not lead to its spontaneous adoption into practice. Educational leadership and preparation is still needed, requiring access to scarce resources. It is also an infusion of something new into education, arguably requiring a fight against status quo, a challenging integration into existing practices and a considerable shift in people's mindsets around teaching, assessment and leadership. What chapter 5 also does not give us much of is guidance on why value creation for others is *not* already used in practice on a wider scale. If it is as good as tentatively claimed here, how come it is not widely used already? This is a vexing question that requires further investigation. Some early attempts to investigate this empirically has resulted in practitioners attempting to explain it with fear of uncertainty among teachers and students, path dependent thinking and a box-ticking educational culture triggered by formal assessment requirements. If this is the case, the educational philosophy articulated in chapter 5 could indeed be useful. Others, particularly within design education, claim that student value creation for others is not at all that unusual.

6.1.2 RQ2 - What is new with an educational philosophy grounded in the field of entrepreneurship?

Some aspects covered in the theory section on entrepreneurship have indeed been discussed previously by scholars of existing educational philosophies. I will however argue here that this is the case primarily in incidental and superficial ways, leaving teachers looking for a needle in a haystack rather than providing them with a map to guide them and give directions (Dewey, 1923). This section attempts to dissect what is new, what is less new and what is not new in the educational philosophy articulated in chapter 5.

6.1.2.1 Comparison to previous entrepreneurship grounded efforts

As a general observation, I posit that existing educational philosophies lack a firm answer to the question of learning-by-doing-*what*? According to existing educational philosophies, students are to be active, engaged and self-directed in authentic experiences that they can learn from, but advice given around how this is to be accomplished is often vague, difficult to put to educational practice or leads to activities detached from curriculum knowledge. The most common answers coming from entrepreneurship scholars so far could be labeled as learning-through-*starting-a-venture* and learning-through-*writing-a-business-plan*, both leaning on Gartner's (1989) definition of entrepreneurship as organization creation. But the role of business plan writing in entrepreneurial education is contested (Honig, 2004; Jones and

Penaluna, 2013; Neck and Greene, 2011), and letting students start a real-life venture as formal part of education is immensely complex and perhaps even unethical in formal education due to the risk of triggering personal crisis and emotional fallout (Pittaway and Cope, 2007b; see also appended papers 1 and 2). In reality a simplified format is often applied by teachers, letting students start a mini company stripped of many of the deeply emotional aspects of entrepreneurship. The venture is already at the outset destined to liquidation after the course, any profits are often donated to charity and emotional ownership through equity is often prohibited due to legal or practical restrictions in educational settings (Dwerryhouse, 2001; Shilling, 1989; Tosey et al., 2013). While still transformative and suitable for some students, such approaches are not uncontested. They have been argued to nurture a myth that entrepreneurship is about book-keeping, planning, administration and making money. They also lean on a narrow definition of entrepreneurship viewed as starting a business, only relevant for a small minority of students (Otterborg, 2011; Smålandsposten, 2013). Therefore I posit that an entrepreneurship grounded educational philosophy widely applicable in education cannot be solely grounded on the idea of letting students write a business plan or start a company. The educational philosophy articulated here represents a different answer: *learning-through-creating-value-to-others*.

6.1.2.2 A novel combinatory movement between different philosophies

Figure 13 shows how the tentatively new educational philosophy proposed here moves across the entire philosophical playing field of education outlined previously in Figure 5. The process starts in the classroom, somewhere in the middle between traditional and progressive education. It moves towards traditional education to firmly ground the value creation process in curriculum subject matter and propositional knowledge, then moves towards progressive education in its emphasis on team-based co-creation of artifacts, to finally turn towards experiential education in its emphasis on creating something of value to someone outside the own group, class or school / university. It then returns to the classroom to reflect, draw conclusions and connect back to subject matter and developed competencies.

Another way to describe the movements in Figure 13 is to see them as allowing for whole person learning, described by Jarvis (2006) as learning that encompasses all three faculties of mind; cognition (thoughts), affection (emotions) and conation (actions). The first turn in Figure 13 emphasizes cognition with its emphasis on traditional education, the second turn emphasizes affection with its emphasis on progressive education, and the third turn emphasizes conation with its emphasis on opening up the classroom door to interact with external stakeholders in the field. This means that the tentatively new educational philosophy articulated here allows for a more balanced distribution between the three faculties of mind. In many cases it will mean that more affection and conation are infused into the learning process, but without losing the cognitive grounding. For an overview of the three faculties of mind and their implications on how to develop entrepreneurial competencies, see the licentiate thesis preceding this doctoral thesis (Lackéus, 2013a).

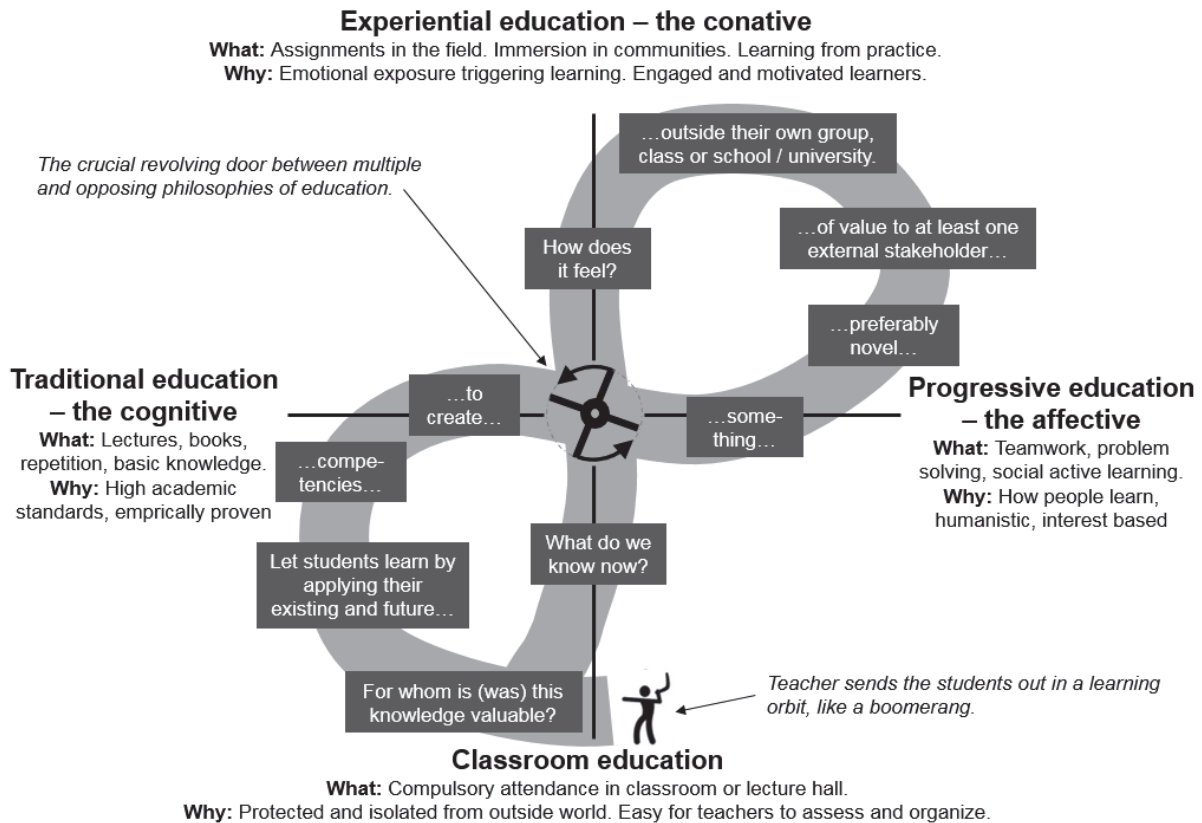


Figure 13. How entrepreneurship guides movement between opposing philosophical positions. The cyclical eight-shape shows how entrepreneurship provides teachers with the culture / “music” to a philosophically boundary-spanning movement / “dance” that their students can learn from. Like a boomerang, students are sent out to learn from interplay between theory and practice within and outside the classroom, passing through a “revolving door” connecting opposing perspectives.

Yet another way to view the movements in Figure 13 is to see them as advice on how to balance between multiple opposing positions stipulated by conflicting and incommensurable educational philosophies (see further appended paper 4). A toolbox of entrepreneurial methods helps teachers manage the process in each step, determining when it is time to lecture, to read books, to work in groups or to talk to external stakeholders, thereby providing a distinct rhythm to the necessary oscillations between opposing educational philosophies. Entrepreneurial methods help determining when the classroom door should be firmly closed to allow for focus, and when it should be wide open to let students work with real-life recipients of value creation attempts. The benefits of whole person learning in terms of engaged learners, increased perceived relevancy and deeper learning of content have been documented before (Jarvis, 2006; 2010), but Figure 13 outlines a novel map potentially guiding teachers and students.

Having shown how the tentatively new educational philosophy constitutes a concerted movement across different educational philosophies, I will now relate its groundedness in entrepreneurship to the three key philosophies more in detail; traditional, progressive and experiential education. This will be done by drawing on interaction aspects of entrepreneurship outlined in the theory section.

6.1.2.3 Novelty of entrepreneurial altruism

Traditional and progressive education have to my knowledge not emphasized the creation of value to others as a key part of education. Experiential education however, in particular service-learning, has been known to include value creation for others but perhaps not with an emphasis on artifact creation, novelty or entrepreneurship and its methods. Experience, reflection and teamwork are widely advocated, but less is said in generic terms of how to accomplish it in practice. I posit that the missing key here is a worthwhile purpose and empirically validated methods that can drive the experiential learning process while still connecting it to core curriculum.

The collectivist flavor of entrepreneurial education leaning on a pluralistic view of value creation is closely related to existing educational initiatives such as community education (Jarvis, 2010) and citizenship education (Deuchar, 2007). These traditions both emphasize the individual's responsibilities in a wider democratic community but are arguably not fully aware of how entrepreneurship can contribute with new aims and methods. I posit that the tentatively new educational philosophy proposed here can contribute to facilitating and empowering such initiatives in new ways. Future work by practitioners and scholars could develop this emerging opportunity to synergize further. Asking students to act in more altruistic ways as part of their education can trigger powerful learning in ways that previous educational philosophies have somewhat neglected in their focus on students as consumers of education, i.e. as students-as-takers (cf. Biesta, 2004). In appended paper 5, I have labeled this an altruistic paradox of learning, stipulating that students in certain situations perhaps learn more when asked to develop their competencies by doing good for others in 15 minutes than when asked to learn what is good for themselves in 15 years. This paradox has triggered much interest among practitioners, and merits further scholarly investigation.

Another tentative novelty of introducing altruistic value creation in education could be to view it as a new kind of relationship based *educational* economics, where focus is on nascent and explorative value creation for the purpose of maximizing learning, see Figure 14. This contrasts to demand based neoclassical economics with its customer choice based logic, where focus is to maximize utility and predict markets and prices. Perhaps value creation as educational practice is more legitimate when it focuses primarily on the early phase of artifact production, outside of established markets and price levels, thereby reducing the risk for unfair exploitation of students. A particularly interesting application of educational economics is to let students learn by serving needs of disadvantaged groups in society that regular markets forces systematically neglect.

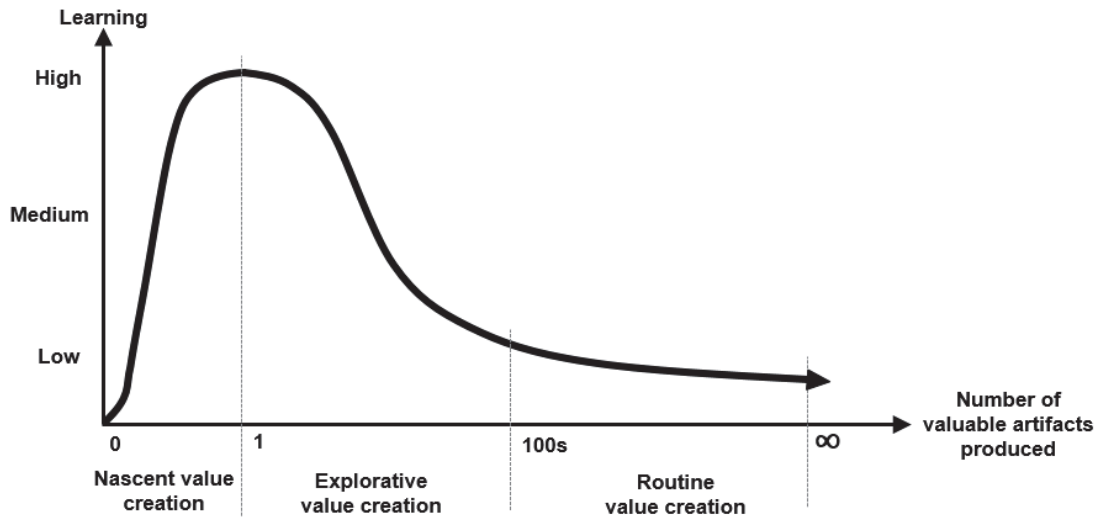


Figure 14. Relationship between learning and number of valuable artifacts produced. Illustrates how the tentatively new educational philosophy articulated here works at its best in low numbers of artifacts produced, where learning is maximized and value creation is nascent or explorative.

6.1.2.4 Novelty of entrepreneurial methods

Collaboration, interaction with others and artifact creation have frequently been emphasized in writings on existing educational philosophies. See for example well-cited articles defining problem-based learning (Savery, 2006) and project-based learning (Blumenfeld et al., 1991). It could be argued that this represents the *learning-through* aspect of the six-word definition of the tentatively new educational philosophy proposed in chapter 5. Learning from failure is less explored in existing educational philosophies, and primarily discussed in negative terms such as the perils of failing to solve a demanding problem (Blumenfeld et al., 1991), rather than the positive and emancipatory role failures and mistakes are attributed in entrepreneurial learning theory (Cope and Watts, 2000; Cope, 2011; Rae, 2005).

Iterative ways of working have also been covered in the field of experiential learning through cyclical learning models such as Kolb's experiential learning cycle. Such cyclical models have however had difficulties impacting education for reasons outlined further in section 2.3.5. Figure 15 outlines how the tentatively new educational philosophy proposed in chapter 5 can be positioned relative to Kolb's experiential learning cycle. Some of the challenges with this widespread theory of experiential learning could perhaps be addressed through the introduction of entrepreneurship and its methods. This could be seen as a response to the call by Holman et al. (1997) to ground experiential learning in social and cultural contexts, since entrepreneurship can be viewed as a set of cultural-cognitive tools that students can use to think *with*, as outlined in detail in appended paper 4. It could maybe also be seen as a way to treat action and reflection more integrated.

When it comes to the *creating-value-for-others* part there is much less written, if at all anything, in connection to existing educational philosophies. What is novel here could perhaps be stated in terms of a set of methods explicitly outlined for the purpose of creating new kinds of value to others. The utility of such a set of methods taken from the field of entrepreneurship has not previously been discussed in relation to existing educational philosophies. Some entrepreneurial methods that might be applicable are outlined in appended papers 4 and 5.

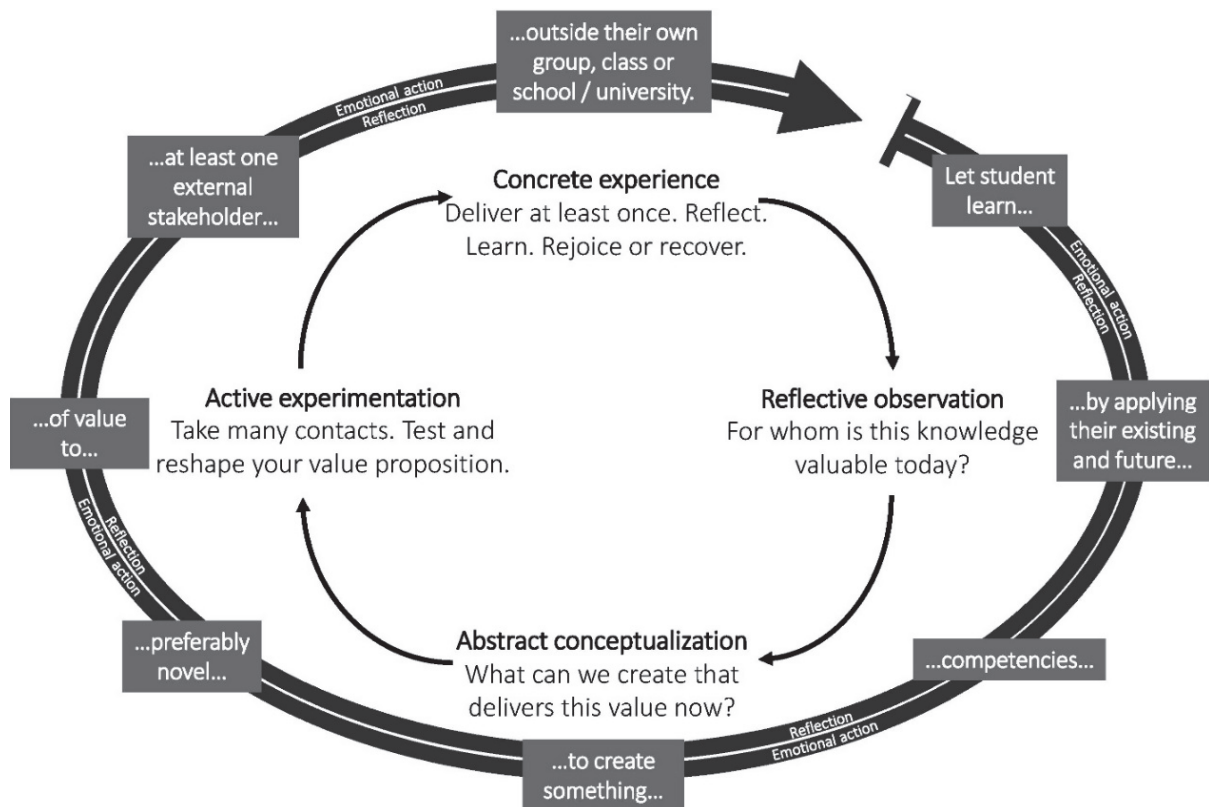


Figure 15. How entrepreneurship could add a cultural context to Kolb's learning cycle. The figure illustrates how entrepreneurship contributes with specification of what to do when learning from experience, and how to constantly blend emotional action with reflection.

6.1.2.5 Novelty of entrepreneurial interactions

There are numerous implicit links between entrepreneurial interactions and educational philosophy that have not yet been explored by scholars in either of the two fields. A term frequently used when discussing interpersonal interaction is *intersubjectivity*, defined by Rogoff (1990, p.67) as the understanding that occurs *between* people. Biesta and Burbules (2003) have described Dewey's work on educational philosophy as founded largely on intersubjectivity, thereby avoiding the educationally problematic divide between the individual and the social. This is achieved by emphasizing communication, cooperation and co-creation around both intellectual and social perspectives (Biesta and Burbules, 2003, p.102). In line with this, Matusov (2001) has described how an explicit focus on intersubjectivity in terms of shared and authentic activities for all students in a class can mitigate some of the challenges inherent in progressive education. I however posit that the challenge for teachers is *how* to organize such intersubjectivity, and that an educational philosophy grounded in entrepreneurship could contribute with tangible aims and methods that infuse intersubjectivity into education.

While interaction with the world outside educational institutions has been discussed (if not required) to a large extent in both progressive and experiential education, a clear purpose of such interactions to use knowledge to create value for others has not been stated before. Dewey (1938) claimed that letting students apply the scientific method to solve problems by conducting experiments is the only authentic method available to us in order for students to experience the significance of our life-world. Such a practice does however not require students to interact

with stakeholders outside their own group, class or school. Had Dewey known what is today known about entrepreneurship as a method for unleashing human potential, contrasted as an alternative to the scientific method by Sarasvathy and Venkataraman (2011), he might have wanted to revise his singular reliance on the scientific method in his educational endeavors. Experiments are indeed common also in entrepreneurship, but then the focus is often to explore an *opportunity* related hypothesis in social science settings rather than a *problem* related hypothesis in natural science settings. Using entrepreneurship methods to intersubjectively test the practical value of any theoretical knowledge in social settings has arguably not been proposed before by philosophers of education, and constitutes a different kind of intersubjectivity than the common problem-based learning approach of progressive education.

A model illustrating such extended intersubjectivity, drawing on activity theory pioneered by educational psychologist Vygotsky (1978), was outlined in the licentiate thesis leading up to this thesis (Lackéus, 2013a), as well as in appended paper 5 on page 28. According to Vygotsky and colleagues, human activity leads to two main outcomes; “externalization of activity into artifacts” (Miettinen, 2001, p.299) and “internalization of activity and gradual formation of mental actions”, i.e. construction of new mental abilities (Arievitch and Haenen, 2005, p.159). In this case, externalization is the resulting value creation for others and internalization is the resulting deep learning. And if value to at least some extent is a subjective concept as outlined in section 2.2, a subjective evaluation of the artifacts produced by the students must be performed by an external part in order for it to be deemed a value creation activity. External stakeholder interaction is thus arguably a requirement in the tentatively new educational philosophy articulated here. Given that such a requirement has not been emphasized in previous educational philosophies, it also constitutes a novel addition to education.

6.1.2.6 Novelty of entrepreneurial learning

Experiential education scholars have discussed the important role of emotions in general terms, but have arguably not classified specific emotional events deemed particularly useful for teaching or assessment purposes in education. I posit that an emotional learning based educational philosophy based on specific, measurable and generic entrepreneurial events has not previously been proposed. In terms of teaching, taking advantage of the quite characteristic emotional and critical learning events so prevalent in entrepreneurial settings could be a novel approach to educational design. The emotional events typology developed in papers appended to this thesis could be used to articulate robust design principles for teachers.

6.1.2.7 Novelty claims summarized

To summarize the issue of novelty, the tentatively new educational philosophy proposed in this thesis has been argued to contribute with a number of novel aspects. It has been shown to be very different from the well-known but still marginal approaches of *learning-through-starting-a-venture* and *learning-through-writing-a-business-plan*. Compared to existing educational philosophies it has been shown to contribute with a purposeful movement between multiple opposing philosophical positions rather than being yet another flag on the philosophical playing field of education. The value creation based purpose that drives such movements has been shown to be inherently novel in its capacity to drive an experiential learning process of students, facilitate the teachers’ job of organizing for intersubjectivity and provide a “rhythm” that can

guide teachers and students as they move around on the playing field of educational philosophy. In terms of methods, there is certainly a wide plethora of existing methods, models and tools anchored in traditional, progressive and experiential education. Still, the entrepreneurial methods represent something new that has not previously been considered by philosophers of education. They are in many respects qualitatively different from the scientific methods so dear to Dewey. Other possibly novel aspects include the new term educational economics with its related recommendations, the development of Kolb's learning cycle, the stipulated mandatory interactions with external stakeholders and an emphasis on emotional entrepreneurial events for teaching and assessment purposes.

Despite these numerous novelty claims, the idea of learning-through-creating-value-to-others could still be viewed as a mere combination of old educational philosophies. Whether it then represents a new or merely a revised educational philosophy is difficult to determine. Here it is useful to return to Schumpeter's (1934, p.134) view on innovation, which centered around "the carrying out of new combinations". Schumpeter differentiated between "continuous adjustment in small steps" and "new combinations [that] appear discontinuously" (ibid, p.65-66). Therefore it arguably remains to be determined whether the tentatively new educational philosophy is an incremental adjustment to existing practices not really meriting the term "new", or instead is a new and disruptive novelty causing discontinuous change. We might need to await its consequences when put into practice in order to determine whether it is new or not.

6.2 Implications for practice and research

If the educational philosophy articulated here is deemed to be both useful and novel it could be used by practitioners as a ground for new recommendations for how to infuse entrepreneurship into education. Policymakers could draw from it when advising or requiring teachers on multiple levels of education to infuse entrepreneurship into education. It could inspire teaching guidelines on entrepreneurial education in terms of how entrepreneurial education can or should be done in practice, and on which reasons to ground such practices. Teachers could apply it in order to bridge the problematic rift between traditional and progressive education and thereby achieve a better combinatory effort of different teaching "recipes". Such prescriptive uses of the tentatively new educational philosophy could primarily be applied to wide definition based enterprise education, but perhaps also to narrow definition based entrepreneurship education. It thereby constitutes an early path towards issuing one single entrepreneurial education related teaching recommendation applicable in multiple settings.

Viewing this thesis as critical philosophy of education work, the focus on entrepreneurship as altruistic and collective activity could mitigate the problematic bias towards male white hero entrepreneurs currently at risk of being promoted unintentionally by less aware entrepreneurial educators (Gill, 2014). It could also be a way to provide teaching methods that cater for the needs of those students that do not thrive in the current educational paradigm, such as students at risk of dropping out of school (Moberg, 2014b), students diagnosed with for example ADHD (for an example, see Roth and Lee, 2007) and students viewing themselves as unsuccessful in the current emphasis on business related competitions and award schemes (Berglund, 2013; Petersen and O'Flynn, 2007).

In terms of research implications, a useful and novel educational philosophy could trigger new research efforts on a few different themes. This could include prescriptive research aiming to generate recommendations on *when*, *how* and *why* to infuse entrepreneurship into education. It could inform descriptive research aiming to assess the impact of infusing entrepreneurship into education. It could also spur more theoretical and conceptual research on the overlap between entrepreneurship and education, such as exploring the proposed term educational economics further; a different and perhaps new kind of entrepreneurship where the payback consists primarily of learning.

Viewing this thesis as analytical work in terms of language analysis implies a clarification on definitional level of what “entrepreneurial” signifies when used in connection with education. It thus allows for better distinguishing between entrepreneurial and non-entrepreneurial education. This aligns with the referee role of educational philosophers outlined by Burbules and Raybeck (2003). Such definitional language clarification, or perhaps narrowing, could allow scholars to unify the two currently separated fields of enterprise and entrepreneurship education.

6.3 Limitations and challenges

The work leading up to this thesis has surfaced many limitations and challenges of the work at hand. Some are on a philosophical level, others are on a more practical level and yet others are on a scholarly level.

6.3.1 Philosophical limitations and challenges

An educational philosophy asking students to focus on knowledge that can be useful for others will likely be criticized for its utilitarian emphasis. If focus is put primarily on useful knowledge, there is a risk of neglecting a disinterested pursuit of such knowledge that is deemed irrelevant for society short term. Value creation as educational philosophy can thereby be seen as a companion to consumerism and marketization of education with its focus on competencies valuable on a “market” of external stakeholders, even if no financial transactions take place.

Another philosophical challenge is whether it is ethical to expose students to the risk of experiencing strong negative emotions. This problem was brought up by Pittaway and Cope (2007b), and appended papers 1 and 2 indeed illustrate just how transformative and crisis-generating value creation as educational practice can be. Some ethical aspects are if such highly negative events are acceptable, how students are to be informed about the risks, how to manage problematic events once they occur, and how much resources to devote to the treatment of them.

A challenge with narrowing the definition of entrepreneurial education to student value creation could be its excluding effects. It is therefore important that such a strict definition of entrepreneurial education is not used to blame teachers for doing “wrong”. Instead, a strict definition could perhaps be used as an ambitious vision that teachers could be working towards, sometimes reaching it and sometimes not depending on circumstances and available resources. Such progression based issues constitute an important focus for further research.

Another challenge with a narrowed definition would be what to label learning *about* entrepreneurship, since a value creation based definition of entrepreneurial education would exclude such courses and programs from the field of entrepreneurial education in its more strict

sense. Also, the mere use of the term *entrepreneur-ial* (rather than *entrepreneur-ship*) education could by some be interpreted as signifying that it is the education that is entrepreneurial rather than education being about entrepreneurship. Such perceptions are not necessarily misleading, given the definition proposed in section 5.1, likely leading to an embedded approach of *entrepreneur-ial* education rather than a separate approach of *entrepreneur-ship* education (cf. Smith et al., 2006; Smith, 2008; Pittaway and Edwards, 2012; Handscombe et al., 2008).

There is also a general critique against any analytical work in philosophy of education that is worth taking into account here. An “ostensibly neutral and objective” definition of a term can also result in a hidden imposition of certain values (Burbules, 2000, p.23). Applied to this situation, an attempt to propose a more precise definition of entrepreneurial education, with all its plausible benefits, is still inevitably based on assumptions and values that are potentially excluding and too rigid. Such risks need to be taken into account here, in what seems to be a challenging choice between inclusive fuzziness and excluding precision.

6.3.2 Practical limitations and challenges

Applying value creation as educational philosophy is rife with practical challenges. There is currently no literature apart from this thesis describing it extensively. The entrepreneurial methods proposed to be used for supporting teachers and students are not contextualized to educational purposes in terms of removing unnecessary business terms and adjusting them for educational purposes. This constitutes a major endeavor, given that each method needs to be tested in a variety of different settings, adjusted in ways that are then found necessary, and then evaluated against the intended learning outcomes for the students as well as resource requirements that might limit its practical applicability in various settings. There is also a wide plethora of generic challenges in educational change (Elmore, 1996) that will likely impede the dispersion of the educational philosophy articulated here. Any application of the tentatively new educational philosophy will also likely be done in a combination with other established educational philosophies, leading to interaction effects not investigated at this stage. Another practical challenge will likely be the patronizing of students from adults. In appended paper 1 there is empirical evidence of students being seen as incapable of creating value to others.

6.3.3 Scholarly limitations and challenges

Research in entrepreneurial education is inherently interdisciplinary. The two scholarly domains of entrepreneurship and education are very distant from each other, representing what seems to be two different galaxies. Future research endeavors drawing on the work presented in this thesis will be reliant upon involving experts from both fields, thus applying a collaborative approach to research. Even if such dual expertise is secured, there will still be the challenge of getting the results diffused more widely through publication outlets. Journals are often employing rather strict delimitations when taking decisions on which contributions / contributors to accept (Burbules, 2000), making diffusion of results a challenge. Scholarly discussion that might follow will be hampered by the absence of dual experts. A scholar who is an expert in one of the fields might not even be a novice in the other field. This opens up for many kinds of miscommunication and misunderstandings. Given how rare it is for teachers to let students learn by creating value to others (see appended paper 3), there is probably a multitude of additional limitations and challenges that has not yet been identified.

6.4 Future work

Proposing a tentatively new educational philosophy can be viewed as the starting point of what might turn out to encompass a wide variety of both short-term and long-term future activities involving scholars, practitioners and policymakers. Short-term there is a multitude of tactical activities that could be done in order to develop and further expand the number of emerging examples of value creation as educational practice, constituting what Elmore (1996, p.1) has labeled “pockets of excellence”. Long-term however, strategical work on a very different level is required, constituting a road paved with numerous failed attempts to achieve large-scale educational reform. It is important here to acknowledge that long-term and large-scale adoption of the tentatively new educational philosophy articulated here is a very different endeavor from the focus of this thesis. Large-scale adoption will require a quite different set of theories and activities than those outlined and focused on in this thesis. It is arguably an entire doctoral thesis in itself. Still, a brief attempt will be done below to also sketch out some long-term key issues.

6.4.1 The short-term future – Tactical work with pockets of excellence

Short-term scholarly work could include deductive research strengthening the evidence for links between emotional events and developed competencies. The evidence base for which entrepreneurial education practices “work” for teachers and students on a micro level could be carefully and meticulously expanded, perhaps by using the common method of establishing model schools (Elmore, 1996). Scholarly assessment of entrepreneurial education could be undertaken that employs the new methodological perspectives proposed in this thesis. The emergent research on the role of emotions in education could be connected more to entrepreneurship research on entrepreneurial events triggering emotion and learning. Deeply interdisciplinary research projects could be set up involving dual expertise from both fields of education and entrepreneurship. In such projects the app instrument developed in this research could be used to collect experiential data, as outlined in section 3.4.3.

Short-term practical work could include practitioners from all levels of education to participate in the contextualization of entrepreneurial methods to educational settings by testing them out and adjusting them according to what “works” for them and their students. An example bank could be built up illustrating how students can contribute to society while still in education if only they are given the chance by adults trusting their ability to create value. Existing and emerging information technology could be put to work further in order to facilitate the many human interactions required for value creation as educational practice, as well as the formative assessment and feedback required to support teachers and students in entrepreneurial processes. Literature and other support material tailored to the practical needs of teachers could be written in close collaboration between researchers and practitioners. Policymakers could consider whether value creation as educational philosophy could support the aims they currently have for infusing entrepreneurship into education, and if there are additional aims that they want to consider such as facilitating for teachers to balance between opposing educational philosophies and increasing school engagement among students. If that is of interest, policies need to be developed and decided upon that can support and guide teachers and other key educational stakeholders. Policymakers could also consider whether the emotional events based assessment strategy emerging from this research is useful for their needs of assessing and supporting entrepreneurial education.

6.4.2 The longer-term future – Strategic work towards widespread adoption

Elmore (1996) has pointed out how fundamentally different the challenge of developing a new educational idea into emerging pockets of excellence is from the challenge of getting to full scale adoption. As illustrated in Figure 1 the focus of this thesis is on the former of these two kinds of challenge. The latter challenge was rather identified as a future possibility in Figure 1. There is thus little ground in appended papers that could serve as basis for robust recommendations on how to put the educational philosophy described in this thesis to widespread use. Still, the considerable empirical exposure from the nine different studies presented here has arguably generated some clues that could help in future attempts to spread the ideas developed in this thesis. This section therefore outlines some admittedly speculative ideas on aspects to consider in future work of trying to scale value creation as educational practice. They build to a large extent on a framework developed by Rogers (2002) on how to foster the diffusion of innovations and on an article by Elmore (1996) on how to scale good educational practice. First some recommendations from Rogers' innovation diffusion theory will be related to what a variety of stakeholders will likely expect from value creation as educational practice. Then a number of long-term implications for policymakers, school principals, university presidents and other potential reformers will be derived from Elmore.

6.4.2.1 Innovation diffusion theory considerations

Rogers (1983, p.16) claims that “innovations that are perceived by receivers as having greater relative advantage, compatibility, trialability, observability, and less complexity will be adopted more rapidly than other innovations”. This has a number of implications for the long-term adoption of value creation as educational practice. In terms of *relative advantage*, evidence needs to be developed showing that value creation as educational practice yields better results than alternative educational practices in a number of dimensions that matter for a variety of stakeholders. *Compatibility* is required in a number of dimensions according to Rogers (ibid, p.223-230), such as in relation to values and beliefs, and to previously introduced ideas. The issues of values and relations to existing educational philosophies have been discussed at length in this thesis, and are now through Rogers also related to the expected rate of adoption of entrepreneurial education. Similarities to existing practices can here in fact be regarded as a positive driver towards adoption. *Trialability* stipulates that dividing an innovation into small nuggets that can be tested small-scale is beneficial for its adoption. Here I posit that the question “For whom could this knowledge be valuable today?” outlined in sections 5.3 and 5.5 is crucial as a small-scale way to test value creation for the first time in the classroom. Future work could focus more systematically on the role of this question in early steps of adoption, and on how to optimize the use of it. *Observability* has been discussed extensively in connection to assessability in section 5.3.4. Here the app instrument could play a key role in raising the level of observability. Finally, *complexity* has also been discussed extensively in connection to simplification in section 5.3.1. Here Rogers' framework illustrates how simplification could lead to an increased rate of adoption for entrepreneurial education. Different definitions of entrepreneurial education could thus lead to different rates of adoption depending on their level of complexity.

6.4.2.2 Some implications for policymakers, principals, presidents and reformers

Elmore (1996) states that educational change is primarily a problem of low demand for new ideas, since the number of ideas and initiatives for change is much higher than the number of schools and teachers asking for change. Any attempt to introduce new ideas coming from above therefore needs to be based on something more than a mere willingness of teachers to voluntarily change their practice in the classroom. Elmore shows how the history of educational change contains ample evidence that good educational practice does not spread spontaneously on a wider scale, but at its best reaches “roughly 25 percent of the total [teacher] population” (p.16). What is needed to reach larger scale change is strong normative structures for good teaching, evaluation, monitoring, inspection and feedback to teachers. Such structures need to be established by multiple levels of authority both within and outside schools. Associated incentive structures are also crucial. Elmore also warns against two common but flawed practices in educational change. First, the idea of letting energetic early adopters work with change initiatives separated from the more sceptic and timid teachers is a common road to failure, since this alienates and separates the majority of teachers from the change initiative and confirms beliefs that only the most ambitious teachers are able and willing to deal with the new practice. Secondly, teacher training that is not coupled with organizational support and pressure to apply the new ideas treated in the training sessions are equally bound to fail.

This illustrates that any attempt to spread value creation as educational practice needs to be coupled with normative structures of multiple kinds and on multiple levels in order to succeed long-term and on a wider scale. Every bottom-up based teacher training program needs to connect to top-down normative structures for support, monitoring and incentives. Future work on how these couplings play out in practice could be a key theme for both practice and research.

Drawing on Elmore as well as on discussions held in some of the empirical cases associated to this thesis, another tentative implication here for future work is that it could be better to let all teachers in an educational institution do a little something around value creation as educational practice than letting a small group of teachers become champions. Any hope that such champions would lead the way for the rest of the teachers conflicts with previous experience of what works. It might instead be better to leverage on Rogers’ ideas of trialability and observability by demanding and then monitoring that each teacher does at least one minor value creation assignment with their students over the course of a given time frame. This means that key actors in change initiatives will be principals, presidents and project managers of change projects running whole school / university / municipality projects rather than any given small group of enthusiastic and ambitious teachers attempting to lead the way through own practice.

Policymakers also have a key role to play in long-term adoption endeavors. New teaching practices need to be supported by policies and regulations in order to be adopted on a wider scale (Kliebard, 1988). If principals and presidents are going to be willing and able to change organizational structures, they will likely need support from policymakers on multiple levels. And if policymakers are to take such measures, more empirical evidence of positive impact is likely needed. The inevitable conclusion from the educational change perspective taken in this section must be that the pragmatic focus of this thesis on value creation as educational practice for teachers and students is but an early start. We are in the infancy of value creation as educational practice and substantial future work remains to be done.

7 Conclusions

The purpose of this thesis has been to qualify a tentatively new educational philosophy grounded in entrepreneurship viewed as new value creation. It was developed through an abductive five-year action research process of iterating between theory and practice. In terms of theoretical grounding it was supported by entrepreneurial methods, entrepreneurial competencies, entrepreneurial interactions, entrepreneurial altruism and entrepreneurial learning. In terms of practice, a total of nine empirical studies on all levels of education were drawn from, employing a few hundred primary, secondary, tertiary and continuing education teachers, around 2000 students and around 100 different educational institutions in three different countries. The resulting definition of a tentatively new educational philosophy became: Let students learn by applying their existing and future competencies to create something preferably novel of value to at least one external stakeholder outside their group, class or school/university. This was labeled *learning-through-creating-value-for-others*, constituting a way to tightly connect education and entrepreneurship by means of value creation as a stepping stone in between them.

In this thesis I have endeavored to show that this is both a novel and a useful proposition to educational practitioners. In terms of novelty, it represents a fundamentally different philosophical proposition than established philosophies such as traditional, progressive and experiential education, or at least a novel combination thereof. In terms of usefulness, it allows teachers to draw on a thoughtful and coherent description and justification of entrepreneurial education when trying to infuse entrepreneurship into education, giving firm advice to questions of *what* to do, *how* to do it and *why*. I have shown how this can mitigate many of the challenges inherent in entrepreneurial education, such as definitional confusion, organizational issues, lack of resources, assessment challenges and fear of capitalism. A tentatively new educational philosophy grounded in entrepreneurship thus represents a means to increase the chances of successful outcomes from calls by policymakers on regional, national and international levels to infuse entrepreneurship into education.

The tentatively new educational philosophy has been argued to simplify for teachers, to make students learn from taking responsibility in society, to allow for using available means when learning by doing, to facilitate assessment and to help students apply theories in practice. It thereby provides teachers with a “rhythm” to better perform the crucial “dance” of moving between multiple and conflicting educational philosophies in their daily work. The tentatively new educational philosophy also has analytical implications in that it allows for a more precise definition of entrepreneurial education, potentially useful both in enterprise education and in entrepreneurship education.

Some important challenges and limitations with the proposed educational philosophy have also been discussed. Focusing on useful knowledge and value creation constitutes a risk of neglecting a disinterested pursuit of knowledge for its own sake and excluding educational practices that some deem to be entrepreneurial. The interdisciplinary challenge of bridging between education and entrepreneurship was also shown to be significant. A stepping stone has been introduced, but will scholars and practitioners be able to keep their feet dry?

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Paper 1

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Venture creation programs: bridging entrepreneurship education and technology transfer

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Abstract

Purpose – The purpose of this paper is to explore how university-based entrepreneurship programs, incorporating real-life venture creation into educational design and delivery, can bridge the gap between entrepreneurship education and technology transfer within the university environment.

Design/methodology/approach – Based on a literature review and snowball sampling over a two-year period, 18 entrepreneurship education programs were identified as applying a venture creation approach. Ten of these programs were selected for case study, including direct interviews and participatory observation during a two-day workshop. Empirical findings were iteratively related to theory within entrepreneurship education and technology transfer.

Findings – The paper identifies the bridging capabilities of venture creation programs (VCP) across five core themes, illustrating the potential benefits of closer collaboration between entrepreneurship education and technology transfer in a university environment.

Research limitations/implications – A definition for “VCP” is tested empirically. These programs are shown to be sophisticated laboratory environments, allowing for clinical research towards the understanding of entrepreneurship and technology transfer processes.

Practical implications – Findings identify practical benefits of combining entrepreneurship education and technology transfer activities, such as increased value creation through not only new firms, but also an entrepreneurially equipped graduate population. VCPs allow for “spin-through” of innovative ideas in the university environment, while simultaneously contributing to entrepreneurial learning.

Originality/value – This paper presents findings from the first multiple case study into entrepreneurship education specifically designed to develop real-life venture as part of the core curriculum. Findings provide basis for investigating the value of integrating entrepreneurship education and technology transfer at the university.

Keywords Technology transfer, Entrepreneurship education, University spin-outs, Venture creation
Paper type Research paper

1. Introduction

Entrepreneurship is seen as a major engine for economic growth and job creation (Wong *et al.*, 2005), with entrepreneurial competency development highly sought after by policy-makers and practitioners (Hofer *et al.*, 2010; OECD, 2011). And while debate continues whether entrepreneurs are born or made (Haase and Lautenschläger, 2011; Henry *et al.*, 2005a, b; Lautenschläger and Haase, 2011), there is growing consensus that certain knowledge, skills and attitudes for entrepreneurial action is teachable (Gorman *et al.*, 1997; Neck and Greene, 2011; Pittaway and Cope, 2007a; Rae *et al.*, 2012).

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But while most entrepreneurship education focuses on learning about the phenomenon of entrepreneurship, few address learning for new venture creation (Mwasalwiba, 2010; Pittaway and Edwards, 2012), even though entrepreneurship education in higher education institutions continues to grow worldwide (Kuratko, 2005). In parallel, university technology transfer practice has also experienced global growth following legislation passed in the USA in 1980[1] (Bozeman, 2000; Goldfarb and Henrekson, 2003; Mowery *et al.*, 2001), and then copied around the world (O'Connor *et al.*, 2010).

Exploiting university technology through venture creation (in addition to licensing or contractual agreements (Siegel *et al.*, 2003)) is attributed primarily to the domain of university technology transfer (Di Gregorio and Shane, 2003; Shane, 2002, 2004). However, university-based venture creation is increasingly recognized as an activity potentially facilitated through specialized entrepreneurship education (Barr *et al.*, 2009; Rasmussen and Sørheim, 2006; Siegel and Phan, 2008). Technology transfer and venture creation-based entrepreneurship education are seen to share many goals, priorities and strengths (Meyer *et al.*, 2011; Moroz *et al.*, 2010); for example commercialization of new ideas or innovations or entrepreneurial competency development. Researchers point at potential synergies, such as using university inventions in class projects, using students as resources in technology evaluation, and increasing awareness of technology transfer opportunities among students (Boh *et al.*, 2012; Greene and Rice, 2011; Nelson and Byers, 2005). Boh *et al.* propose an emphasis on project-based classes in technology commercialization, allowing faculty and students to experiment together within a safe environment prior to launching ventures stemming from university inventions. Nonetheless, recent literature shows that research on the interaction/integration of technology transfer and entrepreneurship education is almost non-existent (Nelson and Byers, 2010; Ollila and Williams Middleton, 2011; Siegel and Phan, 2008), with a lack of literature regarding programs specifically combining entrepreneurship education and technology transfer activities. Heinonen and Hytti (2010) state that the main difficulty of integrating entrepreneurship education with technology transfer is the tension that exists between academic and pragmatic approaches within the university context.

The purpose of this paper is to investigate the ways in which educational programs specializing in venture creation can contribute to bridging the gap between entrepreneurship education and technology transfer. From literature, we establish a definition for “venture creation program” (VCP). The definition is subsequently used to identify a population for empirical study. Entrepreneurship education and technology transfer literature is reviewed to determine a set of capabilities for bridging entrepreneurship education and technology transfer, from which we construct a theoretical framework of analysis. We outline methodologies for case study selection from the initial population, data collection, and data analysis. We present our findings from selected cases, followed by a discussion of the ways in which VCPs contribute to integration of entrepreneurship education and technology transfer activities.

2. Theory

One form of entrepreneurship education including authentic economic activity involves students temporarily buying and selling finished goods, such as giveaways or accessories, within a course setting. An example, Young Enterprise (Dwerryhouse, 2001), enables adolescents to run a company for eight months followed by voluntary liquidation. More complex kinds of economic activity, including the intention to create a viable company, are mostly found in programs of longer duration and at higher

educational levels. These programs can take significant time to develop, due to institutional, programmatic and pedagogical challenges (Thursby *et al.*, 2009). Nonetheless, pedagogic foundations and program design for venture creation focused education have been proposed and applied (see e.g. Gibb, 1993, 2011; Ollila and Williams Middleton, 2011). We use one of these, the venture creation approach, as a means to establish a definition for identifying entrepreneurship education programs contributing to new venture creation.

2.1 *The venture creation approach*

Ollila and Williams Middleton (2011) state the primary focus of a venture creation approach as “the development of new ventures from university research” (p. 173) through an educational platform. Learning is facilitated through an integrated environment consisting of both education and incubation, resulting in the development of both entrepreneurs and ventures. Students “test the waters” by attempting to create real-life ventures in collaboration with complementary stakeholders such as academics, investors, and practitioners. Mistakes are encouraged and learning outcomes emerge from the real experiences in both problem- and solutions-oriented ways, facilitated in part through reflection-in-action (Schön, 1983). The creation of new ventures is a consistent outcome of the venture creation approach; for example, the European Commission (2012) summarized the results from a program applying this approach as follows:

The output so far has consisted of 47 technology ventures with a survival rate of 80%, and around 300 educated entrepreneurs. These ventures had a total turnover of €30 million and around 270 employees in 2010. Common for most of the ventures from CSE [Chalmers School of Entrepreneurship] is that their initial ideas would have been too early or too vague to be accepted by traditional incubators. This means that the CSE model represents a novel means to create value that would never have been created otherwise (p. 31).

The approach is also recognized as delivering an experiential and experimental learning environment, enabling transformation of students into entrepreneurs (Berggren, 2011; Williams Middleton, 2010). Thus, the approach acts as a basis for a “VCP” definition: entrepreneurship education programs which utilize the on-going creation of a real-life venture as the primary learning vessel (thus involving venture creation as part of the formal curriculum), including intention to incorporate.

2.2 *Literature on “VCP”*

There is limited research addressing action-based entrepreneurship education, and in particular, learning through venture creation. As faculty of a VCP, we are familiar with literature that has addressed our own program (Berggren, 2011; Hofer *et al.*, 2010; Lindholm Dahlstrand and Berggren, 2010; Lundqvist and Williams-Middleton, 2008; Ollila and Williams Middleton, 2011; Rasmussen and Sørheim, 2006). To “test” the VCP definition, we reviewed literature addressing entrepreneurship education programs applying some kind of venture creation approach. Most of the literature found describes single case studies discussing programs in which students create real-life ventures (Barr *et al.*, 2009; Boocock *et al.*, 2009; Janssen *et al.*, 2007; Laukkanen, 2000; Meyer *et al.*, 2011; Thursby *et al.*, 2009). We also identified a multiple case study (Kington *et al.*, 2001) comparing US based programs developing high-technology start-ups.

The program descriptions in the literature were seen to align with the proposed VCP definition. Reviewing the literature also highlighted potential commonalities

of VCPs: experiential learning, interdisciplinarity, process-based curriculum, an external network of resources, and contribution to regional economic development. These five common themes are used towards a constructed framework of analysis, discussed further in the method section.

2.3 *Venture creation in a university setting*

Literature on venture creation at the university falls under multiple streams, including university entrepreneurship (e.g. Rothaermel *et al.*, 2007), academic entrepreneurship (e.g. Shane, 2004), incubation (e.g. Carayannis and von Zedtwitz, 2005), and university spin-offs (e.g. Pirnay *et al.*, 2003). It is not our intention to substantially review these streams, but to highlight key principles for university venture creation, and to recognize it as one form of university technology transfer. We differentiate venture creation at the university from most entrepreneurship education, as such education typically focuses on knowledge about the phenomenon of entrepreneurship (Kirby, 2007; Mwasalwiba, 2010, and others previously mentioned), and not actual engagement in an entrepreneurial process.

In Rothaermel *et al.*'s substantial review (2007), creation of new firms from university research is primarily conducted through technology transfer offices (TTOs), incubators and science parks. However, TTO operations typically prioritize licensing and material transfer activities over creation of new firms (Siegel *et al.*, 2003). Louis *et al.* (1989) found that new venture creation was the least common form of entrepreneurial activity carried out by life-science academics at universities. Deprioritization was based on the perceived controversy in using university resources for commercial goals.

Literature on university spin-offs specifically addresses new firm creation at the university. Pirnay *et al.* define university spin-offs as "new firms created to exploit commercially some knowledge, technology or research results developed within a university" (2003, p. 356). Van Burg *et al.* (2008) propose a framework for creating university spin-offs, derived from a theory-based meta-analysis of two recent literature reviews and a book on university spin-offs (Djokovic and Souitaris, 2008; O'Shea *et al.*, 2004; Shane, 2004), and a practice-based grounded theory methodology involving 25 interviews in the Netherlands. The van Burg *et al.* (2008, p. 114) framework is presented as five principles:

- (1) create university-wide awareness of entrepreneurship opportunities, stimulate the development of entrepreneurial ideas, and subsequently screen entrepreneurs and ideas by programs targeted at students and academic staff;
- (2) support start-up teams in composing and learning the right mix of venturing skills and knowledge by providing access to advice, coaching, and training;
- (3) help starters in obtaining access to resources and developing their social capital by creating a collaborative network organization of investors, managers, and advisors;
- (4) set clear and supportive rules and procedures that regulate the university spin-off process, enhance fair treatment of involved parties, and separate spin-off processes from academic research and teaching; and
- (5) shape a university culture that reinforces academic entrepreneurship by creating norms and exemplars that motivate entrepreneurial behavior.

Pirnay *et al.* (2003) distinguish between university spin-offs founded by researchers and those founded by students. In this paper's study, we explore university spin-offs based upon ideas initiated by both researchers and students, but developed through a process where students are the lead driving force. While the van Burg *et al.* (2008)

principles are developed in regards to university spin-offs, we posit that they constitute a useful means for analyzing venture creation in a university setting, including our focus on entrepreneurship education programs performing venture creation. Thus, we utilize these principles as the basis for constructing the first part of our own framework of analysis, discussed further in the method section.

2.4 Potential bridging capabilities of VCPs

Three of the cases from literature refer to the potential of university venture creation utilizing education (thus by our definition VCPs) to create economic value by bridging the “valley of death” (Barr *et al.*, 2009; Boocock *et al.*, 2009; Meyer *et al.*, 2011) – the financial gap innovators often face when bringing research to the market (Branscomb and Auerswald, 2003). Lack of available/applicable financing is often termed a “market failure”, signaling need for government-funded institutional support (Branscomb and Auerswald, 2003, p. 11). Meyer *et al.* (2011) propose that the “valley of death” represents three separate gaps: technology discovery, commercialization, and venture launch. They argue that each gap could potentially be addressed through the experiential learning and process-based design we associate to VCPs. Previously studied ventures created through such programs have delivered mixed economic outcome, with only some reporting high levels of employment and value generation (Barr *et al.*, 2009; Lundqvist and Williams-Middleton, 2008), while others have indicated modest or disappointing economic performance (Janssen and Bacq, 2010; Meyer *et al.*, 2011).

Another potential bridging capability of VCPs is interdisciplinarity (Barr *et al.*, 2009; Boocock *et al.*, 2009; Janssen *et al.*, 2007; Meyer *et al.*, 2011; Thursby *et al.*, 2009). Interdisciplinarity in regard to a VCP framework may include student team composition, diversity of problems to solve, and faculty portfolio. Interdisciplinarity can connect disciplines, reaching across organizational and cultural boundaries within the university, to connect students and faculty from different domains. However, interdisciplinarity also presents institutional challenges, including logistics regarding cross-campus collaboration, “buy-in” from faculty and administrative staff, and domain-specific conflicts within thesis assessment (Janssen and Bacq, 2010; Janssen *et al.*, 2007; Thursby *et al.*, 2009).

Entrepreneurship education utilizing venture creation can be seen to integrate university commercialization activities when collaborating with technology transfer partners (Barr *et al.*, 2009; Meyer *et al.*, 2011; Rasmussen and Sørheim, 2006; Thursby *et al.*, 2009). Collaboration facilitates entrepreneurial competency development through interaction with key stakeholders (Williams Middleton, 2010, 2013). However, collaboration between education and commercialization activities also presents various negotiation challenges regarding ownership (Meyer *et al.*, 2011) and rights to intellectual property (Barr *et al.*, 2009).

3. Method and data collection

Due to the perceived lack of systematic exploration into this area of research, a qualitative and explorative multiple case-study approach (Yin, 2008) is used, aligning with methodological recommendations (Edmondson *et al.*, 2007). We developed a theoretical framework consisting of ten main themes, building from van Burg *et al.*’s five design principles for university spin-outs (2008), a select case study (Barr *et al.*, 2009), and general literature within entrepreneurship education (Cope and Watts, 2000; Gibb, 1998, 2002, 2005; Mwasalwiba, 2010). The ten themes were grouped resulting in

an adapted version of five design principles, see Table I. This framework was used when designing a semi-structured interview template, and when comparing the empirical VCPs. There are potential limitations to using such a framework, since the creation of a new venture is contextual and influenced by institutional and cultural factors. Nonetheless, there was a need for structure due to the large amounts of data resulting from a qualitative approach.

3.1 Data collection

General knowledge of the field was used to form an initial sensitizing concept (Flick, 2006) for the VCP definition, and then tested relative to example cases from existing literature. Following definition establishment, we identified potential VCPs from the

Five design principles for venture creation at the university (van Burg <i>et al.</i> , 2008)	Ten themes of a VCP	Ten themes in short	References (in addition to van Burg <i>et al.</i> , 2008)	Five resulting design principles for VCPs
Create university-wide awareness through programs targeted at students and academic staff	Marketing to and selection of students	Marketing/screening		Targeting and selecting the students
Create and support start-up teams by providing skills matching, training and coaching	Establishing start-up teams in a creative environment	Teams		Creating the start-up teams
	Establishing fair and motivating rules	Rules/motivation	Cope and Watts (2000)	
Create a network of investors, managers and advisors	Securing collaborative network	Network		Collaborating with external actors
	Linking to external outreach activities	Outreach	Mwasalwiba (2010)	
Set clear and supportive rules and procedures that regulate the start-up process	Maintaining good academic entrepreneurship environment	Faculty	Gibb (2005)	Designing the learning environment
	Supplying relevant theory content with the right mix	Content	Mwasalwiba (2010)	
	Delivering a well balanced mix of pedagogical methods used	Pedagogy	Mwasalwiba (2010)	
	Actual business start-up process (core process)	Start-up process	Gibb (1998)	
Shape a culture that motivates entrepreneurial behaviour	Influencing students' attitudes towards entrepreneurship	Attitudes	Barr <i>et al.</i> (2009), Gibb (2002)	Developing entrepreneurial attitudes

Table I.
Theoretical
framework for data
collection

regions of Europe, North America and Asia-Pacific using previously available research, internet resources and snowball sampling. This resulted in an initial population. A web site[2] was also created as a receiving point for programs self-identifying as VCPs. The initial population was analyzed through e-mail/telephone contact in order to determine a refined VCP population. After two years of investigation, 18 VCPs have been identified.

For the purpose of this paper, key individuals at ten programs were selected for interview, based on availability, utilizing the designed interview template. A pilot interview was held with a trusted individual at one of the programs, from which adjustments were made prior to data collection. The three members of the research team[3] conducted interviews independently. Interviews were recorded and transcribed and complemented by written interview notes. Documentation and public data found online or provided by the interviewee were used to supplement the interview data. Follow-up interviews were conducted as necessary.

A two-day focus-group of program directors/key colleagues was held with 14 of the identified 18 programs in June 2012 (in Gothenburg, Sweden), providing additional in-depth data. A folder containing one-page structured program descriptions (which were supplied by the participating directors) was compiled prior to the meeting. Presentations were video recorded and participants produced written material during the meeting based on key themes identified through the initial interviews, including: program objectives, background, key partners, achievements, challenges and funding. These texts added to the available data on the ten VCPs interviewed. Written participant feedback from the meeting confirmed "VCP" as a productive and surprisingly unusual common denominator.

3.2 Data analysis

Basic and themed information about the VCPs was compiled into tables (see Tables II and III). Data from the ten VCPs was compared in order to identify common characteristics, methods and practice. Each of the interviewers then focused on a specific theme, listening to and reading the interview data, in order to reduce individual bias or select interpretation of data. The refined data were compiled independently by the authors into a matrix (Table IV), according to the five design principles generated from literature (Table I) on one axis, and five proposed bridging capabilities on the other. The matrix contents developed by each author were then discussed, combined into one, and analyzed jointly to clarify findings drawn from the interviews and identify potential patterns across the ten VCPs.

4. Findings

The VCPs are all masters-level programs or higher, except for one bachelor-level program, and range from one to two years in length. The student cohort size ranges from 12 to 60. Six of the programs were founded between 1995 and 2001, with the remaining four founded 2006 or later. Students have different educational backgrounds. Almost all of the programs collaborate, to a greater or lesser extent, with a technology transfer (or equivalent) organization. All of the programs have successfully facilitated creation of new firms. A summary of basic information about the selected VCPs is presented in Table II.

When looking more specifically at the components of the various VCPs in regards to the ten themes presented in Table I, some differences appear. Some of the programs are marketed externally, while others are only open to students already enrolled at the

VCP	Location	University Size – total students	Type of institution	Start year	Degree	Annual Student Cohort (total alumni)	Program Length	Tech transfer partner	Activity of some ventures started at program
A	USA	3,300	Private College	2000	MBA	15 (200)	1 year	Alumni Fund	Public space recycling
B	Sweden	11,500	Public University of Technology	1997	MSc	25 (300)	2 years	Associated Incubator	Online and mobile recipes Fleet management systems Aviation brokerage
C	USA	30,000	State University (Land Grant)	2007	MSc/MBA	25 (100)	1,5 years	Associated Accelerator	Tidal energy solutions Women's health products Solar lighting technology
D	Sweden	47,000	Public University	2006	MSc	40 (90)	1 year	Associated Innovation Office	Irrigation pumps Accommodation solutions Web based charity
E	USA	34,000	State University (Land Grant)	1995	MBA	60 (450)	2 years	TTOs at home and neighboring universities	Game development engine Textile dyeing technology Personalized diagnostics
F	Belgium	21,000	Public University	1997	MSc/MA	35 (350)	2 years	Regional TTO and Science Park	Nanofiber production Biogas plant construction Chain of leisure stores
G	England	1,000	Private University	2006	BSc	12 (26)	2 years	na	Digital storage Sustainability business Sky Diving Supporting New Entrepreneurs

(continued)

Table II.
Basic information of
select VCPs

Table II.

VCP	Location	University Size – total students	Type of institution	Start year	Degree	Annual Student Cohort (total alumni)	Program Length	Tech transfer partner	Activity of some ventures started at program
H	USA	24,000	Public University	2001	MBA/JD/ PhD	20 (400)	1 year	TTO at home and Innovation laboratories	Renewable energy sources Genomic analysis technology Custom sunglasses
J	USA	51,000	Public University	1996	MSc	60 (800)	1 year	TTOs at home and other universities	Eye diseases treatment Aesthetic laser technology
K	Norway	9,000	Public University	2008	MSc/MBA	20 (10)	2 years	Regional TTO	Ground movement monitoring Drug uptake technology

VCP	Idea Basis ^a	Team structure	Venture structure	Venture process in education	Network
A	Student	Individual (majority) or 2-3 team; student formed	Mentorship	Two phases: opportunity development and delivery; go/no-go incorporation at post education	Faculty, incubator (Entrepreneurial) Alumni Financiers
B	Provided	2-3 team (interdisciplinary); faculty formed (w/ input)	Student ownership stake (3%); mentorship; funding	Multi-phase: evaluation to incorporation with 4 tollgates; final go/no-go incorporation post education	Research depts., faculty, incubator, alumni, financiers, regional service providers, regional innovation system
C	1/2 student 1/2 provided	3 team (interdisciplinary); faculty formed (w/ input)	Student ownership stake (idea origin dependent)	Multi-phase including implication in the field; final go/no-go incorporation post education	Research depts., faculty, incubator, alumni, financiers, regional service providers, regional innovation system
D	Student or provided (optional)	2-3 team or individual; student formed	Student ownership stake (idea origin dependent); funding (discretionary)	4 phases of development; educational tollgates (linked to courses)	Incubator, holding company, mentors, private donor
E	Provided	5-8 team (interdisciplinary); student formed	Student ownership stake (depending upon student performance)	Multi-phase: ideation, assessment & commercialization; tollgates; final go/no-go incorporation post education	Faculty, financiers, regional entrepreneurial community
F	Student or provided (optional)	2-3 team (interdisciplinary); student formed	Student ownership stake (idea origin dependent); funding (discretionary)	Non-specific – mainly competency development	Research depts., faculty, incubator, TTO, holding company, student club
G	Student	50/50 individual and team; student formed	Student ownership stake; funding (discretionary)	Four-phase process from start to launch to operation and finally transition	Private donor; regional and national service providers and innovation system; “incubator”

(continued)

Table III.
Specific information
of select VCPs

Table III.

VCP	Idea Basis ^a	Team structure	Venture structure	Venture process in education	Network
H	Provided	4 team (interdisciplinary); faculty formed	Student ownership stake (idea origin dependent); funding (discretionary)	Multi-phase: ideation, assessment & commercialization; tollgates; final go/no-go incorporation post education	Univ. research depts., financiers
J	Provided or student	4-6 team; faculty formed (w/input)	Student ownership stake (depending upon idea origin)	Multi-phase: technology validation, business plan, operational plan, & venture launch. Intrapreneurship projects encouraged	Faculty, TTO, financiers, "corporate America"
K	Provided	2-3 team (interdisciplinary); faculty formed (w/input)	Student ownership stake (2%); funding	Multi-phase: evaluation to incorporation with 4 tollgates; final go/no-go incorporation post education	Faculty, TTO, holding company
Note: ^a "Provided" indicates that the incubator or TTO partner provides ideas stemming from university research, industry, or independent actors					

	Experiential learning	Interdisciplinarity	Process-based design	Network resources	Regional economic development
Targeting and selecting the students	Attracting action-oriented students from the entire university in order to learn by doing	Students from different faculties recruited bringing diversity into the process	Comprehensive screening, searching for the “right” mix of people for the job Implicit screening continues during program	Selection of students is done in collaboration with the network, such as alumni and TTO personnel	Attracting students that otherwise might not have self-selected into an entrepreneurial (or entrepreneurially-oriented) career
Creating the start-up teams	Teams, tasks and dedicated office space offer a degree of closeness and trust contributing to learning and productivity	Roles in teams are assigned based on discipline knowledge, taking advantage of interdisciplinarity	Multiple match-making processes involving students and idea providers, which are sometimes faculty led, and often negotiated	Ideas sourced from the surrounding network – TTOs, alumni, industry, innovators, faculty, etc. Equity and royalty negotiations are common	Dedicated (incubator-like) facilities provided as formal part of education Funding often provided or available during education period
Collaborating with external actors	Student learning through interaction with actors that are motivated by creating value	Programs utilize a wide variety of key partners such as other faculties at the university, specialty advisors and business practitioners	Educational process includes “pitching” opportunities, business plan competitions, trade fairs and/or network events	External actors provide new pathways to resources normally not available through traditional education	Projects are active in the regional entrepreneurial ecosystem and its support structures

(continued)

Table IV.
Bridging capabilities of VCPs stemming from design principles

Table IV.

	Experiential learning	Interdisciplinarity	Process-based design	Network resources	Regional economic development
Designing the learning environment	Real venture creation is tightly coupled with academic theory and reflection through an iterative format	A mix of senior academics and practademics helping to bridge the gap between university and industry	A prevalence of process-oriented descriptions rather than content oriented descriptions, address not only what to do, but how as well	Students conduct (are responsible for) much of the networking and outreach that is normally done by organizations such as the TTO	Explicit focus on creating value for external stakeholders as part of the formal learning environment
Developing entrepreneurial attitudes	Students experience the entrepreneurial roller-coaster, contributing to entrepreneurial attitude and skill development	Team diversity contributing to the level of holistic learning and the quality of the venture created	The iterative nature of managing a real-life venture creation process contributing to entrepreneurial self-efficacy	Expanding the venture's resource base through networking leads to effectual and bricolage skills	Real-life entrepreneurial value-creating behaviour and action (beyond intentionality)

university/college. Six of the ten VCPs have students explicitly selected from different disciplines (ex. business, engineering, medicine). Seven VCPs use a team-based format, and the remaining three programs allow for team- as well as individual-based ventures. All team-based VCPs utilize a mix of students from multiple disciplines, with team sizes ranging from two to eight. At some of the VCPs students form the teams independently, while other programs utilize designed team formation managed by the faculty. Designed team formation is more common for VCPs providing university technologies or external ideas as the basis for the venture. Programs allowing students to develop their own ideas are the only programs with individual-based venture formats.

Motivation to engage in venture creation is often supported through financial and ownership-based incentives. Access to networks of mentors brings in reflections from “real world” experience. In some cases, contributing practitioners are university or program alumni. Core faculty size ranges from one and a-half to 13 full-time individuals, with four to six being the most common amount of faculty. Most programs include a mix of academics and “pracademics”[4]. While anchored in an action-based experiential approach, core pedagogy also includes lectures and literature. The start-up processes at most VCPs include phases of initial idea evaluation and verification, often requiring presentation tollgates, and sometimes connected to financial investments during or after the program. Detailed VCP data are presented in Table III.

Findings from the ten VCPs provided multiple examples of the five proposed bridging capabilities. In the following sections 4.1 to 4.5, quotes from the VCP interviews are used to illustrate bridging capabilities relative to the five resulting design principles for VCPs in Table I.

4.1 Targeting and selecting the students

Interviews revealed that VCPs market their programs broadly. VCP F and H communicate the ambition to attract action-oriented students from multiple disciplines, noting the value of team interdisciplinarity on venture creation activity:

[...] students from almost all schools at the comprehensive [university] are brought together in cross-disciplinary teams to create businesses (Quote 1, VCP F).

We have added other universities [as partners][...] they have an engineering school which we do not have [...]. [Teams] seemed to always fare better because they had this interdisciplinary nature to them (Quote 2, VCP H).

Many VCPs try to align student composition with the needs stipulated by the venture creation process and partnering organizations. The following quotes from VCP K and VCP D illustrate that the associated TTO willingly collaborates with both student and project recruitment:

Because our students are almost potential recruits to start these businesses, it's important to us that [our TTO] is also included in the [student] selection group. [This group consists of] students from the previous class, the teachers and [TTO staff] (Quote 3, VCP K).

[the TTO] brings up a number of projects that they deem appropriate. They're pretty well versed in the program because they have been involved the whole time. They know what type[s] of projects are possible, because they know the technical level of our students (Quote 4, VCP D).

4.2 Creating the start-up teams

Once students and ideas are sourced into the program, multiple match-making processes take place. Team formation activities may include careful composition based on required roles, as evidenced by VCP J, or pairing idea partners with student teams as explained by VCP B:

We put them in teams based on a number of dimensions, but [a personality test] is probably the most important one. The hypothesis is that if you have individuals from each of the four quadrants, you have a more effective team. The four quadrants would be planners, communicators, doers, policy people (Quote 5, VCP J).

Teams of two or three students are matched with a scientist or innovator to take forward a business idea into a business (Quote 6, VCP B).

Team formation also involves fixed or negotiated partnership distribution. VCP B utilizes an established equity distribution, with a 30 percent share open for negotiation at a later stage. At VCP H, the partnership negotiation is more in regards to who becomes the core team of any particular venture from within the student cohort:

The equity is distributed 20% to [the university], the rest goes to approximately 45% idea provider, students in total 10% by default, 30% left to be decided on at a later stage, often given to the students if proving themselves" (Quote 7, VCP B).

They can fire team members that they don't get along with, and they can hire some new ones, but it's up to them (Quote 8, VCP H).

4.3 Collaborating with external actors

An important part of the students' action-based activities at the VCPs is based on external collaboration. A variety of external actors, primarily motivated by creating value, are involved:

It isn't just a classroom curriculum. Getting the student interacting with the environment, with customers, with trade-shows, with a mentor who's been there and done that [...] We also give them exposure to potential investors (Quote 9, VCP A).

Presentation opportunities in front of external actors, such as the "pitching" conducted at VCP G, are commonplace across the VCPs interviewed:

Within 4 months of starting the programme, students must prepare and "pitch" their business plan to [a] VC panel (Quote 10, VCP G).

VCPs are also shown to be highly integrated within the regional entrepreneurial ecosystem, both within and associated to the university system. Incubators, TTOs are important partners, as evidenced in Table III, and stated again by VCP F, as well as student organizations. VCP H also explains the importance of embedded partners within academic disciplines:

The most important partners are the different schools [...] technology transfer office [...] incubators, the student entrepreneurship club (Quote 11, VCP F).

[...] you need a champion in each of these [university] departments willing to lead their particular area to be good contributors to the whole" (Quote 12, VCP H).

4.4 Designing the learning environment

Most of the VCPs studied have designed their learning environment around a venture creation process rather than according to content. Entrepreneurial practice is

often tightly coupled with theory and reflection, but fundamentally based upon the real-world activities connected to the iterative process of creating a viable business, as explained by both VCP D and B:

The programme is focused on letting the student learn from their own actions by reflection and by relating action and practice to theory” (Quote 13, VCP D).

It is an iterative process with increasing degree of engagement and personal ownership in the process. [...] it is the doing around the business plan that is important (Quote 14, VCP B).

This action-based setting is viewed as attractive by technology transfer staff, since the tasks that the students do are the same tasks that they themselves would have needed to do otherwise:

[...] a student must satisfy multiple parties. The inventor can relax. Now and then [the inventor] is not so interested in having the students, but when [the inventor] sees how much work [the students] do, [...] the TTO is so interested in this, because the TTO has problems in that they are [too] few people (Quote 15, VCP K).

4.5 *Developing entrepreneurial attitudes*

Many interviewees comment upon strong personal development, specifically entrepreneurial attitude, intention and behaviour, both during and after the program. They relate the personal developments in students to the experiential and interdisciplinary setting of the VCPs. For example VCP G notes the change in students' ability to be self-promoting. VCP A associates personal change to the dynamic fluctuation experienced through the program, which reinforces the entrepreneurial experience:

Enormous personal development [...] they learned and they changed a great deal [...] they move from being very much teenagers to being people who are able to go out and do things and sell themselves (Quote 16, VCP G).

[...] they're exposed to the highs and the lows, and you often see them get very discouraged, to give up some of them, you see some of them get some very early indications of success and they get very excited, so yeah it is kind of that usual roller-coaster that you would expect for any entrepreneur (Quote 17, VCP A).

And finally, VCP H described development occurring through a “tipping point” moment:

[...] you [the student] go into the fall, you write this business plan, and it's still a school project. But now you go into the winter and spring, and you're starting to think, holy smokes, I'm gonna graduate in four months and I've been studying this business idea for X months and I'm really getting kind of excited about it, and you know the question is: is this something I'm really gonna do? [...] [for some people] they will tip over from being a school project to being real. That is a very exciting moment for us as educators, because all of a sudden, they own it more than you do. All of a sudden, the students own it. They own the problem. They own the business. They own the whole concept of going forward in this thing. And they take off with it. And they start working harder than they've ever worked before on anything in their life. It's amazing (Quote 18, VCP H).

In the discussion, the quotes from Sections 4.1 to 4.5 are used to illustrate the ways in which VCPs can be seen to bridge between entrepreneurship education and technology transfer activities in a university environment with regard to venture creation.

5. Discussion

This paper aims to investigate how educational programs specializing in venture creation can contribute to bridging the gap between entrepreneurship education and

technology transfer. Some VCPs communicated results of direct combination between their education and venture-creation-based technology transfer at their institution, as exemplified by VCP E: “over the last ten years our teams have raised 250 MUSD in equity funding [...] they created 250 jobs. Of all the new business start-ups using [our university’s] technology, [our] program accounted for 55% of them”. To look further at the potential contributions of VCPs, we analyzed the empirical data from ten programs relative to the five design principles from Table I and the bridging capabilities derived from the literature in Section 2. Table IV summarizes the ways we found VCPs to demonstrate bridging capabilities relative to design principles, marrying entrepreneurship education and technology transfer objectives in a university setting.

5.1 *Experiential learning*

Engaging entrepreneurially driven students in the venture creation process is a key contribution that VCPs can provide to technology transfer. In return, the entrepreneurial education receives access (through the TTOs and incubators) to projects and human capital resources that are “real” and can result in creation of an incorporated venture. The creation of venture teams, including not only students as the driving force, but also the other key players to provide insight, feedback or even resources (quotes 6, 7, 9, and 11), facilitates learning through engagement in entrepreneurship. The negative experiences of the entrepreneurial roller-coaster may also trigger transformative learning, which can lead to “profound changes in self” (Mezirow, 1991, p. 177).

Bridging entrepreneurship education and technology transfer in the way VCPs have been shown to do can facilitate more in-depth study of the treatment effects of entrepreneurial education on students (see e.g. Thursby *et al.*, 2009). The VCPs studied present multiple examples of student teams achieving the commitment and dedication needed for starting a real-life venture, based on the experiential and process-based design of the education (quotes 16-18). Through contractual and emotional ownership of a real-life venture, students reach a “tipping point”, treating the venture as “theirs”. Literature outlines the potential benefits of ownership perception, such as increased creativity (Amabile *et al.*, 1996), emotional involvement and commitment (Gibb, 1987), motivation (Savery and Duffy, 1996), and responsibility (Cotton, 1991).

5.2 *Interdisciplinarity*

Attracting and forming small interdisciplinary student teams matched with research-based intellectual assets (often from university research) and their associated providers is one of the most common bridging capabilities across the VCP cases, as evidenced in Table II, where TTOs are listed as key partners. Students at for example VCP F stem from business, law, engineering, physiotherapy, psychology, sciences, agronomy and liberal arts. A multi-discipline recruitment base increases diversity in the venture creation-based technology transfer processes at universities where VCPs collaborate with their TTOs, incubators, etc. According to Meyer *et al.* (2011), diversity is necessary for effectively determining the commercial potential of university research, and interdisciplinary teams are said to often do a better job than professional business development consultants, in uncovering unforeseen or promising applications for the technologies assessed.

According to Rasmussen and Sørheim (2006), several desirable goals are achieved through a match-making approach, including successful commercialization of research

conducted by scholars reluctant to become entrepreneurs, development of ideas that might otherwise have been neglected, and better access to ideas for students that want to become entrepreneurs. The screening processes utilized by VCPs may better facilitate match-making between entrepreneurial actors, innovative ideas and mentors/advisors. For example, VCP K's student admissions process involves not only faculty, but also TTO staff and alumni, to include real-world perspectives upon the forthcoming venture process (quote 3). Many of the VCPs have highly designed match-making processes that include equity distribution and partner negotiation (quotes 5-8, and venture structure in Table III). VCPs can be seen to constitute an educational platform that facilitates a diverse competency basis for technology assessment, through a diverse team structure (Table III), as students work with creating ventures based on or in collaboration with university research (as illustrated through Table III idea basis and quotes 4 and 11).

5.3 *Process-based design*

VCPs are by definition action- and experience-oriented, as they use the process of creating a real-life venture as a primary learning vessel. Less obvious, but emphasized by many VCP directors, is the iterative nature of the process, common to current developments in entrepreneurship research on effectuation (Sarasvathy, 2001) and technology transfer research on university spin-outs (Vohora *et al.*, 2004). In technology transfer literature, learning from iteration is shown as able compensation for lack of commercial experience (Druilhe and Garnsey, 2004). The challenge is finding industrial partners tolerant of time and resource intensive iterations (Wright *et al.*, 2004). We argue that VCPs provide an alternative partner to TTOs, capable of facilitating the necessary resources for venture spin-out, including access to surrogate entrepreneurs (Franklin *et al.*, 2001; Lundqvist, 2014; Radosevich, 1995) in a designed learning process tailored to the needs of the new ventures.

The experiential and process-based design emphasized by many of the respondents may explain why a venture creation approach (Ollila and Williams Middleton, 2011) is potentially at odds with the more traditional academic values emphasizing theory and content (Ardalan, 2008). We propose that the learning environments of VCPs can empower research within both entrepreneurship and technology transfer. Viewing entrepreneurship as a learning process (Cope, 2005; Minniti and Bygrave, 2001; Rae, 2004), we claim that VCPs allow for focused studies on nascent entrepreneurial stages of creating research-based ventures, and could be regarded as clinical laboratory environments. The term "clinical" (Schein, 1993), builds on the work of Lewin (1947) stating that only by changing a human system it can be understood.

5.4 *Network resources*

VCPs actively collaborate with key partners such as TTOs and incubators, arguably building upon at least some shared values and goals. From an entrepreneurship education standpoint, students gain practical experience in future entrepreneurial activity (quote 18), exemplified through incorporated ventures stemming from the programs (Table II). From a technology transfer or incubator standpoint, students can fulfil tasks valuable to their organization such as idea evaluation, IP analysis or market verification (Table III, quote 15), or even acting as surrogate entrepreneurs (as mentioned previously). The ability for students to fill this space has been recognized in previous research (Barr *et al.*, 2009; Lundqvist, 2014). We posit that VCPs provide an

opportunity for TTOs to extend their resource base with entrepreneurial and committed students capable of creating value.

The VCPs studied exemplify student collaboration with external actors (Table III, quotes 9 and 10). Collaborative activities include business plan competitions, pitching events, trade fairs and key stakeholders procurement, and are conducted as a formal part of the curriculum, using a venture creation approach (Ollila and Williams Middleton, 2011). Such activities also resemble situated learning in communities of practice (Lave and Wenger, 1991; Wenger, 1998), where social processes increase emotional exposure, fostering reflection, personal development, and entrepreneurial skills development (Cope, 2003; Pittaway and Cope, 2007b).

5.5 Regional economic development

Entrepreneurship education has been shown to be capable of facilitating development of entrepreneurial attitude and intention (Lüthje and Franke, 2003; Peterman and Kennedy, 2003; Souitaris *et al.*, 2007), when grounded in social learning theory and self-efficacy (Bandura, 1997). Attitude developed is assumed to lead to entrepreneurial behaviour, building primarily on the theory of planned behaviour (Ajzen, 1991). But, research conducted in entrepreneurship education lacks empirical evidence illustrating direct transition from intention to behaviour (Williams Middleton, 2010), argued as perhaps due to the often substantial time lag between educational treatment and entrepreneurial behaviour (Fayolle, 2005).

In our study, the challenge of establishing a link between attitude, intention and behaviour is a secondary issue, as the VCPs present evidence of actual entrepreneurial behaviour both during and after the programs. Entrepreneurial behaviour can be illustrated through direct or indirect contribution to regional economic development; direct contribution evidenced through the actual creation of new ventures (Table II), and indirect contribution through annual cohorts of students actually engaging in venture creation (Table II), or individual efficacy in the role of “entrepreneur” (quote 16 and 18). Through partnering with TTOs and incubators, VCPs also simultaneously deliver commercialization of university research, or, in the cases of externally-based ideas (student, corporation or independent), through utilization of university competencies. We argue that VCPs are capable of shaping a more entrepreneurial university culture by developing entrepreneurial behaviour among involved students, researchers and other stakeholders, relating to the fifth design principle of van Burg *et al.* (2008).

6. Implications and conclusions

Our study addresses ways in which VCPs bridge the gap between entrepreneurship education and technology transfer. Both areas may benefit from closer collaboration, confirming previous claims (Greene and Rice, 2011; Moroz *et al.*, 2010; Nelson and Byers, 2010). We illustrate that VCPs contribute to technology transfer processes by: increasing the number of engaged stakeholders which expands the competency base, increasing effective assessment of disclosed inventions, decreasing neglect of latent opportunities, and providing match-making between innovators and entrepreneurial capacity which includes access to entrepreneurial talent. While VCPs report significant variance in the frequency and economical significance of ventures created, they present potential for substantial value creation through not only economic value generated from new firms, but value created through increased entrepreneurial capacity (student

graduates). Further research is required to understand if venture creation variation is due to contextual factors, or if output can be increased through exchange of good practices.

VCPs provide new access to clinical research opportunities, increasing our knowledge about nascent stages of entrepreneurship and technology transfer, and allowing for observation of entrepreneurial behaviour, as it is taking place, instead of in hindsight. Students learn from real-life failure in a designed environment, resulting in potential treatment effects from entrepreneurship education. In such an environment, failure experienced in a venture can be a positive learning outcome for the student and provide insight in terms of invention assessment (Meyer *et al.*, 2011).

The unique environments of VCPs stress the importance of balancing between multiple dualisms. Practice needs to be balanced with theory. Action needs to be balanced with reflection. Learning goals need to be balanced with more business-oriented value creation goals. Research-oriented faculty need to be balanced with pracademics. Much of the perceived incompatibility of a venture creation approach in university settings could potentially be associated to these dualisms. While VCPs could be seen as too practice-, action- and business-oriented (Janssen and Bacq, 2010; Meyer *et al.*, 2011), they may present a compromised balance between the multiple dualisms. The problems of dualisms in learning and education have been addressed by Hager (2005), and we posit that viewing VCPs from this rather philosophical point of view could help increase our understanding not only of what it might take to bridge between entrepreneurship education and technology transfer, but also between education and real-world learning.

For policy makers, VCPs constitute an opportunity to alleviate the “valley of death” in early stages of university commercialization, and at the same time increase the entrepreneurial capacity in a region. There are also opportunities for industry-based commercialization to benefit from complementary university knowledge by bringing corporate ideas into the university setting. This “university spin-through” provides societal benefit as well by taking potential innovations off the shelf in the corporate setting.

Finally, some important challenges are identified. TTOs remain reluctant to consign valuable IP to inexperienced students. The interdisciplinarity of a VCP learning environment poses substantial issues in an academic environment. Dualisms will continue to spur discussion and disagreement around VCPs. The low level of predictability in the learning process and the resource intensive VCP environment demands entrepreneurial and practice-oriented faculty, currently in short supply. Finally, further study is needed to understand the emotional impact upon students experiencing the entrepreneurial roller-coaster, in order to address moral and ethical considerations.

Notes

1. US University and Small Business Patent Procedures Act of 1980, also known as the Bayh-Dole Act.
2. www.vcplist.com
3. The two authors and an additional member from the same research division at Chalmers.
4. Practitioners delivering lectures in the academic environment.

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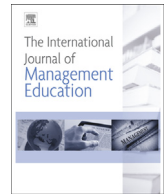
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An emotion based approach to assessing entrepreneurial education



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ABSTRACT

This study investigates links between emotional events and developed entrepreneurial competencies in an action-based entrepreneurship education program where students create real-life ventures. It represents a novel approach to assessing entrepreneurial education. A longitudinal design was applied following three engineering students during nine intensive months. Students were equipped with a mobile smartphone app used to report emotional events and critical learning events. Reports were followed up quarterly with semi-structured interviews. Links were identified through data analysis software NVIVO.

Findings indicate a large number of links between emotional events and developed entrepreneurial competencies. Three kinds of emotional events strongly linked to developed entrepreneurial competencies were interaction with outside world, uncertainty and ambiguity and team-work experience. These emotional events were linked to formation of entrepreneurial identity, increased self-efficacy, increased uncertainty and ambiguity tolerance and increased self-insight. These links represent early empirical evidence for three effective design principles of entrepreneurial education, and can also be used as indirect measures in assessment. This study also confirms venture creation programs as a suitable environment for studying entrepreneurship as experience.

Limitations of this study include a small number of interviewees, unknown transferability of results to other contexts, and risk for individual bias in data coding.

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1. Introduction

There is no shortage in the domain of entrepreneurship and enterprise education (i.e. entrepreneurial education, see [Erkkilä, 2000](#)) of prescriptive literature advocating for action-based and experiential approaches to developing entrepreneurial competencies (See for example [Gibb, 2008](#); [Heinonen & Hytti, 2010](#); [Mwasalwiba, 2010](#); [Neck & Greene, 2011](#); [Pittaway & Thorpe, 2012](#)). A group oriented, project based, hands-on and context laden approach with facilitated reflection is often recommended. Fewer articles empirically account for when, how and why such learning environments contribute to the development of entrepreneurial competencies. This is essentially an assessment challenge that remains largely unsolved in the domain of entrepreneurial education.

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Psychologists often divide the human mind into three parts; thoughts, actions and emotions (Hilgard, 1980). The assessment of entrepreneurship and enterprise education has hitherto relied primarily on two of these three parts, i.e. on thoughts or on actions, largely neglecting emotions as a potential indicator variable. Scholars have investigated students' *thoughts* by probing for perceived willingness and ability to act entrepreneurially before and after an educational intervention, leaning primarily on the theory of planned behavior (Ajzen, 1991; Krueger & Carsrud, 1993). Former students' entrepreneurial *actions* have been probed for by investigating the prevalence of actual entrepreneurial behavior, such as business plan writing, venture start-up and venture success among alumni (Martin, McNally, & Kay, 2013). Both of these approaches to assessing entrepreneurial education have important shortcomings, leading to the evidence base of entrepreneurial education outcomes being rather inconclusive to date (Bae, Qian, Miao, & Fiet, 2014; Lautenschläger & Haase, 2011; Martin et al., 2013).

The thought based assessment strategy is indeed easy to apply, but only tells us if entrepreneurial competencies have been developed or not, and does not answer crucial questions such as how, when and why entrepreneurial competencies are developed through educational interventions. Another problem is the unreliability of students' perceptions due to their naïve views of work life in general and entrepreneurship in particular, especially before the entrepreneurial education intervention studied (Cox, Mueller, & Moss, 2002; Liñán, Rodríguez-Cohard, & Guzmán, 2011).

The action based assessment strategy can reliably identify entrepreneurial behavior. The difficulty here is to prove that it is entrepreneurial education that has caused successful entrepreneurial behavior. Venture creation takes many years to reach financial success, making it difficult to isolate the role of entrepreneurial education (Fayolle, Gailly, & Lassas-Clerc, 2006). Self-selection bias aggravates this problem, making it difficult to rule out the possibility that already entrepreneurial people are attracted to entrepreneurial education, causing these higher levels of entrepreneurial activity (Bager, 2011).

An explicit emotion based assessment strategy has not previously been tried in the domain of entrepreneurial education, but is the aim of this study. Studies empirically examining the role of emotions in entrepreneurial education are very scarce in general. One of the very few studies so far was performed by Pittaway and Cope (2007), and emphasized the role of emotional and risk-laden events and processes where students resolve uncertain, complex and ambiguous situations in authentic settings. They concluded that emotional exposure plays a major role in how students learn to become entrepreneurial. A few quantitative studies have also included emotional aspects as a minor part of their study design and/or outcome (Lepoutre, Van, Wouter, & Olivier, 2010; Rosendahl Huber, Sloof, Van Praag, 2012; Souitaris, Zerbini, & Al-Laham, 2007).

The purpose of this study is to increase our understanding of the impact action-based entrepreneurial education can have on students' development of entrepreneurial competencies. It is a longitudinal and in-depth exploratory and primarily qualitative study following three master level students during nine intensive months, exploring what emotionally laden experiences can be linked to entrepreneurial competency development. This linkage attempt represents a new approach to the assessment challenges in entrepreneurial education. It could spur development of new test items for use in future quantitative impact studies, and could also open up new methodological avenues for future impact studies. The study asks the question: How are emotional events linked to development of entrepreneurial competencies in an action-based entrepreneurial education program?

The article proceeds as follows. Relevant literature within general and entrepreneurial learning, emotions in entrepreneurial education and assessment of entrepreneurial competencies is explored. Then the mixed methods study design, empirical setting and underlying methodological assumptions are described, followed by the resulting data. This is then discussed and analyzed, followed by implications for practitioners and scholars.

2. Review of literature

A framework that has been instrumental in the design of this study consists of the three categories of the human mind; thoughts, emotions and actions. A philosophical underpinning has been identified as the tripartite division of mind (Hilgard, 1980), stipulating that "the study of mind could be divided into three parts: cognition, affection, and conation" (Hilgard, 1980, p. 107); or thoughts, emotions and actions respectively (see for example Jarvis, 2006); or knowledge, attitudes and skills respectively (see for example Fisher, Graham, & Campeau, 2008; Kraiger, Ford, & Salas, 1993). Such a tripartite framework has been frequently applied in the scarce previous work on emotions in entrepreneurial education when treating experience, learning and competencies (See for example Gibb, 2002; Gondim & Mutti, 2011; Kyrö, 2008; Oganisjana & Koke, 2012; Pless, Maak, & Stahl, 2011). The main benefit for this study of such a framework is that it puts a more equal emphasis on the three faculties of the human mind. This allows for exploration of emotional aspects without neglecting cognition and conation. In today's rationalist biased society focusing primarily on cognition (Lutz & White, 1986; Postle, 1993; Yorks & Kasl, 2002), such a framework can be valuable. The framework is related to in Sections 2.1, 2.2, 2.3, 2.4, 3.2, 3.3 and 5 below.

2.1. Emotional learning events

This study draws on work by entrepreneurship scholar Jason Cope, who has developed a comprehensive framework for entrepreneurial learning (Pittaway & Thorpe, 2012). Cope has pioneered research on discontinuous and emotional learning "events" in the field of entrepreneurial learning, and states (2003) that they have "a prominent role to play in how entrepreneurs learn" (Cope, 2003, p.436). Cope (2005) states however that "the entrepreneurship discipline does not currently possess sufficient conceptual frameworks to explain how entrepreneurs learn" (Cope, 2005, p.373). According to Cope, we

need to go outside the entrepreneurship domain to find learning theories that can help us explain the emotionally intense process that entrepreneurial activities constitute. One such theory is Peter Jarvis' theory of human learning (2006), which according to Gondim and Mutti (2011) fully acknowledges the importance of emotion in the learning process.

A foundational statement in Jarvis' (2006) theory of human learning is that "it is the whole person who learns" (Jarvis, 2006, p. 31, 32, 50, 116, 151, 181 and 186). This reflects a view of the learner as comprising both body (genetic, physical and biological) and mind (knowledge, skills, attitudes, values, emotions, meaning, beliefs and senses), and postulates that learning occurs through thought, action or emotion, or any combination of these three dimensions of experience. Another key concept in Jarvis' theory of human learning is "disjuncture", which is a situation when a person's harmony is disturbed by something or someone in the environment, triggering thoughts, actions and emotions. This concept is similar to Cope's notion of discontinuous and emotional learning events (Cope, 2003). According to Jarvis, the trigger can be another person, a phenomenon (thing/event), a future phenomenon or self. This situation forces the person to raise questions such as "What do I do now?", "What does that mean?" etc., and subsequently initiate a learning process.

Jarvis outlines ten different types of learning (2010), where only one of them, action learning, fully takes all three dimensions thoughts, actions and emotions into account. As a methodological note for this study, this implies that action-based learning environments could be particularly suitable for studying emotional aspects of entrepreneurial education.

2.2. Action learning

According to a review of action learning conducted by Marsick and O'Neil (1999), the main theoretical base of action learning comes from Kolb (1984) and Revans (1971), representing the experiential school and scientific school respectively. Kolb's proposed experiential learning cycle has been widely used in entrepreneurial education theory and practice, and consists of four phases – concrete experience, reflective observation, abstract conceptualization and active experimentation (Kolb, 1984).

Experiential learning did however not start with Kolb's seminal work. Hoover and Whitehead (1975) had earlier defined experiential learning as follows: "Experiential learning exists when a personally responsible participant(s) cognitively, affectively, and behaviorally processes knowledge, skills, and/or attitudes in a learning situation characterized by a high level of active involvement." (Hoover & Whitehead, 1975, p.25). This definition is illustrative of aspects important in this study in that it leans on activities involving all three faculties of mind, i.e. thoughts, actions and emotions (Hilgard, 1980), and also is similar to the "whole person" approach.

Revans did not consider the Kolbian cycle to be an appropriate theory base for action learning (Marsick & O'Neil, 1999). Instead Revans proposed three problem solving phases – Alpha, or situation analysis; Beta, or implementation of a solution; and Gamma, or the manager's mindset and its development (Dilworth, 1998; Marsick & O'Neil, 1999). Revans was reluctant to define action learning due to the risk of opening up to shallow thinking, and stated that "the day it is accurately described in words will be the day to stop having anything to do with it" (Revans, 1983, p.49). In addition to Revans, a few other scholars also critique Kolb's experiential learning theory (Holman, Pavlica, & Thorpe, 1997; Jarvis, 2006), stating that it cannot be empirically validated and that it omits considering emotional aspects of learning.

Given that Kolb's critiqued experiential learning theory is a commonly used theory in studies of entrepreneurial education, and that emotions are central to how entrepreneurs learn, further empirical and theoretical work is arguably needed in order to advance the knowledge base of entrepreneurial education. This also shows the importance of being able to empirically validate learning theory, which is an aim of this study.

2.3. Emotions in entrepreneurial education

The importance of studying emotions in connection with education has been highlighted in the fields of entrepreneurship (Gibb, 2002; Kyrö, 2008; Rae, 2005; Shepherd, 2004), education (Dirkx, 2001; Hargreaves, 1998; Hattie & Timperley, 2007; Zembylas, 2005), psychology (Eynde, De Corte, & Verschaffel, 2007; Schutz & Pekrun, 2007) and neuroscience (Immordino-Yang & Damasio, 2011; OECD, 2007). Dirkx (2001) states that explicit attention paid to affective dimensions of learning can contribute to a more positive educational experience. Postle (1993) has identified emotion as the foundation on which all learning leans, drawing on Heron (1992) and Langer (1967) who both claim that rationality and knowledge branch out from emotion. Hargreaves (2005) states that schools are full of emotions, and that good teaching is all about emotionally connecting with the students, their feelings, their interests and their excitement. Teaching without emotion risks getting lost in boredom and stagnation, and educational reform not taking emotions into account can severely damage what teachers do well.

Within the entrepreneurship domain, Gibb (2002) leans on Kyrö (2000) when stating that emotion based perspectives "can lead to major reconsideration of approaches to research as well as teaching" (Gibb, 2002, p.256). Kyrö (2005) in her turn leans on pragmatist John Dewey when stating that "the affective construct actually rare in entrepreneurship research, should take a more explicit place in learning and teaching practices." (Kyrö, 2005, p. 46). Pittaway and Cope (2007) point out that "emotional exposure ... created principally via group dynamics ... plays a major role in creating an environment within which effective student learning can take place." (Pittaway & Cope, 2007, p. 222–223). Gondim and Mutti (2011) show that teaching activities similar to real situations generate greater emotional impact. Souitaris et al. (2007) conclude that the only factor affecting entrepreneurial attitudes and intentions is inspiration, and draw the conclusion that an educational intervention's

capacity to make the students “fall in love” with an entrepreneurial career is vital if the goal is to increase entrepreneurial behavior. Lepoutre et al. (2010) state that “emotional aspects of entrepreneurship may well be one of the most important contributions of entrepreneurship education research” (Lepoutre et al., 2010, p.113).

There is a need for the entrepreneurial education domain to draw on sources outside its own field when addressing emotion related issues. Some key concepts are emotional intelligence (Goleman, 1995), emotional labor (Hochschild, 1983), emotional understanding (Denzin, 1984) and emotional geographies (Hargreaves, 2001). Salovey and Mayer (1990) define emotional intelligence as “the subset of social intelligence that involves the ability to monitor one's own and others' feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions.” (p. 189). Emotional labor on the other hand could be regarded as diametrically opposed to emotional intelligence, according to Hargreaves (2000). Denzin's theory of emotional understanding (1984) is an intersubjective theory of emotions (McCaughy, 2003), i.e. emphasizing the interactions between people; when sharing common experiences, when in long-term relationships and when showing empathy towards less significant others. It is interesting to note the intersubjective nature of entrepreneurship recently highlighted by Sarasvathy and Venkataraman (2011). An intersubjectivity based emotions theory could thus turn out to be quite useful in entrepreneurship. Action learning theory also often emphasizes the importance of cooperative learning in groups, where an intersubjective approach to emotions might be fruitful. Sutton and Wheatley (2003) highlight the importance of positive and negative emotions, and also the importance of appraisal theory (Scherer, 1999) potentially explaining why one same external event can lead to differing emotions among different people. Positive emotions are a necessary precondition for experiencing “flow” (Csikszentmihalyi, 1991), and negative emotions help focusing attention (Derryberry & Tucker, 1994).

Despite these numerous scholarly efforts, research on emotions in general education as well as entrepreneurial education is in an early stage, focusing on basic questions such as what emotions are experienced by students in various learning environments, the functional importance of emotions in education and how to foster students' emotions by modifying instruction and teacher behavior (Pekrun, 2005). This study attempts to advance such issues in the domain of entrepreneurial education.

2.4. The assessment of entrepreneurial competencies

An important goal of entrepreneurial education is to develop some level of entrepreneurial competencies among learners. Combining the two terms *entrepreneurial* and *competencies*, we get a concept that varies substantially in its meaning and interpretation. Still, many scholars have found value in using the concept (Bird, 1995; Man, 2006; Markowska, 2011; Mitchelmore & Rowley, 2010; Rasmussen, Mosey, & Wright, 2011; Sánchez, 2011). Man, Lau, and Chan (2002) see it as a higher-level characteristic that reflects the “total ability of the entrepreneur to perform a job role successfully” (Man et al., 2002, p.124). In this study entrepreneurial competencies are defined as knowledge, skills and attitudes that affect the willingness and ability to perform the entrepreneurial job of new value creation; that can be measured directly or indirectly; and that can be improved through training and development (cf. Burgoyne, 1989; Sánchez, 2011). This definition aligns with much of the literature on competencies in general as well as entrepreneurial competencies, and is also aligned with the tripartite division of mind outlined earlier.

According to Bird (1995) assessing the development of entrepreneurial competencies is problematic, requiring multiple methods and approaches that to a varying degree are subjective. She lists 17 potential methods for assessing entrepreneurial competencies, such as diaries, observation, archival data, critical event interviewing, role set ratings, cases, think aloud protocols and job shadowing. Fisher et al. (2008) have proposed a knowledge, skills and attitudes based framework for assessing entrepreneurial competencies that leans theoretically on the tripartite division of mind, as outlined by Kraiger et al. (1993) in their article applying cognitive, skill-based and affective theories of learning outcomes to training evaluation.

Teachers have a need to assess to what degree students have developed their entrepreneurial competencies. Common assessment methods are exams, business plans and reports, oral presentations and mandatory class attendance, mirroring an unfortunate focus on the less effective passive pedagogical approaches in entrepreneurial education (Honig, 2004; Mwasalwiba, 2010; Pittaway & Edwards, 2012).

There is also a need for researchers to assess whether entrepreneurial education contributes to the societal goals of spurring entrepreneurial behavior and ultimately leading to value creation for society. Here two main research strategies are applied; a thought-based direct strategy probing for students' thoughts on their developed entrepreneurial competencies in direct connection to the education, and an action-based indirect strategy probing for entrepreneurial actions post graduation (Martin et al., 2013). Both approaches have important shortcomings, leading to a situation where the value of entrepreneurial education is questioned by some scholars (Lautenschläger & Haase, 2011; Oosterbeek, van Praag, & Ijsselstein, 2010).

2.4.1. Thought-based assessment strategies

The most frequently used thought-based assessment strategy among researchers is based on theory of planned behavior (TPB), developed originally in the domain of psychology and adapted to the domain of entrepreneurial education (Ajzen, 1991; Fayolle et al., 2006; Karlsson & Moberg, 2013; Krueger & Carsrud, 1993). This theory stipulates that intention predicts behavior, implying that if an educational intervention leads to increased entrepreneurial intentions it will also lead to future entrepreneurial behavior (Fayolle et al., 2006). The recommended research design (Martin et al., 2013) is taken from natural science and consists of a randomized experiment where the treatment in question is randomly allocated to a

sufficiently large group and measurable effects are statistically compared to a control group not getting treatment. A survey probing for entrepreneurial knowledge, skills and attitudes is administered before and after an educational intervention to treatment and control groups. The parsimonious research design allows for large scale studies reaching thousands of students, generating statistically robust data on the direct impact of the treatment studied (Moberg, 2014). This “evidence based” method has been a recurring theme in education for some decades now, fueled by research funding policy in United States and elsewhere (Slavin, 2002), and has been claimed to represent “the most rigorous evidence we can provide” (Slavin, 2002, p. 15).

The method however has multiple problems attached to it, both in general education and in entrepreneurial education. In general education its critics claim that the search for cause–effect relations so common in natural sciences is largely inappropriate in the educational domain where beliefs, hopes and reasons of intentional individuals lead to contextual and largely non-causal practices (Biesta, 2007; Olson, 2004). This relates to a well-known general problem in experimental research design stating that correlation does not prove causation (Shadish, Cook, & Campbell, 2001). In entrepreneurial education there are additional problems. Almost all entrepreneurial education today is voluntary, meaning that the randomization requirement of the experimental design most often cannot be satisfied. This results in impact studies having difficulties mitigating the risk for self-selection bias, unable to determine whether it is the educational treatment or the self-selection bias that is responsible for any correlations found. Also, so far scholars have not been able to prove the alleged link between educationally induced entrepreneurial intentions and actual entrepreneurial behavior (Moberg, 2014). Another challenge with TPB is its inability to open the “black box” of entrepreneurial learning, i.e. to explore how, when and why entrepreneurial competencies are developed rather than only determining if entrepreneurial competencies have been developed or not.

The transformation that the randomized experiment has brought to fields such as medicine, agriculture and technology (Slavin, 2002) has indeed not yet materialized in the domain of entrepreneurial education. Evidence of “what works” is so far largely inconclusive and heterogeneous (Lautenschläger & Haase, 2011; Martin et al., 2013). Thought-based assessment strategies are easy to use, but convincing and useful results are scarce.

2.4.2. Action-based assessment strategies

When probing for entrepreneurial actions taken by entrepreneurship education alumni several years after graduation, the linkage between educationally induced intentions and entrepreneurial behavior is again difficult to prove, but in the reverse order. Here the problem is to prove that the observed entrepreneurial behavior is caused or at least supported by the entrepreneurial competence developed in the educational intervention administered earlier, and not a result of self-selection bias or other contextual variables impacting over the often long periods of time between education and venturing (Fayolle et al., 2006; Liñán et al., 2011). Many attempts to apply an action-based assessment strategy span across more than one decade, leading to difficulties in establishing robust causal relations (Lange, Marram, Jawahar, Yong, & Bygrave, 2011; Lundqvist, 2014).

What is clear from this assessment strategy however is that entrepreneurship education graduates have a higher frequency of acting entrepreneurially (Charney & Libecap, 2000; Kolvereid & Moen, 1997; Menzies & Paradi, 2002). Regardless of if they would have acted entrepreneurially or not without education, it is difficult to deny the benefit of these practicing entrepreneurial individuals having received some degree of preparedness through an education in entrepreneurship. In most other professions it is generally accepted and unquestioned that education is provided for future practitioners such as doctors, engineers, lawyers and others (Hindle, 2007). Still, if the aim is to prove the impact of entrepreneurial education the action-based assessment strategy is so far quite unsuccessful, resource intensive and methodologically challenging.

2.4.3. Emotion-based assessment strategies

While no previous study known to the author has employed a fully emotion-based assessment strategy in the domain of entrepreneurial education, a small number of studies have included emotion related variables alongside more conventional variables. Souitaris et al. (2007) included a test item labelled “inspiration”, probing for educational events causing drastic changes in “heart and mind” (Souitaris et al., 2007, p.578). They concluded that it is inspiration rather than textbook knowledge that impacts entrepreneurial intentions, and called for research exploring what kinds of emotions are experienced in entrepreneurship programs. Lepoutre et al. (2010) coded 21 entrepreneurship education programs in terms of intensity and experientiality (three subjective ordinal levels), which yielded significant and positive correlation between these variables and entrepreneurial intentions as well as other commonly desirable outcome variables. They concluded that effectiveness of entrepreneurship education depends on intensity and experientiality of the educational intervention. Rosendahl Huber et al. (2012) controlled for being part of a winning team in an entrepreneurship education intervention awarding prizes to the best group in each class. They found significant correlation between being part of the winning team and developing entrepreneurial intentions, entrepreneurial self-efficacy and proactiveness. These three attempts to measure some degree of emotional intensity illustrate the explorative stage this research is in, but also indicates that designing more robust test items for emotional intensity could result in interesting findings.

The idea that extraneous variables such as emotional intensity moderate the impact of entrepreneurial education on development of entrepreneurial competencies has been put forward in a recent meta-study on entrepreneurship education outcomes. Although they did not explicitly mention emotional intensity as such a variable, Martin et al. (2013) found “strong indications of heterogeneity in [their] correlations, suggesting that there are moderators, which might help to better explain

the relationships” (Martin et al., 2013, p.220). They recommended more research on potential moderators. This study is in line with their recommendation, exploring the impact of emotion related variables.

Summarizing the literature reviewed, there is a need for further research in the domain of entrepreneurial education on how, when and why individuals develop entrepreneurial competencies. This research could draw more on general and action-based learning theories outside the field of entrepreneurship as well as on further empirical work in action-based educational environments. Applying an emotional lens is increasingly being advocated by scholars, positioning emotions as central to learning. In order to include emotions in the assessment of entrepreneurial education, a “whole person” approach grounded in the tripartite division of mind can help uncovering important previously unconsidered extraneous variables impacting the development of entrepreneurial competencies.

3. Methodology

This study applied a mixed methodology consisting of both quantitative and qualitative research methods. A quantitative approach was used to capture emotional events as they occurred through a mobile app based survey, data which then informed the qualitative approach consisting of semi-structured interviews aiming to reveal underlying mechanisms. This could be labeled as an “app-informed interview technique”, where an adjusted interview template is produced for each new interview, informed by the collected quantitative data.

Mixed methodology poses certain challenges due to the contrasting research traditions of qualitative and quantitative research (Mahoney & Goertz, 2006), constituting two “distinct cultures marked by different values, beliefs and norms” (Mahoney & Goertz, 2006, p. 277). The main emphasis here is on the qualitative research tradition due to this study’s exploratory nature, allowing for a better methodological fit (Edmondson & McManus, 2007) to the nascent state of research into emotions in entrepreneurial education (Kyrö, 2005).

Qualitative researchers often select cases based on where interesting outcomes occur, whereas quantitative researchers use random selection on independent variables (Mahoney & Goertz, 2006). Where the quantitative researcher avoids selection bias by increasing N to be able to control for extraneous variables, the qualitative small- N researcher explicitly selects extreme and deliberately biased cases based on the dependent variable due to this strategy’s capacity to discover new explanations and insights (Collier & Mahoney, 1996). The drawback of such a strategy is its limitations in generalizability. Mahoney (2009) recommends small- N analysis to be used for “exposing missing variables that can then ... [be] a supplement to large- N research” (Mahoney, 2009, p. 140). Little (1991) states that in social science regularities are often weak and exception-laden, implying that causal explanations require microfoundations derived from individual actions, reflections and beliefs. Therefore micro-level studies on a small number of individuals need to precede and inform macro-level studies on large populations (Mahoney, 2009). According to Merriam (1995), even from a study with $N = 1$ quite a bit can be learned, and strategies for achieving trustworthiness of the results in qualitative research are very different from quantitative research where increasing N is a common strategy.

In this study the entrepreneurial education program studied was selected through an extreme case selection strategy. The two-year master level program situated at Chalmers University of Technology in Gothenburg, Sweden, is a program ripe of practitioner involvement, requiring students to extensively engage with a wide variety of external stakeholders in the process of attempting to start a venture. The pedagogical approach of this program has been labeled the “venture creation approach” (Ollila & Williams-Middleton, 2011), and has been emulated internationally spurring the set-up of similar “venture creation programs” elsewhere (Lackéus & Williams Middleton, *in press*). For the purpose of this study the program was selected due to its well-documented strong capacity to develop entrepreneurial competencies (Hofer et al., 2010; Lindholm Dahlstrand & Berggren, 2010; Lundqvist, 2014; Rasmussen & Sørheim, 2006), allowing for observation of entrepreneurial competence development as it takes place, instead of through hindsight. It thereby constitutes a rare “clinical” laboratory environment (Schein, 1993) of high value in research on emotions, giving access to insights that otherwise might not have been revealed by the interviewees.

Three engineering students from this program were followed longitudinally during nine intensive months starting in September 2012 and ending in May 2013. The engineering background of the three students was heterogeneous with backgrounds from industrial management, electrical engineering and biotechnology. The students had no previous experience in starting or running a business, and they had not attended an entrepreneurship course or program previously. They were chosen for inclusion in the study based on interest to participate, on gender and on certain attitudinal and trait-based values reported in a survey distributed to the entire class of 24 students probing for attitudes towards entrepreneurship, emotional stability and entrepreneurial self-efficacy. At the outset 14 students volunteered to the study. Five of them were equipped with a mobile app, and three of these students were included in the interview phase where qualitative analysis was focused on participants with the most interesting outcomes according to app reports made. The use of app reports to select interviewees is a promising strategy for identifying interesting cases to study. The drill-down based sampling strategy outlined here, going from 24 cases, to 14, to 5, and finally to 3 cases was employed in order to focus on the most interesting and illustrative outcomes, i.e. in line with a non-random qualitative sampling strategy outlined earlier.

All students in this study worked with intellectual property developed by university researchers or individual inventors outside university, aiming to commercialize it through starting a venture. They all belonged to a group of three students respectively, where only one of the group members was part of this study. All three student teams collaborated extensively

with the inventors supplying the idea for the prospective venture. The educationally connected part of the attempt to develop a venture around the initial idea and related intellectual property was initiated in September 2012 and finished in May 2013. Teams were composed by faculty and were encouraged to interact with industry-specific stakeholders suitable for each project. Students were assessed based on such interaction instances by means of pass/fail assignments requiring students to identify and contact potential customers, industry specialists and other relevant external stakeholders, and reflect on the results of such interactions. After graduation the students and inventors were free to continue the project on their own. All three projects have continued at least eight months after graduation with one or two of the former students in leading positions. One of the students in this study chose to continue working with the project after graduation.

3.1. Quantitative approach: mobile survey engine

Using a short survey to capture experiences immediately in the natural environment was pioneered by Mihaly Csikszentmihalyi in early 1970s, aiming to study “flow” experiences in everyday life (Hektner, Schmidt, & Csikszentmihalyi, 2007). It has been labelled “experience sampling method” (ESM) as well as “ecological momentary assessment” (EMA) (Stone, Shiffman, & DeVries, 2003). A typical advantage is the unprecedented precision when capturing subjective experiences, resulting in a high degree of validity, combining “the ecological validity of naturalistic behavioral observation with the nonintrusive nature of diaries and the precision of scaled questionnaire measures” (Hektner et al., 2007, p.7). With the advent of mobile smartphones the distribution and management cost of short momentary surveys has been substantially reduced, and there is today a plethora of tools available (Conner, 2013). In ESM, respondents are normally expected to complete the survey based on triggers randomly issued across the day through wireless technology or beepers, often resulting in around 30–50 reports per participant over the course of a few weeks.

In this study the reporting trigger has instead been assigned to the respondents themselves, who were instructed to make a report whenever an emotionally intense event occurred. This alternate triggering strategy leans on people's natural tendency and need to share strong emotions socially (Rimé, Finkenauer, Luminet, Zech, & Philippot, 1998), and gives more focus on strong positive and negative emotional events than in regular ESM, which suits the purpose of this study well. It also allows for longer periods of time applying ESM, in this case nine months. The drawback is that it opens up for reporting fatigue and a risk of missing important emotional events due to trigger subjectivity.

According to Pekrun, Götz, Frenzel, Barchfeld, and Perry (2011), measuring emotions quantitatively in educational settings is difficult due to lack of measurement instruments. One area where research on emotions has been quite in-depth is consumer research. The emotions that products and advertisements trigger have been studied in-depth by many scholars. An interesting non-verbal approach to measuring emotions can be found in this domain (Morris, Woo, Geason, & Kim, 2002), where using a questionnaire consisting of images instead of words has been developed as a means to overcome challenges in cognitive translation of emotions among respondents. Morris and colleagues call it the self-assessment mannikin.

Looking at verbal approaches to measuring emotions, this is an area of controversy. The extremes could be illustrated with the many different ways used to measure emotions, from the circumplex model of affect involving only two independent constructs, valence (pleasantness) and activation (Posner, Russell, & Peterson, 2005; Russell, 1980), to up to 12 different constructs, all stated to be independent from each other. The use of factor analysis is common in constructing these measurement instruments (Russell, 1980). Even though factor analysis in this domain is extensive and convincing to many, scholars have disagreed for long whether or not there exists a set of basic emotions from which all other emotions are constructed or derived. Ortony and Turner (1990) state that such a statement would be as unreasonable as stating that there is a basic kind of person or language, and that it is “an unsubstantiated and probably unsubstantiable dogma—an air, earth, fire, and water theory of emotion” (Ortony & Turner 1990, p.329). But even these critics agree that it is reasonable to classify emotions in certain ways as a research strategy.

In ESM it is crucial that the survey is very brief, preferably taking “about one to two minutes to complete” (Hektner et al., 2007, p.49). The approach opted for in this study is a mixture between the self-assessment mannikin and the circumplex model of affect. This was the approach with the least number of constructs, only the two variables valence and activation (Russell, 1980), allowing for a very short survey in the app. In this specific study where students' own subjective experience of strong emotions was the trigger for reporting, it was deemed even more important to keep the survey short. The self-assessment mannikin pictures allowed for increasing the consistency of interpretation between participants.

Students were equipped with a mobile app in their smartphones connected to a mobile survey engine, and were asked to momentarily register every strong positive and negative emotional event they experienced related to their educational experience, and rate it according to the circumplex model of affect, i.e. to rate valence and activation for each event deemed worthy of registering. They were asked to quantitatively rate the following two questions from 1 to 7 in a likert scale manner each time they made a report; Q1: “How do you feel? (1 = very sad/upset versus 7 = very happy/contented)”, and Q2: “How intensely do you feel this? (1 = not at all versus 7 = very intensively)”, see Fig. 1. The self-assessment mannikin pictures as well as the circumplex model of affect were used when introducing the measurement instrument to the students in order for them to be able to use the instrument in a coherent way. For each emotional event report the students were also asked to write a sentence or more describing the emotional event and why they felt like they did. When launching the study the students attended a meeting of one hour containing the same information for all participants where the research team explained in-depth the different measures asked for, the self-assessment mannikin pictures and the circumplex model of affect figure and its example emotions such as feeling sad, upset, stressed, excited, happy, relaxed, depressed, bored etcetera.

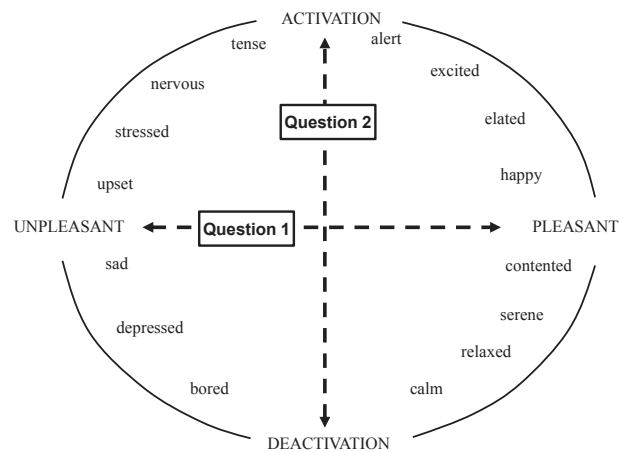


Fig. 1. The circumplex model of affect and its relation to the two questions posed. Question 1 was “How do you feel?” and question 2 was “How intensely do you feel this?” Both questions were answered with a likert scale of 1–7 and illustrated with the pictures from the self-assessment manikin. The circumplex model of affect is adapted from Posner et al., 2005.

The mobile app also contained a possibility to report critical learning events, since this kind of events constitutes an important source of both emotions and learning according to Cope's entrepreneurial learning framework described previously in this article. The app probed for six different kinds of critical learning events: (1) changed personal norms, values or attitudes (Cope, 2003); (2) changed basic assumptions (Cope, 2003); (3) changes in important taken-for-granted matters (Cope, 2003); (4) changes in self-image or self-awareness (Cope & Watts, 2000; Woods, 1993); (5) changes in self-esteem or self-efficacy (Fisher et al., 2008); and (6) major revelations about oneself or significant others (Cope, 2003; Woods, 1993). These critical learning event reports were also coupled with an opportunity for the students to write a sentence or two about the reason for the critical learning event occurring. In the study launch meeting these categories were outlined and explained in detail to all participants. The reason for including critical learning events alongside emotional events was that some key insights around entrepreneurial competencies might not be so emotional but can still be crucial for personal development.

3.2. Qualitative approach: semi-structured interviews

The app-based measurements were followed up with two quarterly individual interviews of one hour each, aiming to uncover links between emotional events and resulting development of entrepreneurial competencies. A semi-structured approach was applied, using an interview template with themes covering learning and themes covering emotions. Themes in the learning part were: (1) sources of learning; (2) learning events; (3) learning outcomes; and (4) similarities and differences compared to previous educational experiences. Themes in the emotion part were: (1) emotions experienced; (2) sources of motivation; (3) important decisions taken; (4) behavior important to learning; and (5) connections between learning and emotions. Learning was defined for the interviewees and repeatedly probed for in terms of knowledge, skills and attitudes, in accordance with the tripartite division of mind (Hilgard, 1980). In addition to the semi-structured parts, each interview also included a significant share of the time used for discussing around app reports deemed to be particularly interesting from a research perspective, aiming to guide the discussion to interesting emotional events as well as critical learning events having occurred between interviews, discussing triggers to these events and articulating resulting learning. All interviews were recorded and transcribed verbatim.

Table 1
Emotional events. Framework for emotional events in entrepreneurship education, used as coding framework in NVIVO.

Main themes	Sub themes used for coding in NVIVO
New kind of learning environment	Uncertainty and confusion Theory versus practice Support from outside of the learning environment
Collaborative learning	Team-work experience Time pressure
Challenging tasks	Individual differences between the students Overcoming knowledge and skills gaps Interacting with outside world Leadership and managing people

Adapted from Arpiainen et al., 2013

Table 2**Entrepreneurial competencies.** Framework for entrepreneurial competencies, used as coding framework in NVIVO.

Main theme	Sub themes	Primary source	Author's interpretation when coding data
Knowledge	Mental models	(Kraiger et al., 1993)	How to get things done without resources; risk and probability models.
	Declarative knowledge	(Kraiger et al., 1993)	Basics of accounting, finance, technology, marketing, risk etc.
	Self-insight	(Kraiger et al., 1993)	Knowledge of personal fit with entrepreneurship career
Skills	Marketing skills	(Fisher et al., 2008)	Conducting market research, assessing the marketplace, Marketing products and services, Persuasion, getting people excited about your ideas, Dealing with customers, Communicating a vision
	Opportunity skills	(Fisher et al., 2008)	Recognizing and acting on business opportunities, Product development skills
	Resource skills	(Fisher et al., 2008)	Creating a business plan, including a financial plan, Obtaining financing
	Interpersonal skills	(Fisher et al., 2008)	Leadership, motivating others, Managing people, Listening, Resolving conflict
	Learning skills	(Fisher et al., 2008)	Active learning, Adapting to new situations, coping with uncertainty
	Strategic skills	(Fisher et al., 2008)	Setting priorities (goal setting) and focusing on goals, Defining a vision, Developing a strategy, Identifying strategic partners, Risk management
Attitudes	Entrepreneurial passion	(Fisher et al., 2008)	"I want". Need for achievement
	Self-efficacy	(Fisher et al., 2008)	"I can"
	Entrepreneurial identity	(Krueger, 2005; Krueger, 2007)	"I am/I value". Deep beliefs, role identity, values, axiology
	Proactiveness	(Sánchez, 2011; Murnieks, 2007)	"I do". Action-oriented, initiator, proactive
	Uncertainty/ambiguity tolerance	(Sánchez, 2011; Murnieks, 2007)	"I dare". Comfortable with uncertainty and ambiguity, adaptable, open to surprises,
	Innovativeness	(Krueger, 2005; Murnieks, 2007)	"I create". Novel thoughts/actions, unpredictable, radical change, innovative, visionary, creative, rule breaker
	Perseverance	(Markman, Baron and Balkin, 2005; Cotton, 1991)	"I overcome".

3.3. Data analysis: coding procedure

All data collected in the study was coded in the qualitative data analysis software package NVIVO. A coding approach inspired by grounded theory was applied (Corbin & Strauss, 1990), in that both open coding and axial coding was applied by "[alternating] between the two modes" (Corbin & Strauss, 1990, p. 98). Axial coding was done by using two emerging theoretical frameworks for emotional events and entrepreneurial competencies, consisting of 9 and 15 sub-themes respectively. The coding framework for emotional events was based on a paper by Arpiainen, Lackéus, Täks, and Tynjälä (2013) outlining main sources of strong emotions in two entrepreneurship education programs in Finland and Namibia and one entrepreneurship education course in Estonia, see Table 1. This framework was developed through thematic analysis, iteratively going back and forth between longitudinal student interview data and interpretation of sources of strong emotions in the three different educational environments. The coding framework for entrepreneurial competencies was based on a framework developed by Fisher et al. (2008), and was further developed by drawing on work by other scholars, see Table 2.

There is a methodological difference with this study compared to classical grounded theory where new theory is inductively generated without regards to previous literature. Here the two frameworks used for coding have been iteratively matched against empirical data and relevant theory, resulting in emerging theoretical frameworks neither solely inductive nor solely deductive. This abductive approach has been labelled "systematic combining" by Dubois and Gadde (2002), describing "a process where theoretical framework, empirical fieldwork, and case analysis evolve simultaneously ... [having] the potential to yield more than inductive fit" (Dubois & Gadde, 2002, p. 554–556). These resulting theoretical frameworks could be useful in future research irrespective of the findings presented in this article.

During the coding process more codes were added when the two coding frameworks did not capture dimensions in the data perceived to be important. After the interviews were coded, a coding matrix was produced using functionality for this in the NVIVO software package. This matrix was used to identify salient connections between emotional events and developed entrepreneurial competencies in the data.

4. Findings

4.1. Quantitative data – mobile app based survey engine

The mobile survey engine resulted in a total of 55 reports; 16 critical learning events, 13 negative emotional events, 3 neutral emotional events and 23 positive emotional events (see Table 3). The mobile survey reports were predominantly done by the participating students in the two first months of the study, indicating that a certain reporting fatigue occurred for all three participants. One hypothesized way to counter this was to send out reminders by e-mail to the participants, but attempts to do this during spring 2013 were not effective. Some kind of incentive might be worth trying in future studies.

Two of the students reported both positive and negative emotional events, and one of the students reported predominantly positive emotional events. The level of difference in reported activation levels was rather small, indicating that this measure might perhaps be left out in future studies for simplification reasons since it does not add significantly to the study.

Table 3**Descriptive statistics.** Number of app reports done by each student in the study.

Student (anonymized)	Idea origin	Number of app reports in total	Number of emotional events reported	Number of critical learning events reported
Anthony	Individual inventor	7	4	3
Barbara	University research	16	12	4
Carol	University research	21	23	9
Total		55	39	16

The reporting of critical learning events was perceived as difficult to understand by some participants, particularly the part where the kind of CLE was to be specified. In future studies this classification could be simplified or left out, instead captured through the text and subsequent interviews. The use of the mobile phone's keyboard to input text posed no significant problems for the users. All reports were accompanied with a text consisting of between ten and 100 words, which could later be used during the interviews to increase the quality of the discussion. Some examples of text supplied in emotion reports illustrating education related emotional moments are given:

"Similarly to before, I learn of my own interests and what I don't like. Accepting this as ok personally even though it causes some difficulty in group."

Anthony

"Excited!!! We handed in our business model and we hired a guy to develop our prototype and we are applying for money to go to this awesome fair"

Barbara

"Tough personal insight made me say I am sorry to my team. Felt great afterwards since they responded very well."

Carol

Similarly, the reporting of critical learning events contained text illustrating what was going on at that particular time:

"[Changed personal norms / self-awareness:] Interest in tech fields vs interest in business. Perceived bullshit in business world. Own academic learning. Self-ability higher than thought. Importance of doing what feels right in one's core."

Anthony

"[Major revelation about a person important to you:] Under pressure people's priorities clearly comes out. Time pressure, and it's time to deliver"

Barbara

"[Changed personal attitude:] My thought of how the success of this project year will be defined was completely revised."

Carol

All app reports were coded using the coding framework for emotional events (see Table 1) in order to uncover which emotional event types and critical learning event types were the most frequent ones causing students to make an app report, see Table 4. Interaction with outside world was the most common event type causing primarily positive emotions, followed

Table 4

Coded app reports. Indicates which emotional event types and critical learning event types were the most frequent ones causing students to make an app report, and whether the associated emotions were positive, negative or neutral. Where applicable, some of the 55 app reports were coded with multiple event types, leading to 96 coding instances.

Emotional event type (see Table 1)	Number of app reports	Share of emotion app reports being...			Emotion app reports	Critical learning app reports
		...positive	...negative	...neutral		
Interacting with outside world	22	88%	6%	6%	16	6
Team-work experience	18	45%	45%	10%	11	7
Individual differences between the students	11	—	100%	—	5	6
Time pressure	10	57%	43%	—	7	3
Uncertainty and confusion in learning environment	9	29%	71%	—	7	2
Support from outside of the learning environment	8	100%	—	—	6	2
Presenting in front of others	6	75%	—	25%	4	2
Motivation	4	100%	—	—	4	0
Overcoming competency gaps	2	50%	50%	—	2	0
Leadership and managing people	2	100%	—	—	1	1
Getting feedback on own performance	2	—	—	—	0	2
Reaching tipping point	1	100%	—	—	1	0
Discrimination	1	—	—	—	0	1
Theory versus practice	0	—	—	—	0	0
Relevancy	0	—	—	—	0	0
Need for sacrifice	0	—	—	—	0	0
Total number of types coded	96	57%	33%	10%	64	32

Table 5
Occurrence of codes. Number of occurrences for axial and open codes in transcribed interview data.

Codes			Total number of occurrences
Main theme	Kind of codes	Sub theme (axial codes)	
Emotional events	Axial codes	Interaction with outside world	29
		Team-work experience	26
		Uncertainty and confusion in learning environment	24
		Theory versus practice	15
		Individual difference	10
		Overcoming competency gaps	9
		Leadership and managing people	6
		Support from outside of learning environment	5
		Time pressure	5
	Open codes	Presenting in front of others	12
		Getting feedback on own performance	8
		Reaching tipping point	8
		Other	6
		Experiencing relevancy	6
		Experiencing motivation	5
		Experiencing need for sacrifice	5
		Discrimination issues	2
	Axial codes	Self-efficacy	30
		Self-insight	20
		Entrepreneurial identity	20
		Uncertainty, ambiguity tolerance	16
		Marketing skills	12
		Entrepreneurial passion	12
		Perseverance	12
		Interpersonal skills	11
		Mental models	8
		Resource skills	8
		Declarative knowledge	3
		Opportunity skills	3
		Proactiveness	3
		Strategic skills	2
		Learning skills	1
		Innovativeness	–
	Open codes	Autonomy	6
		Self-esteem	4
		Other	2
Other themes	Open codes	Building castles in the air and imagination aspects	11
		Learning environment	10
		Roller-coaster discussions	6
		Make a difference in the world	3
		Being exposed, nowhere to hide	2
		Starting a business as a consequence of the program	2
		Difficult to find employer to work for	2
		Methodology	1
		Graduation hesitation – continue project or take job	1

“There has to be a seed somewhere in order to grow a flower. Starting a venture is like convincing everyone that there is a flower even though you know that there is only a seed at this point. It is the entrepreneur's job to nurture the seed, replace the soil and water it until it becomes a flower in the end as promised in the beginning. Everyone else needs to see a flower while I see a seed.”

Barbara

According to the interview data, this capability to create and transmit an initial vague idea and turn it into reality was improved as an effect of the program. This capability was related by interviewees to increased marketing skills, increased resource acquisition skills and increased capability to manage uncertainty and ambiguity. It was also clear that the act of building an “air castle” was not something that everybody perceived as desirable or positive.

Another theme that all of the interviewees talked about was that the education program triggered an emotional roller-coaster:

“the whole trip was really like this – first we went up... Coming in at the [potential customer], talking to all the people, coming out quite lyrical and then we go to the patent office and are told that we must have a patent, and it was only down again so that this will not go anyway then... But I think that [the feeling that] we can take over the world if we want to – you don't get it if it hasn't felt pretty damn hard before, I don't think so... Somehow you learn how terribly funny it is – it may still be worth all these pesky, pesky hours, and also getting to share it with someone.”

Carol

Table 6**Links uncovered.** Links between emotional events and developed entrepreneurial competencies.

Coding based linkages in interviews		Number of occurrences in total	Number of occurrences Anthony	Number of occurrences Barbara	Number of occurrences Carol
Emotional event	Developed entrepreneurial competency				
Interacting with outside world	Self-efficacy	13	—	5	8
Uncertainty and confusion in learning environment	Uncertainty, ambiguity tolerance	10	4	2	4
Team-work experience	Self-insight	9	5	3	1
Interacting with outside world	Marketing skills	8	—	4	4
Overcoming competency gaps	Self-efficacy	7	2	—	5
Interacting with outside world	Uncertainty, ambiguity tolerance	7	—	3	4
Team-work experience	Entrepreneurial identity	7	2	4	1
Uncertainty and confusion in learning environment	Entrepreneurial identity	6	2	1	3
Interacting with outside world	Self-insight	6	—	4	2
Interacting with outside world	Entrepreneurial identity	5	—	3	2
Team-work experience	Self-efficacy	5	1	2	2
Theory versus practice	Self-insight	5	3	2	—
Team-work experience	Interpersonal skills	5	—	—	5
Getting feedback on own performance	Self-efficacy	5	—	3	2
Uncertainty and confusion in learning environment	Self-efficacy	5	2	—	3
Individual differences	Self-insight	5	4	—	1
Interacting with outside world	Entrepreneurial passion	4	—	1	3
Team-work experience	Entrepreneurial passion	4	—	2	2
Uncertainty and confusion in learning environment	Perseverance	4	—	2	2
Leadership and managing people	Interpersonal skills	4	—	—	4

“there is a lot going on for us right now, and the last 3 weeks have been really crazy and the last week now from Monday to Friday has been a roller coaster emotionally for me, ... there was kind of a crisis in my head and there was crisis in my stomach”

Barbara

This indicates that an emotional roller-coaster can result in entrepreneurial self-efficacy as well as entrepreneurial passion and identity. But it is not without risk for negative experiences:

“It wasn't a roller-coaster, it was free falling from an airplane without a parachute... I don't see the point in doing this as education instead of just doing entrepreneurship outside of education.”

Anthony

4.3. Links between emotional events and developed entrepreneurial competencies

After coding all interviews it was possible in the NVIVO software to construct an interaction matrix, capturing all instances of text where emotional events and developed entrepreneurial competencies were discussed simultaneously and related to one another. This analysis resulted in 80 such strings of text. As a methodological note, it was evident that an effective procedure in terms of uncovering links was to first ask the respondent to tell the story behind a mobile app report made, then ask the respondent to reflect on what was learned from this in terms of entrepreneurial knowledge, skills and attitudes. Oftentimes the learning attached to a story told needed to be prompted for again and again from various perspectives in order to bring out the most interesting reflections. Common links are displayed in Table 6.

The results of this table cannot be adequately interpreted without being aware of two quite different kinds of experience of the education for the three participants in the study. The data shows that Anthony did not engage in any substantial interaction with the outside world that caused strong emotions (see Table 6), while Barbara and Carol engaged to a very large extent in interaction with the outside world. Interviews with Anthony indicate that the reason for this is related to group dynamics. The group Anthony was part of did not function well for the entire fall of 2012, but was instead split up in December following a decision by the faculty. The groups Barbara and Carol were part of reached deep levels of collaboration and productivity, giving a distinctly different experience of the program. Still, Anthony reported some quite interesting learning outcomes related to entrepreneurship, such as increased uncertainty/ambiguity tolerance, increased self-insight, increased entrepreneurial self-efficacy and the formation of a distinctly personal entrepreneurial identity. In fact, after the program was finished, Anthony started up his own company together with some friends, which according to Anthony was a direct effect of his taking part in the program studied here. In this new company Anthony was determined to practice his more “substance”

or “technology” based view of entrepreneurship formed during the program and rooted in his background in electrical engineering:

“I’d like to... [practice] something you could call informed entrepreneurship, ... when you actually know what you’re doing, ... something where I feel I am on top of everything needed in order to initiate a start-up... [Take] for example a math book where you have a proof and every step must be justified, it is for me [a] completely opposite approach and... I can imagine that there are others who also think so. I think that when you apply social constructivism on technology development, ... it summarizes what I think is wrong [in this education’s approach to entrepreneurship]”

Anthony

4.3.1. Most common links

The most common link between emotional events and developed entrepreneurial competencies in this study is interaction with outside world being linked to build-up of entrepreneurial self-efficacy:

“I guess it is the blend between the people you meet and the success stories you hear and things you do in the project as well as when you get confirmation that – hell, we could probably do this.”

Barbara

“it had certainly not been the same if it were not for real. Then it would have been like any other school project that you have done, you might say. Yes, I would say it’s a feeling that you – that you can – that you – yes, and that people trust you, that our idea partners can come to us with this idea and trust that we can do something good out of it – that they give you their trust and that – I do not know why it is so immensely motivating that it’s real, but it really is.”

Carol

In addition to this link the interview data contains quotes indicating that interaction with outside world also can lead to build-up of marketing skills, increased uncertainty/ambiguity tolerance, increased self-insight and build-up of entrepreneurial identity and passion:

“I have learned, I realized now, to be able to convey something that you just have in your head and this feels extremely important when you as an entrepreneur are going to convey something that you have a clear image of but that doesn’t even exist”

Carol

“the lesson here – the lesson is that such small things that can – it’s a mere coincidence if it can succeed or not if [the potential customer] cancels within 10 minutes or half an hour.”

Barbara

“I kind of walked around there [at the recruitment fair] looking at all companies and [realizing that] I don’t want to work for these [companies]. Why should I work for someone else, why should they tell me what to do? ... Why should I build on someone else’s house when I can build on my own? ... I have not always thought this way... It’s [caused by] a mix between the people and the doing [at the education], for example that we collaborate with [a potential customer].”

Barbara

The second most common link between emotional events and developed entrepreneurial competencies in this study is uncertainty and ambiguity in the learning environment leading to increased uncertainty and ambiguity tolerance:

“during that time in the fall [i.e. in the preparatory year, one year before this study started], I thought that yes, yes it was really a good simulation but in real life it cannot be as uncertain as that. And I’ve noticed that [in reality] it is even as uncertain as it was there... It was an interesting reflection... it’s almost a little ridiculously uncertain... If I had been trying to sell my stuff to someone who has no knowledge about [this] topic, I would just have needed to make up a bunch of bullshit and they would have swallowed that... but that is nothing I can stand for... I can imagine that in some areas it can work out very well that way...”

Anthony

“you get a task, and one would think like this: Oh God, we do not even know what it is, no one understands what we are doing, and [still] at the end you have something to submit... It has built a little peace of mind that okay, it might be as stressful or as messy as anything, but it always turns out with something. I think it has been very much [a source of learning to me].”

Carol

Also in this case uncertainty and ambiguity in the learning environment seems to lead to other learning outcomes, such as build-up of entrepreneurial identity, increased self-efficacy and increased perseverance:

“Well, people say that hey, starting a new company, wow how cool, it must be very difficult, how are you doing, do you get any customers, do you get an office, and what laws are applicable and how do you do this kind of. But I have noticed more like this: no it is not so difficult. It is of course a lot of work and so, but it is nothing, it has probably been... overestimated how difficult it is.”

Anthony

The third most common link in the data is between team-work experience and increased self-insight:

"I would say that the greatest source of learning then has... been largely myself and the situation the group has been in, ... more self-awareness, perhaps, I feel I know myself better."

Anthony

"[Right] now [the major source of learning] is probably more the interaction between the three of us – that we have come quite far in... how well we know each other. So we have discussions on group climate and group norms, they are on a very deep level... Those small things that can still create a bit like crisis and so then when you understand the different ways to deal with it so it will be like this – yes – we'll try to meet there."

Carol

Also team-work experience has been shown to lead to learning outcomes such as entrepreneurial identity formation, increased self-efficacy, increased interpersonal skills and increased entrepreneurial passion:

"I have thought about how it would have been to do this on your own. If you hadn't done it in a group, if it would be the same thing. I really don't know about that. I think it is this thing about feeling, well sharing it and feeling that we have done this together... you have your little group and you have your little thing and you really get to go in deep... I think it is a crucial factor that we have had our group... I think it somehow makes it very easy".

Carol

5. Discussion

Some of the methods for assessing entrepreneurial competency development advocated by Bird (1995) have been used in this study, such as "self-reflective diaries", "retrospective construction of events and behavior", "critical event interviewing" and "oral histories" (Bird, 1995, p. 61). This study can confirm them as productive ways to link educational interventions to developed entrepreneurial competencies, provided that one agrees that the emotional events reported in this study are indeed caused by educational design. Since the program studied involves frequent interaction with the outside world as formal part of curriculum and assessment as outlined in Section 3, and since such interaction is the most common kind of event leading students to report emotionality and critical learning (see Table 4), such a causality has been shown here, albeit in an exploratory study with unknown transferability to other environments. The study further shows that this interaction with the outside world in turn causes the development of entrepreneurial self-efficacy and other entrepreneurial competencies. The team-based characteristic of the educational design is also causing development of entrepreneurial competencies, since all students are required by faculty to work in carefully composed teams for nine months, which has shown to lead to increased self-insight and other entrepreneurial competencies. These are major finding of this study, confirming the study of emotional events as a viable strategy for assessing entrepreneurial education and developing pedagogies that "work" (cf. Olson, 2004; Slavin, 2002).

A large number of links have been uncovered between emotional events and developed entrepreneurial competencies, see Fig. 3. The evidence in the data is stronger for some links than for others, and this discussion will focus on the strongest links due to the exploratory nature of this study and the limited amount of empirical data collected. Three emotional events that seem to be particularly linked to developed entrepreneurial competencies are interaction with outside world, uncertainty and ambiguity in learning environment and team-work experience. These emotional events are often linked to formation of entrepreneurial identity, increased self-efficacy, increased uncertainty and ambiguity tolerance and increased self-insight. A conclusion that can be drawn from this is that emotional events induced by action-based entrepreneurial education primarily impact attitudinal learning outcomes, rather than skill-based and knowledge based learning outcomes. This coincides with attitudes being a major focus both in regards to assessment (Karlsson & Moberg, 2013) and desired outcomes (Draycott, Rae, & Vause, 2011) of entrepreneurial education. The emphasis of attitudinal learning outcomes in this study could be due to the methodology applied here which focuses on the more emotional aspects of learning outcomes, whereas codifiable knowledge and skills is perhaps not as emotionally engaging at times. Interestingly however, the learning outcomes specified by the program director of the entrepreneurship education program studied here are more focused on knowledge and skills. This could be due to a legitimacy problem with explicitly stating attitudinal learning outcomes in the traditional culture of higher education institutions (Ardalan, 2008; Mwasalwiba, 2010).

Adopting a whole-person view of learning and competency, as advocated by Jarvis (2006) and Man et al. (2002) respectively, has led this study to focus particularly on the previously neglected emotional aspects of entrepreneurial education. This approach has been capable of empirically confirming some aspects of Cope's framework for entrepreneurial learning stating that emotional learning events are central to how people become entrepreneurial (Pittaway & Thorpe, 2012). This study can also empirically confirm that disjunctural situations where a person's harmony is disturbed, the importance of which is emphasized by Jarvis (2006), can initiate profoundly personal and deep learning processes changing a person on attitudinal level, i.e. spurring new insights on issues such as "Who am I?", "What can I do?" and "What do I dare?" (cf. Sarasvathy & Dew, 2005). The critique of Kolb's (1984) widely used framework for experiential learning stating that it cannot be empirically validated illustrates the need for research of the kind reported here.

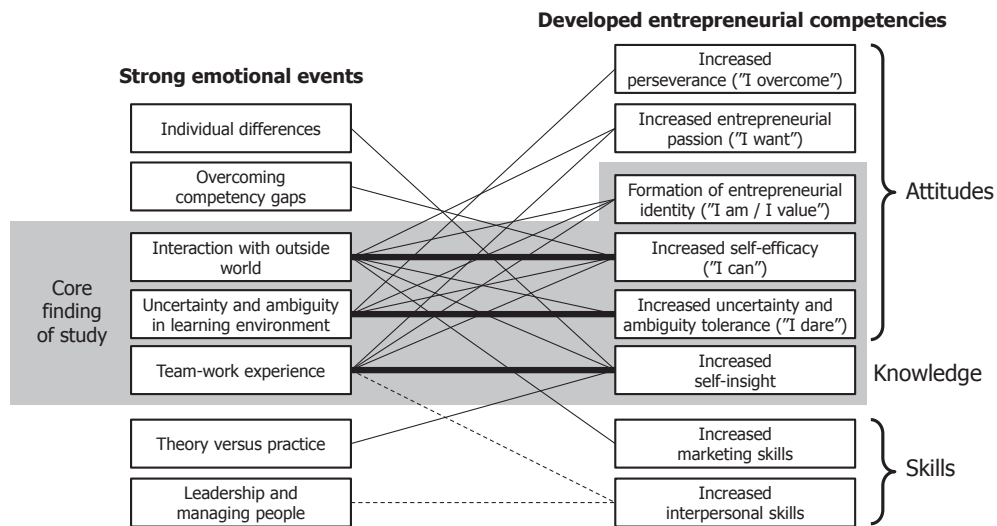


Fig. 3. Links between emotional events and developed entrepreneurial competencies uncovered/confirmed in this study. The three most salient links are displayed with thicker lines. The two weakest links are displayed with dotted lines, indicating that these links were only found in one of the three interviewee stories.

5.1. Impact of interaction with outside world

Although it is outside of the scope of this article to extensively describe how all the uncovered links between emotional events and developed entrepreneurial competencies played out in detail and why it was so, some basic proposed mechanisms are given as example, see Fig. 4. Given that this is exploratory work, these mechanisms need to be viewed as propositional rather than evidenced. Educational design requiring students to start a venture by attempting to create value to external stakeholders triggers frequent interaction with the outside world. This in turn triggers very high levels of happiness and motivation among students, as well as significant frustration at times, which in turn leads to a number of effects. They increase their levels of energy put into the tasks and challenges constituting the action-based learning environment. They increase the willingness to overcome obstacles and learn to tolerate uncertainty and ambiguity ("I dare"), leading to increased perseverance ("I overcome"). When students get to present their work for people outside the educational environment, and when these external people give their honest feedback in a committed and interested way, the students feel highly acknowledged and appreciated. This feeling of being valued and valuable leads to increased self-efficacy and self-confidence ("I can do this"). The students develop an aptitude for these situations, which over time in turn leads to increased

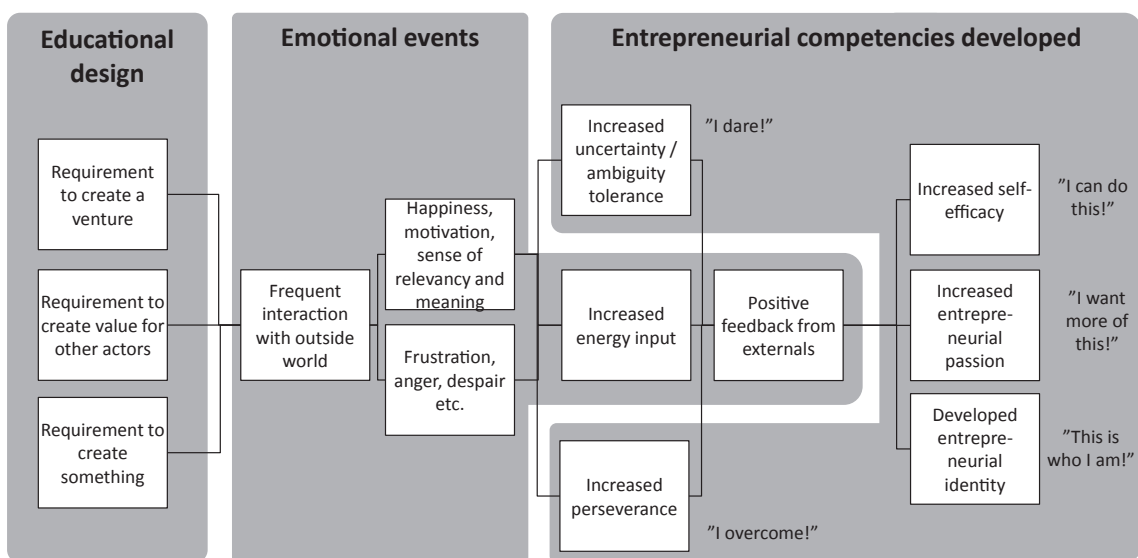


Fig. 4. Early glimpse into the "black box" of entrepreneurial learning. A conceptual example of how educational design triggers emotional events which in turn develop entrepreneurial competencies. Links are propositional rather than evidenced, as they are based on exploratory work.

entrepreneurial passion (“I want more of this”) and in prolonged exposure even a more entrepreneurial identity (“this is who I am”). This in turn correlates in time with a “tipping point” when students assume emotional ownership of their projects, treating them as “theirs”, especially if the positive feedback external people give them can be attributed to their own unique contribution to the project, and if the external people devote time to their project for other reasons than giving back to university, i.e. if they are motivated by the actual or perceived value created in the project.

This uncovering of proposed basic mechanisms explaining links between emotional events and developed entrepreneurial competencies only represent an early glimpse into the “black box” of entrepreneurial learning at this specific learning environment, and might well be contextual and not transferable to other environments. Still, the generalization potential of these findings could be important, as they resonate with educational psychology theory stipulating that student motivation and enjoyment is enhanced through actions that are perceived as both controllable and valuable (Pekrun, 2006), as well as with activity theory stipulating that human action can result in both deep learning and valuable artifact creation at the same time (Arievitch & Haenen, 2005; Miettinen, 2001). Also literature on subjective well-being supports the accounts given here, in that participation in valued and challenging goal-oriented cultural activities can result in strong feelings of confidence, happiness and motivation (Cantor & Sanderson, 2003). The study reported on here implies that deep learning can be propelled by letting students perform more or less altruistic acts of value creation towards society (i.e. entrepreneurship, cf. Gilder, 1981), with the resulting external appreciation serving as able payback for students starved of societal participation and feedback in educational settings.

The topic of students interacting with the outside world has been researched previously in domains such as experiential learning (Kolb, 1984), pragmatism (Dewey, 1916), service learning (Meyers, 1999) and communities of practice (Lave & Wenger, 1991). A contribution of this study is however the strong links between such interaction with practice and the development of entrepreneurial competencies. This established linkage implies that the entrepreneurship domain could contribute “backwards” to general educational literature with deep insights on how to create value to external stakeholders, since new value creation is central to entrepreneurship (Bruyat & Julien, 2001). In fact, literature on experiential learning frequently lacks a strong focus on what to focus on when experiencing the world of practice apart from just participating, i.e. giving a firm answer to the question: Learning-by-doing-what? (Lackéus, 2013) This study gives some answers to this question by showing how important it is that the students are trusted to create real-life value for external stakeholders, as this boosts motivation and deep learning. Participation is apparently not enough; students need to be perceived as legitimate value-creating actors.

5.2. Other salient links between emotional events and developed entrepreneurial competencies

The high levels of uncertainty and ambiguity reported in this study have been shown to build up students' tolerance for such situations. Uncertainty and ambiguity produces stress among students initially, something which is perceived strongly negative. But after some time and exposure a calmness in the middle of the storm is being built up according to the students in this study. This implies that the students build their capacity for reaching and keeping a state of mindfulness, described by Levinthal and Rerup (2006) as capacity to “contain and manage real-time unexpected events in an adaptive, flexible fashion” (Levinthal & Rerup, 2006, p.505).

Infusing uncertainty and ambiguity in learning environments can however be counter-intuitive for teachers, since it often results in complexity, student discomfort and institutional demands for more structure. Previous work on infusing uncertainty and ambiguity in entrepreneurial education is rare. Jones-Evans, Williams, and Deacon (2000) conclude that uncertainty and ambiguity is a natural consequence of introducing real world complexity into a course. The QAA guidelines on entrepreneurship and enterprise education in United Kingdom (2012) state that “ambiguity and risk are difficult to evaluate in predictable and forecast able schedules” (QAA, 2012, p.24), recommending sudden shifts and changes in an ongoing assignment as well as authentic activities containing emerging situations. Williams-Middleton (2010) has argued that reducing uncertainty and ambiguity is a core task of a nascent entrepreneur, implying that developing such skills would require an environment ripe of uncertainty and ambiguity.

Experiencing uncertainty and ambiguity can also lead to development of entrepreneurial self-efficacy, according to data in this study. When the students see what valuable outcomes they can create from the immense uncertainty and ambiguity they experienced at the outset, they get the perception that nothing is impossible. This impact is particularly strong when working in teams, since they perceive the chance of succeeding as higher when working in teams. The team can compensate individual blockages, as in a team there is always someone seeing a way forward in the mist of uncertainty and ambiguity.

Data in this study indicates that the developed entrepreneurial competencies that team-work experience has triggered in this study is reliant upon the long time span and intensive characteristic of the teamwork studied here, i.e. several months of sustained and highly focused teamwork. Self-insight related learning as well as development of entrepreneurial identity seem to occur regardless of whether the group is successful or not. It should however be highlighted that the program studied here has quite sophisticated group development mechanisms in place, which could be responsible for some of the reported team related competencies developed.

5.3. Other salient themes

The two “other” salient themes emerging from the data that were discussed previously in Section 4.2 – building air castles and experiencing a roller-coaster – both bear implications for entrepreneurial education. Being visionary is often attributed

to entrepreneurs (See for example [Hisrich, Langan-Fox, & Grant, 2007](#); [Murnieks, 2007](#)) but seldom discussed as a competency that can be acquired through education. This study indicates that visionary capacity can be acquired through education, albeit not without risk for occasional student discontent. When students are given the task to build something out of nothing, and in the process are required to attract external stakeholders by presenting an “air castle” or a vision, some students react strongly negative ([Anthony](#)) while others develop an aptitude for doing this and begin to see it as an emerging entrepreneurial competency that they possess and value ([Barbara and Carol](#)).

The roller-coaster ride reported by all students in this study resonates with a new string of research in entrepreneurship, positioned as an experience focused research paradigm complementing the more mainstream process based research paradigm in entrepreneurship. A recurring theme in this string of research is the peaks and valleys of the entrepreneurial experience ([Morris, Kuratko, & Schindehutte, 2012](#); [Morris, Pryor, & Schindehutte, 2012](#); [Schindehutte, Morris, & Allen, 2006](#)), where the entrepreneurial process is described as “trying to control a roller coaster while riding it” ([Schindehutte et al., 2006](#), p. 351). The study reported here shows that the empirical setting in this study – venture creation programs – represents a comparatively convenient and still highly valid environment for studies on the entrepreneurial experience and its roller-coaster characteristics.

5.4. *Implications for design of entrepreneurial education*

Although a venture creation approach in education ([Ollila & Williams-Middleton, 2011](#)) is a very unusual educational design even on a global level ([Lackéus & Williams Middleton, in press](#)), the underpinning principles of promoting interaction with the outside world, constructing a learning environment characterized by uncertainty and ambiguity and building on a strong team-work logic over extended time periods all seem to be design principles worthy of emulating in other kinds of educational environments if the aim is to develop entrepreneurial competencies. Building a learning environment on these principles can result in formation of entrepreneurial identities, increased self-efficacy, increased uncertainty and ambiguity tolerance and increased self-insight. These findings contribute with empirical evidence to similar theory based recommendations ([Heinonen & Hytti, 2010](#), p.287–288).

The findings of this study further imply that interaction with outside world, uncertainty and ambiguity in learning environment and team-work experiences are intertwined in terms of pedagogical mechanisms. They should perhaps be considered not as individual categories capable of developing entrepreneurial competencies, but as a viable integrated pedagogical approach where a value creation assignment (such as but not limited to venture creation) given to students triggers frequent interaction with the outside world but requires a teamwork approach to allow students to successfully manage the uncertainty and ambiguity it unleashes. For teachers such an integrated pedagogical approach founded on empirical evidence could be quite useful, and is unusual in the domain of entrepreneurial education with its wide variety of theory-based and general subjective experience based prescriptive recommendations to teachers. The scarcity of successful assessment strategies seems to have led to a scarcity of empirically based recommendations on pedagogical approaches. These early findings indicate that further research applying an emotion-based assessment strategy could spur more empirically grounded and useful recommendations to teachers.

5.5. *Implications for further research*

This study set out to explore an alternative route to assessing entrepreneurial competency development, instead of the traditional thought-based and action-based assessment strategies. Although only based on three students, some rather strong patterns have been observed, opening up the “black box” of entrepreneurial learning. It could be that the “app-informed interview technique” described earlier is one reason why the study of only three individuals could surface so many relevant links so frequently. This is promising, and merits further research with similar methodological approaches. This study also confirms previous claims that venture creation programs constitute “clinical” laboratory environments allowing for focused studies on nascent entrepreneurial stages of venture creation ([Lackéus & Williams Middleton, in press](#)), and also allowing for focused studies of entrepreneurship as experience ([Morris, Kuratko, & Schindehutte, 2012](#); [Morris, Pryor, & Schindehutte, 2012](#)). The utility of such research environments is probably not limited to development of entrepreneurial competencies only, but can be expanded into other domains of entrepreneurship research as well.

If emotional events in an entrepreneurial education intervention play such an important role as this study indicates, emotional intensity should be included as a control, moderating or independent variable in impact studies of entrepreneurial education in future studies. This study implies that studying attitudinal learning outcomes of entrepreneurial education without controlling for the emotional intensity of the educational intervention could lead to significantly increased and unwanted variance on dependent attitudinal variables.

The mixed methodology developed in this study based on experience sampling method ([Hektner et al., 2007](#)) in combination with longitudinal semi-structured interviews could be applied to other settings than venture creation programs, and on other levels than tertiary education. It has been capable of exposing mechanisms and links between educational design and the development of entrepreneurial competencies, using emotional and critical events as a proxy. Certain kinds of emotional events could be used as indicators for emotional intensity, allowing for designing a survey-based measurement instrument for emotional intensity. Instead of asking students how emotionally intensive a specific course or program was, test items could be designed around events that have proven to be emotional. This could reduce recall bias on retrospective

Table 7

Assessment focus. Current assessment focus in entrepreneurial education based on TPB and entrepreneurial outcomes, contrasted to a future complementing assessment focus proposed to be built on ESM.

Main focus of assessment strategy	Before education	During education	Immediately after education	Years/Decades after education
Thoughts	TPB	ESM	TPB	–
Actions	–	ESM	–	Entrepreneurial outcomes
Emotions	–	ESM	–	–

questions probing for emotionality. Emotions are experienced “on-line”, and are difficult to capture at a later stage through surveys and questionnaires (Eynde et al., 2007). They require resource intensive “experience sampling methods, video-based stimulated recall interviews, and instruments to measure physiological parameters” (Eynde et al., 2007, p.169). Specific kinds of events, such as interaction with outside world, should however be possible to capture retrospectively with acceptable levels of reliability and validity.

This study also indicates that it could be possible to design an ESM based assessment instrument probing for emotional thoughts and actions as they unfold. This would represent a combination of an emotion-based, an action-based and a thought-based assessment strategy based on mobile app technology capable of capturing the human experience as it unfolds, see Table 7. Such an instrument could contribute to empirically grounded recommendations on “what works” by giving firm advice on not only if but also on how, when and why entrepreneurial competencies are developed, much more so than a randomized experiment design based on TPB has been able to contribute with so far in the domain of entrepreneurial education. The study of alumni based entrepreneurial outcomes is even farther from being able to provide such recommendations.

5.6. Limitations of the study

This study has some important limitations that should not be overlooked. It is based on three students' views only, selected for inclusion based on a number of factors making it difficult to assess the resulting level of representativeness. The transferability of the results from this particular learning and research environment is difficult to assess at this stage, given that this is exploratory research. The coding procedure has been performed by one researcher only, representing a potential source of bias arguably acceptable in exploratory work but advisable to complement with measures of inter-rater reliability in future studies.

The two axial coding frameworks used is another limitation. Frameworks for emotional events in entrepreneurial education is an under-researched area, and there are no other frameworks that the author knows of in this specific domain. The availability of frameworks for entrepreneurial competencies in previous research is higher, but there is no clear consensus among scholars as to what constitutes entrepreneurial competencies, which means that a framework was constructed as part of this study.

Although experience sampling method has shown high validity and reliability in previous studies (Hektner et al., 2007), a deviation from the common randomly triggered reports was opted for in this study, by asking the respondents to report emotional events at will. This could have introduced potential bias such as respondents not remembering to report important events. Although interviews were used to probe for additional events, this is an inherent limitation of the study.

6. Conclusions

Through a longitudinal mixed methods approach, this study has investigated links between emotional events and developed entrepreneurial competencies in an action-based entrepreneurship education program applying a venture creation approach (Ollila & Williams-Middleton, 2011), i.e. requiring student teams to start a real-life venture. A large number of links between emotional events and developed entrepreneurial competencies have been uncovered and/or confirmed. These findings represent a novel approach to assessing learning outcomes within entrepreneurial education. They also represent early empirical evidence for three effective design principles of entrepreneurial education. Educators aiming to develop entrepreneurial competencies should try to design a learning environment ripe of uncertainty and ambiguity where students frequently are able and encouraged to interact with the outside world in a working environment emphasizing a team-based approach. This was hypothesized to constitute an empirically grounded integrated pedagogical approach, which is unusual in the domain of entrepreneurial education due to the prevailing assessment challenges with hitherto applied methods.

Interaction with the outside world has for the students in this study resulted in increased entrepreneurial self-efficacy. Uncertainty and ambiguity in the learning environment frequently resulted in students increasing their tolerance for uncertainty and ambiguity. Team-work experience of long duration in time frequently resulted in increased self-insight among students. There were other frequent links between emotional events and developed entrepreneurial competencies in the data from this study. These links represent an attempt to open the “black box” of entrepreneurial learning, since this study has uncovered mechanisms connecting educational design to developed entrepreneurial competencies, with emotional events acting as a proxy between them.

The study also found that the educational design of the program studied at times induced an emotional roller-coaster that led to increased entrepreneurial self-efficacy, increased entrepreneurial passion and build-up of entrepreneurial identity.

Another finding was that students' capability to envision and communicate an initial and vague idea was improved by the program studied, leading to improved marketing skills, resource acquisition skills and capacity to tolerate uncertainty and ambiguity. This implies a teachability of visionary competence. Further practical implications are that students' entrepreneurial competence development can be fostered by integrating altruistic acts of value creation for outside stakeholders (cf. Gilder, 1981) into the curriculum.

Some research implications of this study include the opportunity to study entrepreneurship as experience (Morris, Kuratko, & Schindehutte, 2012; Morris, Pryor, & Schindehutte, 2012) through the "clinical" environments that venture creation programs constitute, as well as the need to include emotional intensity as a moderating variable (Martin et al., 2013) in impact assessment of entrepreneurial education. This study has presented some ideas for test items probing for emotional intensity that reduce the recall bias so frequent in retrospective surveys on emotions. Further research on assessing entrepreneurial education could also benefit from the presented emotion-based assessment strategy, representing an addition to the previously used thought-based and action-based assessment strategies. This study has also further developed two frameworks for emotional events in entrepreneurial education and entrepreneurial competencies. These frameworks could be valuable not only for studying venture creation programs, but also when researching many types of entrepreneurial education.

Some important limitations of this study include a limited number of interviewees, unknown transferability of results to other contexts and learning environments, risk for individual bias in data coding procedures and a lack of suitable theoretical frameworks for emotional events and entrepreneurial competencies within the domain of entrepreneurship education.

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Paper 3

How “entrepreneurial” is Swedish compulsory education?

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Abstract

Entrepreneurial education with its roots in US business schools is increasingly finding its way into other educational levels due to international policy pressure from OECD, EU and others. A broader definition of entrepreneurship is often applied aiming to make people more entrepreneurial rather than making them start a business. This study investigated the impact of such an initiative led by Swedish National Agency for Education. 83 students were followed for one semester in three Swedish compulsory level schools with a long history of entrepreneurial education. A novel longitudinal mixed methods research design taken from a higher education setting was used, building on mobile app based experience sampling and interviews. The definition of “entrepreneurial” applied here was based on a *learning-through-creating-value-for-others* perspective to what entrepreneurial education signifies.

The findings show that the three schools were not as entrepreneurial as anticipated and advertised. Nevertheless, a set of entrepreneurial teaching methods and principles were identified and developed. The study contributes with empirical evidence and causal mechanisms for how letting students interact with outside stakeholders and create value for others can increase engagement, perceived relevance and deep learning. While arguably useful for compulsory education, we also posit that the generated results can be transferred to other levels of education, facilitating teachers’ design of entrepreneurial education. The study also represents an exemplary application of an innovative and technology-based method for formatively assessing 21st century skills such as perseverance, self-efficacy, collaborative skills and self-insight.

Keywords: Elementary school, Middle school, Mixed methodology, Assessment, Testing, Evaluation, Instructional design, Design principles.

Introduction

For almost two decades there has been a firm policy pressure in many countries in general and in the European Union (EU) particularly on infusing entrepreneurship into all levels of educational systems (Mahieu, 2006; Leffler, 2009; Li et al., 2003; Ohe, 2012; Farstad, 2002). Reasons stated include a need for innovative and entrepreneurial citizens more able to cope with an increasing change pace in a globalized society (European Commission, 2012; OECD, 2009). There is also a need to increase the number of people contributing to a dynamic economy by starting new companies, creating new jobs and revitalizing existing organizations (Surlmont, 2007). In Sweden this has led to revised national curriculum documents in 2010 and earmarked funds allocated yearly since 2009 aiming to support primary and secondary education schools in integrating entrepreneurship into their daily activities (Hörnqvist and Leffler, 2014). In order to assess the impact of such support in primary education settings and to learn from good examples, the study reported here was initiated and funded by Swedish National Agency for Education (SNAE, known in Sweden as Skolverket).

For this purpose we adopted a student perspective on entrepreneurial education and related school development by studying primary and lower secondary school students' perceptions, reactions and reflections on entrepreneurial education. Learning environments deemed particularly entrepreneurial in compulsory schools in Sweden were analyzed to explore what teachers do when teaching entrepreneurially, as well as what, how and why students learned from this. SNAE was interested both in the findings the chosen method could generate and in developing a method they deemed promising for assessment purposes. The aim was therefore twofold; (1) to increase our understanding of how particularly successful entrepreneurial education impacts student learning, and (2) to apply and further develop an innovative technology-based and student-centered assessment method for new kinds of skills (cf. Roschelle et al., 2011; Martin and Sherin, 2013), involving a quantitative mobile app based experience sampling methodology and a qualitative interview and transcription analysis methodology.

The method applied here was first described by Author (2013) who had applied it on master level university students in entrepreneurship at a Swedish engineering university. The method is based on the “proxy” theory of how people develop entrepreneurial competencies, stipulating that emotional events can be considered intermediaries (i.e. proxies) between teachers' instructional design and students' developed entrepreneurial competencies. Such an approach means that the emotional events that students experience in an educational setting represent a clear signal that some sort of entrepreneurial learning process is occurring. The resulting research design is then to use emotional events as signals of where to look for causal mechanisms governing how different teaching methods lead to different types of learning. Theoretically this research design leans on the key role of emotional and critical learning events for developing students' entrepreneurial competencies, as advocated by scholars in the field of entrepreneurial education (Souitaris et al., 2007; Kyrö, 2005; Gibb, 2002; Pittaway and Cope, 2007; Cope, 2003).

A sampling approach in five steps was applied in this study to identify the most entrepreneurial learning environments at primary and lower secondary education level in Sweden. Classrooms in three municipalities stated to be particularly entrepreneurial were studied more closely from a student perspective. 83 students at three different locations around Sweden were followed longitudinally for two and a half months with the help from a mobile smartphone app to get detailed insights into how students experience their everyday lives at school. Based on 1058 generated app reports from these 83 students, 25 of them were selected for in-depth interviews. The teachers were also interviewed for corroboration of the research team's findings.

Through this research design the research team was looking for “*entrepreneurial*” education here defined as when students are asked to use knowledge from school to create something of value to at least one person outside their group / class / school. Key “*entrepreneurial*” aspects searched for were when students were working in teams over extended periods of time, when they had to work iteratively, when they learned by daring to fail, when they interacted with the world outside school, and when this was done in a process they felt ownership over and got feedback from. Previous research has shown that these are key element in entrepreneurial education that can lead to greatly increased student motivation and more in-depth learning of subject knowledge and skills (cf. Lackeus, 2015).

The study aimed to uncover which types of emotional events that were common or rare in the studied environments, which types of learning that occurred and did not occur and which links between emotional events and learning that were common and less common. The study also aimed to uncover which teaching methods teachers used that led to emotional involvement of students, which learning outcomes these methods generated and how the mechanisms governing the learning process worked.

The article proceeds by first providing an overview of entrepreneurial education and its impact assessment. The applied methodology is then outlined in detail, followed by the findings it generated. These findings are then discussed and concluded upon, outlining recommendations for policymakers, practitioners and for further research.

Theory and literature

Entrepreneurial education

Infusing entrepreneurship into education has been high on the political agenda the last two decades (Ball, 1989; Mahieu, 2006; Rosalinde-Hofer et al., 2010). Intended effects include job creation, economic growth, competence development, increased student engagement and societal change (Hindle, 2007; Kuratko, 2005; Hytti and O’Gorman, 2004; Moberg, 2014b; Rae, 2010). These effects have however shown to be difficult to achieve in practice due to generic school development challenges (Fullan, 2007; Elmore, 1996) and also due to more specific challenges with entrepreneurship in the educational system (Johannisson, 2010; Surlemont, 2007). Some common hurdles include resource scarcity, anti-commercialism among teachers, rigid educational structures, assessment difficulties and a lack of clear definitions around what signifies “*entrepreneurial*” in connection to education (Sagar, 2013).

Entrepreneurial education is a unifying term for the two terms *entrepreneurship education* and *enterprise education* (Erkkilä, 2000). *Entrepreneurship education* has been defined as the development of competencies required to set up a new company, i.e. preparing students to assume a role as *entrepreneur*. *Enterprise education* has been defined as developing competencies needed to generate and realize new ideas, i.e. preparing people to be more *entrepreneurial* in their everyday life (QAA, 2012). The former term represents a narrow view of entrepreneurship viewed as organization creation whereas the latter term represents a broader view of entrepreneurship focusing on personal development, creativity, self-efficacy, initiative-taking, proactiveness and perseverance. While the narrow view is common in research on entrepreneurial education, such a view is relevant only to a small minority of students and teachers being explicitly interested in entrepreneurship as an elective subject. In contrast, a broader view has potential to make the infusion of entrepreneurship into education relevant to most if not all students and teachers in the educational system. It however requires a clear view of what entrepreneurial competencies are in order to avoid being confounded with other initiatives in school development such as problem / project based learning and progressive / constructivist learning (Blumenfeld et al., 1991; Helle et al., 2006; Savery, 2006; Tynjälä, 1999). Table 1 shows a framework for entrepreneurial competencies based on previous research

in entrepreneurial education (Fisher et al., 2008; Lackéus, 2014), applying a tripartite division of competencies into knowledge, skills and attitudes (Kraiger et al., 1993).

Table 1. Framework for entrepreneurial competencies. *Some competencies often deemed as entrepreneurial according to previous research (Fisher et al., 2008; Author, 2014)*

Entrepreneurial...	What is it?
...knowledge	Declarative entrepreneurship knowledge, procedural entrepreneurship knowledge, knowledge about oneself as entrepreneur/ial
...skills	Marketing, strategy, resource acquisition, opportunity identification/creation, learning skills, interpersonal skills, leadership skills, collaborative skills, creativity
...attitudes	Entrepreneurial passion, entrepreneurial self-efficacy, entrepreneurial identity, proactiveness, perseverance, uncertainty and ambiguity tolerance

Fayolle (2007) has outlined three different research paradigms in entrepreneurship; (i) a focus on entrepreneurship as the creation or discovery of opportunities (see for example Shane and Venkataraman, 2000), (ii) a focus on entrepreneurship as the creation of new organizations (see for example Gartner, 1993) and (iii) a focus on entrepreneurship as the creation of new kinds of value (see for example Bruyat and Julien, 2001). Depending on purpose and perspective, any one or more of these three paradigms could be appropriate. In this study the third focus on entrepreneurship as value creation has been applied due to its ability to align with educational settings and values; more so than the overly complex task of creating a new organization or the arguably vague concept of opportunity (Dimov, 2011). Learning-through-creating-value-for-others constitutes a broad yet specific and actionable task within reach for educators to use as a means for increasing student engagement and learning (Lackéus, 2016).

Entrepreneurial education is often divided into three different categories; educating *about* entrepreneurship, educating *for* entrepreneurship and educating *through* entrepreneurship (Johnson, 1988; O'Connor, 2013; Heinonen and Hytti, 2010). The 'about' approach often entails a content-laden and theory oriented approach giving a general understanding of entrepreneurship as a phenomenon. The 'for' approach is intended to prepare students for assuming the role as entrepreneur. These two approaches lean on a narrow definition of entrepreneurship and are thus relevant primarily to a subset of students on secondary and higher levels of education. The 'through' approach is process based and frequently experiential, letting students go through an authentic entrepreneurial learning process (Kyrö, 2005), where they learn through creating value to others. The value that students create can be financial, cultural or social (Moberg et al., 2012; Blenker et al., 2011). Such an approach is often based on a broad definition of entrepreneurship, can be more easily integrated into core curriculum and is potentially relevant to all students (see for example Smith et al., 2006; Handscombe et al., 2008). In this study the focus is on such a 'through' approach due to its relevancy in compulsory education.

Three strategies for assessing the impact of entrepreneurial education

Impact assessment of entrepreneurial education initiatives can be divided into three different strategies; thought-based, action-based and emotion-based assessment strategies (Lackéus, 2014). The thought-based assessment strategy probes for students' thoughts about their perceived ability and willingness to perform an entrepreneurial job. This is primarily done by using macro-level surveys leaning on the theory of planned behavior (Ajzen, 1991; Krueger and Carsrud, 1993). Students are asked to give their thoughts on their

ability to perform an entrepreneurial job in terms of searching for ideas, entrepreneurial planning and managing resources (see for example Karlsson and Moberg, 2013). Their thoughts before the educational intervention are compared to their thoughts afterwards. Differences are hypothesized to stem from the entrepreneurial education intervention having been administered. While this assessment strategy is easy to apply in large-scale studies, there are some major methodological challenges. Self-selection bias is virtually inevitable, since most entrepreneurial education today is voluntary. In addition, it does not penetrate the “black box” of entrepreneurial education, i.e. uncovering what happens during the education in terms of when, how and why students develop their entrepreneurial competencies (cf. Hedström and Ylikoski, 2010; Elster, 1989). These challenges have led to the current situation where meta studies show that the evidence base for the impact of entrepreneurial education is largely inconclusive (Bae et al., 2014; Lautenschläger and Haase, 2011; Martin et al., 2013).

The action-based assessment strategy entails assessing actual entrepreneurial behavior post graduation. Entrepreneurial education alumni are followed for often substantial amounts of time, tracking their entrepreneurial activity in terms of start-ups and other entrepreneurial behavior related indicators (see for example Lundqvist, 2014; Lange et al., 2011). Establishing causation between an educational intervention and the resulting entrepreneurial behavior is however difficult. Two complicating factors are the challenge of self-selection bias and the time gap between intervention and impact (Fayolle et al., 2006; Liñán et al., 2011).

Due to the methodological challenges with thought- and action-based assessment strategies, an emotion-based assessment strategy was recently proposed by Author (2013; 2014), leaning on the key role that emotions play in learning (Postle, 1993; Kyrö, 2005; Boekaerts, 2010; Dirkx, 2001; Jarvis, 2006). Here, emotional and critical learning events are viewed as a proxy between an educational intervention and the developed entrepreneurial competencies among students, constituting an emotional events based proxy theory of assessing entrepreneurial education. The posited mechanism is shown in Figure 1, and leans theoretically on the key role of ‘critical learning events’ for how entrepreneurs learn (Cope, 2005; Pittaway and Thorpe, 2012; Cope and Watts, 2000). By empirically validating strong links between typical emotional learning events and developed entrepreneurial competencies, it has opened up for a new approach to assessing entrepreneurial education. Measuring the prevalence of certain key emotional learning events among students is proposed as an alternative to measuring the evasive entrepreneurial competencies. This can be regarded as a more fine-grained causal model than the common and idealized deductive-nomological model (i.e. ‘if C then E’) where the cause (C) is entrepreneurial education and the effect (E) is either the developed entrepreneurial competence (i.e. thought-based assessment) and/or the triggered entrepreneurial behavior (i.e. action-based assessment). Viewing emotional events as a proxy between entrepreneurial education and its intended effects allows for studying more in detail the plethora of mechanisms that mediate between cause and effect, potentially opening up the black box of if, how, when and why entrepreneurial competencies are developed through entrepreneurial education (Lackéus, 2014). While still exploratory research, the proxy theory of assessing entrepreneurial education has been corroborated in an empirical study by Kjernald (2014), largely confirming the key emotional events leading to developed entrepreneurial competencies outlined in Figure 1.

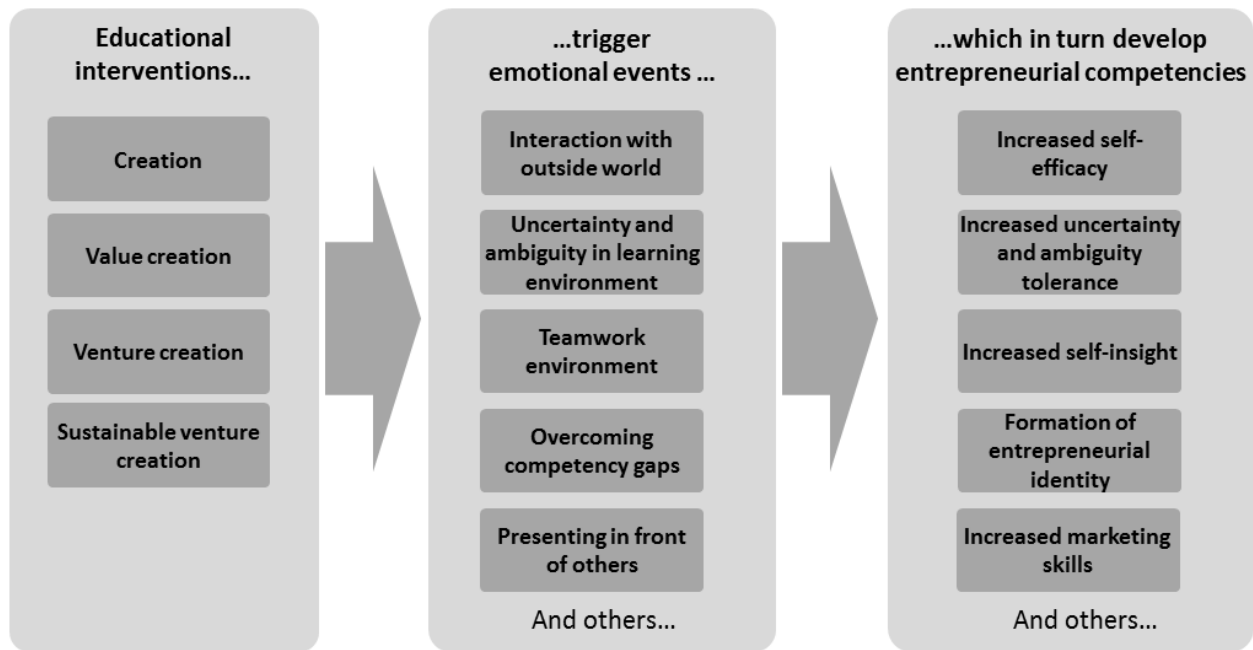


Figure 1. The proxy theory of assessing entrepreneurial education. Regarding emotional events as a proxy between educational intervention and developed entrepreneurial competencies. (adapted from Lackeus, 2013)

Previous work using the proxy theory of assessing entrepreneurial education

The proxy theory emerged from research conducted in a rare educational setting labeled ‘venture creation program’ (VCP). A VCP is defined as a formal credit-giving educational program where a team of students is required by curriculum to try starting a real-life venture with the explicit intention to continue running the venture post graduation as lead entrepreneurs and co-owners (Lackéus and Williams Middleton, 2015; Williams Middleton, 2013). By definition it is the last formal step in the education system for students opting to continue running the newly founded business. Such a program balances on the border between formal entrepreneurial education and informal entrepreneurial learning, and can thus contribute with new insights in both these spheres, given its rare dual characteristic of educational environment and real-life entrepreneurship experience, see figure 2. As it is the educational setting that artificially triggers real-life entrepreneurial activity and learning, with realistic emotional and financial ownership of the lead entrepreneurs, the causal mechanisms of entrepreneurial learning can be studied in unique ways, perhaps even more so than when studying entrepreneurship as practice. Uncovered mechanisms can then be transferred to other educational environments and tested under less extreme conditions.

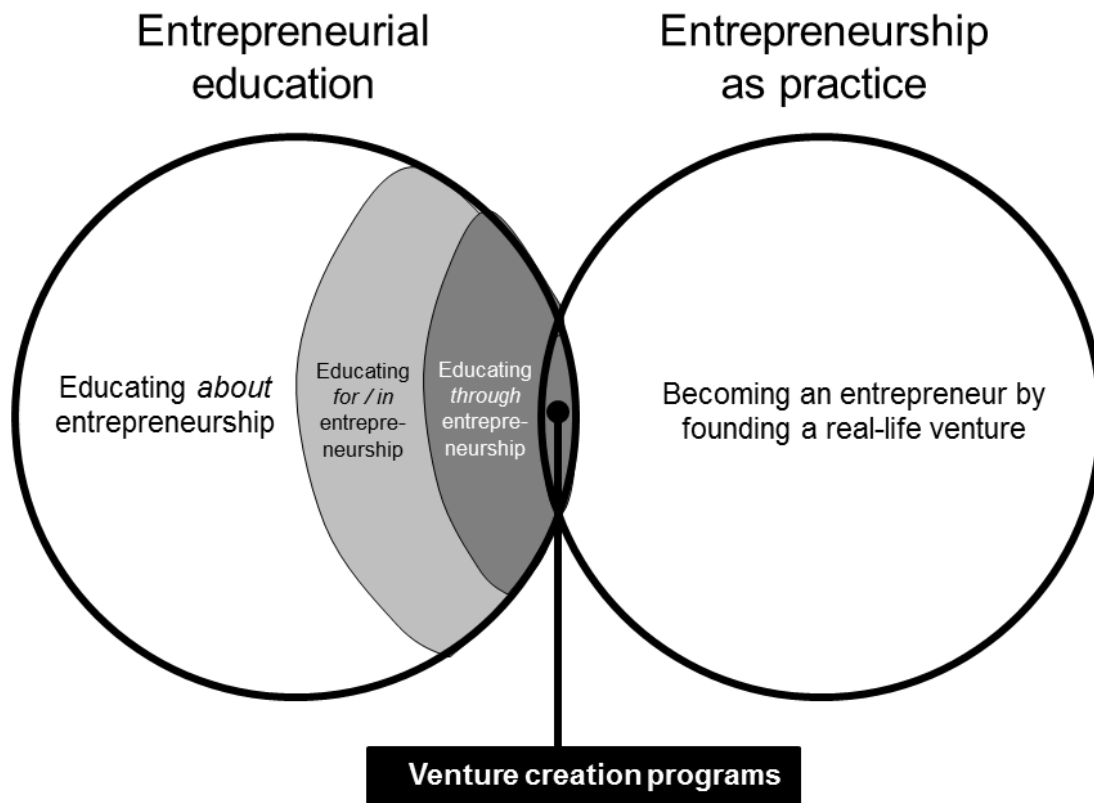


Figure 2. Venture creation programs on the border between education and entrepreneurship. The dual characteristic of a VCP, at the same time constituting an educational environment and a real-life entrepreneurship setting.

VCPs are rife with highly emotional and critical learning events stemming from venture creation activity. Students have described it as riding an emotional roller-coaster and being asked to build a castle in the sky, triggering strong positive and negative emotions as well as deep learning (Lackéus, 2014). The proxy theory was developed by using a mobile app to capture very small but coherent units of experience from students at a VCP and linking them to entrepreneurial learning outcomes as well as to antecedents in terms of instructional design. In this way, a web of causal mechanisms was evidenced empirically and with high ecological validity, uncovering how, when and why action-based entrepreneurial education can develop entrepreneurial competencies. It was shown how educationally induced interaction with the outside world, uncertainty in learning environment and a team approach triggered increased self-efficacy, uncertainty tolerance and self-insight among VCP students. Figure 3 shows the applied study design.

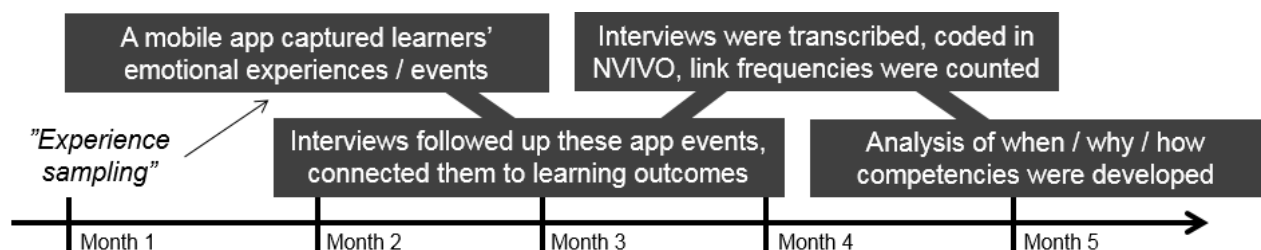


Figure 3. Method used for developing the proxy theory. A mobile app captured VCP students' emotional experiences. Interviews probed for details on these events and were transcribed and analyzed qualitatively.

The proxy theory has also been applied in other educational settings than VCPs, aiming to link educational design to developed entrepreneurial competencies. 12-13 year-old students were followed during three months when producing and broadcasting a radio program of one hour per group. They were asked to report any resulting emotional events using an app. This was later followed up with interviews using the emotional events reported through the app as the main topic for the interviews, asking students to connect their experienced emotional events to any perceived learning outcomes. A slightly different set of causal mechanisms was uncovered in this study, corroborating the importance of letting students interact with the outside world, but this time leading to increased interpersonal skills, self-insight, strategic skills, proactiveness and developed mental models (Lackéus and Sävetun, 2014).

Causal mechanisms research – a tradition aimed at opening black boxes of relevancy

The methodological perspective of studying causal mechanisms has gained popularity in the last two decades as a reaction to perceived shortcomings of the predominant covering law model of scientific explanation (Ylikoski, 2012). The covering law model stipulates that events can be explained by general laws or law like generalizations, i.e. if cause C then effect E (Little, 1991, p.5). The causal mechanisms model on the other hand stipulates that there is a series of causal mechanisms or events E_i leading from cause C to effect E (Little, 1991, p.14-15). Elster (1989) has described it as a method for opening up a black box to show “the cogs and wheels of an internal machinery” (Hedström and Ylikoski, 2010, p.51). This is often necessary in social science due to the weaknesses of social regularities on macro level. Macro level observations on collective level need to be connected to micro level observations on individual level in order to build social scientific explanations. This is why the discussion around causal mechanisms often emphasizes the study of microfoundations in terms of detailed accounts of individual-level processes (Little, 1991). A model based on Coleman’s boat (1994) accounting for this has been proposed by Hedström and Ylikoski (2010), see figure 4, showing how a causal mechanisms perspective studying micro level events can contribute to opening up the black box of social phenomena and generate deep understanding.

Figure 4 can also be seen as a relevance versus rigor dichotomy (Reeves, 2011). On a macro level researchers can design highly rigorous studies, often opting for a randomized controlled trial research design with randomly assigned treatment and control groups. The challenge with such research is to come up with results that are relevant to practitioners in educational settings, i.e. to succeed in a top-down or macro-to-micro approach to educational research. On a micro level researchers focusing on educational design in practice instead start in what appears to work well for teachers and students, and try to build a theory from that, i.e. a bottom-up approach to educational research starting in the black box. Here the focal point is relevancy, but the challenge instead becomes to adhere to the usual requirements for rigor such as prevalence of a control group, random sampling strategy, large sample size and statistically significant results (Reeves, 2011). According to Reeves, the macro approach is highly publishable but often fails to impact educational practice. The micro approach is highly relevant to educational practice, but can have difficulties getting published in top level scientific journals. Schön (1995, p.28) has stated the researcher’s problem succinctly: “Shall he remain on the high ground where he can solve relatively unimportant problems according to his standards of rigor, or shall he descend to the swamp of important problems where he cannot be rigorous in any way he knows how to describe?”. In this perspective, educational research based on the proxy theory and a mobile app approach can be viewed as an attempt to bridge the rigor versus relevance dualism.

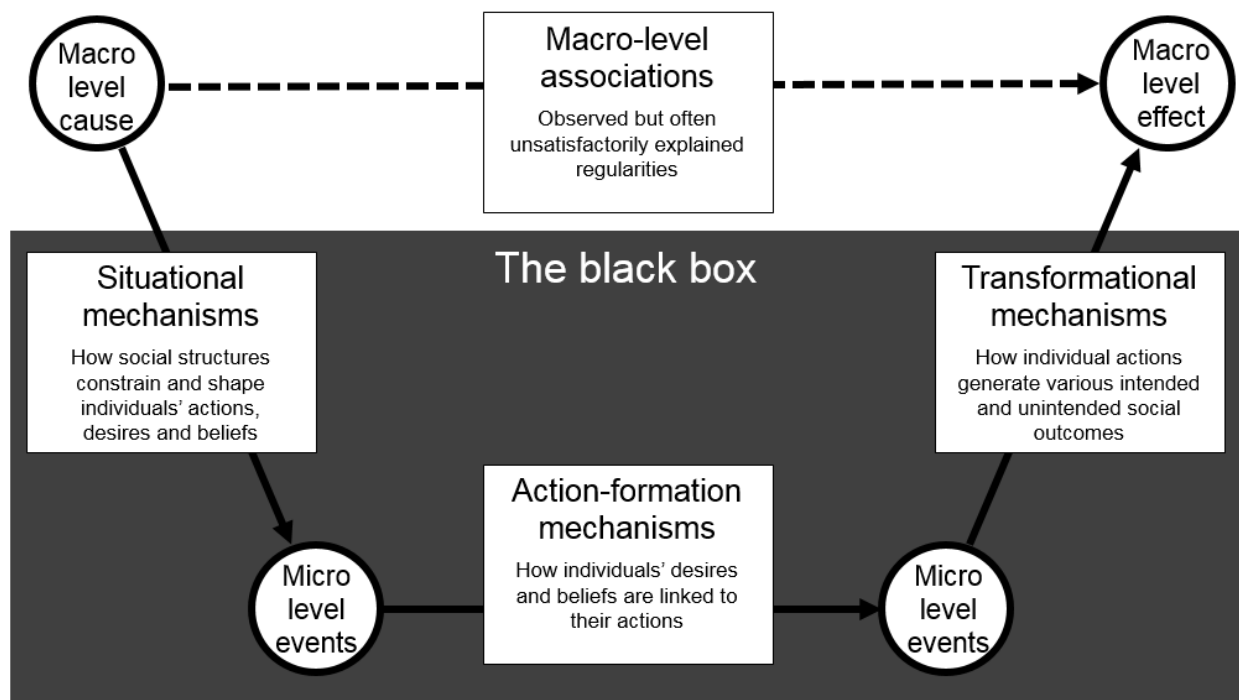


Figure 4. Coleman's boat outlining macro- and micro level social mechanisms. Deep understanding requires opening up the black box of micro-level events and mechanisms generating the macro-level observations (adapted from Hedström and Ylikoski, 2010, p.59).

Methodology

The research design in this article was based on both a qualitative and a quantitative approach, i.e. a mixed methods approach. A quantitative approach was used to capture students' emotional events in three different learning environments, viewing these emotional events as signs of relevancy and valid starting points for comparison and further inquiry. A mobile app was designed and subsequently honed for this purpose throughout a series of studies over a period of three years from 2012 to 2015 (see primarily Lackéus, 2013; Lackéus, 2014; Lackéus and Sävjetun, 2014).

The data collected with the quantitative app-based approach was fed into a more qualitative phase where interview respondents as well as topics to discuss were chosen largely based on app reports made during a period of two and a half months. This could be regarded as an app report based sampling strategy as well as an app-induced interview template. These two key methodological steps have been shown to act as amplifiers, increasing the signal to noise ratio of subsequent steps in the research design. Choosing interviewees and issues to discuss with them based on relevancy allowed the qualitative research phase to focus on the most relevant aspects of what teachers and students were experiencing in the three learning environments studied. Coupled with a multi-site research design it increased the possibility to identify and contrast theoretically relevant and coherent mechanisms in terms of if, how, when and why teachers succeeded in developing their students' entrepreneurial competencies.

Given the purpose of studying when entrepreneurial education works well in primary education, this study employed a five-step "extreme case" sampling strategy (Flick, 2009, p.122). In the first step SNAE sent a request to 30 key people of their choosing around Sweden asking them to propose learning environments where entrepreneurship had been particularly well integrated into compulsory education. The answers received were evaluated by the research team who independently from SNAE selected three municipalities to study more in-depth. These three selected municipalities had all received financial support from SNAE

and expert support from one of three different leading support actors; a university, a non-profit foundation and a privately owned consultancy firm. All three support actors had been involved in many projects around Sweden financed by SNAE. Each of the three chosen municipalities represented a prime success case of one of the three support actors.

In the second step the three municipalities were asked to propose one school each that constituted a particularly good example of entrepreneurial education. In the third step the principal of that school was asked to propose a particularly entrepreneurial class to study during a semester. Table 2 outlines some basic facts about the three selected classes. All 83 students of these classes were asked to use a mobile app to report any education related emotional events they experienced during the fall of 2014, positive as well as negative emotional events. In the fourth step 25 of these students were selected for interview based on which students reported interesting and relevant emotional events in the mobile app. In the fifth step 17 of these 25 interviews were selected for transcription based on relevancy for this study.

Table 2. Basic information about the three classes studied. The table shows similarities and differences between the three classes.

School	Student age	Age structure	# of teachers	# of students	Subjects taught by the teacher(s)	App hardware used
1	10-11 years old	Age homogeneous	1	17	Geography, Social sciences, Religion, History, Swedish, English	iPads
2	15-16 years old	Age homogeneous	1	16	Geography, Social sciences, Religion, History, Spanish	Laptops and students' own smartphones
3	10-13 years old	Age mixed	5	50	All subjects were taught by the teacher team.	iPads

Quantitative approach – a mobile app for students and teachers

Already in the 1970s, psychology researcher Mihaly Csikszentmihalyi used short surveys to capture respondents' experiences directly in their natural environment, attempting to capture the "flow" of everyday experience (Hektner et al., 2007). This method is called "Experience Sampling Method" (ESM) or "Ecological Momentary Assessment" (EMA) (Stone et al., 2003). By capturing subjective experiences with a previously unattained precision, a high level of validity was obtained by combining "the ecological validity of naturalistic behavioral observation with the nonintrusive nature of diaries and the precision of scaled questionnaire measures" (Hektner et al., 2007, p.7). Today the availability and widespread use of smartphones has drastically reduced the distribution and management cost of the ESM approach to capturing human experience (Conner, 2013).

In traditional ESM the respondents are given random triggers to complete a short survey. In the method used here, the respondents decided themselves when to make a report. An advantage is that it is less intrusive and opens up for following respondents over longer periods of time than the usual 2-3 weeks in traditional ESM studies. A disadvantage is the risk for reporting fatigue and an introduced subjectivity in which events are captured or not captured, depending on habits and moods of respondents. An important part of the three-year app development phase preceding this study has been to identify strategies to reduce such risks. Students have stated that when they get periodical reminders to make reports (in class, through the app and/or through e-mail), when time is set aside in class to make reports and when there are multiple teachers to send their reports to, it increases the likelihood that students will send reports continuously.

The short survey that was used in this study is shown in Figure 5. It started with asking the respondent student to first give a short description of what happened. Then an emotional categorization was made with a seven-step likert scale from -3 to +3. The respondents were asked to categorize the experience in

accordance with a set of meta-data tags shown in Figure 5. Meta-data tags allowed for comparison and contrasting, as well as facilitated further qualitative analysis. Finally the app report was sent to a chosen teacher, either with student name attached or anonymously, making it visible to the teacher but not to fellow students. All reports were also made available to the research team, in accordance with written consent given by all participating students' parents. When receiving a report, the teacher could then interact with the student through a chat functionality integrated into the app (also with anonymous students), allowing the app to become a tool for daily student-teacher interaction as advocated by Lineback (2015) and others. All participants in the study were shown a 4-minute video outlining purpose of the study, how the app worked, when to use it and what benefit it could yield for the students.



Figure 5. Short survey used in this study. Screenshots from the app instrument, showing free text field, the seven grade likert scale of student's current emotional state, choice of recipient teacher and all 36 different meta-data tags available to choose from. Screen on the left shows a new thought reported by a student. Middle screen shows a new activity reported by a student. Screen to the right shows a new feeling reported by a student.

Qualitative approach – students and teachers

The purpose of the interviews was to uncover links between instructional design, triggered emotional events and resulting entrepreneurial learning outcomes. Each interview was prepared by compiling a summary of the most interesting and relevant app reports made by the student. A semi-structured approach was used for the interviews; introduction to the study (5% of time), general lessons learned by the student (10% of time), app-induced questions around specific emotional events (50% of time), other crucial events in general (20% of time), what had motivated them (5% of time), similarities and differences between this and other learning environments (5% of time) and important decisions made by the student lately (5% of time). Each time an emotional event was discussed, the student was immediately and repeatedly asked to connect that event to any learning outcomes in terms of developed knowledge, skills and attitudes. These linkages between events and learning were later harvested in the coding procedure. Each interview was around 45 minutes

long and was recorded and transcribed verbatim. In total 25 interviews were recorded, and 17 of these were transcribed for further analysis.

One teacher from each class was also interviewed using a semi-structured approach. Topics covered were teacher's approach to student development and learning, teaching methods applied during the fall term and teacher's own experiences of the fall term in terms of app usage, challenges, motivational factors, student influence and surprises. All three teacher interviews were recorded and transcribed verbatim.

Analyzing the data

All of the transcribed data from teacher interviews and student interviews was analyzed with interview coding software NVIVO. Open coding as well as axial coding was applied (see Corbin and Strauss, 1990, p.98). Two theoretical frameworks were applied¹; one for emotional events and one for resulting entrepreneurial competencies. The emotional events coding framework was a development of a framework constructed by Arpiainen et al. (2013). The entrepreneurial competencies framework was a development of a framework constructed by Fisher et al. (2008), and elaborated based on a number of different sources (Lackéus, 2014; Moberg, 2014a; Moberg et al., 2014; Leffler et al., 2010; Regeringskansliet, 2009). The coding frameworks were developed further by taking into account previous studies conducted with the same methodology (Lackéus, 2014; Lackéus and Sävjetun, 2014; Lackéus, 2013), and by tentatively coding all interviews and discussing the outcome within the research team.

After having coded all interviews, a number of tables were generated that could support the analysis, see overview in Table 3. While tables give a general overview of data and links in the data, they cannot replace in-depth qualitative analysis of patterns, particular mechanisms and the creative search for theoretical and generalizable insight. They were merely the entry point of deep analysis. Therefore, all generated tables informed a subsequent phase of thematic analysis of different teaching methods deemed entrepreneurial, surfacing in the collected data. They were identified by searching for salient themes in the app reports, and then analyzed using a spider diagram framework for value creation focused entrepreneurial education (Figure 6), abductively developed for the purpose of this study from literature and previous research on value creation in entrepreneurial education (Lackéus, 2016). The selection criteria applied were that each teaching method had to trigger frequent emotional reactions among the students as measured by the app instrument, and that they had to be aligned with at least some of the dimensions in the spider diagram in Figure 6.

¹ Due to limited space here, the complete list of codes and working definitions used when coding are not given here. They are available upon request to the corresponding author.

Table 3. A summary of six tables used for analysis. Six tables that were prepared in order to be able to enter the final creative phase of data analysis and theoretical generalization.

Table type	Origin	Purpose in analysis
Number of app reports per meta-data tag	App instrument	Showed what kinds of events were common, less common and rare according to the app reports made in the different learning environments.
Particularly interesting app reports by students and teachers	App instrument	Showed some of the most interesting app reports made by participating students and teachers in the different learning environments.
Number of occurrences per emotional event in interviews	Coding software	Showed what kinds of emotional events were common, less common and rare in the different learning environments according to the interviews conducted.
Number of occurrences per entrepreneurial competency	Coding software	Showed what kinds of entrepreneurial competencies were common, less common and rare in the different learning environments according to the interviews conducted.
Interaction matrix between emotional events and entrepreneurial competencies	Coding software	Showed salient and less salient links between emotional events and developed entrepreneurial competencies.
Most common links between emotional events and entrepreneurial competencies	Coding software	Showed which links were the most common in the data. Also showed which links were less common.

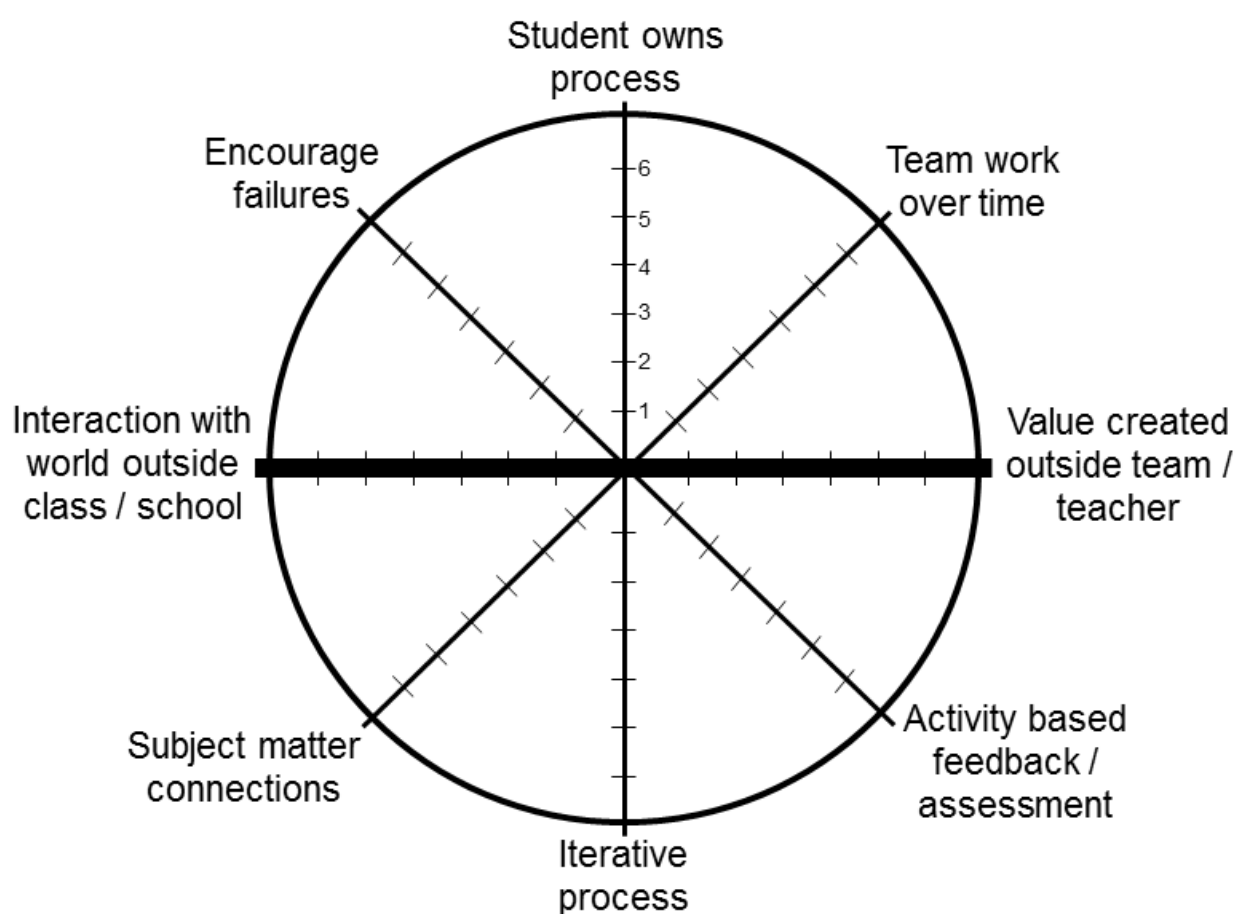


Figure 6. Spider diagram for eight key aspects of value creation as entrepreneurial pedagogy. Analysis framework developed for the purpose of analyzing different instructional designs encountered in the study.

Findings

Findings from quantitative app approach

The two and a half months of app usage generated 1058 app reports from the 83 respondents. School 1 and 3 generated 48% each of the app reports, whereas school 2 generated only 4% of the app reports. Table 4 shows that the more explicitly entrepreneurial report types were rare among the 1058 app reports made.

Table 4. Frequency of different kinds of app reports. Number of reports in hyphen. Particularly entrepreneurial meta data types in bold, showing that while the studied schools were full of joy, creativity and group work, it was rare for the students to experience particularly entrepreneurial events such as uncertainty, interaction with outside world and creating value to others.

Frequency	Metadata type in app (number of reports done)
Frequent	Other thought (205), Other feeling (161), Other activity (142), Joy (129), Creativity (62), Group work (43)
Not as frequent	Got to think independently (35), Got a new good idea (34), Used knowledge in practice (28), Stress (27), Confusion / frustration (25), Used my experience (24), Took initiative / responsibility (21), Gained confidence (15), Tried own idea (13)
Rare	Uncertainty / risk (10), Group belonging (9), Managed something difficult (9), Ownership – "mine" (9), Helped someone (8), Not allowed to decide myself (7), New thoughts about myself (7), Convinced someone (6), Responsibility / hard work (5), Allowed to decide myself (5), Contact outside school (4), Appreciation outside school (4), Group conflict (4), Took important decision (3), Group differences (3), Relevance / meaning (3), Presented in front of others (2), Insight from group (2), Thought about person outside school (2), Initiative (1), Presented outside school (1)

Table 5 shows a number of app reports deemed to be particularly interesting and / or typical. The large variance in content shows how the app captures a wide variety of positive as well as negative experiences within and outside the classroom.

Findings from qualitative interviews and analysis approach

The coding procedure of the 17 student interviews showed that common emotional events among the students were related to putting theory into practice (64 occurrences coded), overcoming competency gaps (62 occurrences coded) and working in teams (59 occurrences coded). Other common emotional events were uncertainty / confusion, time pressure and leadership over oneself (40 occurrences each coded). Some typical entrepreneurial events were much less common, such as creating value for others (18 occurrences coded), interacting with outside world (10 occurrences coded) and support from outside of learning environment (4 occurrences coded). The typical entrepreneurial events frequently found in previous studies applying the same methodology (Lackéus, 2014; Lackéus and Sävetun, 2014) were thus much less frequent in this study, indicating that these were not particularly entrepreneurial learning environments when compared to other settings studied.

When exploring frequencies of different kinds of developed entrepreneurial competencies in the coded interviews, common competencies developed included general passion (41 occurrences coded), school subject knowledge (30 occurrences coded), general self-insight (27 occurrences coded) and interpersonal / leadership skills (25 occurrences). Explicitly entrepreneurial competencies were less frequent, such as innovativeness (8 occurrences coded), entrepreneurial self-efficacy (5 occurrences coded), perseverance (5 occurrences coded), marketing skills (4 occurrences coded), entrepreneurial passion (2 occurrences coded) and entrepreneurial identity (1 occurrence coded). The most common explicitly entrepreneurial competence developed in the interview material was entrepreneurial self-insight (22 occurrences coded), defined in the

coding framework as insights from value creating activities fundamentally changing the student's view of him- or herself.

Table 5. A selection of illustrative app reports. Each report has been categorized by the students into one of 36 different metadata types as well as graded emotionally by the students with a Likert scale from -3 to +3. All personal references are concealed in the table.

Text	Feeling	Metadata type	Research team comments
"It tingles in the stomach!"	0	Other feeling	App reports in connection to tests. Shows that test anxiety is captured by the app instrument, which illustrates validity of the methodology.
"Vocabulary test now"	+1	Other feeling	
"Nervous - soon to get test results"	+2	Other feeling	
"Fun to be assessed by a friend!☺"	+3	Other feeling	Peer assessment can lead to positive feelings.
"Chaos in the classroom"	-1	Other thought	The ensuing discussion showed that the teacher was out for a while, showing that the app gives the teacher information perhaps otherwise missed.
"At the fruit break I comforted a person who was sad ☹"	-2	Helped someone	Student that creates value for another person, and categorizes it with a relevant metadata.
"A guy from the newspaper came and took photos."	+3	Contact outside school	One of very few moments when students meet people from outside school. Was due to app usage.
"It's fun to write about my family!"	+2	Creativity	Many app reports were about this assignment type. This is one example.
"Barely had time to do anything because [another student] needed to write everything and was quite annoying today ☹"	-2	Group differences	One of very few app reports about group differences.
"It's fun with talk-english"	+3	Joy	One of 12 app reports about talk-english being fun.
"Talk english"	-2	Group work	Two app reports where talk-english generates negative feelings.
"This was a really fun app, I don't want to log out of it I'm on it all the time it really was a great app ☺"	+3	Other thought	Many students write positively about using the app.
"The space theme will be really fun and exciting ☺"	+3	Joy	A student happy about upcoming space theme.
"I long for the school team! I have started to become pretty good at floorball now"	+1	Managed something difficult	Sports / physical education is a common theme in the app reports. It triggers many feelings, both within and outside school settings.
"It feels really good to help them to do research on this app ☺☺"	+3	Creativity	Many students were very positive to participating in the study, but they often interpreted it as a study of the app, not of entrepreneurial education.
"Anonymous is cool ☺☺☺"	+3	Creativity	Many students were very positive to the possibility to send anonymous app reports.
"It's not quiet in the classroom, I can't concentrate"	-2	Stress	Many app reports were about students being negative to working environment disturbances.
"Hello [teacher]! Can I take care of the warm-up on physical education today ☺"	0	Took initiative / responsibility	One of very few app reports on student initiative.
"Letting us build space ships and skip a lot of good lessons today is really bad!"	-3	Other thought	Not all students were positive to creative assignments.
"It was very smart of you to introduce a grammar training section in last week's word test"	+2	Joy	Students frequently took the opportunity to give their teacher some feedback on the teaching. When they did, they often chose to be anonymous.
"Why don't you treat all students equally??"	-2	Confusion / frustration	Sometimes the critique from student to teacher was very tough. Teachers almost always chose to respond through comments.

Based on the coded emotional events and the coded developed entrepreneurial competencies, an interaction matrix was constructed consisting of 1204 links between emotional events and developed (more or less) entrepreneurial competencies, see Table 6. This matrix shows that applying theory in practice (154 links), teamwork (150 links) and overcoming competency gaps (142 links) were the most frequent sources of learning, frequently resulting in the development of general passion / motivation (120 links), social skills / leadership (118 links), school subject knowledge (113 links) and entrepreneurial self-insight (112 links). Links that were frequent in previous studies using the same methodology were rare in this setting, indicating again that the learning environments studied here were perhaps not as entrepreneurial as expected. For example, occurrences of students interacting with outside world leading to developed entrepreneurial competencies were rare (22 links).

The test coding of the 17 interviews resulted in several minor developments of both the emotional events coding framework and the entrepreneurial competencies coding framework. Due to the frequent occurrence of more traditional teaching in this study, a clear distinction had to be made between explicitly entrepreneurial competencies and more traditional competencies, such as for example distinguishing between entrepreneurial versus general knowledge, self-insight, self-efficacy, skills and passion (see Table 6). To be able to code many of the emotional events that are frequent in a traditional learning environment, some more codes for emotional events were also added, such as *reflective interaction with teacher*, *information from outside world* (as opposed to *interaction with outside world*), *break or spare time*, *grades*, and *create value for oneself*.

Six identified instances of entrepreneurial teaching methods

Applying the selection criteria outlined above, the research team identified six teaching methods designed by the teachers that to varying extent could be deemed entrepreneurial. They constituted exceptions from a predominantly traditional teaching approach where teachers dictated what to do, what to learn and how to learn. Teachers interviewed explained this by stating that students expect to be served ready-made assignments and often protest when they are required to think for themselves. Some of the six teaching methods found were embedded into core curriculum whereas others were of a one-off and more separate nature. The six identified teaching methods were evaluated by the research team by relating the collected data qualitatively on each of the eight dimensions in the spider diagram in Figure 6, giving from one up to seven points to each teaching method on all eight spider dimensions, resulting in a matrix shown in Table 7. The six identified teaching methods are briefly outlined below.

Talk-English - 71 app reports generated

In “Talk-English”, the teacher let students from two classes work in teams to create a theater play every week for an entire academic year. The students practiced their English skills by producing phrases and delivering them in front of an audience. First in front of two teachers, later in front of their own class and towards the end in front of a different class. They iteratively improved the theater play every week, and worked in the same team for an entire year. Several students expressed a strong desire to create a positive experience for the audience. They stated that they trained themselves to dare more, to learn from each other and to use their creativity. A student said:

"Talk English is the best, it's great fun. (...) You learn more when you get to work in a group and when you get to write [the play] yourself. (...) You have like [name of a fellow student] whom I worked with now, she knows a lot of English, then you can ask her if you don't know. Then it gets easier too, you don't have to Google everything"

	K - Declarative knowledge (entrep.)	K - (School subject) knowledge	K - Procedural knowledge	K - (Entrepreneurial) self-insight	K - General self-insight	S - Learning skills	S - Marketing skills	S - Opportunity skills	S - Resource skills	S - Social skill (leadership)	S - Strategic skills	S - (School subjects) skill	S - Relationship to friends	S - Study skills	S - Collaborating skills	A - Entrepreneurial identity	A - Entrepreneurial passion	A - Entrepreneurial self-efficacy	A - Innovativeness	A - Perseverance	A - Proactiveness	A - Uncertainty tolerance	A - General passion (motivated)	A - Made an important decision	X - Other	A - Self-Efficacy in general	A - Self-esteem	
C - Individual differences	1	4	2	13	10	1	2	0	1	17	6	2	7	0	4	0	0	1	0	1	5	5	5	3	1	1	0	92
C - Leadership and managing people	0	1	0	3	1	0	0	0	0	9	0	0	0	1	1	0	0	0	0	2	2	1	0	2	0	0	0	23
C - Team-work experience	4	10	3	18	5	3	4	0	4	18	7	11	2	10	6	0	1	5	6	2	6	9	11	0	3	2	0	150
L - Information from outside world	0	7	0	0	1	0	1	0	0	1	2	2	4	1	1	1	1	0	0	0	0	0	5	0	0	0	0	27
L - General encouragement from teachers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	5	8	0	1	2	3	0	0	0	0	22
L - Getting feedback on own performance	1	2	1	4	2	1	1	0	0	3	0	5	1	2	1	0	1	3	5	0	2	2	4	1	1	0	0	43
L - Grades	0	3	0	2	4	2	0	0	0	1	6	1	0	1	1	0	0	2	0	1	0	0	6	4	0	0	0	34
L - Reflective interaction with teacher	0	0	0	0	2	0	0	0	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	7
L - Support from outside learning environment	0	2	0	1	1	2	0	0	1	0	2	1	0	0	0	1	2	3	4	0	1	0	1	0	1	0	0	23
L - Theory versus practice	4	17	2	16	6	5	4	0	4	13	9	14	0	11	4	1	2	3	3	2	8	6	15	0	3	2	0	154
L - Uncertainty in learning environment	2	5	1	15	3	6	2	0	2	12	7	5	1	5	4	0	0	0	0	2	7	10	4	0	2	0	0	95
L - Break or spare time	0	0	0	1	7	0	0	0	0	3	0	0	6	1	0	0	1	0	0	1	0	2	0	2	1	0	0	25
T - Interacting with outside world	0	1	0	2	0	0	3	0	0	3	0	1	0	1	0	0	1	3	0	1	1	0	4	0	1	0	0	22
T - Leadership over oneself	2	12	1	9	8	3	0	0	0	5	10	4	0	3	2	1	1	0	7	2	6	7	14	5	1	2	0	105
T - Meaningful, create value for oneself	1	11	0	3	11	1	0	0	0	2	4	1	1	4	2	1	1	0	1	0	4	2	16	3	2	2	0	73
T - Meaningful, create value for someone else	1	4	2	3	1	0	2	0	1	2	2	6	1	3	2	1	1	2	1	1	1	0	8	0	2	1	0	48
T - Overcoming competency gaps	2	24	1	10	7	4	3	0	2	12	13	15	0	14	2	0	0	0	0	3	6	7	12	1	2	2	0	142
T - Time pressure	2	9	0	10	2	5	2	0	4	9	11	10	0	8	1	0	0	0	0	3	4	6	3	0	1	0	0	90
X - Other	0	1	0	2	3	0	0	0	0	5	1	0	0	0	1	0	0	0	0	0	3	3	8	0	1	1	0	29
	20	113	13	112	74	33	24	0	19	118	80	78	23	66	32	7	14	27	35	19	57	63	120	19	25	13	0	1204

Table 6. Interaction matrix for links between emotional events and developed entrepreneurial competencies. Table was generated in analysis software NVIVO. Grey scales are indicating more frequent links. Emotional events are categorized into C = Collaborative learning, L = New kind of learning environment, and T = Challenging tasks. Entrepreneurial competencies are categorized into K = Knowledge, S = Skills, and A = Attitudes.

The teacher expressed a feeling of positive surprise when reading the app reports, learning just how much emotionality the teaching method generated among the students. The pride around the group's play and the positive feedback from the audience triggered the students to work harder, to improve their vocabulary and to lead the group when necessary. The teacher said:

"Well, this talk-English is so popular, they are very proud of [their plays]. I guess you have seen the app reports too – "my play will be awesome". They are very proud and they get to perform in front of an audience. We have also talked a lot about how you should be like as an audience."

Theme Election - 58 app reports generated

In "Theme Election" the students worked in groups to search for information online in order to do posters about political parties in the upcoming national elections. Then they presented these posters to younger students in their school. Whereas the first part of this exercise was rather traditional in terms of seeking out facts, the second part was an example of value creation for others. The students needed to adapt the message to a younger audience. A student said:

"It was fun (...) You had to teach them stuff about the political party. (...) Yes, I've learned the facts about it and, well, I presented it to them. (...) I learned to talk clearly with them and loudly and clearly show what you are talking about and, you know, we have a poster on it."

This method let students learn how to adapt a message to a different audience. They also received valuable feedback from the younger students about their performance.

Own fairytales - 26 app reports generated

In this method the students were asked to write their own fairytale. Every now and then during the writing process new conditions were revealed that they were supposed to integrate into their fairytale, such as "a guest comes", or "someone throws a party". Afterwards the fairytales were assessed by peer students. The students said they were motivated by their ability to decide independently where to take the story and by the opportunity to use their imagination. The interviews also showed that the students had developed their ability to give and received feedback. A student said:

"It's fun that you get to come up with the story yourself, not just do what [the teacher] says (...) You should preferably [write] so that others understand, so I usually ask [classmate]: 'Do you understand now what I write?' If she says no, I try to change it in the best way"

Crow Drawing - 16 app reports generated

"Crow Drawing" was an assignment in the art lesson where the students repeatedly trained their skills in drawing a crow, giving each other peer feedback in between each attempt. Afterwards the students said that they found it difficult to draw a crow, and also difficult to give constructive feedback in a nice way. Some students felt that they improved their ability to draw, and many students felt that they improved their ability to give and take constructive feedback. A student said:

"It was pretty funny that a friend can say 'this was great, but be sure to do this next time'. It's usually not so often that a friend says 'this was great'. Most of my friends say kind of just 'nice' but now, you were supposed to say positive criticism. (...) I don't know if it will be so much difference from when a teacher says [it], but it feels different."

Theme Future - 13 app reports generated

In "Theme Future" the students worked in a group of 2-3 students with a future oriented theme over a period of two weeks. They could choose between creating an invention for the future, a time capsule, a future movie or present their own future occupation. The theme was interdisciplinary and very appreciated by the

students, generating very positive app reports. Students said that they learned to take initiative, to collaborate, to be more creative and to manage uncertainty. A student said:

“Me and my two buddies made a future film. (...) We have shown it to our class, I think we will show it to [other classes] (...) It was very nervous because we also did a fun version (...) the teacher thought it was good and [classmates] also laughed a bit and said you must show it to [other classes] ... We learned to cooperate and discuss as well. If you fell out (...) then we had to get along together instead”

Rocket project - 11 app reports generated

The students worked in a group project for three weeks targeting sustainable development. Students were to create a rocket that 100 people would stay on for 5000 years. They had to consider things such as rocket design, what to bring, what rules would apply. Then they built a rocket prototype with help from an artist who came to class. Each group presented their finished rocket to younger students at their school. A written report was also handed in. Many students said they enjoyed the project with its many opportunities for practicing collaboration skills, but they also had difficulties understanding the purpose of the practical activities, especially since they were never assessed nor given formative feedback on these activities by the teacher. A student said:

“You could do what you wanted and use the material you wanted, there were no rules. It was very fun. (...) Normally there are always templates to adhere to. But here there were no templates. And it allowed for using your imagination to 100%.”

Similarities and differences between schools

A few similarities and differences between the three learning environments studied are worth mentioning. All schools were public schools on compulsory education level. The students in all schools were from a variety of socio-economic groups in society. All three schools had a principal strongly committed and actively engaged in creating an entrepreneurial school. The development work towards this goal had been on-going for at least five years in all three schools, and they had all received external support in this work. All teachers expressed that an entrepreneurial approach to teaching was part of their everyday work life. None of the studied classes employed an explicit strategy of interacting with the world outside school.

Some differences also surfaced. One school was newly built, whereas the two others were older. Two of the schools worked quite traditionally in terms of teacher directed and separated subject teaching with the occasional theme days. One school had a less common setup in terms of recurring themes spanning 2-3 weeks decided upon in collaboration with the students, followed by deep study periods allowing students to focus on a few subjects in order to reach the targets.

The study's impact on teaching

In one of the schools the teacher expressed that the study and app instrument had broadened the teacher's understanding of what works and what does not work in the students' everyday lives. One teacher finally had reached some students through the use of the app instrument. The teacher also expressed appreciation to get feedback on own teaching practices in real-time in the app. Several new dimensions had become visible. Among other things, the teacher had received information about the students' break situations, which were previously unknown, and which were now easily resolved. The teacher said:

“So headers [i.e. metadata codes] - I have looked a little at them. (...) It has kind of become a small alarm clock in some way triggering me to try to develop my pedagogy.”

A methodological concern observed in the study was that the app instrument did not only measure what happened in the classroom, it also impacted what teachers and students focused on. The meta tags raised questions as to whether they perhaps should focus more on activities triggering the kinds of experiences probed for. From a practitioner point of view this represents a rare opportunity to impact behavior in the classroom. From a research perspective it becomes a potentially problematic source of bias. Still in this study, the problem was rather the reverse in that the learning environments were not deemed as entrepreneurial as advertised and hoped for given the purpose of the study.

Discussion

An interaction deficit in Swedish primary schools - 11 and 13 points in Table 7

Findings illustrate that the most common events that students learned from in the studied settings were bridging knowledge gaps, applying theory in practice and working in teams. This is not unexpected to find in learning environments such as compulsory schools. More unexpected given the extreme case sampling method applied was the almost complete absence of explicitly entrepreneurial events such as interaction with people outside class / school, feedback from people outside class / school and value creation to people outside class / school. This should not be confounded with information from the world outside school, which was common in the studied environments. Data showed that students watched movies, searched the Internet, went to the theater and visited the public bath.

The few occurrences of interaction with the world outside school were almost always caused by the study itself, through events such as meeting app developers taking part in the study and being interviewed or photographed by local media covering the study. Letting students interact with, get feedback from and create value for outside stakeholders is one of the most obvious areas of potential improvement in the studied learning environments. Adding such components to the identified example teaching methods should not pose too much of a challenge to the teachers. It would suffice if the students were challenged to apply their work on one single person outside class / school that the students could choose themselves. Given the strong engagement and deep learning of both entrepreneurial and curriculum specific competencies that interacting with and creating value for people outside their own class but within their own school caused, such a challenge of reaching out to external stakeholders would likely have resulted in even stronger engagement, feelings of relevancy and resulting deeper learning of entrepreneurial as well as curriculum specific competencies for the students. Therefore, if agreeing that the extreme case sampling strategy led the research team to study some of the most entrepreneurial compulsory schools in Sweden, we can conclude by stating two empirically grounded resulting propositions:

P1: If the studied learning environments were as entrepreneurial as compulsory school gets in Sweden, Swedish primary school students rarely get to learn through creating value to or interacting with people outside their own class / school.

P2: Adding assignments where students get to interact with and create value to people outside their own class / school will lead to significantly stronger engagement, feelings of relevancy and deep learning of entrepreneurial as well as curriculum specific competencies among students.

Many of the studied example teaching methods could quite easily have been adjusted in accordance with P2 above. Talk-English could have involved an audience outside school, either digitally through videos or physically through invitations. In Theme Election the teacher could have asked students to teach also people outside their school about the political parties they had gathered facts on. In Own Fairytale students could have been asked to get feedback from people outside their own class or school. Crow Drawing could have

involved people outside school in many ways, for example by asking external people to specify what to draw or by getting feedback from people outside school. In Theme Future the teacher could have asked students to interact with people having the occupation the students saw as a future occupation for themselves, which one of the students actually did through own initiative and received very positive feedback from the teacher for doing. The Rocket Project could have asked students to involve external people to teach them or learn from them about sustainability issues arising in their work with the rockets.

Some good practices of entrepreneurial teaching

The most entrepreneurial teaching method identified through this study was Talk-English. Findings show that this particular method developed students' pride, self-efficacy, creativity, perseverance, self-insight and tolerance for uncertainty. It also developed declarative and procedural knowledge and skills of the English language. The study uncovered a causal mechanism of performing a play in front of an audience leading to self-efficacy and pride, which in turn led to increased motivation to learn more English in order to improve following weeks, illustrating a positive self-reinforcing cycle of learning (cf. Farrington et al., 2012, p.33-35). While such findings might seem trivial in retrospect, the study showed that the teacher was not aware of the strong impact this particular educational design had on the students, in terms of presenting in front of others, working iteratively, learning from failure and working over long periods of time in tight teams. The app instrument thereby became an eye opener for the teacher of what worked for the students in the classroom.

While the findings in this study illustrate the almost complete absence of interaction with and value creation to stakeholders outside school, there are many other dimensions in the spider diagram in Figure 6 that can be found in the example methods identified, constituting examples of good teaching practice that others can learn from. Each of the remaining dimensions in the spider diagram in Figure 6 is discussed below, sorted in order of how many points the research team assigned each dimension in Table 7.

Connecting to the curriculum - 35 points in Table 7

Many of the identified teaching methods illustrate how teachers successfully connected practice-oriented assignments to the curriculum. Talk-English shows how students got an engaging and joyful reason to improve their English knowledge and skills. Theme Election shows how a first part in the assignment of finding facts connected to the curriculum could be made more interesting and relevant to the students by adding a second part where they were required to use this knowledge to create value to younger students in their school. In both Own Fairytales and Crow Drawing the students were asked to give constructive feedback, requiring them to assess their classmates according to goals regulated in the curriculum, thereby increasing their awareness of important curriculum dimensions.

Letting students own the learning process - 30 points in Table 7

Allowing students to own the learning process is common in the studied teaching methods. Findings illustrate how such ownership triggered passion and increased motivation to acquire school subject knowledge. Talk-English gave ample opportunities for students to own the process by letting them improve the play every week and by letting them decide on content of the play. Theme Future allowed for student ownership in multiple steps by first letting students choose one of three main themes, and then letting them choose freely how to work with the chosen theme.

Letting students work in teams over time - 28 points in Table 7

The studied teaching methods show that students were seldom allowed to work over extended periods of time in teams. Apart from Team-English where students worked together for a full year, the teamwork did not extend more than a couple of weeks, if they were at all working in teams. In addition to Team-English, the Rocket Project was a fairly good example of teamwork for at least three weeks, involving many different

kinds of tasks of both theoretical and practical nature. In general, many of the studied teaching methods could have been improved simply by letting the teams work for longer periods of time in order to allow for trust to build up and some kind of value to be created. Such improvements are particularly relevant given that findings from this study show just how powerful teamwork is in terms of generating both positive and negative emotional events that then trigger learning (cf. Sullivan and Wilson, 2015). Such events were shown to trigger self-reflection leading to increased self-insight. They also triggered students to take action by assuming leadership of themselves and / or the group.

Activity and reflection based assessment and feedback - 28 points in Table 7

Some of the studied teaching methods resulted in feedback to the students based on their activities, whereas others were weak in this respect. Team-English is again the most obvious good example, allowing for weekly feedback to the students from different kinds of audiences. The use of peer assessment allowed for feedback to students both in Crow Drawing and in Own Fairytales. Rocket Project rather represented a negative example of perils in omitting feedback, illustrated by many students' mistrust in the value of the various practical activities. Findings show that getting feedback either from teachers, from peer students, from an audience (physical or digital) or from stakeholders outside class / school could have improved many of the methods studied considerably. This is in line with previous research highlighting the value of feedback between teachers and students (Hattie and Timperley, 2007; Gamlem and Smith, 2013; Lineback, 2015). Findings also show how formative feedback during the process contributed to establishing a positive cycle of engagement and deeper learning, especially if combined with the two following dimensions of allowing for failure by letting students work iteratively.

Encouraging failure and iterative work - 24 and 22 points in Table 7

The final two dimensions are interrelated, since working iteratively is a way to encourage failure. If students know they will get another trial they feel less enforced to avoid mistakes, and instead focus on opportunities to learn from feedback in playful ways and improve in the next iteration. Two examples here were Talk-English and Crow Drawing, where a playfulness and permissive environment was established. Giving a new play every week for a year gave ample opportunities to fail forward, as did the drawing exercise. Many of the other methods, such as Theme Future, Rocket Project and Theme Election were examples of single instance deliveries with only one occasion to present the result of the process, thereby eliminating the option to fail. One adjustment that could have improved many of the methods would be to give more time and allow the students to test their delivery on increasingly frightening stakeholders, starting with peer students and then expanding with own teachers, students in other classes and finally presenting for people outside school.

Implications for policy

A recommendation back to SNAE who financed this study can now be summarized. While the findings show that many dimensions deemed entrepreneurial were present in the studied learning environments, there also seemed to be ample room for improvements. Most of the teaching in these allegedly highly entrepreneurial schools was rather traditional, and the six entrepreneurial methods outlined here were more of exceptions in the studied schools. And even the positive exceptions could have been improved significantly if more stringent recommendations and support had been given to the schools. The study also showed a complete absence of letting students learn through interacting with and creating value to stakeholders outside school. Such absence is aggravating, especially given the empirical evidence from this study and others (see for example Lack us et al., 2015), showing strong positive effects of such instructional design on student engagement, perceived relevancy and deep learning, both in terms of developing entrepreneurial competencies and developing more subject matter related competencies. Based on this we posit that SNAE, the support organizations they finance and schools in general need to progress from discussing teacher attitudes to entrepreneurship in education (cf. H rnqvist and Leffler, 2014) to also

discussing more practical aspects of what students can do to learn in a more entrepreneurial way. More specifically, we posit that the two propositions previously articulated could be acted upon. In such endeavors, the spider diagram in Figure 6 used as an analytical strategy here could perhaps be used to support teachers.

Implications for practice

Practitioners in compulsory education levels could be inspired by the good practice examples given here, as well as by the more general recommendations stipulated by the eight dimensions in the spider diagram in Figure 6. The eight dimensions could be used as a checklist when designing new teaching methods and assignments. This study also contributes with empirical evidence for improved learning outcomes resulting from practices often deemed to be entrepreneurial, such as interaction with and value creation to stakeholders outside class or school. This could be useful given that such evidence is often demanded by teachers considering to adopt new practices. According to Elmore (1996, p.24), the best direct evidence is when it can be shown that a new practice actually makes “students learn better”. Due to the inherent methodological challenges in impact assessment of entrepreneurial education outlined in this article, such evidence is scarce.

Outside compulsory education there could also be a value in considering adopting the teaching principles of stakeholder interaction and value creation to others tested for in this study, as well as examining the teaching method examples given here, the more general dimensions in Figure 6 and the two propositions in the discussion section. Entrepreneurial education is often advocated for a wide variety of students of all ages. This study contributes with teaching practices developed in rare higher education settings, now empirically validated in a first step in compulsory education, and potentially useful in preschool, primary education, secondary education, higher education and further education. We posit that the principles, examples, dimensions and propositions outlined here could improve student learning also in business schools where teachers are usually employing a narrow definition of entrepreneurship. They could also be viewed as a response to the call by Roschelle et al. (2011) to develop a scientific basis for how to let students learn to participate in innovation.

Methodological implications and limitations

The extreme case sampling strategy applied in this study leaned on the assumption that key people know where the most interesting examples of entrepreneurial education are located. While this study cannot tell beyond reasonable doubt whether this succeeded or not, an alternative sampling strategy can now be articulated. A survey could be administered widely to many teachers asking them to specify to what extent they work in line with the eight dimensions outlined in Figure 6. Selecting extreme cases to study based on such responses could be a more effective method going forward, removing the potential bias of high-level experts being asked to point out interesting instances of entrepreneurial education. While it is important not to overstate the problem with sample selection bias in qualitative research (Collier and Mahoney, 1996), any strategy able to reduce bias could be useful.

This study has allowed for significant development of the app instrument used. The number of app reports sent to the research team has been considerably higher in this study than in previous studies, increasing the chance of capturing a majority of relevant emotional events that students are experiencing. The large amount of emotional but not entrepreneurial events has also allowed for corroborating the ecological validity of the app instrument. The coding frameworks used have been significantly developed through this study, now incorporating several codes capturing non-entrepreneurial emotional events as well as non-entrepreneurial learning outcomes. A novel approach to identifying and analyzing entrepreneurial teaching methods has also been developed in this study. We posit that the findings generated here show that the methodology developed here represents an emerging opportunity to bridge the rigor versus relevance

challenge raised by Reeves (2011) and Schön (1995). It also seems capable of uncovering causal mechanisms and open up the black box of entrepreneurial learning as discussed previously, thereby contributing to increased understanding of continuous processes as discussed by Sayer (2010).

Some methodological challenges have also arisen in this study. The studied learning environments were not as entrepreneurial as the research team had expected, which initially was perceived as a failure. The app instrument was also initially plagued by technical problems impacting the data collection capacity negatively and slightly lowering the trust from the user base. A weakness of the method used here also impacts the ability to answer the question of how entrepreneurial compulsory education in Sweden is – it relies upon a sampling strategy that is affected by the bias of experts on national level and of principals on municipality level.

Implications for further research

Given the perceived relevancy of this study to other educational settings such as preschool, higher education (including business schools and further education), the methodology developed here could be deployed in such learning environments to generate new insights into how, when and why students learn from entrepreneurial education. Such use is probably not only limited to entrepreneurial education but could represent a new and innovative methodological tool possible to apply to a wide variety of challenges in educational research as well as in entrepreneurship research. The app instrument could for example be administered to practicing entrepreneurs reporting their emotional experiences to a business coach at an incubator, thus allowing an associated researcher to select entrepreneurs to interview and to design individualized interview templates.

One of the purposes of this study was to investigate how, when and why students learn when interacting with and creating value to stakeholders outside school. Given that this kind of learning unexpectedly was absent in the learning environments studied, this purpose remains unexplored and represents an avenue for further research. Such research could yield interesting outcomes, given the illustrative examples that surfaced in this study of students learning by creating value to students in other classes.

Conclusions

This study investigated the impact of entrepreneurial education on 83 students in compulsory education in Sweden. A definition of entrepreneurial education leaning on entrepreneurship as value creation to others was used. This way of learning was rare in the studied learning environments. Still, the few instances when it occurred confirmed that it resulted in strong engagement, perceived relevancy and deep learning of entrepreneurial and subject matter competencies. When students get to present their work to others who value it and benefit from it, the resulting feelings involve pride, increased self-efficacy and passion leading to motivation. If given a time and opportunity to repeat this, the students increase their effort, learn more in-depth and enter a positive self-reinforcing cycle of learning. Findings showed that such a causal mechanism impacting learning can be fostered by letting students work in teams over extended periods of time in an iterative manner. This allows them to dare to fail, interact with outside stakeholders, feel ownership over the learning process and receive valuable feedback not only from teachers but also from peer students and outside stakeholders. Findings also show that not even well-informed teachers in entrepreneurial education principles were fully aware of the power of such a teaching approach.

This study also resulted in development of the technology-based innovative methodology applied and a confirmation that a proxy theory based experience sampling app instrument coupled with qualitative interviews and coding of links between events and learning could help uncovering causal mechanisms of learning, bridge a rigor versus relevancy gap in educational research and help teachers in their daily quest

to better understand what works for their students. This represents an alternative or a complement to the frequent calls for more “gold standard” methods based macro level research in education, employing rigorous randomized controlled field trials but perhaps not always delivering useful results relevant to teachers at work (Cartwright, 2012; Slavin, 2002; Biesta, 2009). Being initiated and financed by a governmental agency, this study thereby represents a response to a call by Noddings (2007, p. 144-145) for more methodological plurality in government funded educational research.

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Paper 4

Bridging the traditional-progressive education rift through entrepreneurship

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Keywords

Entrepreneurial education, educational philosophy, effectuation,
customer development, appreciative inquiry, dualisms

NB: Lackéus is first author. Lundqvist and Williams-Middleton are equal second authors.

Abstract

Purpose – The purpose of this article is to deductively generate a tentatively new educational philosophy by drawing on entrepreneurial tools viewed as psychological tools that people think *with*.

Design/methodology/approach - A rift between traditional and progressive education is first illustrated through five abductively generated dualisms. Conceptual question-based analysis is then applied to determine if and how three entrepreneurial tools could contribute to bridging this rift; effectuation, customer development and appreciative inquiry. Finally, generalizations are drawn from this conceptual analysis.

Findings – Patterns in the conceptual analysis motivated the articulation of an overarching educational philosophy – *learning-through-creating-value-for-others*.

Research limitations/implications – Even if entrepreneurial tools could be useful for teachers, the linguistic form plays a key role. The tools arguably need to be contextualized in order to be adopted more widely in general education. An educational philosophy grounded in entrepreneurship could also lead to a value clash in education due to its capitalist connotation.

Practical implications - The tentatively new educational philosophy has been shown capable of bridging five dualisms in education causing major problems for teachers in their daily practice, and to remedy teacher challenges, such as complexity, lack of resources, assessment difficulties, and student disengagement.

Originality/value – A value creation focused educational philosophy has arguably not been proposed before. Contrasted to existing educational philosophies it goes beyond a *learning-through* approach to also emphasize *creating-value-for-others*. This could facilitate bridging between traditional and progressive education, one of the most important challenges in education. It could also be used to facilitate infusing entrepreneurship into general education.

Introduction

Infusing entrepreneurship into primary, secondary and tertiary education has been high on the agenda for policymakers during the last decades (Mahieu, 2006, Rosalinde-Hofer et al., 2010). Some stated effects include job creation (Hindle, 2007, Jones and Iredale, 2010), economic growth (Kuratko, 2005), development of key competencies (Henry et al., 2005, Hytti and O’Gorman, 2004), increased school engagement (Moberg, 2014) and increased ability to address societal challenges (Rae, 2010, Volkmann et al., 2009). Competencies commonly deemed entrepreneurial include knowledge about how entrepreneurs create value; skills in marketing, resource acquisition, and opportunity identification; and attitudes such as entrepreneurial passion, self-efficacy, pro-activeness and perseverance (Fisher et al., 2008, Mitchelmore and Rowley, 2010). The stated effects have however proven difficult to achieve in practice, given both generic challenges when changing educational practice (Fullan, 2007) and more specific challenges when instilling entrepreneurship into education. Common specific hurdles include lack of resources, teachers’ fear of commercialism, impeding educational structures, assessment difficulties, and lack of definitional clarity (Bennett, 2006, Johannisson, 2010, Surlemont, 2007).

Whereas a narrow definition of entrepreneurship, viewed as creating a venture and becoming an *entrepreneur*, is suitable only for a small fraction of the student population, a wider definition of entrepreneurship, aimed at making people become more *entrepreneurial* in general, has potential to be relevant to a majority of students in the educational system (Draycott and Rae, 2011, Fayolle and Gailly, 2008, Jones and Iredale, 2010, Williams Middleton, 2013). Research on adopting such a wide definition of entrepreneurship to general schooling and education is very limited. The main aim of this article is to introduce an educational philosophy and associated educational tools that help substantiate wide-spread hope and expectation of more entrepreneurship into the curriculum. An educational philosophy is here viewed as a belief-based and coherent set of articulated prescriptive propositions offering normative advice to primarily teachers on *what* to do, *how* to do it and *why* (Burbules and Raybeck, 2003, Curren, 2008, Dewey, 1938, Frankena, 2003).

This article proposes that entrepreneurship can facilitate bridging the rift between traditional and progressive education, described as “one of the greatest challenges in teaching” (Darling-Hammond, 2012, p. 189). In many cases, entrepreneurial education has been seen as yet another form of progressive education, with difficulties gaining ground in a school system firmly resting on more objective and measurable formats. Instead, this article posits that entrepreneurship should be interpreted as ‘creating value for others’ (cf. Bruyat and Julien, 2001) and include tools that help achieve both objective norm-based learning and subjective experiential learning. Three entrepreneurial tools – effectuation (Sarasvathy, 2001), customer development (Blank and Dorf, 2012) and appreciative inquiry (Cooperrider et al., 2008) – stemming from entrepreneurship are presented and argued to bridge the rift between traditional and progressive education.

The article will first focus on the rift between traditional and progressive education, including how it is addressed in philosophy and general education, as well as in existing forms of entrepreneurial education. Next, analytical methods are introduced to first better understand the rift through five dualisms, and then analyze if and how entrepreneurial tools could bridge the rift. Then, the article outlines and discusses how the entrepreneurial tools contribute to bridging the dualisms while also

addressing potential challenges. Finally, the analysis is synthesized into an overarching educational philosophy – ‘learning-through-creating-value-for-others’ – which is illustrated through a set of practical questions.

While presented as a conceptual article, many of the ideas outlined have emerged abductively through the authors’ active participation in empirical settings. Three of these settings are outlined in Appendix 1. With a focus on what might be, Peirce (1998, p.216) has stated that abduction is “the only logical operation which introduces any new idea”, in contrast to induction which outlines what “actually is” and deduction which outlines what “must be”. Given the often non-linear and idiosyncratic nature of abductive processes, a linear deductive write-up has been applied here in order to facilitate scholarly reading and scrutiny (Dubois and Gadde, 2014, Van Maanen et al., 2007).

A rift of dualisms and its bridging

For the purpose of this article, a rift is defined as a combination of multiple dualisms illustrating a fundamental divide between competing perspectives. The rift between traditional and progressive education can be traced back to ancient Greek philosophy. The distinction between the immaterial mind and the material world has survived to present-day as an integral part of contemporary Western philosophy, epistemology and culture (Biesta and Burbules, 2003). This foundational idea of a dualism between mind and matter has formed the premise for many other dualisms: facts versus values, objective versus subjective, theory versus practice, thought versus action, individual versus social, structure versus agency, etc. (Sayer, 2010).

Dualisms can be useful as a means to explain and classify our life world (Egan, 2002). Both Dewey (Noddings, 2007, p.24) and Descartes (Easton, 2013, p.24) used dualisms as a methodology to keep things experienced as united more conceptually distinct. But dualisms also serve as a root cause of significant troubles in education. Many common views on learning appreciate only one side of the educational rift, for instance stating that the “best” learning resides in the mind rather than in the body, that rational knowledge-based thinking is superior to “irrational” feeling, or in a reverse manner, that the only valid learning comes from practical experience, or that teachers should refrain from guiding their students (Hager, 2005, Kirschner et al., 2006, Pring, 2012, Roth and Lee, 2007). One-sided perspectives can prove problematic, such as more traditional views neglecting that which is intersubjective and relational (Sayer, 2010), or more progressive views neglecting basic characteristics of human cognitive architecture in their downplaying of explicit instruction (Kirschner et al., 2006). Such one-sidedness risks missing out on the value provided by the other side, as well as the critical integration of both sides.

Educational philosophies illustrating the rift

Two contrasting philosophical positions – objectivism and subjectivism – have influenced different educational philosophies (Pring, 2010), and underlie the main rift between traditional and progressive education. Objectivism states that reality is a given and that it is possible to obtain “real” and objective knowledge about “truths” independent from humans observing the world; while subjectivism states that reality is imagined and constructed by humans, and therefore all knowledge is personal and subjective (Cunliffe, 2011, Núñez, 1997).

Anchored in objectivism, traditional education emphasizes a teacher centered approach, and centers on lecturing, memorizing, repeating and testing (Cuban, 2007, Pring, 2010). Anchored in subjectivism, progressive education emphasizes a student centered approach, and centers around active project work, problem based learning and social team-based learning (Jonassen and Land, 2000, Labaree, 2012, Tynjälä, 1999). The polarized discussion between traditional and progressive education was initiated in the 18th century when Rousseau (1762/2003) published his book “Émile or Treatise on Education”, exposing the “fundamental conflict between forming the citizen and forming the individual” (Egan, 2008, p.23). In the ongoing debate between competing perspectives, traditional education has remained predominant in practice (Labaree, 2005, 2012). A main reason for this dominance, according to Labaree, is that traditional education constituted a message more appealing to people in power and with more convincing quantitative test results.

Teachers are often left with the two “equally unattractive options of inhuman rationality and human irrationality” (Biesta and Burbules, 2003, p.21), forcing them to navigate between the rigidity of traditional education and the vagueness of progressive education (Egan, 2008). Research has shown that the choice many teachers opt for can be described as “hugging the middle” between these extremes, blending and creating hybrids of the two educational philosophies, albeit with strong emphasis on traditional education (Cuban, 2007). Teachers have had to find their own personal approaches for dealing with the rift, following the curriculum of standardized subject matter while at the same time attending to individual students’ differing “interests, abilities, starting points and pathways” (Darling-Hammond, 2012, p.40). As teachers are faced with such continuous management of multiple “chronic educational dilemmas” (Labaree, 2012, p. 157), a solution that has been proposed is to provide new “concrete tools and practices” (Darling-Hammond, 2012, p.37) which can bridge the rift between traditional and progressive education, rather than yet another version of one or the other. Entrepreneurial education employing a wider definition of entrepreneurship holds such promise.

Entrepreneurial education

In an attempt to unify the educational field of entrepreneurship, the term entrepreneurial education has been proposed (Erkkilä, 2000). This term includes the more narrow term *entrepreneurship education* focused on developing competencies specific to setting up a new venture or business, i.e. preparing people to assume the role *entrepreneur*. It also includes the wider term *enterprise education* defined more broadly as developing competencies necessary to generate and realize ideas, i.e. preparing people to be more *entrepreneurial* in their everyday life (Pittaway et al., 2011, QAA, 2012). Research on entrepreneurial education is primarily emphasizing progressive education dimensions. Examples include proposing active, process-based, collaborative, experiential and multidisciplinary approaches to differentiate from passive, content focused, standardized and single-subject based approaches more often found in traditional education (see for example Cotton, 1991, Kirby, 2007, Ollila and Williams-Middleton, 2011, Wing Yan Man and Farquharson, 2015).

To summarize, the traditional versus progressive rift in education has been traced back to ancient Greek philosophy and found to posit a major challenge for teachers to date. When aiming to infuse entrepreneurship into general education, teachers risk ending up in a challenging cause together

with marginalized progressive approaches. This article instead focuses on attempting to bridge this rift, with potential implications for the educational system in general. The rift is dissected into a set of dualisms (Sfard, 1998) and then tools are presented which could be applied to solve the challenges these dualisms pose by infusing entrepreneurship into education. Key questions are: what are the key dualisms to be bridged, and what entrepreneurial tools could be functional to bridge them?

Deriving relevant dualisms

The disentanglement of a fuzzy lifeworld into dualisms is a philosophical clarification method championed by the likes of Plato, Descartes and Dewey (Easton, 2013, Lavazza and Robinson, 2014, Noddings, 2007). Plato disentangled our lifeworld into perceivable objects such as a tree, and immaterial entities such as souls, forms and universal knowledge (Gerson, 1986). Descartes disentangled the human experience, keeping conceptually distinct attributes of the mind from attributes of the body (Easton, 2013). Dewey (1938) disentangled the educational experience of the student into what is now labeled traditional and progressive education. In order to infuse entrepreneurship into education, there is a need to further disentangle the traditional - progressive education rift. Further disentanglement allows for breaking down the rift into more specific and manageable everyday challenges faced by teachers and students in their educational experience.

Such disentanglement however requires not getting lost in separation as so often is the case in education. This article therefore aims to assert that entrepreneurship as manifested through entrepreneurial tools could help bridge the rift between traditional and progressive education. To qualify entrepreneurial tools that motivate a tentatively new “*learning-through-creating-value-for-others*” educational philosophy, the article first deduces a framework of dualisms illustrating the educational rift (see Figure 1). This generates solvable questions which can be applied to teaching situations, and utilize the tools proposed. Doing this allows for appreciation of the extent to which a dualism is resolved, i.e. addressing concerns on both sides of the rift. Finally, the article concludes with a theoretical foundation qualifying the type of tool suggested is presented, followed by proposal and motivation of three entrepreneurial tools which are argued to bridge the rift.

Deriving five key dualisms

Five dualisms are derived from literature to represent different aspects of the educational rift between traditional and progressive education (see summary in Figure 1). These dualisms are formulated to capture both sides of the rift equally, using neutral language to avoid normative preference for either side. While these dualisms were originally abductively generated, they are deductively derived here.

TRADITIONAL EDUCATION — PROGRESSIVE EDUCATION

Simplicity vs Complexity

A reductionist and simplistic perspective	vs	A holistic and systemic perspective (Deshpande, 1983; von Bertalanffy, 1972)
Standardized single-subject education	vs	Preparing for multidisciplinary and complex tasks (Tynjälä, 1999)
Single-subject based learning about entrepreneurship	vs	Multidisciplinary learning through entrepreneurship (Cotton, 1991)

Individual vs Social

Reality a concrete structure	vs	Reality a social construction (Cunliffe, 2011)
Individual information processing based learning	vs	Social interaction based learning (Jeffrey and Woods, 1998; Egan, 2008)
A focus on know-that	vs	A focus on know-who and know-how (Cotton, 1991)

Content vs Process

Linear concrete processes	vs	Iterative situated processes (Cunliffe, 2011)
Product and content focus in education	vs	Process focus in education (Jeffrey and Woods, 1998)
Content based conventional approach to education	vs	Process based enterprising approach to education (Cotton, 1991)

Detached vs Engaged

Focus on being dispassionate / value free	vs	Focus on the meaningful / value-bound (Cunliffe, 2011; Guba & Lincoln, 1985)
Education where learner is passive	vs	Education where learner is active and emotional (Tynjälä, 1999; Egan, 2008)
Educational focus on absolute detachment	vs	Entrepreneurial focus on emotional involvement (Gibb, 1987)

Theory vs Practice

Objective knowledge exists beyond human experience	vs	Knowledge constituted through lived experience (Weber, 2004)
Learning as acquisition of inert knowledge	vs	Learning as participation in practical experiences (Tynjälä, 1999; Egan, 2008)
Emphasis on entrepreneurship theory	vs	Emphasis on entrepreneurial creation (Ollila and Williams Middleton, 2011)

Figure 1. A framework of dualisms illustrating the educational rift. Five dualisms derived from literature in philosophy, education and entrepreneurial education representing different aspects of the rift between traditional and progressive education.

Simplicity versus complexity

The first dualism derived and presented in the framework addresses the continuous dilemma teachers face when delivering education, balancing between learning which can be easily quantified, and learning that is representative of sociocultural context. Deshpande (1983) describes an objective worldview as being outcome-oriented and reductionist, and contrasts it to the subjective worldview being process-oriented and holistic. This resonates with the contrasting views between on the one hand the reductionist Cartesian perspective that any complex phenomenon can be reduced to and understood through its smallest and most simple parts (Spinosa et al., 1999), and on the other hand a systems view where holistic understanding is needed in an increasingly complex and interdisciplinary world (Von Bertalanffy, 1972). Simplicity represents the traditional side, exemplified through focus on standardized and single-subject curriculum. This is contrasted with a localized and multidisciplinary approach primarily found in progressive education (Cotton, 1991, Tynjälä, 1999), often resulting in complexity for the teacher (Dewey, 1938, Jonassen, 1999, Robinson and Malach, 2007).

Individual versus social

Cunliffe (2011) states that the subjectivist approach is to perceive reality as a social construction which is contrasted to the objectivist view that reality is a concrete given. In progressive education the social dimension plays an important role in the learning process (Cotton, 1991, Egan, 2008, Jeffrey and Woods, 1998), and is frequently contrasted to the individually focused information-

processing approach in traditional education. Information processing at an individual level is relatively uncomplicated to monitor and assess, whereas capturing independent individual outcomes when embedded in group activity or teamwork presents several hurdles. Final performance is not often easily dissected into individually associated parts, and additional extenuating circumstances of real-world experience may also influence outcome. This dualism therefore represents the problematic implications teachers face in regards to assessment of individual students. For example, when teachers let students participate in preferably team-based social learning environments they also need to be able to manage the resulting challenge of assessing each of them individually.

Content versus process

According to Cunliffe (2011), the conception of time and progress differs between subjectivism and objectivism, being iterative in subjectivism and linear in objectivism. Jeffrey and Woods (1998) report about a product focus among school inspectors representing traditional education values, whereas teachers prefer a process focus, being more oriented towards progressive education. Cotton (1991) states a similar dualism between focus on content in traditional education versus focus on process in entrepreneurial education. This dualism was included as a response to the common critique of progressive education to downplay the importance of content and the reverse critique of traditional education to neglect the importance of a learning process directed by student initiative and interest (Dewey, 1938, Labaree, 2005).

Detached versus engaged

Traditional education emphasizes objective pursuit of truth, distinct from circumstance or contingency. Guba and Lincoln (1994) position traditional approaches as value-free inquiry, contrasting them to value-bound progressive approaches. In progressive education there is frequent emphasis on the importance of emotionally engaged and active learners, which stands in contrast to the passive and detached learners depicted in traditional education (Egan, 2008, Gibb, 2011, Tynjälä, 1999). The inclusion of this dualism in our framework reflects a challenging need for teachers to bridge between detached reflection and emotionally engaged learning, representing the difference between learning which can be gained without practical experience, and learning which is contingent upon the learner's own action and reaction/reflection to what is happening specifically to him/her.

Theory versus practice

Theory versus practice is a long-standing dualism. One main issue concerns which view of knowledge is used, and in what fields production and publication of relevant propositional "expert" knowledge is feasible (Kennedy, 1999). The use of theory is very different in the scholarly fields of education, entrepreneurship and management compared to scholarly fields such as medicine and law (Khurana et al., 2005, Nuthall, 2004). Epistemologically these differing views on knowledge could be regarded as mirrored through the dualism between the objectivist view that there is an objective reality and the subjectivist view that knowledge is constructed through lived experience (Weber, 2004). The centrality of lived experience is frequently discussed in entrepreneurial education (Cotton, 1991, Jack and Anderson, 1999), and entrepreneurship is even

posited as a methodological alternative to scientific method (Sarasvathy and Venkataraman, 2011). The various approaches in entrepreneurial education – learning *about*, *for* and *through* entrepreneurship – span from an emphasis on knowledge about the phenomenon to learning generated through practice of the phenomenon, illustrating either side of the rift.

Bridging the educational rift

While the educational literature contains many descriptions of the educational rift (Ackerman, 2003, Cuban, 2007, Fletcher, 2009, Labaree, 2005, Tobias and Duffy, 2009), few innovative or viable attempts have been presented as able to bridge it. Sfard (1998) has advocated for solving the dualistic dilemma in general education by constantly combining the two competing perspectives of acquiring knowledge versus participating in communities of practice, i.e. living with the contradictions. Sfard (1998, p.11) states that “an adequate combination of the *acquisition* and *participation metaphors* [for learning] would bring to the fore the advantages of each of them, while keeping their respective drawbacks at bay” (italics in original). Such a combination of two dualistic positions can according to Sfard turn two seemingly competing and incompatible positions into a complementary and reflective discourse. This gives hope for developing tools capable of merging dualistic positions into one practically adequate and empirically testable meta-framework (Little, 1991).

Posing ten bridging questions

A set of ten questions are constructed to explore opportunities to bridge and combine across the five dualisms outlined (see Table 1). Each of the ten questions bridges in one direction of one key dualism. By trying to answer some or all of these ten questions potentially leads to finding new ways of achieving the constant combining of competing approaches to learning, as recommended by Sfard.

Table 1. Ten bridging questions. Ten questions bridging in both directions between outlier positions of five key dualisms for teachers taken from Figure 1.

Dualisms – A vs. B	Bridging questions – from B to A	Bridging questions – from A to B
(A) Simplicity vs. (B) Complexity	1.How can we make complex learning environments more simple?	6.How can we help teachers design a complex learning environment?
(A) Individual vs. (B) Social	2.How can we connect the fuzzy social learning environment to the individual?	7.How can we help individual students engage with the social learning environment?
(A) Content vs. (B) Process	3.How can we package the learning process in a reified / teachable way?	8.How can we help teachers design a learning process based on teachable content / principles?
(A) Detached vs. (B) Engaged	4.How can we facilitate detachment and reflection for the individual?	9.How can we help teachers design an emotional engagement based learning environment?
(A) Theory vs. (B) Practice	5.How can we facilitate generalizing from practical experiences?	10.How can we help teachers and students let theoretical subject matter inform practice?

The questions in Table 1 should help analyze whether any tools hold merit in bridging the rift. Such tools could then be used by teachers when designing learning environment for their students. In the next section, the article addresses what kind of tools could address such issues, and how

tools could then be derived from the field of entrepreneurship to help bridge the rift of traditional versus progressive education by infusing entrepreneurship into education.

Qualifying tools to “think with”

What would then be a suitable type of tool to address the questions outlined in Table 1? A century ago, Vygotsky (1978) introduced the idea of tools mediating between individuals and their environment, forming an ‘individual – tool – environment’ triangle to overcome the “split between the Cartesian individual and the untouchable societal structure” (Engeström, 2009, p.54). Three kinds of mediating tools for learning were proposed by Vygotsky; human beings (teachers or parents), material tools (pen and paper etc.) and psychological tools (concepts to think *with*) (Egan, 2008, Kozulin and Presseisen, 1995). Such mediating tools fundamentally shape and transform our mental processes (Cole and Wertsch, 1996). According to Egan (2002, p.70), “the tools we use, when learning, shape and very largely determine what and how we can learn.”, and that “from a Vygotskian perspective, our intellectual abilities are not “natural” but are sociocultural constructs.” (ibid, p.113). Literature contains many examples of what could be considered a psychological tool in the Vygotskian tradition. A common example is natural and artificial languages (Kozulin and Presseisen, 1995), constituting the “ultimate” psychological tool (Wertsch, 1998). Other examples include signs, symbols, numeracy, schemas, models, methods, concepts, algorithms, graphic organizers, maps, diagrams and heuristics (Arievitch and Stetsenko, 2000, Egan, 2008, Jonassen and Rohrer-Murphy, 1999, Kozulin, 2003).

Qualifying three entrepreneurial tools

The purpose of this article pays particular attention to Vygotsky’s psychological tools approach. The article posits that there are at least three different requirements that can be placed on an entrepreneurial tool for it to be considered a psychological tool in accordance with the Vygotskian research tradition. First, considering that psychological tools constitute what people “think with” (Egan, 2008), the entrepreneurial tool needs to provide a philosophy of its own, i.e. a way of *thinking*. Secondly, since the psychological tools to think *with* profoundly impact how individuals take action in the world (Wertsch, 1998, p. 519), the entrepreneurial tool needs to provide hands-on *advice* on how to manage complex environments, social interactions, iterative processes, emotional involvement and practical creation experiences (Figure 1). Thirdly, given the instrumental role that language plays in social functioning (ibid, p. 519), the entrepreneurial tool needs to provide some novel words, principles and resulting key *terms* illustrating the helpfulness of the particular tool in question, thereby establishing a “social language” of its own (Wertsch and Toma, 1995, p. 165).

Based on abductive work illustrating appreciation among teachers and students, three entrepreneurial tools from the field of entrepreneurship are selected as representing the Vygotskian tool criteria previously stated. These entrepreneurial tools are effectuation, customer development and appreciative inquiry. The tools are seen as exemplifying how the traditional verses progressive rift could be bridged. The tools are also argued as helping to substantiate a new educational philosophy – ‘*learning-through-creating-value-for-others*’ – presented as a core contribution in this article.

Effectuation as an entrepreneurial tool

Effectuation has been developed by Saras Sarasvathy and colleagues (see for example Sarasvathy, 2001, Sarasvathy and Dew, 2005). Effectuation starts with the premise “what could be the effect of my available resources?”, rather than focusing on “for what cause am I doing this?” applying causal logic. Whereas causal logic would stipulate a chef to cook a meal based on a recipe and a visit to the grocery store, effectual logic would ask the chef to open a refrigerator and begin to cook a meal from its contents (Sarasvathy, 2001).

Effectuation has been described from the outset as a way of *thinking* about entrepreneurship. Sarasvathy presents it as a logic embedded in “three principles that together form the core of effectual reasoning” (2003, p.210). These principles offer *advice* for taking entrepreneurial action. While Sarasvathy did not invent the word effectuation, she gave it new meaning and introduced it to a mainstream audience of both scholars and practitioners, suggesting it as a *term* that could guide entrepreneurial thought and action.

Customer development as an entrepreneurial tool

Originating from Silicon Valley in the United States, customer development (Blank, 2005, Blank and Dorf, 2012) has been adopted worldwide among practicing entrepreneurs. Customer development states that entrepreneurs need to quickly validate whether or not a hypothetical product or service creates value for users. A common technique used in customer development is to build a stripped down version of the imagined product or service, a minimum viable product (MVP), and test it iteratively on potential customers. The testing generates opportunities to learn about necessary adjustments, which, if resulting in major changes to the business concept, is termed a ‘pivot’.

Blank and Dorf (2012) state that customer development represents a shift in *thinking* from building the perfectly engineered product towards a more agile and iterative development process. Hands-on *advice* for this process comes from the customer development manifesto (ibid, p.31-49), consisting of 14 rules outlining do’s and don’ts for a start-up founder, such as “There are no facts inside your building, so get outside” and “No business plan survives first contact with customers”. These rules together with the key *terms* pivot and MVP have changed the current social language and reasoning of many practicing entrepreneurs.

Appreciative inquiry as an entrepreneurial tool

Appreciative inquiry is presented as a means for change management within the field of organizational behavior (Cooperrider et al., 2008). The association of change management to organizational renewal and opportunity recognition implicitly anchors appreciative inquiry in the field of entrepreneurship as well (cf. definitions by Shane, 2003, Sharma and Chrisman, 2007). Appreciative inquiry has been deemed useful in entrepreneurial education due to its solution (as opposed to problem) orientation (Blenker et al., 2011, Ollila and Williams-Middleton, 2011, Saiduddin et al., 2009). It allows for collaborative generation of new ideas in groups by asking appreciative questions, triggering new perspectives to old issues (Bushe and Kassam, 2005). The key principle of appreciative inquiry is to locate and highlight an organization’s strength base,

building upon what works well and use this to collectively imagine a dream of what might become. Common questions posed are “What has been successful before?” and “What can be learned from what works well?”.

By virtue of focusing on strengths, appreciative inquiry has been described as a counter-intuitive way of *thinking* (Cooperrider et al., 2008), since the human nature is prone to focus on weaknesses and threats (Stavros et al., 2003), reacting more strongly on negative than on positive stimuli (Cameron, 2008). It also provides *advice* for organizational renewal activities, such as focusing on what works rather than what is problematic, instigating change by asking powerful yet simple questions, and opening up discursive arenas in which individuals are allowed to freely dream and be optimistic (Cooperrider et al., 2008). While appreciative inquiry does not define new *terms*, as has been illustrated for effectuation and customer development, it does follow a four-step logic labeled the 4-D cycle (Cooperrider et al., 2008).

Applying the five dualisms framework to the three entrepreneurial tools

Having identified three entrepreneurial tools to ‘think with’, the article proceeds by utilizing the ten bridging questions (Table 1), generated through the framework of dualisms, to illustrate how the tools address the rift-based challenges that teachers face in their daily work. A summary of findings is presented in Table 2.

Bridging using effectuation

Effectuation can be put to use in schools by letting students initiate an iterative process of trying to create value to stakeholders outside their classroom. The process is based on the students’ available means and knowledge, starting with students asking themselves “For whom is this knowledge valuable today?”. Addressing bridging questions 1, 3, 6, 8 and 9 in Table 1, teachers can rely on the iterative and dynamic process of effectual interactions outlined by Sarasvathy and Dew (2005), leading to identification of committed stakeholders, access to resources and gradual clarification of goals. Addressing bridging questions 2 and 7 in Table 1, teachers can support student engagement with such a social learning environment by letting them ask themselves questions such as “Who am I?”, “What do I know?”, “Whom do I know?” and “What effects can I create?”. These effectual questions could also address bridging question 4 in Table 1 by allowing for detached reflection in between each iteration. Addressing bridging question 10 in Table 1, teachers could let students connect theoretical knowledge in the curriculum to an iterative process of interaction with people outside the classroom by putting emphasis on the effectual question “What do I know?” and then exploring which of this knowledge that leads to stakeholder commitment. Such stakeholder commitment could then help in answering bridging question 5 in Table 1 by allowing students to relate back to theory, based on students’ own practical experiences of what knowledge proved to be valuable to stakeholders outside the classroom.

Table 2. Entrepreneurial tools bridging a rift of dualisms in education. Outline of how three entrepreneurial tools can help bridging between five main dualisms in education outlined in Figure 1.

Dualistic challenge	Entrepreneurial tools		
	Effectuation	Customer development	Appreciative inquiry
Bridging simplicity and complexity	A teachable logic for value creation, based on how experienced entrepreneurs create value	A set of 14 rules for how to validate value creation hypotheses, relying on extensive target group interactions	A set of principles that can simplify the complex task of driving change by triggering people to identify, shape and act on opportunities
Bridging individual and social	Four individually phrased questions are posed at the outset of each iteration in the effectuation cycle	Emphasizes first-hand feedback from real people iteratively collected by the people running the project	Specifies basic sets of questions that individuals can use to navigate a wide variety of social contexts
Bridging content and process	A reification of an uncertain value creation process of embracing surprises	A reification of the iterative and fail-prone process of honing a value proposition to external stakeholders	A reification of a collective opportunity identification process based on strengths
Bridging detachment and engagement	Four self-focused questions starting each cycle, promoting individual reflection and detachment	Emphasizes detached design of experiments that can then be carried out in the all-engaging real world	Outlines a repeatable and teachable process for triggering positive emotions and engagement
Bridging theory and practice	The initial "What do I know" question connects theory to practice, allowing for curriculum linkages	Links theory with practice by emphasizing iterative formulation of hypotheses that are tested in practice	Turns inert knowledge into meaning-laden stories of past and future success and practical adequacy

Bridging using customer development

Similar to effectuation, customer development prescribes a process where students can try to create value for stakeholders outside of the classroom. They are advised to form hypotheses about what could be valuable to people and then design experiments involving an MVP that allow them to test these hypotheses. Addressing bridging questions 1, 3, 6, 8 and 9 in Table 1, the customer development manifesto provides rules and principles for how to design such an iterative learning process. Translated to education recommendations could include "Books are only hypotheses, so get outside your school building and test them" and "No project plan survives first contact with stakeholders outside school". Addressing bridging questions 2 and 7 in Table 1, students are encouraged to go out and test their ideas on people outside school by designing an MVP and performing pass/fail experiments. Addressing bridging question 4 in Table 1, reflection upon failure is facilitated through the term *pivot* which defuses the perceived risk of failure. Finally, customer development is all about iterating between theoretical hypotheses and the complex and surprising real world of practice, addressing bridging questions 5 and 10 in Table 1.

Bridging using appreciative inquiry

Appreciative inquiry as an entrepreneurial tool allows teachers to facilitate identification and creation of opportunities by students, building upon students' own and others experiences of previous success and accomplishment. The opportunity identification outcome of appreciative inquiry addresses bridging questions 1, 3, 6, 8 and 9 in Table 1. By opening a positive discursive arena and letting students reflect on their knowledge, past successes and associated dreams, students can be compelled to take action and inquire with people outside the school setting about opportunities to put their knowledge and skills to practical use. Addressing bridging questions 2 and 7 in Table 1, appreciative inquiry specifies some basic questions that individuals can use when interacting in a social learning environment. Addressing bridging question 4, it provides explicit mechanisms for students to reflect on past experiences with emphasis on what worked well. Finally, addressing bridging questions 5 and 10, appreciative inquiry emphasizes the importance of "life-giving" storytelling as a means to make inert knowledge come alive (Cooperrider et al., 2008). Used in the classroom, such stories can facilitate generalizing from students' past experiences (Rae, 2000). They can also inspire teachers to identify stories that illustrate how knowledge has been and can be put to use in practice (Hadzigeorgiou et al., 2012).

Discussion

The previous sections have illustrated the article's main proposition that entrepreneurial tools could help teachers address challenges faced due to the traditional – progressive rift in education. Next the article qualifies *how* these tools are helpful by connecting back to the dualisms representing the rift. This leads to the suggestion of a new educational philosophy, stemming from the field of entrepreneurship, termed *learning-through-creating-value-for-others*, and argued as viable across disciplines and levels of education.

Bridging simplicity versus complexity

All three of the stated entrepreneurial tools can be regarded as a reification of inherently complex and fuzzy processes. This indicates a potential for reducing the complexity inherent in the daily work of teachers trying to balance between traditional and progressive education. While none of the identified entrepreneurial tools were originally designed for use in educational curriculum, all have nevertheless been put into practice. Thus far, their use in education is largely limited to entrepreneurship specific courses and programs, most of whom adhere to a more narrow definition of entrepreneurship. Only appreciative inquiry seems to have been applied to general education (Yballe and O'Connor, 2000), although Sarasvathy and Venkataraman (2011) recently identified use in education as an opportunity also for effectuation. The lack of resources commonly required to manage the complexity perceived by teachers considering adoption of progressive education could also be addressed using the entrepreneurial tools outlined in this article; taking advantage of their focus on what has worked previously (appreciative inquiry), what resources are currently available (effectuation) and what is useful (customer development).

Bridging individual versus social

The entrepreneurial tools allow for utilizing key questions that can facilitate bridging between individual and social life-worlds, such as “Who am I?”, “What can I do” (effectuation), “How can I test this?” (customer development) and “When have I succeeded before here?” (appreciative inquiry). These individually focused questions could help teachers support students in the often frightening task of interacting with external stakeholders (Arpiainen et al., 2013). For a teacher acting as a coach rather than as a sage on stage (Löbner, 2006), such a collection of questions could be useful. They could also be used when constructing written reflection assignments. For the individual student the task of exploring the needs of others and responding to them also represents an opportunity to develop one’s ability and willingness to take collective responsibility (Deuchar, 2007).

Bridging content versus process

The perceived lack of knowledge content in progressive education could be addressed in two ways through use of entrepreneurial tools. The tools are extensively described in literature and constitute content knowledge in themselves. However, such scholarly content is not always helpful or viable for a teacher trying to connect student action to standardized national curriculum documents. To address this challenge, the article posits that teachers could start a value creation process by asking their students to find answers to the following bridging question: “For whom is this knowledge valuable today?”. This question could be used in connection with other starting point questions taken from entrepreneurial tools, such as “What methods have been useful?” (appreciative inquiry), “What do I know?” (effectuation) and “Do people care?” (customer development). These same questions could be restated after the end of each action iteration, facilitating reflection and theory connection. This way the tools first facilitate student thinking about content, then they facilitate the initiation and management of a purposeful process rife with uncertainty and external interaction, but nevertheless grounded in content.

Bridging detachment versus engagement

All three entrepreneurial tools could be perceived as supporting the management of uncertainty, ambiguity and risk of failure; factors that could deter teachers from achieving a balance between traditional and progressive education. This opens up for a simplified route to balancing without the teacher running the risk of losing control of the educational process or the student feeling too exposed. Infusing uncertainty, ambiguity and failure in educational environments has been shown to be a key factor in developing entrepreneurial competencies among students (Carrier, 2007, Cope, 2011, Cope and Watts, 2000, Shepherd, 2004). The challenge is how to lead and assess it in a manageable way for teachers. The three examined entrepreneurial tools are argued to provide hands-on guidance, facilitating concepts, identifiable emotional events useful for formative assessment and a language for constructively managing common sources of negative emotions and uneasiness among both students and teachers. Being proven wrong is rephrased as a “pivot” (customer development), not always getting stakeholder commitment is being positioned as a natural step in an iterative process (effectuation) and fear of failure is countered with an explicit focus on what works (appreciative inquiry).

Bridging theory versus practice

Many of the questions and perspectives outlined in previous sections contribute to the bridging between theoretical curriculum content and practical value creation processes, such as the questions “What do I know?” (effectuation) and “For whom is this knowledge valuable today?”. Entrepreneurship could contribute to education by letting students test theories and concepts in practical value creation processes as a formal part of their education.

A new educational philosophy: Learning-through-creating-value-for-others

A key commonality between the three entrepreneurial tools is the focus on providing means for individuals to attempt to create value to external stakeholders in cycles of testing and inquiry. The means, methods and underlying concepts differ, but the end result is frequently some kind of valuable artifact appreciated by the external stakeholder. In an educational landscape often reported to be deprived of engagement and meaningfulness, this could constitute a much needed relevant and engaging purpose for students. While value creation is certainly not the main goal of education, students could be allowed such a focus when it triggers increased engagement and deeper learning. It does not represent a paradigmatic change away from knowledge, theory and content, but rather regards this as its key starting point in each iteration. The article posits that this constitutes a novel philosophy of education, labeled *learning-through-creating-value-for-others*. This is tentatively defined as letting students learn by applying their existing and future competencies to create something preferably novel of value to at least one external stakeholder outside their group, class or school. Such assignments are preferably supported by entrepreneurial tools such as the three outlined in this article, or others exhibiting similar qualities. A coupling of learning with value creation is in line with a Vygotskian view on learning, stating that human activity triggers two main outcomes; learning through “internalization of activity and gradual formation of mental actions” (Arievitch and Haenen, 2005, p. 159), and value creation through “externalization of activity into artifacts” (Miettinen, 2001, p. 299). The importance of a learner perspective for value creators such as entrepreneurs has been acknowledged before (see for example Cope, 2003, 2005). Building upon Cope, but drawing attention to the reverse in terms of the usefulness of considering a value creation perspective for learners, Table 3 illustrates how the proposed new educational philosophy contributes to bridging the rift between traditional and progressive education.

Providing value creation assignments as an explicit educational philosophy has, to our knowledge, not been defined in previous literature on adjacent¹ educational philosophies such as problem-based learning (Blumenfeld et al., 1991, Savery, 2006, Tan and Ng, 2006), project-based learning (Blumenfeld et al., 1991, Helle et al., 2006, Jones and English, 2004) or service-learning (Desplaces et al., 2009, Spring et al., 2008). Some definitional similarities and differences between them are summarized in Table 4, illustrating contrasts by quoting highly cited articles defining these existing educational philosophies. A categorization in Table 4 illustrates how existing philosophies have focused on *learning-through* aspects but have largely neglected *creating-value-for-others* aspects, thereby arguably lacking a clear answer to the question: *Learning-by-doing-what?*

¹ While there are other educational philosophies that could be claimed to be more or less similar, these three were frequently mentioned in discussions with practitioners involved in the three cases outlined in Appendix 1.

Table 3. Bridging benefits of value creation as educational philosophy. A summary of five different bridging capabilities of the tentatively new educational philosophy proposed in this article.

Traditional education	Bridging benefits Value creation as educational philosophy	Progressive education
<p>Simplicity Easy for teacher¹. Routinized¹. Scientific reductionist method⁹.</p> <p>Individual Learning through acquisition². Standardized content¹.</p> <p>Content Cognitive skills¹⁰. Linear¹¹. Subject matter¹².</p> <p>Detached Passive learners⁴. Value free³. Disengaged¹. Easy to assess⁸.</p> <p>Theory Inert knowledge¹³. Objective reality¹⁴. Material¹⁵. Timeless¹⁵.</p>	<p>Simplification Tool-based. Succinct purpose of creating value which is easy to communicate.</p> <p>Responsibility-taking Tool derived questions that push students to dare to make a difference in society.</p> <p>Effectuation Theory and content used as the start and end points of a value creation process.</p> <p>Assessability Assessment of emotional events and reflective questions as stipulated by tools</p> <p>Applicability Let students test theories and concepts in practical value creation processes now.</p>	<p>Complexity Difficult for teacher¹. Unpredictable⁵. Entrepreneurial method⁶.</p> <p>Social Learning through participation². Unique experience¹³. Intersubjective⁴.</p> <p>Process Non-cognitive skills¹⁰. Iterative¹¹. Entrepreneurial competencies¹².</p> <p>Engaged Action-based⁷. Emotional learning⁵. Engagement⁴. Difficult to assess⁸.</p> <p>Practice Lived experience¹⁴. Co-creation¹⁶. Meaningful¹⁵. Cultural¹⁵. Realtime¹⁵.</p>
<p>1: Dewey (1938), 2: Sfard (1998), 3: Guba and Lincoln (1994), 4: Tynjälä (1999), 5: Woods (1993), 6: Sarasvathy and Venkataraman (2011), 7: Cotton (1991), 8: Labaree (2005), 9: Deshpande (1983), 10: Moberg (2014), 11: Cunliffe (2011), 12: Fisher et al. (2008), 13: Egan (2002) 14: Weber (2004) 15: Latour (2014), 16: Ollila and Williams Middleton (2011)</p>		

An educational philosophy based on letting students learn through creating value for others could offer a simplification in terms of a starting point which is easy to understand and communicate, and an end result which is easy to comprehend and assess for all parties involved, including those external to the formal educational system. It also represents an altruistic element in education in that it lets students create value for others immediately instead of for themselves in a distant future. It also contains a more robust answer to the “What’s in it for me?” question often posed by stakeholders outside the educational system when asked to be involved in education.

Challenges in using entrepreneurial tools to bridge dualisms

Novel approaches take time to spread throughout social systems, and the entrepreneurial tools outlined here have not yet had time to spread throughout the educational system. If these tools are as useful to teachers as proposed, they might constitute a major contribution that entrepreneurship can make outside its own domain. Rogers’ (1983) five factors of innovation diffusion will most likely determine the rate of adoption of these entrepreneurial tools and the overarching educational philosophy in the domain of education, i.e. relative advantage, compatibility with existing values, complexity, trial-ability and observability of results. Given the inherent challenges in observing the results of entrepreneurial education (Bae et al., 2014, Fayolle, 2007, Lackéus, 2014, Martin et al., 2013, Pittaway and Cope, 2007) it is unlikely that the entrepreneurial tools outlined here will become widespread among teachers in general education any time soon. Previous research has also outlined significant value clashes between entrepreneurship and education in terms of anti-commercialism (Johannisson, 2010).

Table 4. Definitional comparison of value creation as educational philosophy with three common educational philosophies. *The comparison is based on selected highly cited definitional texts. If no quote is given it signifies that the aspect was not covered in the text where the educational philosophy was defined.*

Value creation in education focusing on...	Categorization	Problem-based learning (according to Savery, 2006, p.9-15)	Project-based learning (according to Blumenfeld et al., 1991, p.369-372)	Service-learning (according to Furco, 1996, p.2-6)
...problems	Learning-through... (i.e. learning-by-doing)	"develop a viable solution to a defined problem"	"a question or problem that serves to organize and drive activities"	"placing [students] in challenging situations"
...authenticity		"selection of authentic problems"	"engage students in investigation of authentic problems"	"active participation in ... thoughtfully organized service experiences"
...team-work		"students work in collaborative groups"	"working with others"	-
...artifact creation		-	"activities result in a series of artifacts"	-
...work across extended time periods		-	"engaged with subject matter over an extended period of time"	-
...real world (inter-) action	...creating-value-for-others (i.e. entrepreneurship)	-	-	"places curricular concepts in the context of real-life situations"
...value creation to external people		-	-	"service experiences that meet actual community needs"
...opportunities		-	-	-
...iterative experimentation		-	-	-
...newness / innovativeness		-	-	-
...failure an integral part of the process		-	-	-

Another key challenge is whether educators are willing to use these or other entrepreneurial tools. Wertsch (1998) states that even if a new audience, such as teachers in this case, knows about a potentially useful cultural tool taken from a different domain, it does not equate to them attempting to appropriate the tool. The linguistic form arguably plays a key role here, in that the audience at the receiving end of a new tool needs to create their own understanding and terminology around the tool in order to embrace it and feel ownership.

Implications

The main purpose of this article has been to propose and articulate a novel way to bridge the traditional – progressive education rift. The article has endeavored to show how three tools from the field of entrepreneurship – effectuation, customer development and appreciative inquiry – could help teachers on all levels of education in the crucial task of combining standardized subject matter with individual students’ needs and abilities, and therefore, in line with Vygotsky, bridging the educational rift. Some main challenges to entrepreneurial education have been outlined along with how these three entrepreneurial tools could help teachers address these challenges. This has opened up a new research strand in terms of a “Vygotskian tools to think *with*” approach to infusing entrepreneurship into education. Further research into this area could benefit from the framework of five key dualisms presented in Figure 1 and the ten bridging questions presented in Table 1.

Commonalities among the analyzed bridging tools motivated us to introduce and define a tentatively new educational philosophy of *learning-through-creating-value-for-others*. This offers new and potentially useful perspectives for teachers related to but also significantly adding to existing educational philosophies such as problem- or project-based learning and service-learning. In addition to the potential of further infusing engagement, relevancy and joy to disengaged students, it also represents a starting and ending point easy to understand and appreciate by teachers. Students could be asked to create value to stakeholders outside their classroom based on the theory connecting question “For whom is this knowledge valuable today?”. Such an assignment could be supported by the three outlined entrepreneurial tools, as well as by other tools fulfilling the bridging criteria developed here. This educational philosophy could simplify and facilitate teachers’ practice of progressive education, often perceived as too complex to manage and too difficult and risky in terms of student assessment. The article posits that the student activities stipulated by the new educational philosophy could lead to increased student motivation, developed responsibility-taking and deeper learning, by virtue of a more explicit answer to the seldom posed question: *Learning-by-doing-what?*

Some challenges have also been outlined. This article posits that the diffusion rate of entrepreneurial tools into general education will be determined by their compatibility with existing values in education and by the observability of any positive effects in terms of improved student learning. How linguistic transformation of such tools is managed when applying them in educational settings will also determine the rate of adoption.

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Appendix 1 – three cases

Three cases are outlined below that have been instrumental in the abductive research process leading up to this article. Each case is outlined with basic information, brief history, key activities and outcomes. Each case description is followed by an outline of how the case represents a bridging of educational dualisms, its relevance to this article and how it exemplifies the claims made by the authors. Relevant links between the three cases are also outlined.

Case 1: An entrepreneurship master program at Chalmers University of Technology

Entrepreneurship and Business Design at Chalmers University of Technology is a two-year entrepreneurship master program started in 1997 by one of the authors of this article. Today, all authors are part of the faculty. The program has four different tracks – technology, bioscience, corporate and intellectual property entrepreneurship – accepting a total of around 50 students each year. The program has a strong venture creation track record with 75 ventures still up and running that were started as educational projects constituting formal part of the program. These ventures are as of 2016 employing some 400 people and have a total annual turnover of €40m. A number of publications authored by faculty members as well as by external researchers are available outlining this case more in-depth.

Bridging capabilities of the case. The case is a rare example of a venture creation approach, defined in research as “entrepreneurship education programs which utilize the on-going creation of a real-life venture as the primary learning vessel” (Lackéus and Williams Middleton, 2015, p.50). Previous research has shown such an approach to be able to balance between multiple dualisms such as theory versus practice, reflection versus action, learning versus value creation and research versus practice. The ambition at the program to not only produce exams but also tangible venture results has created an environment of teachers and students being open to new tools and perspectives, allowing for a natural selection and application of tools appropriate for bridging the rift of educational dualisms developed in this article.

Case relevance for this article. The case constitutes the main empirical setting from which the authors generated key insights that were subsequently applied and tested on other environments, such as but not limited to case 2 and 3. The authors’ status as insiders over an extended time period and with unique access to data allowed for the articulation and honing of working hypotheses that led up to propositions put forward in this article. All three entrepreneurial tools outlined in this article have been extensively used at the master program.

Case 1 does not constitute an example of how entrepreneurship can contribute to general education, but represents the idea origin and primary cultivation environment for the authors’ research endeavors. What it does exemplify is the powerful impact of value creation as educational practice on student engagement and learning, as well as some important challenges that teachers face when letting students create value to external stakeholders (Lackéus et al., 2011).

Case 2: An educational platform at non-profit foundation Drivhuset

Drivhuset is a non-profit non-governmental organization supporting student entrepreneurs. It employs 55 people at 14 different locations across Sweden. In 2011 Drivhuset initiated the construction of an educational platform to better inform their support activities towards student entrepreneurs. This platform was developed in close collaboration with one of the authors of this article, taking advantage of key insights made at Case 1. The platform was designed as five one-day workshop sessions spread out across 2-3 months, complemented by value creation assignments towards key external stakeholders to be completed between each workshop. It was built by synthesizing a careful selection of a dozen different entrepreneurial tools. Since the launch of the new educational platform in 2013, it has been used for supporting and educating around 2000 people around Sweden. Common participants have been student entrepreneurs, but the platform has also been used for supporting unemployed people, youth summer entrepreneurs and employees at private as well as public organizations.

Bridging capabilities of the case. The educational platform constitutes a theory-informed set of practical assignments, thereby building on current research in entrepreneurship packaged in an accessible way suitable for extracurricular activities at universities, but also for a wide range of non-academic settings such as companies, municipalities, youths, unemployment support organizations and city development projects. A course book has been written by two employees at Drivhuset, supported by faculty at Chalmers University of Technology, summarizing a wide range of theories and methods from the scholarly domain of entrepreneurship to a wide audience of potential practitioners. The partnership with Chalmers University of Technology has been formalized in a written agreement between the parties, constituting an institutionalized link between theory and practice.

Case relevance for this article. Two of the entrepreneurial tools outlined in this article have been used as key building blocks of the educational platform at Drivhuset. Effectuation has informed the design of the idea generation workshop, and customer development has informed the design of the value creation assignments in between workshops. The educational philosophy of letting people learn through creating value for others has been integrated into the core of the platform by making it the most important recurring theme throughout the workshop series. Case 2 shows that value creation to others can be practiced without having to start a company as done in Case 1, thereby simplifying the educational format for value creation and allowing it to be used in less extreme conditions and in a shorter time span than the two-year process applied in Case 1. Case 2 also shows that value creation to others is relevant not only to budding entrepreneurs, but also to employees in existing companies and organizations, to youths, and to unemployed people currently not contemplating to start a business. The quick diffusion of the educational platform across Sweden and the rather uniform acclaim from thousands of participants show that entrepreneurial tools as well as a general value creation assignment constitute a feasible way to apply entrepreneurship in wider educational settings as claimed in this article.

Case 3: A municipality-wide education reform initiative in Sundsvall, Sweden

Sundsvall municipality in northern Sweden has a population of around 100.000 people. It is the 17:th largest of the 290 municipalities in Sweden. The public education sector in Sundsvall

employs some 3000 people and consists of around 130 schools from preschool to secondary education. In 2014 the local government of Sundsvall decided to initiate a project aiming to integrate entrepreneurship into the entire educational sector of Sundsvall, in line with requirements outlined in Sweden's national curriculum documents. The people responsible for the implementation project then initiated a collaboration with one of the authors of this paper, in order to apply value creation as educational philosophy in all schools in Sundsvall. This was chosen as the main strategy for infusing entrepreneurship into public education. The project managers also initiated a collaboration with Drivhuset (Case 2), using their educational platform to train key people in value creation. As of 2016 the project is still in an early phase. Around 500 people have been educated through the Drivhuset educational platform. Seven specialists employed at the municipality are championing the process, and have received special training in theoretical as well as practical perspectives of value creation in education, and have also contributed significantly to the development of the tentatively new educational philosophy. Some 60 teachers have so far started practicing value creation assignments with their students, putting the number of students being explicitly involved to one thousand so far.

Bridging capabilities of the case. A survey sent to the four project managers in Sundsvall asking them to outline any bridging capabilities of the project has confirmed many of the stated ways in which value creation as educational philosophy could help teachers bridge multiple educational dualisms. Administrators, principals, teachers and students have used effectuation as a tool to spot opportunities and get started instead of getting stuck in searching for resources, which they state is otherwise commonplace in educational change projects. School administrators and principals have found customer development to be particularly useful in school development due to its emphasis on finding out what students and others need rather than guessing, leading to an appreciated outside-in approach. Appreciative inquiry has been found to trigger enjoyment, engagement and initiative among participants.

Case relevance for this article. Case 3 represents the third step in a decades-long research process, where a tentatively new educational philosophy stemming from Case 1 and entrepreneurial tools incorporated into an educational platform outlined in Case 2 have been applied to primary and secondary education in Case 3. While still early in the implementation, rich data has emerged indicating the usefulness and appreciation of the tentatively new educational philosophy in general education settings. Many of the hypotheses developed from Case 1 and Case 2 have been confirmed in Case 3.

Paper 5

ENTREPRENEURSHIP IN EDUCATION

WHAT, WHY, WHEN, HOW

ENTREPRENEURSHIP360 BACKGROUND PAPER

MARTIN LACKÉUS, 2015



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Authorised for publication by Sergio Arzeni, Director, Centre for Entrepreneurship, SMEs, Tourism and Local Development.

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Cover visual: Joseph Tixier

ENTREPRENEURSHIP IN EDUCATION

WHAT, WHY, WHEN, HOW

Martin Lackéus, 2015



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INTRODUCTION

1. The idea of infusing entrepreneurship into education has spurred much enthusiasm in the last few decades. A myriad of effects has been stated to result from this, such as economic growth, job creation and increased societal resilience, but also individual growth, increased school engagement and improved equality. Putting this idea into practice has however posed significant challenges alongside the stated positive effects. Lack of time and resources, teachers' fear of commercialism, impeding educational structures, assessment difficulties and lack of definitional clarity are some of the challenges practitioners have encountered when trying to infuse entrepreneurship into education.

2. This report aims to clarify some basic tenets of entrepreneurship in education, focusing on what it is, why it is relevant to society, when it is applied or not and how to do it in practice. The intended audience of this report is practitioners in educational institutions, and the basis of this clarification attempt consists primarily of existing research in the domains of entrepreneurship, education, psychology and philosophy. Where research is scarce the author of this report will attempt to give some guidance based on own conducted research.

3. *What* we mean when we discuss entrepreneurship in education differs significantly. Some mean that students should be encouraged to start up their own company. This leans on a rather narrow definition of entrepreneurship viewed as starting a business. Others mean that it is not at all about starting new organizations, but that it instead is about making students more creative, opportunity oriented, proactive and innovative, adhering to a wide definition of entrepreneurship relevant to all walks in life. This report takes the stance that a common denominator between these differing approaches is that all students can and should train their ability and willingness to create value for other people. This is at the core of entrepreneurship and is also a competence that all citizens increasingly need to have in today's society, regardless of career choice. Creating new organizations is then viewed as one of many different means for creating value.

4. *Why* entrepreneurship is relevant to education has so far primarily been viewed from economic points of view. This has worked fairly well for elective courses on higher education level, but is more problematic when infusing entrepreneurship into primary and secondary levels of education for all students. Here, a much less discussed but highly interesting impact that entrepreneurship can have on education is the high levels of student motivation and engagement it can trigger, and also the resulting deep learning. This report will argue that in line with a progression model of when to infuse entrepreneurship into education, the question of what effects to focus on should also be progressively changing over time in the educational system. Students can become highly motivated and engaged by creating value to other people based on the knowledge they acquire, and this can fuel deep learning and illustrate the practical relevancy of the knowledge in question. Those students that pick up strong interest and aptitude for value creation can then continue with elective courses and programs focusing on how to organize value creation processes by building new organizations. Such an approach has far-reaching implications on how to plan, execute and assess entrepreneurship in education, and they will be discussed in this report.

5. When we should infuse entrepreneurship into education is increasingly clear in theory, but in practice much remains to be done. In theory we should start at an early age with a wide definition of entrepreneurship embedded across the curriculum and relevant to all students, preferably in preschool and primary school. Later in the educational system we should complement with a parallel voluntary and more business-focused approach, applying a more narrow definition of entrepreneurship. In practice however, explicit entrepreneurial activities on primary education levels are rare. And on secondary and tertiary levels most initiatives are business start-up focused, lacking embeddedness into other teaching subjects. In vocational education and training, entrepreneurial activities are frequent in terms of value creation for other people, but they are seldom connected to the entrepreneurship domain and its tools, methods and processes for creating value.

6. How to make students more entrepreneurial is probably the most difficult *and* important question in this domain. Many researchers claim that the only way to make people more entrepreneurial is by applying a learning-by-doing approach. But then the question of learning-by-doing-*what* needs to be properly answered. There is increasing consensus among researchers that letting students work in interdisciplinary teams and interact with people outside school / university is a particularly powerful way to develop entrepreneurial competencies among students. However, if this kind of experiential learning based activity is to be classified as entrepreneurial, some kind of value needs to be created for the people outside school or university in the process. It is not sufficient to just interact with outside stakeholders without a clear end result. For this to work in practice, teachers can draw on the entrepreneurship domain which contains many useful value creation tools, methods and processes. This report will outline some of them.

7. Future challenges and opportunities abound in entrepreneurial education. This report will try to outline some of them through a final section in each of the following chapters.

WHAT IS ENTREPRENEURSHIP IN EDUCATION?

8. This chapter starts with a discussion on the different terms used for describing entrepreneurship in education. Then various definitions are outlined and discussed. Value creation is presented as a commonality uniting different views in the field. Entrepreneurial competencies are discussed and exemplified through some competencies often termed as entrepreneurial. Based on these different terms and concepts, connections to general education are made by contrasting different pedagogical approaches and discussions. Some theoretical roots to entrepreneurship in education are given and briefly discussed.

1.1 Terminology of entrepreneurship in education

9. The two most frequent terms used in this field are *enterprise education* and *entrepreneurship education*. The term enterprise education is primarily used in United Kingdom, and has been defined as focusing more broadly on personal development, mindset, skills and abilities, whereas the term entrepreneurship education has been defined to focus more on the specific context of setting up a venture and becoming self-employed (QAA, 2012, Mahieu, 2006). In United States, the only term used is entrepreneurship education (Erkkilä, 2000). Some researchers use the longer term *enterprise and entrepreneurship education* (See for example Hannon, 2005), which is more clear but perhaps a

bit unpractical. Sometimes enterprise and entrepreneurship education is discussed by using the term entrepreneurship education only, which however opens up for misunderstanding. Erkkilä (2000) has proposed the unifying term *entrepreneurial education* as encompassing both enterprise and entrepreneurship education. This term will be used extensively in this report to avoid confusion. Further, the word “student” will in this report be used for learners on all levels of education, rather than adding the word “pupil” that some still use. For an overview of terms, see figure 1.

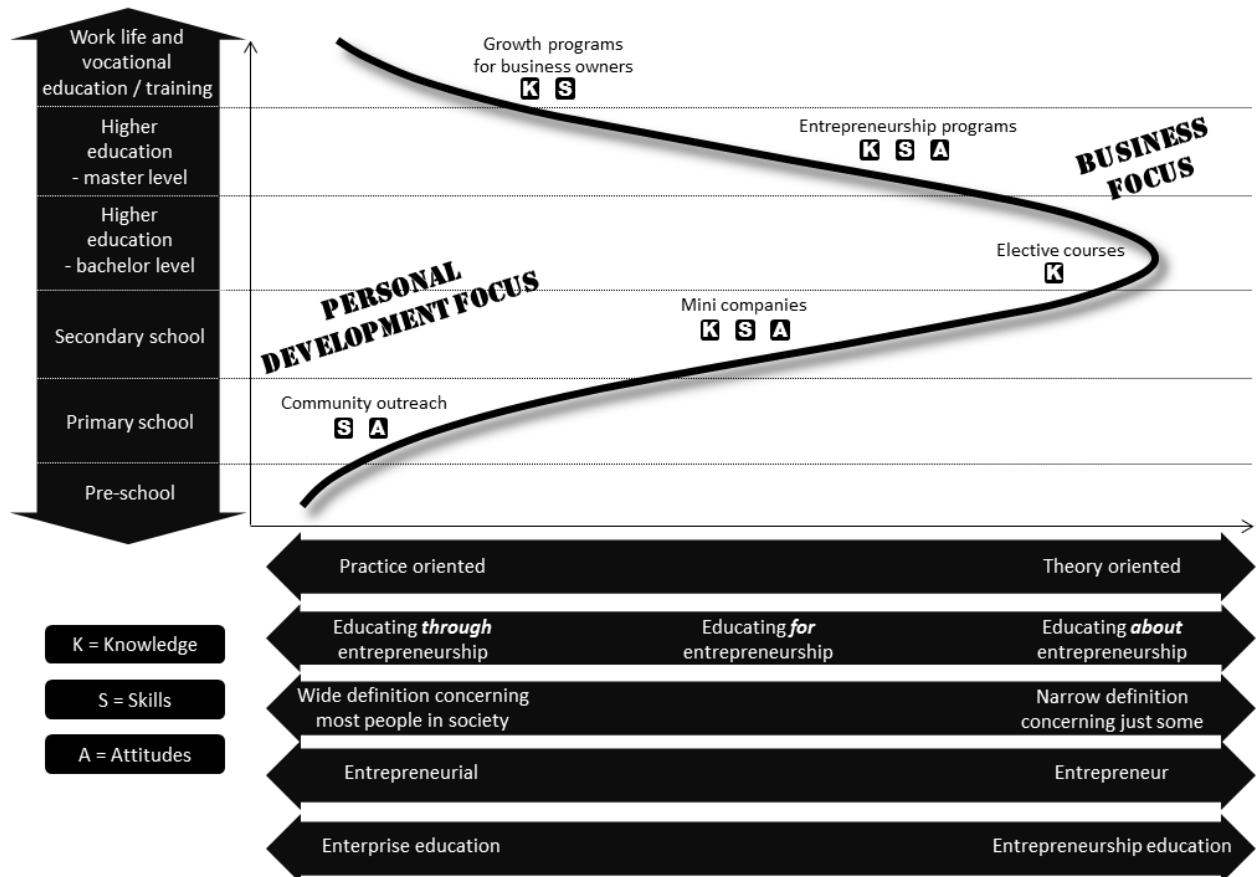


Figure 1. Overview of terms and definitions currently used in entrepreneurial education. Some examples illustrate the current progression over time in the educational system, with shifting definition, pedagogical approaches and varying emphasis on theory over practice. The current lack of practice orientation on higher education levels lamented by many researchers is illustrated in the figure.

10. In Northern and Eastern Europe some additional terms are used. In Sweden and the Balkans the term *entrepreneurial learning* is often used as an equivalent to enterprise education (See for example Leffler and Falk-Lundqvist, 2013, Heder et al., 2011). This sometimes causes confusion, since it is the same term used in the research domain of entrepreneurial learning, which is about studying how entrepreneurs learn outside of the educational domain. Another set of terms used in Finland is *internal entrepreneurship education* and *external entrepreneurship education* (See for example Seikkula-Leino et al., 2010). Internal entrepreneurship education is a synonym to enterprise education, and external entrepreneurship education is a synonym to entrepreneurship education. Adding to the confusion here is the fact that internal entrepreneurship is sometimes used as a synonym to intrapreneurship, i.e. when acting entrepreneurially in an established organization (See for example Burgelman, 1983).

1.2 Wide and narrow views on entrepreneurship

11. Being entrepreneurial can mean many things to many people. A common conception according to Gartner (1990) is that entrepreneurship is about entrepreneurial individuals creating innovative organizations that grow and create value, either for the purpose of profit or not. But entrepreneurship does not have to include the creation of new organizations, it can also occur in existing organizations (Shane and Venkataraman, 2007). It is not only limited to the entrepreneurial individual, but also to entrepreneurial opportunities and the relation between the individual and the opportunity, i.e. the individual-opportunity nexus as described by Shane (2003). Stevenson and Jarillo (1990) define entrepreneurship as “a process by which individuals - either on their own or inside organizations - pursue opportunities without regard to the resources they currently control” (p.23). Bruyat and Julien (2001) use a constructivist approach and propose a definition incorporating not only the entrepreneur, but also the new value created, the environment within which it takes place, the entrepreneurial process itself and the links between these constructs over time. They also propose the terms “individual” and “entrepreneur” to represent teams whenever applicable.

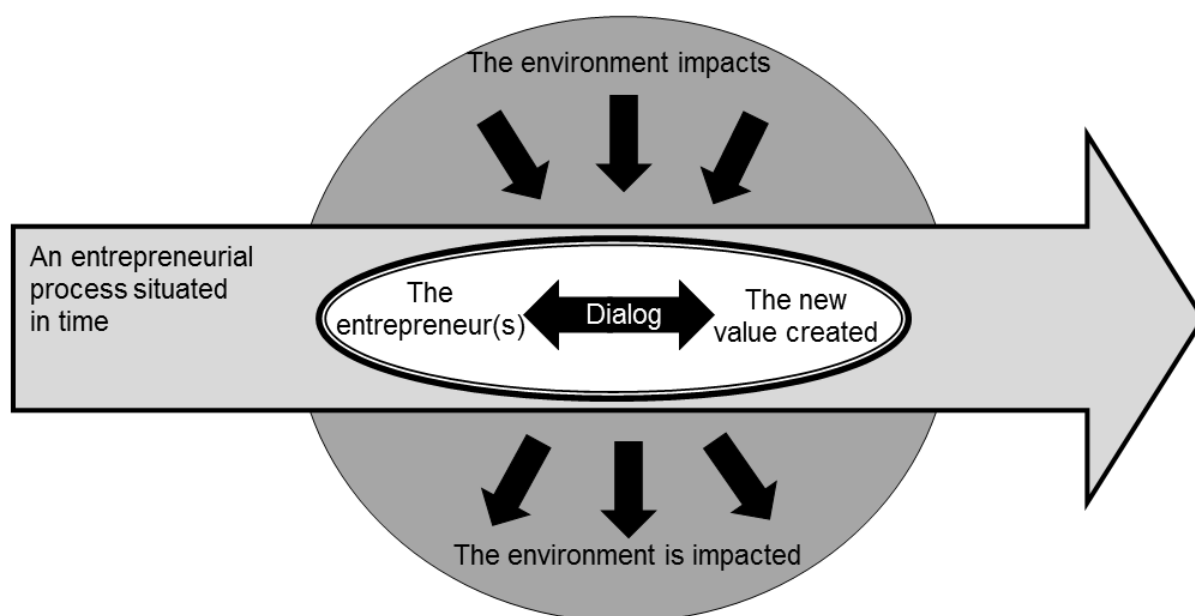


Figure 2. *The entrepreneurial process located within its environment and time. The dialog between the individual and the new value created is shown in the middle, and constitutes the core of entrepreneurship (adapted from Bruyat and Julien, 2001, p.170).*

12. In the educational domain the two terms enterprise and entrepreneurship education indicate that there are two quite differing views on what is meant by entrepreneurship, one termed “wide” and one termed “narrow”, see figure 1. The risk for confusion and misunderstanding is significant, and any discussion on entrepreneurial education needs to start with clarifying which definition is used. According to the narrow definition of entrepreneurship it is about opportunity identification, business development, self-employment, venture creation and growth, i.e. becoming *an entrepreneur* (Fayolle and Gailly, 2008, QAA, 2012, Mahieu, 2006). According to the wide definition of entrepreneurship it is about personal development, creativity, self-reliance, initiative taking, action orientation, i.e. becoming *entrepreneurial*. What definition and approach is used profoundly affects educational objectives, target audiences, course content design, teaching methods and student assessment procedures, leading to a wide diversity of approaches (Mwasalwiba, 2010).

13. It is important to be aware of a common tendency in society to perceive entrepreneurs as predominantly male heroic individuals possessing special innate traits and preferring to work under adverse conditions in solitude (Hytti, 2005, Ogbor, 2000). Applying such a view of entrepreneurship in education is counter-productive and leads to alienation of (not only female) students (Leffler, 2012), neglect of the potential in collective team-based entrepreneurial endeavors (Drnovsek et al., 2009, Garud and Karnøe, 2003) and a damaging reproduction of outdated, gender-biased and oversimplistic images of entrepreneurship (Jones, 2012). An alternate view of entrepreneurship better suited to the educational domain is to view it as a generic method for human action, comprising of principles and techniques that anyone can learn through basic education (Sarasvathy and Venkataraman, 2011). Recent research has also shown that a majority of successful companies are started by teams rather than by sole entrepreneurs (Beckman, 2006, Klotz et al., 2014).

1.3 Educating about, for and through entrepreneurship

14. Entrepreneurial education is often categorized into three approaches, see figure 1 (Johnson, 1988, Heinonen and Hytti, 2010, O'Connor, 2013). Teaching “about” entrepreneurship means a content-laden and theoretical approach aiming to give a general understanding of the phenomenon. It is the most common approach in higher education institutions (Mwasalwiba, 2010). Teaching “for” entrepreneurship means an occupationally oriented approach aiming at giving budding entrepreneurs the requisite knowledge and skills. Teaching “through” means a process based and often experiential approach where students go through an actual entrepreneurial learning process (Kyrö, 2005). This approach often leans on the wider definition of entrepreneurship, and can be integrated into other subjects in general education, connecting entrepreneurial characteristics, processes and experiences to the core subject. While the “about” and “for” approaches are relevant primarily to a subset of students on secondary and higher levels of education, the embedded approach of teaching “through” entrepreneurship can be relevant to all students and on all levels of education (See for example Smith et al., 2006, Handscombe et al., 2008). Some important challenges have however been identified when trying to embed entrepreneurship into education this way, such as resource and time constraints, resistance from teachers, assessment challenges and cost implications (Smith et al., 2006), see further in chapter 4 below.

1.4 Value creation as the common core of entrepreneurial education

15. The varying definitions of entrepreneurship and resulting variations in pedagogical approaches have made it difficult to give teachers firm advice on how to approach entrepreneurial education (Fayolle and Gailly, 2008). If a useful definition could be agreed upon, the field and the teachers could benefit significantly. For the purpose of this report, Bruyat and Julien’s (2001) definition grounded in the concept of *value creation* is outlined more in detail below and constitutes the basis of many of the resulting recommendations in this report. This does not mean that it is the only suitable definition, merely that the author of this report has judged it to be particularly useful for entrepreneurial education.

16. Bruyat and Julien (2001) state that studying the entrepreneur (or team) in isolation is inherently wrong, as it is not solely from the entrepreneur that entrepreneurship occurs. Entrepreneurship is as much about the change and learning that the individual entrepreneur experiences by interacting with the environment as the change and value creation the entrepreneur causes through his/her actions. Learning and value creation are thus seen as two main aspects of entrepreneurship. This view aligns better with the learning focused aims of educational institutions than many other definitions of entrepreneurship. It forms the basis of a resulting definition of entrepreneurial education leaning on value creation as a main goal for students. Letting students try to create value to outside stakeholders will then result in development of entrepreneurial competencies,

regardless of whether successful value creation is being achieved or not. Alluding to famous educational philosopher John Dewey's notion of "Learning-by-doing" the author of this report has proposed to label this a "Learning-by-creating-value" approach grounded in the field of entrepreneurship (Lack  us et al., 2013). According to this definition of entrepreneurial education, if a pedagogical intervention lets students learn to create value for other people (own group and teachers excluded), it is indeed entrepreneurial education. It could be done by actual value creation for other people as formal part of the curriculum (a preferred teaching "through" approach), or by learning about how to create value to other people (a less effective teaching "about" approach).

17. A definition of entrepreneurial education in line with this has been proposed by Danish Foundation for Entrepreneurship (Moberg et al., 2012, p.14): "Content, methods and activities supporting the creation of knowledge, competencies and experiences that make it possible for students to initiate and participate in entrepreneurial value creating processes". This definition of entrepreneurial education leans on the following underlying definition of entrepreneurship: "Entrepreneurship is when you act upon opportunities and ideas and transform them into value for others. The value that is created can be financial, cultural, or social." (p.14).

18. Implicit in these definitions is the notion of *entrepreneurial* value creation, i.e. that the value created should be novel, but also that it requires some kind of initiative on behalf of the value creator, that it involves acquisition of resources needed to create the value, that the value creation process is managed and owned by the initiator of the process (i.e. the student) and that this initiator also assumes the risk of failure (Shapero and Sokol, 1982, Okpara and Halkias, 2011). Value creation occurs extensively in society, and is tightly connected to people's happiness since helping others results not only in making a living but also in feelings of meaningfulness, participation, engagement and life satisfaction (Baumeister et al., 2012). Value creation is however seldom entrepreneurial, see Table 1. Two main categories of value creation are routine value creation and explorative value creation (O'Reilly and Tushman, 2013), see figure 3. Routine value creation is based on operational competencies such as process management and execution, optimization and incremental improvements. Explorative value creation is based on entrepreneurial competencies, see further in next section. Finding a balance between these two forms of value creation is important for society but difficult to achieve. Routine value creation is often emphasized due to its greater certainty of short-term success. As a solution to the resulting lack of explorative value creation, researchers have advocated separating structures between routine value creation and explorative value creation, i.e. forming ambidextrous organizations (O'Reilly and Tushman, 2004).

Table 1. Value creation examples. How different stakeholders in society are creating value for others

Stakeholder	Creates value for	How value for others is created	F/S/C type	R/E type
Established business	Customers, employees and shareholders	By offering commercial services and products	Financial value	Routine
Business entrepreneur	Customers, employees and shareholders	By offering novel commercial services and products	Financial value	Explorative
Social entrepreneur	Society and individuals in need	By offering novel social services and products	Financial, social and cultural value	Explorative
Welfare state	Citizens of the state	By offering welfare services	Financial, social and cultural value	Routine
Family member	Other family members	By always being there	Social value	Routine
Pet	Other family members	By always being there	Social value	Routine
Artist	Other individuals	By entertaining, provoking and triggering new thoughts	Cultural value	Routine / explorative
Student	Future employers /	By preparing for work life; by	Financial, social	Routine

	family / society	becoming an educated citizen	and cultural value	
Teacher	Students	By facilitating student learning	Social / cultural value	Routine

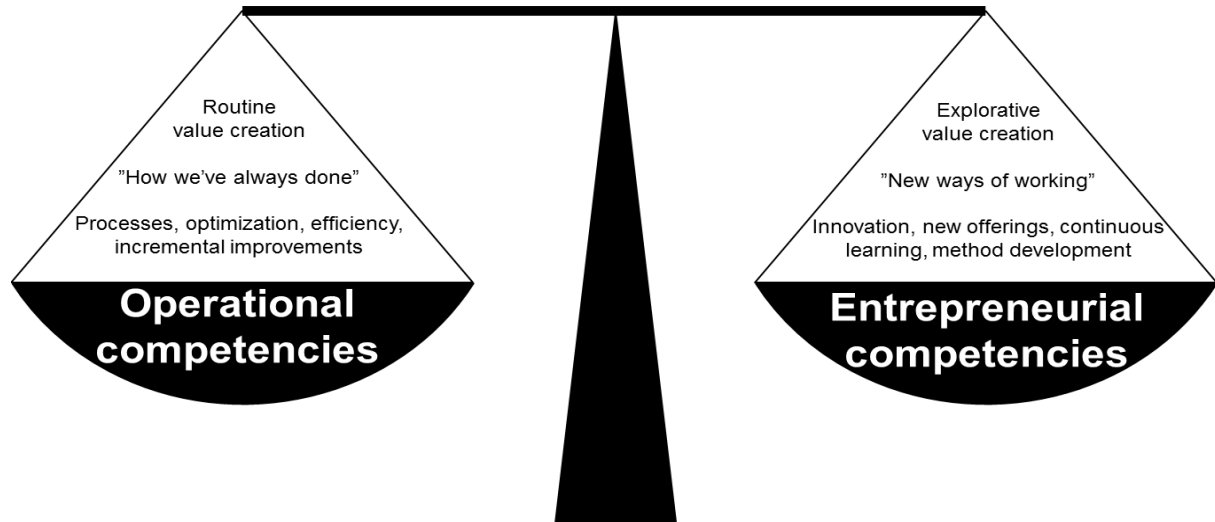


Figure 3. Two kinds of value creation. Routine value creation is based on operational competencies such as process management and execution, optimization and incremental improvements. Explorative value creation is based on entrepreneurial competencies. A balance between them is desirable but seldom achieved.

1.5 Entrepreneurial competencies

19. The main goal of most entrepreneurial education is to develop some level of *entrepreneurial competencies*. Table 2 contains a framework outlining some competencies often deemed to be entrepreneurial. Entrepreneurial competencies are defined here as knowledge, skills and attitudes that affect the willingness and ability to perform the entrepreneurial job of new value creation. This definition aligns with much of the literature on competencies in general as well as on entrepreneurial competencies (See for example Sánchez, 2011, Burgoyne, 1989, Kraiger et al., 1993, Fisher et al., 2008). The definition as well as the competencies in Table 2 can be viewed from a wide as well as a narrow perspective. Marketing skills can for example be necessary for a start-up in need to market its newly developed products, but also for a student wanting to get class-mates excited about an entrepreneurial project in order to get them to contribute to its development.

20. There are striking similarities between many of the outlined entrepreneurial competencies and what researchers label “non-cognitive factors”, such as perseverance, self-efficacy, learning skills and social skills (Farrington et al., 2012). Table 2 outlines a continuum showing that the top rows represent cognitive competencies, i.e. primarily intellectual capacity based competencies, and the bottom rows represent typical non-cognitive competencies. Cognitive competencies are easy to teach and evaluate, whereas non-cognitive competencies require learning-by-doing and are more difficult to evaluate (Moberg, 2014a). The current educational policy climate emphasizing high-stakes standardized testing, international large-scale assessments and institutional ranking has led to a focus on cognitive competencies, neglecting non-cognitive competencies. This has led to a narrowing of the curriculum, teaching to the tests and a de-professionalisation of teachers (Hursh, 2007, Amrein and Berliner, 2002, Ball, 2003, Young and Muller, 2010). The risks with such a neglect of non-cognitive competencies is increasingly being acknowledged by researchers (Farrington et al., 2012, Morrison Gutman and Schoon, 2013, Levin, 2013), highlighting the strong research evidence that students’ non-

cognitive competencies significantly impact academic performance and future labor market outcomes, perhaps even more than cognitive competencies (Moberg, 2014b). See figure 4 for five general categories of non-cognitive factors, and the reciprocal relationship between academic mindsets, perseverance, behaviors and performance.

Table 2. Entrepreneurial competencies. Framework outlining some key entrepreneurial competencies and their relation to cognitive and non-cognitive competencies. Adapted from (Lackeus, 2014).

	Main theme	Sub themes	Primary source	Interpretation used in this report
Cognitive competencies	Knowledge	Mental models	(Kraiger et al., 1993)	Knowledge about how to get things done without resources, Risk and probability models.
		Declarative knowledge	(Kraiger et al., 1993)	Basics of entrepreneurship, value creation, idea generation, opportunities, accounting, finance, technology, marketing, risk, etc.
		Self-insight	(Kraiger et al., 1993)	Knowledge of personal fit with being an entrepreneur / being entrepreneurial.
	Skills	Marketing skills	(Fisher et al., 2008)	Conducting market research, Assessing the marketplace, Marketing products and services, Persuasion, Getting people excited about your ideas, Dealing with customers, Communicating a vision.
		Resource skills	(Fisher et al., 2008)	Creating a business plan, Creating a financial plan, Obtaining financing, Securing access to resources
		Opportunity skills	(Fisher et al., 2008)	Recognizing and acting on business opportunities and other kinds of opportunities, Product / service / concept development skills
		Interpersonal skills	(Fisher et al., 2008)	Leadership, Motivating others, Managing people, Listening, Resolving conflict, Socializing
		Learning skills	(Fisher et al., 2008)	Active learning, Adapting to new situations, coping with uncertainty
		Strategic skills	(Fisher et al., 2008)	Setting priorities (goal setting) and focusing on goals, Defining a vision, Developing a strategy, Identifying strategic partners
	Attitudes	Entrepreneurial passion	(Fisher et al., 2008)	"I want". Need for achievement.
		Self-efficacy	(Fisher et al., 2008)	"I can". Belief in one's ability to perform certain tasks successfully.
		Entrepreneurial identity	(Krueger, 2005, Krueger, 2007)	"I am / I value". Deep beliefs, Role identity, Values.
		Proactiveness	(Sánchez, 2011, Murnieks, 2007)	"I do". Action-oriented, Initiator, Proactive.
		Uncertainty / ambiguity tolerance	(Sánchez, 2011, Murnieks, 2007)	"I dare". Comfortable with uncertainty and ambiguity, Adaptable, Open to surprises.
		Innovativeness	(Krueger, 2005, Murnieks, 2007)	"I create". Novel thoughts / actions, Unpredictable, Radical change, Innovative, Visionary, Creative, Rule breaker.
		Perseverance	(Markman et al., 2005, Cotton, 1991)	"I overcome". Ability to overcome adverse circumstances.
Non-cognitive competencies				

21. While there is almost no research done on the interaction between non-cognitive factors and entrepreneurial education (For some exceptions, see Moberg, 2014b, Rosendahl Huber et al., 2012), this is a promising area where entrepreneurial education can aid the improvement of general education

through its innate capacity to foster the development of non-cognitive competencies leading to increased academic performance.

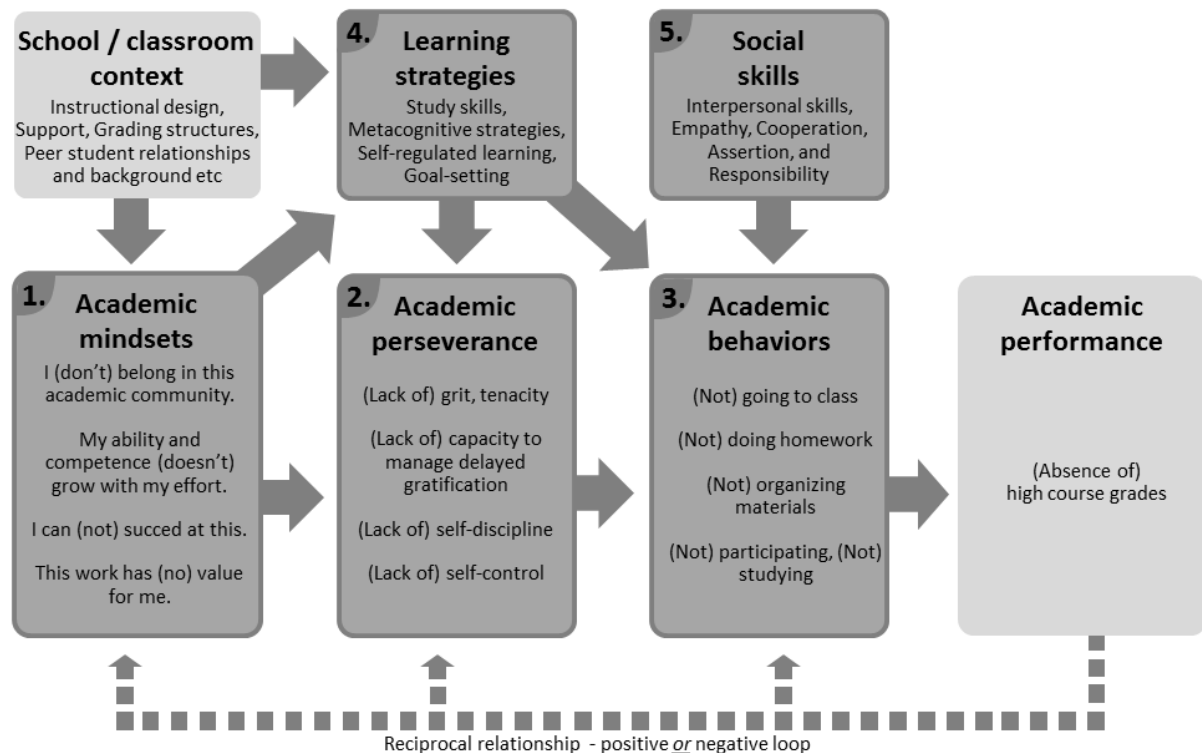


Figure 4. Non-cognitive factors. Five categories of non-cognitive factors impacting academic performance. (Adapted from Farrington et al., 2012)

1.6 The debates around entrepreneurial education

22. Much discussion around entrepreneurial education contrasts between a “traditional” and an “entrepreneurial” way of teaching. A common way to illustrate the differences is by showing a table with two columns contrasting the two modes of teaching, advocating for a paradigmatic change from traditional to entrepreneurial teaching (see for example Gibb, 1993, Johnson, 1988, Ollila and Williams-Middleton, 2011, Cotton, 1991, Kyrö, 2005, Kirby, 2004). Standardized, content focused, passive and single-subject based curriculum in traditional education is contrasted with an individualized, active, process-based, project centric, collaborative, experiential and multidisciplinary approach in entrepreneurial education. Most of this discussion is however being held without reference to the century-long debate between traditional and progressive education (Labaree, 2005, Cuban, 1990, Cuban, 2007), and the corresponding debate in philosophy between positivism and interpretivism, see figure 5. A few researchers have pointed out the striking similarities between entrepreneurial education and constructivist education (Löbner, 2006), but general awareness is very low. Other pedagogical approaches and movements with similarities to entrepreneurial education are experiential learning (Kolb, 1984), situated learning (Lave and Wenger, 1991), service-learning (Meyers, 1999), problem / project-based learning (Helle et al., 2006), adult learning (Jarvis, 2006), cognitive apprenticeship (Collins, 2006) and social constructivist learning (Steffe and Gale, 1995).

23. In this battle between competing positions, traditional education has remained the predominant approach in practice since more than a century. A main reason for this dominance according to Labaree (2005) is that in the end utility won over romanticism, with a message more

appealing to people in power and with far more convincing quantitative test results proving the behaviorist approach originally proposed by Edward Thorndike, placing the philosophical father of entrepreneurial education John Dewey (according to Pepin, 2012) on the losing side and regarded as too eclectic (Kyrö, 2005). Today traditional education shows no sign of weakening in the current education policy climate focusing on measurement and performativity (Ball, 2003, Apple, 2000, Biesta, 2009). Recent political pressure to increase emphasis on entrepreneurship in education has actually rather resulted in a value clash where teachers are reacting negatively on contradicting goals (Falk-Lundqvist et al., 2011).

POSITIVISM TRADITIONAL EDUCATION TRADITIONAL EDUCATION SCIENTIFIC METHOD		INTERPRETIVISM PROGRESSIVE / CONSTRUCTIVIST EDUCATION ENTREPRENEURIAL EDUCATION ENTREPRENEURIAL METHOD	
Science as... Learning as... Entrepreneurship education as... A method to...	Simplicity ...reductionist ...standardized ...single-subject ...harness nature	Complexity ...holistic ...localized and child-centered ...multidisciplinary ...unleash human nature	(Deshpande, 1983; von Bertalanffy, 1972) (Tynjälä, 1999) (Cotton, 1991) (Sarasvathy and Venkataraman, 2010)
	Individual ...reality a concrete structure ...individual work ...know-that ...objective	Social ...reality a social construction ...social interaction / storytelling ...know-who and know-how ...intersubjective	(Cunliffe, 2011) (Jeffrey and Woods, 1998; Egan, 2008) (Cotton, 1991) (Sarasvathy and Venkataraman, 2010)
	Content ...linear ...product focus ...content ...linear	Process ...iterative ...process focus ...process ...iterative	(Cunliffe, 2011) (Jeffrey and Woods, 1998) (Cotton, 1991) (Sarasvathy, 2001)
	Detached ...dispassionate / value free ...learner is passive ...absolute detachment ...transaction based	Attached ... meaning-making / ...value-bound ...learner is active and emotional ...emotional involvement ...commitment based	(Cunliffe, 2011; Lincoln and Guba, 1985) (Tynjälä, 1999; Egan, 2008) (Gibb, 1987) (Sarasvathy and Dew, 2005)
	Theory ...objective reality ...inert knowledge ...emphasis on theory ...observation & "law" discovery	Practice ...lived experience ...practical experiences ...emphasis on creation ...action & co-creation	(Weber, 2004) (Tynjälä, 1999; Egan, 2008) (Ollila and Williams Middleton, 2011) (Sarasvathy and Venkataraman, 2010)
Science as... Learning as... Entrepreneurship education as... A method to...	Science as... Learning as... Entrepreneurship education as... A method to...	Science as... Learning as... Entrepreneurship education as... A method to...	Science as... Learning as... Entrepreneurship education as... A method to...

Figure 5. Dualistic debates on multiple levels. *Entrepreneurial education as embedded in debates in philosophy, education and entrepreneurship (Lackéus et al., 2013).*

1.7 Comparing entrepreneurial education to other pedagogical approaches

24. Some common pedagogical approaches often claimed to be similar to or appropriate in entrepreneurial education are problem-based learning (Tan and Ng, 2006), project-based learning (Jones and English, 2004) and service-learning (Desplaces et al., 2009). Although these approaches suffer from similar problems with multiple definitions as entrepreneurial education, table 3 shows an attempt to illustrate some key similarities and differences. Project-based learning has been defined as letting students work on a preferably authentic problem and create an “artifact” addressing the problem, i.e. a final product such as a report, a model, a video etc. (Blumenfeld et al., 1991). Problem-based learning also starts with a preferably authentic problem, but does not end with the production of an artifact addressing the problem, but instead with discussing possible solutions and guiding students’ further study (Helle et al., 2006). Service-learning has been defined as classroom instruction integrated

with community service such as cleaning parks, visiting elderly and providing food to people in need (Spring et al., 2008). According to Spring et al. (2006) service-learning works best when students participate in the planning of the project, when the duration is one semester or longer, and when student reflection is explicitly facilitated.

25. Table 3 also illustrates some unique features of entrepreneurial education, such as emphasis on not only problems but also on opportunities (Rae, 2007), iterative experimentation in collaboration with external stakeholders (Sarasvathy and Venkataraman, 2011) and focus on (or even requirement of) newness or innovativeness of created artifacts / value (Shapiro and Sokol, 1982). Some features of entrepreneurial education are also rare in the other pedagogical approaches contrasted here, such as focus on value creation to external stakeholders (Bruyat and Julien, 2001), interaction with the outside world (Fayolle and Gailly, 2008), and artifact creation (Lack  us, 2013). These rare or unique features explain to a large extent why entrepreneurial education can trigger much higher levels of motivation, experienced relevancy, engagement and deep learning than can other pedagogical approaches (Lack  us, 2013).

Table 3. Comparison of pedagogical approaches. Similarities and differences between entrepreneurial education and some pedagogical approaches often stated to be similar.

Major focus on...	Entrepreneurial education	Problem-based learning	Project-based learning	Service-learning
...problems	X	X	X	X
...opportunities	X			
...authenticity	X	X	X	X
...artifact creation	X		X	
...iterative experimentation	X			
...real world (inter-)action	X			X
...value creation to external stakeholders	X			X
...team-work	X	X	X	
...work across extended periods of time	X		X	X
...newness / innovativeness	X			
...risk of failure	X			

1.8 Future answers to the question “What is entrepreneurship in education?”

26. In the future we can hope for less confusion in terminology used, higher awareness of the existence of a wide definition of entrepreneurship and increased definitional clarity and agreement among researchers and practitioners. It is desirable that the domains of entrepreneurship and education increase their collaboration with each other in the future, both within research and practice. Neither of the domains will likely progress our knowledge of entrepreneurial education theory and practice without the other’s help and committed collaboration.

27. We can also hope for increased acknowledgement in society that there is a problematic deficit of new and innovative value creation activity and that equipping all citizens with increased entrepreneurial competencies through entrepreneurial education is a viable strategy for alleviating this problem. For this to succeed it will probably help if entrepreneurial education is perceived as an effective and easy-to-use pedagogical approach alongside other progressive pedagogies such as problem/project-based learning, service-learning and others. Infusing value creation experiences across the entire curriculum can be one of the most important contributions entrepreneurship can make to education in the future.

28. It will however require substantial work both from researchers and practitioners. If entrepreneurial education is to advance beyond the currently marginalized position of innovative

pedagogy and separate minor subject status, much more is needed than calls for paradigmatic change in education. Assessment strategies need to be outlined that can be put to use by teachers in daily practice, allowing for detached and individual assessment of an inherently collective, social and emotional learning process. Ways to manage and reduce the complexity (see figure 5) that entrepreneurial education can result in need to be outlined. Strategies for embedding creative learning-by-doing into content and theory laden curricula need to be developed. If future work in the field of entrepreneurial education can succeed with these and other related challenges, the common answer to “What is entrepreneurship in education?” will perhaps be very different from today’s usual (lack of) answers and widespread confusion.

2. WHY IS ENTREPRENEURIAL EDUCATION RELEVANT?

29. Entrepreneurial education has seen worldwide exponential growth in higher education institutions (Kuratko, 2005), and was in 2001 offered at around 1200 business schools only in United States (Katz, 2008). On other levels of education such strong growth has not yet been seen, but development is under way with policy pressure exerted on educational institutions worldwide (see for example Ohe, 2012, Li et al., 2003, Farstad, 2002, Mwasalwiba et al., 2012). Today entrepreneurial education has become an important part of both industrial and educational policy in many countries (Hytti and O’Gorman, 2004). This chapter will first discuss the *stated* reasons for this focus on entrepreneurial education, and then outline some of the attempts that have been made to provide empirical evidence for some of the stated effects, indeed a challenging endeavor so far. Finally a way forward will be outlined taking into account the need to widen the definition of entrepreneurship used in assessment attempts in order to cater for other levels of education than higher education, and to provide evidence for other effects than purely business related.

2.1 Stated effects of entrepreneurial education

30. The most common reason that researchers and experts promote entrepreneurial education is that entrepreneurship is seen as a major engine for economic growth and job creation (Wong et al., 2005). Entrepreneurial education is also frequently seen as a response to the increasingly globalized, uncertain and complex world we live in, requiring all people and organizations in society to be increasingly equipped with entrepreneurial competencies (Gibb, 2002). Besides the common economic development and job creation related reasons to promote entrepreneurial education, there is also a less common but increasing emphasis on the effects entrepreneurial activities can have on students’ as well as employees’ perceived relevancy, engagement and motivation in both education (Surlmont, 2007) and in work life (Amabile and Kramer, 2011). Finally, the role entrepreneurship can play in taking on important societal challenges (Rae, 2010) has positioned entrepreneurial education as a means to empowering people and organizations to create social value for the public good (Volkmann et al., 2009, Austin et al., 2006). For an overview of areas where entrepreneurial education is stated to have an impact, see table 4.

31. The strong emphasis on economic success and job creation has indeed propelled entrepreneurial education to a prominent position on higher education level, but not as an integrated pedagogical approach for all students on all levels. So far primary focus has been on elective courses and programs for a few secondary education and university students already possessing some degree

of entrepreneurial passion and thus self-selecting into entrepreneurial education (Mwasalwiba, 2010). The emphasis on economic effects has so far hampered a widespread adoption of entrepreneurial education in the remaining parts of the educational system. Instead it is often viewed as a “dark threat” by teachers, stating that the “ugly face of capitalism” is now entering educational institutions (Johannisson, 2010, p.92). The stated necessity of all people to become more entrepreneurial due to globalization and increasing uncertainty on the market has spurred significant activity on policy level, but has not yet transferred into wide adoption among teachers on all levels of education.

32. A more viable starting point in education could be to perceive entrepreneurial education as a means to achieve more interest, joy, engagement and creativity among students (Johannisson, 2010, Lackeus, 2013). A few scholars have recently put forward the potential of entrepreneurial education to spur increased perceived relevancy of subjects taught among learners, increasing motivation and school engagement and alleviating problems of student boredom and dropout (Deuchar, 2007, Surler, 2007, Mahieu, 2006, Nakkula et al., 2004, Moberg, 2014a). This is however a very unusual approach so far in practice.

33. The booming student interest in social entrepreneurship (Tracey and Phillips, 2007) is another unusual but promising starting point for entrepreneurial education. Interest among young people to engage in solving societal challenges is high around the world (Youniss et al., 2002). Here entrepreneurship can be positioned as a tool for young people to attempt to act as societal history-makers (Spinosa et al., 1999). If such an interest can be mobilized as part of curriculum, it can propel deep learning and put theoretical knowledge to practical work in meaningful ways for students. Corporations can also be asked to participate with their financial resources in such endeavors.

Table 4. Overview of why entrepreneurial education is stated to be relevant and important. Job creation, economic success, globalization, innovation and renewal are common but not so effective on a wider scale. Joy, engagement, creativity and societal challenges are less common but promising.

	Individual level	Organizational level	Societal level	References
Commonly stated reasons for entrepreneurial education, but less effective in schools and for embedded approaches				
Job creation	More individuals are needed that are willing and capable to create job growth	Growing organizations create more jobs	Entrepreneurship and innovation are primary paths to growth and job creation	(Jones and Iredale, 2010, Hindle, 2007, Kuratko, 2005, Volkmann et al., 2009)
Economic success	Entrepreneurship can give individuals economic success	Organizational renewal is fundamental to every firm's long-term success	Renewal processes are fundamental to the vitality of economies	(Kuratko, 2005, O'Connor, 2008, Volkmann et al., 2009, Gorman et al., 1997)
Globalization, innovation and renewal	People need entrepreneurial skills and abilities to thrive in an ever-changing world	Entrepreneurial firms play a crucial role in changing market structures	A deregulated and flexible market requires people with higher-level general skills	(Henry et al., 2005, Jones and Iredale, 2010, Kuratko, 2005, Hytti and O'Gorman, 2004)
Rarely stated reasons for entrepreneurial education, but promising for schools and embedded approaches				
Joy, engagement, creativity	Creation / value creation / creativity is a main source of joy and pride for people	Employee creativity and joy is essential for the performance of new and existing organizations	Economic wealth of nations correlates with happiness of its citizens	(Amabile and Khaire, 2008, Amabile and Kramer, 2011, Goss, 2005, Diener and Suh, 2003)
Societal challenges	People can make a difference to society, and marginalized people can achieve economic success	Corporations can collaborate with small social entrepreneurship initiatives to create social value	Social entrepreneurship addresses problems in society that the market economy has failed to address	(Volkmann et al., 2009, Kuratko, 2005, Seelos and Mair, 2005, Austin et al., 2006, Rae, 2010)

2.2 Evidenced effects of entrepreneurial education

34. Research on the effects of entrepreneurial education has primarily leaned on a narrow definition of entrepreneurship. The commonly desired outcome of an educational intervention is that the students sooner or later end up creating new companies that are growing and creating jobs. This is in line with the previously described focus on the economic benefits of entrepreneurial education. Almost no research has been conducted using a wider definition of entrepreneurship, or the potentially resulting student engagement and societal value creation (for some exceptions, see Moberg, 2014a, Nakkula et al., 2004).

35. Most studies on the effects of entrepreneurial education lean on the assumption that becoming an entrepreneur is a consciously planned behavior. A linkage between attitudes, intentions and behavior is used, based on the “Theory of Planned Behavior” (TPB) taken from the domain of psychology (Ajzen, 1991, Bandura, 1997, Krueger et al., 2000), see figure 6. If people’s attitudes towards entrepreneurship are positively influenced by entrepreneurial education, their entrepreneurial intentions will also change, and it will subsequently lead to the so desired entrepreneurial behavior. Using this assumed linkage, researchers have administered surveys that try to capture the perceived entrepreneurial attitudes and intentions of students before and after an educational intervention. If the attitudes and/or intentions have changed in positive ways afterwards, it is deemed to be a successful entrepreneurial education. There are however numerous problems with this approach. It leans on a research method taken from natural sciences where the effects in a treatment group are compared to the effects in a control group not getting treatment. The strict circumstances needed to be fulfilled for this method to work are however almost never met in the domain of entrepreneurial education due to practical challenges, so the results need to be interpreted with significant precaution (Martin et al., 2013). The results themselves are also quite inconclusive (Lautenschläger and Haase, 2011), something which neither confirms nor refutes the utility of entrepreneurial education. Another challenge is the stipulated linearity of entrepreneurial thought and action (Krueger, 2009). In reality,

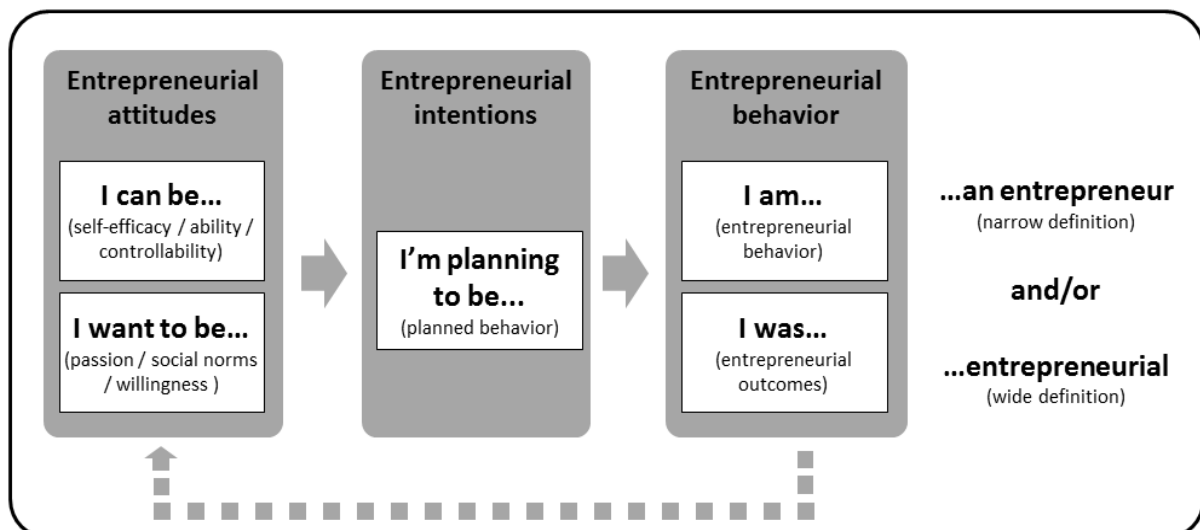


Figure 6. The theory of planned behavior (TPB). Entrepreneurial attitudes impact people’s entrepreneurial intentions, which in turn spurs entrepreneurial behavior. The dotted arrow illustrates the iterative nature of entrepreneurship which is not taken into account by impact studies leaning on the theory of planned behavior.

entrepreneurial processes are seldom linear (Sarasvathy and Dew, 2005), they are rather iterative which means that attitudes, intentions and behavior are dynamically interrelated, see dotted arrow in figure 6. This poses additional challenges to assessing the effects of entrepreneurial education. This said, there are undeniable similarities between Figure 6 and Figure 4, implying that the same quantitative methods used to assess entrepreneurial education could be used for assessing the development of non-cognitive competencies, perhaps with more useful results.

36. Another common strategy for assessing effects of entrepreneurial education is to capture actual entrepreneurial behavior as it occurs years after the educational intervention. The difficulty here is to prove that it was entrepreneurial education that caused the successful entrepreneurial behavior. Venture creation takes many years to reach success, making it difficult to isolate the role of entrepreneurial education (Fayolle et al., 2006). Self-selection bias aggravates this problem, making it difficult to rule out the possibility that already entrepreneurial people are attracted to entrepreneurial education, causing these higher levels of entrepreneurial activity (Bager, 2011). What is clear from behavioral research on assessment is however that entrepreneurship education graduates have a higher frequency of acting entrepreneurially (Kolvereid and Moen, 1997, Menzies and Paradi, 2002, Charney and Libecap, 2000). And regardless of if these students would have acted entrepreneurially or not without educational treatment, it is difficult to deny the benefit of these practicing entrepreneurial individuals having received some degree of preparedness through entrepreneurial education. In most other professions it is generally accepted and unquestioned that education is provided for future practitioners such as doctors, engineers, lawyers and others (Hindle, 2007).

37. Neither of the two main assessment strategies described above contribute more than marginally to illuminating the question of *how*, *when* and *why* students develop entrepreneurial competencies. The unfortunate situation when it comes to reliable evidence for the effectiveness of entrepreneurial education is that there is not much of the quantitative kind. Most of the affirmative quantitative evidence that has been put forward is methodologically flawed due to inherent challenges in the field (for some rare exceptions see Oosterbeek et al., 2008, Mento and Friedrich, 2007). There is however increasing qualitative evidence of effective practices (see for example Pittaway and Cope, 2007, Neck and Greene, 2011, Barr et al., 2009, Surlemont, 2007, Mueller, 2012). Perhaps we need to accept that the currently used methods for assessing the impact of entrepreneurial education need to be developed and refined further in order to deliver robust teacher recommendations and effectiveness evidence in line with widespread beliefs and convictions. One possible avenue is to use mixed methods, i.e. a mix of quantitative and qualitative methods.

2.3 Some novel ways to assess the development of entrepreneurial competencies

38. Some qualitative methods for assessing entrepreneurial competencies have been put forward by Bird (1995), i.e. student diaries, student observation, critical event interviewing and think aloud protocols. The formerly neglected role of emotions in learning has also been highlighted by some entrepreneurial education scholars, suggesting that emotional and critical events have “a prominent role to play in how entrepreneurs learn” (Cope, 2003, p.434), and that “the affective construct actually rare in entrepreneurship research, should take a more explicit place in learning and teaching” (Kyrö, 2008, p.46). Dirkx (2001) states that emotions are key to attributing meaning to our learning experiences, thus making emotions a central part of entrepreneurial education and a plausible assessment path going forward.

39. These methods and perspectives have been applied in a study conducted by the author of this report, using emotional and critical learning events as a link between educational design and developed entrepreneurial competencies, capturing such events through students’ own mobile smartphones using experience sampling methods (ESM, see Hektner et al., 2007), feeding them into

interviews with students and analyzing these interviews with text analysis software (Lackeus, 2013). This approach has yielded some insights into the “black box” of entrepreneurial learning in education, see figure 7, and opens up for increased understanding of how, when and why students develop entrepreneurial competencies. It also represents a novel strategy for assessing entrepreneurial competencies by assessing emotional activity during education rather than competencies obtained after education (Lackeus, 2014), which is similar to formative assessment strategies. Formative assessment has been defined as a teacher- or learner-directed feedback process that establishes where learners are in their learning, where they are going and what needs to be done to get them there (Black and Wiliam, 2009).

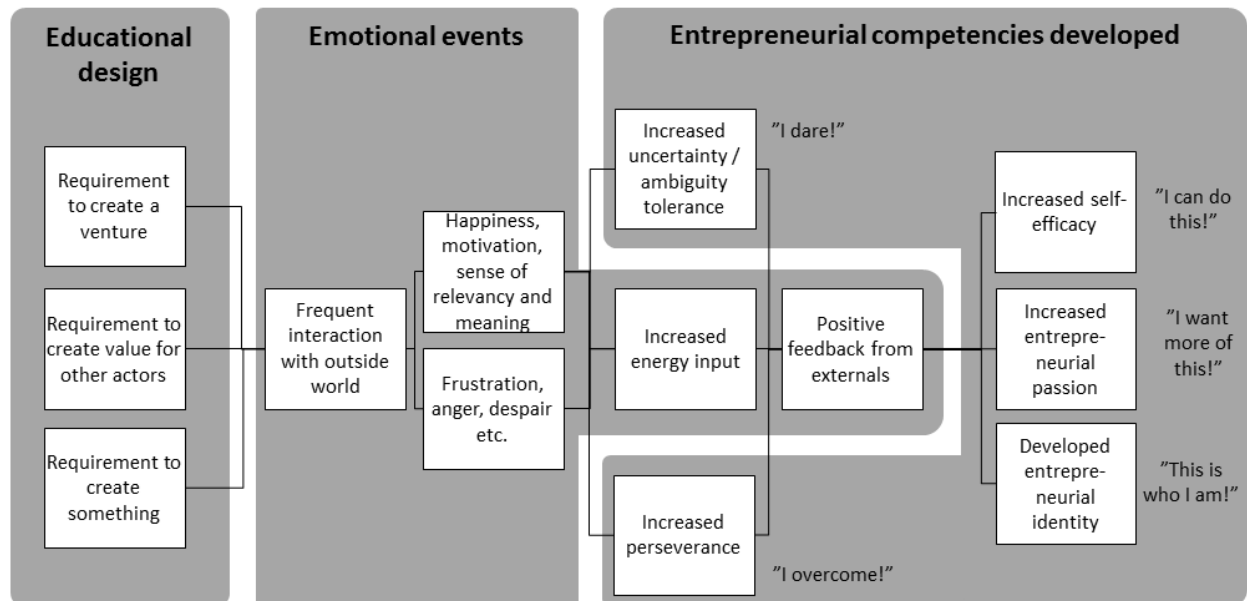


Figure 7. Early glimpse into the “black box” of entrepreneurial learning. A conceptual example of how educational design triggers emotional events which in turn develop entrepreneurial competencies. (Lackeus, 2014).

40. Another approach could be to lean on the numerous individual reports of “practical adequacy” of entrepreneurial education, rather than searching for an evasive “truth” on the effects of entrepreneurial education (cf. Sayer, 2010, p.69-70). This should however lean on learner perspectives rather than other stakeholders’ views of what allegedly works, since it is difficult for others to reliably guess what learners experienced and appreciated at an educational intervention. Whenever there are enthusiastic learners asking for and enjoying high quality entrepreneurial education there is good reason to try to understand, generalize and expand the diffusion of methods and theories underlying such positive cases. Some caution is however required. Literature on entrepreneurial education is replete with single case studies outlining what one particular team of teachers did and how it worked for them, but without a deeper decontextualization, categorization or contrasting of learners’ own experiences to other relevant educational environments within or outside the entrepreneurial domain.

41. Yet another approach could be to draw on neighboring domains where assessment issues are important, such as service-learning assessment (Steinke and Fitch, 2007, Furco and Root, 2010), problem / project based learning assessment (Helle et al., 2006, Vernon and Blake, 1993), non-cognitive factors assessment (Morrison Gutman and Schoon, 2013), formative assessment (Black and Wiliam, 2009) and other domains where a similar search for evidence is ongoing. To conclude, Table 5 summarizes some current and emerging assessment strategies in entrepreneurial education.

Table 5. Assessment in entrepreneurial education. Current assessment focus in entrepreneurial education based on TPB, case studies and entrepreneurial outcomes, contrasted to a future complementing assessment focus proposed to be built on ESM (Adapted from Lackeus, 2014).

Main focus of assessment strategy	Before education	During education	Immediately after education	Years / decades after education
Thoughts	TPB	ESM	TPB, Case studies	Case studies
Actions	-	ESM	-	Entrepreneurial outcomes
Emotions	-	ESM	-	-

2.4 Future answers to the question “Why is entrepreneurial education relevant?”

42. In the future we can hope for less discrepancy between stated effects of entrepreneurial education and those effects desired and appreciated by most teachers, as well as a corresponding shift in assessment research towards providing evidence for the effects teachers actually are interested in. We can also hope for a methodological development allowing researchers to better prove any effects of entrepreneurial education, from wide as well as narrow approaches to entrepreneurial education. This will probably entail more focus on qualitative and mixed research methods helping us to better understand how, when and why entrepreneurial education leads to desirable effects rather than merely if they lead to any stated effects or not. Promising avenues for such research are the role of emotions, links to non-cognitive competencies and the use of formative assessment strategies. Case studies and good (even “best”) practice studies will probably continue to be produced, and we can hope for increased effort of such initiatives to decontextualize and contrast their experiences to other cases and to existing theory, generating more generalizable knowledge and perhaps even new theory. In the future we will hopefully also see more research and practice on primary and secondary levels of education studying and applying embedded approaches where entrepreneurship is integrated into existing curriculum. It could help balancing the current heavy focus on voluntary business based courses and programs in higher education, so that the future common answer to “Why is entrepreneurial education relevant?” will resonate better with all students and teachers on all levels of education than today.

3. WHEN TO DO WHAT?

43. Establishing a progression model has recently been proposed as a solution to the problems of differing definitions of entrepreneurship, differing intended learning outcomes and differing pedagogical approaches in the domain of entrepreneurial education (Gibb, 2008, Blenker et al., 2011, Rasmussen and Nybye, 2013, Mahieu, 2006). A progression model allows for gradual change of definitions applied and learning outcomes stipulated as learners progress in the educational system, and can support teachers in their daily work with embedding entrepreneurship into education. Such models are however rare since the main focus among researchers has been higher education initiatives and programs.

3.1 Four progression models from United Kingdom, Denmark and Sweden

44. Gibb (2008) proposes that in order for entrepreneurial education to be embedded into the education system, it should be “child centred in primary [education], subject centered in secondary [education], vocational centred in further education and discipline centred at university” (p. 122). Based on this, Gibb outlines an evaluation framework linking this progression model to eight allegedly testable learning outcomes for each of the four levels of education (p. 138-141). These learning outcomes consist of different variations on entrepreneurial competencies much in line with Table 2 above. Gibb provides some example exercises and evaluation methods that could inspire teachers, such as asking learners to “explain what the use of some particular piece of knowledge might be to whom and why” (p. 132-137).

45. A progression model proposed by Blenker et al (2011) leans on two central ideas. The first idea is that entrepreneurial activity can lead to many kinds of value, not only economic value. The second idea is the existence of a value-creating entrepreneurial mindset and generic methodology possible to apply to all walks of life which they label “entrepreneurship as everyday practice” (see also Blenker et al., 2012), an approach very similar to the wide definition of entrepreneurship. They conclude that such an entrepreneurial approach to life is a mandatory component of all entrepreneurial education, no matter if the desired outcome is venture creation, growth or social change. Based on this they propose four basic building blocks that can develop entrepreneurial attitudes among learners, and that constitute practical recommendations that teachers can draw on: 1) Letting students construct entrepreneurial stories anchored in their own life world helps them develop their opportunity skills. 2) Letting students reflect upon problems and disharmonies in their own life world helps them develop everyday value creation skills. 3) Letting students imagine themselves as entrepreneurial individuals in a distant future helps them transform into a more entrepreneurial identity. 4) Letting students work in interdisciplinary teams picturing and then realizing entrepreneurial opportunities helps them develop work forms for “team-efficacy” (Blenker et al., 2011, p.425).

46. Another progression model has been proposed by the Danish Foundation for Entrepreneurship – Young Enterprise (Rasmussen and Nybye, 2013). They state that there are four basic dimensions that always need to be taken into account by educators, regardless of educational level. Entrepreneurial education needs to be based on practical actions by learners where they work in teams creating value for others. It needs to allow for creativity where learners get to try out their own ideas, apply their acquired knowledge and find new solutions. It needs to be connected to the environment outside the school / university, interacting with and learning from society’s cultures, markets and professional actors. Finally it also needs to relate to attitudinal aspects such as belief in own ability, ambiguity tolerance and risk of failure. These four basic dimensions are stated to be useful for teachers on all levels developing new educational content, new educational processes and new forms of assessments and exams.

47. The author of this report has proposed a progression model (Lackéus, 2013) that outlines four different types of action-based pedagogy, see Figure 8. According to this model, increasing complexity in the creation process could be introduced the higher up in the educational system you get. This can help teachers determine which class of activity to opt for in any given teaching situation depending on purpose, ability, resource access, interest and context. The further you get into the classification questionnaire (further down in Figure 8), the higher the potential student motivation and engagement, but unfortunately also the higher the teaching complexity. According to this classification, the common business plan focus in entrepreneurial education (Honig, 2004) is more in line with a creation approach than with a value creation or venture creation approach, since writing a business plan by itself does not create value to external stakeholders. Instead the business plan often becomes a deliverable to the teacher, and would not survive first contact with the assumed customers

(Jones and Penaluna, 2013). Project based learning is also an example of a creation approach since the artifacts are primarily used for teacher evaluation, not for creating value to outside stakeholders. Service-learning is a rare example of a value creation approach where value is created to the surrounding community.

48. The value creation approach is not so common in education today, but represents a promising compromise between student motivation and teacher complexity. Some new value creation tools that have emerged in the last decade include Effectuation (Read et al., 2011), Customer Development (Blank, 2005), Business Model Generation (Osterwalder, 2004), Lean Startup (Ries, 2010), Appreciative Inquiry (Bushe and Kassam, 2005) and Design Thinking (Johansson-Sköldberg et al., 2013). These tools will be outlined in next chapter of this report.

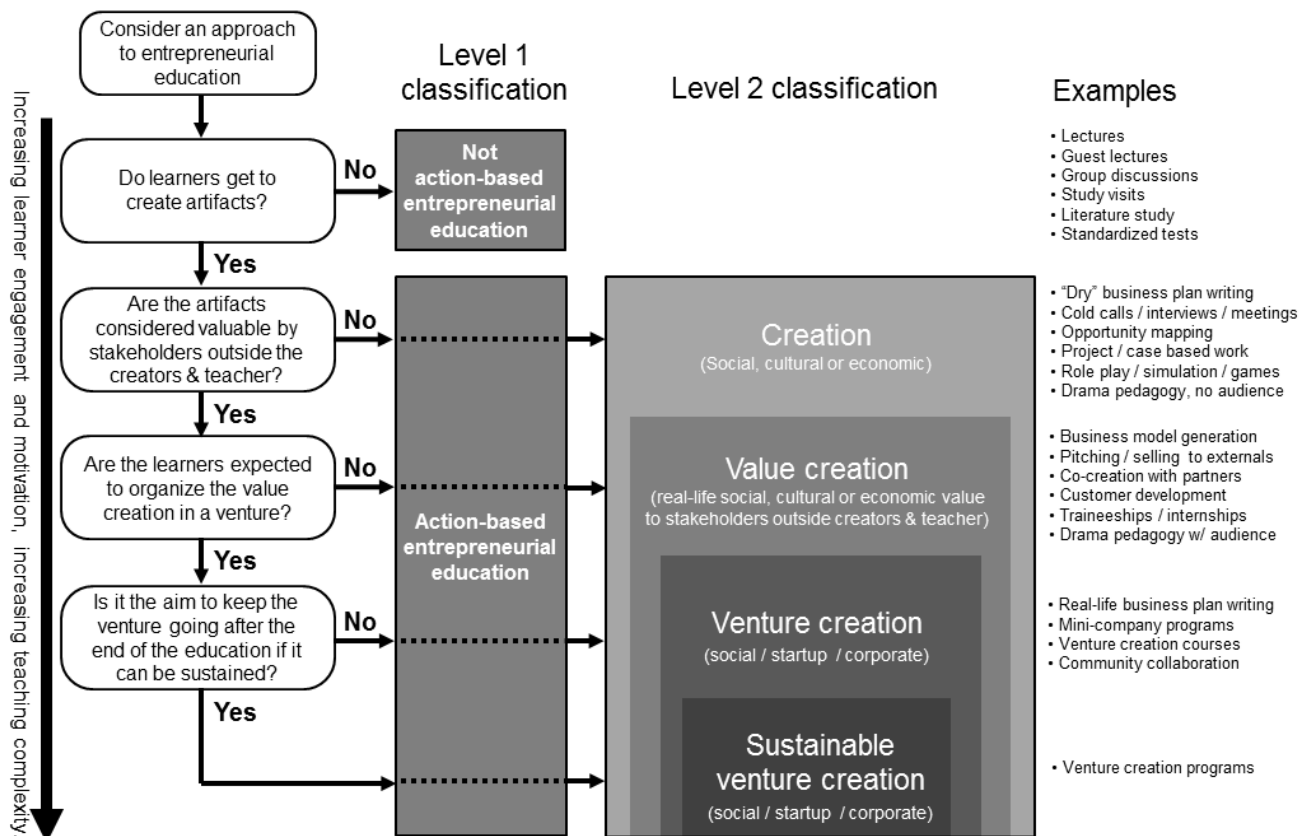


Figure 8. Classification of action-based entrepreneurial education. Four types of action-based pedagogy, a question scheme and some examples of pedagogical approaches (Lackéus, 2013).

3.2 Towards a unified progression model for entrepreneurial education

49. Based on the four above outlined progression models it is possible to construct a unified model incorporating many of the dimensions deemed to be central to achieving progression in entrepreneurial education, see figure 9. Some generic features have been highlighted by all of the authors of the four progression models, such as a team based approach, a focus on value creation, connecting the students to the outside world and letting students act on their knowledge and skills. This results in deep learning as well as development of entrepreneurial competencies, as outlined previously in this report.

53. In third step separate subject approach, theory is also made explicit. As learners approach the end of their education it is possible to add the goal of creating a sustainable venture with intention to incorporate after graduation, i.e. the sustainable venture creation approach (Lackéus, 2013). This adds to the engagement levels of students and also results in some of these ventures actually becoming real-life start-ups creating jobs and economic growth (see for example Lackéus and Williams Middleton, 2014, Barr et al., 2009). The final output of the separate subject approach is actual entrepreneurs creating ventures within or outside established organizations, but also entrepreneurial people creating growth and value in all domains of society (Williams Middleton, 2013, Lundqvist, 2014).

3.3 Future answers to the question “When to do what?”

54. In the future we can hope for a greater awareness of the need to develop and establish progression models for entrepreneurial education, rather than continuing the quest for a “one size fits all” approach to entrepreneurial education. We can also hope for researchers identifying some unifying characteristics of entrepreneurial education across all levels of education to a higher degree of certainty and with stronger empirical evidence than has been possible in this report. In the future teachers will hopefully have access to classifications, frameworks and other support material allowing them to pick and choose from a large variety of pedagogical tools and methods allowing them to more quickly identify and hone a teaching style and progression strategy appropriate to their own students, contexts and available resources. The future will hopefully also bring a consciousness that any age is the right age for introducing assignments where students use their competencies to create innovative value to people outside schools and universities. Earlier is of course better since it allows for better progression, but it is never too late to start. Such a start will hopefully also more often consist in embedded value creation for all students rather than separate venture creation for a few interested students.

4. HOW TO DO ENTREPRENEURIAL EDUCATION?

55. Many scholars state that there is only one way to learn to become entrepreneurial, and that is by learning through own experience. Cope leans on a variety of scholars (Minniti and Bygrave, 2001, Dalley and Hamilton, 2000, Young and Sexton, 1997, Gibb, 1997) when stating that there seem to be no shortcuts, it “can only be acquired through learning-by-doing or direct observation” (Cope, 2005, p.381). The research that has been done on how real-life entrepreneurs learn is however largely disconnected from the educational domain, and offers little advice to teachers. This leaves teachers with the unanswered question “learning-by-doing-*what?*”. There is a need for robust advice on what to let students do in order to develop their entrepreneurial competencies.

4.1 Activities that trigger entrepreneurial competencies

56. Previous research outlined in chapters 1-3 of this report as well as empirical data collected by the author of this report (Lackéus, 2014) can give some initial advice on learning-by-doing activities that can trigger the development of entrepreneurial competencies. Teachers should give their students assignments to create value (preferably innovative) to external stakeholders based on problems and/or opportunities the students identify through an iterative process they own themselves and take full responsibility for. Such assignments lead to repeated interactions with the outside world,

which triggers uncertainty, ambiguity and confusion. This should be regarded as a positive outcome and a source of deep learning. To alleviate the levels of difficulty and uncertainty such an assignment can result in, a team-work approach should be applied giving the students access to increased creative ability and peer learning opportunities. Sufficient time allowing for establishing fruitful relationships with external stakeholders should also be given to the students, preferably months or years. Robust advice on how to manage the value creation process should be given to the students, some of which will be outlined below in this chapter. Figure 10 outlines the relation between educational assignments, triggered activities / events and developed entrepreneurial competencies.

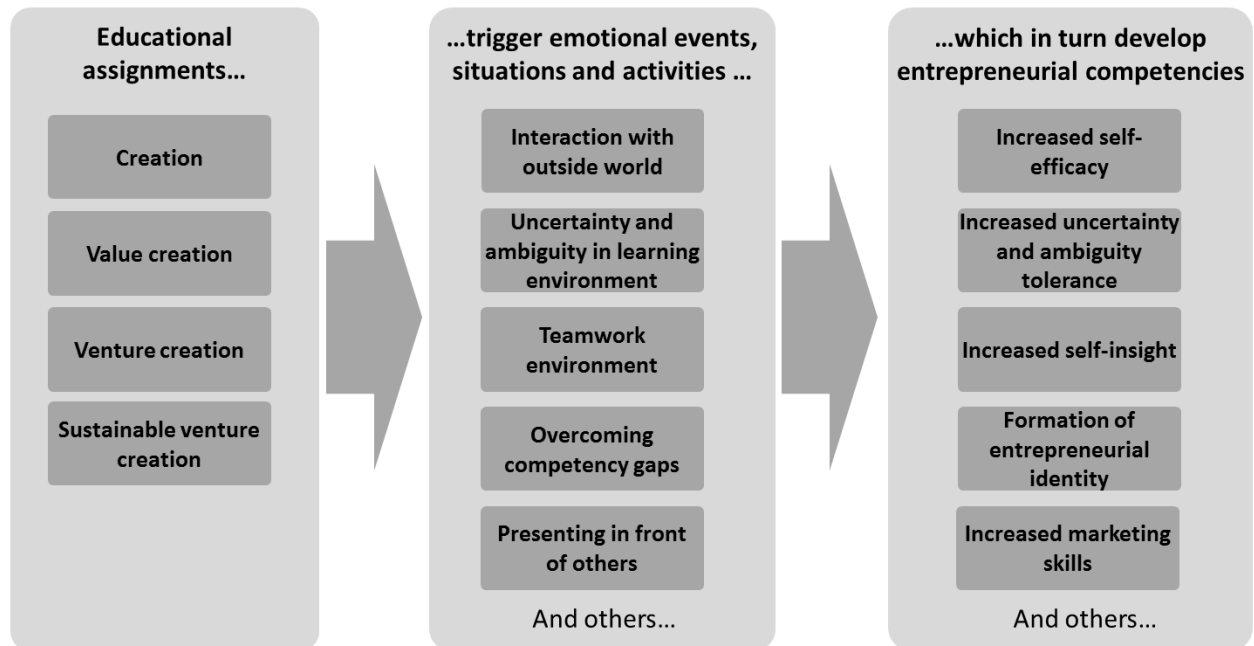


Figure 10. A model of entrepreneurial education and its outcomes. The relationship between educational assignments, emotional events / situations / activities and developed entrepreneurial competencies.

57. The assessment of such an assignment should concentrate on the activities triggered rather than the developed entrepreneurial competencies (Lackéus, 2013). Each individual's contribution in terms of interaction with outside stakeholders should be assessed and supported by the teacher continuously. In line with a Vygotskian perspective on learning (Roth and Lee, 2007), it is the interactions and activities that drive the learning process, and these interactions and activities should therefore be the focus of teachers' assessment rather than the evasive entrepreneurial competencies. Assessment strategies could include asking students to report names and other practical information about external stakeholders contacted, occurrence of external stakeholders willing to engage with the students, and letting students reflect on whether the value creation attempts were appreciated by the external stakeholders (for more examples, see Lackéus, 2013, p.34). Such assessment strategies will lead to what is often called constructive alignment, i.e. when the assessment applied is in alignment with what the students need to do in order to achieve the learning outcomes stated by the teacher (Biggs, 1996).

4.2 How learning-by-doing works

58. Figure 11 outlines a conceptual model for learning-by-doing based on Russian researchers such as Vygotsky, Leont'ev and Galperin. In learning-by-doing the student takes action together with other people, primarily classmates but also external stakeholders. This interaction is based on a shared

set of “mediating artifacts”, such as shared tools, rules, processes, knowledge, signs, ideas etcetera. A tool-mediated view on learning was proposed by Vygotsky as a reaction to the predominant acquisition-based model of learning in solitude explored by Piaget and others (Egan, 2004), where prepackaged knowledge is transmitted to passive recipients (Kozulin, 2003, Kozulin and Presseisen, 1995). The term “artifact” can be broadly defined as anything created by human art and workmanship (Hilpinen, 2011). According to Vygotsky and colleagues, human activity leads to two main outcomes; “externalization of activity into artifacts” (Miettinen, 2001, p.299) and “internalization of activity and gradual formation of mental actions”, i.e. construction of new mental abilities (Arievitch and Haenen, 2005, p.159). Here, externalization is the resulting value creation and internalization is the resulting deep learning. Shared artifacts, new artifacts and mental artifacts can all consist of tools, rules, processes, knowledge, ideas, etc.

59. Also illustrated in Figure 11 are the concepts of surface learning defined as memorization and acquisition of facts, and deep learning defined as abstraction of meaning and interpretation of experience (Jarvis, 2006). Surface learning informs action, and deep learning is the result of the shared inter-action. Deep learning is therefore by definition meaningful to learners, which leads to increased motivation. If the artifacts created become valuable to a wider community it will also trigger even higher levels of motivation and engagement. In essence, learning-by-doing can be regarded as an emotional and motivation laden process, where motivational levels depend on (1) what actions are taken, (2) what learning occurs and (3) what value is created.

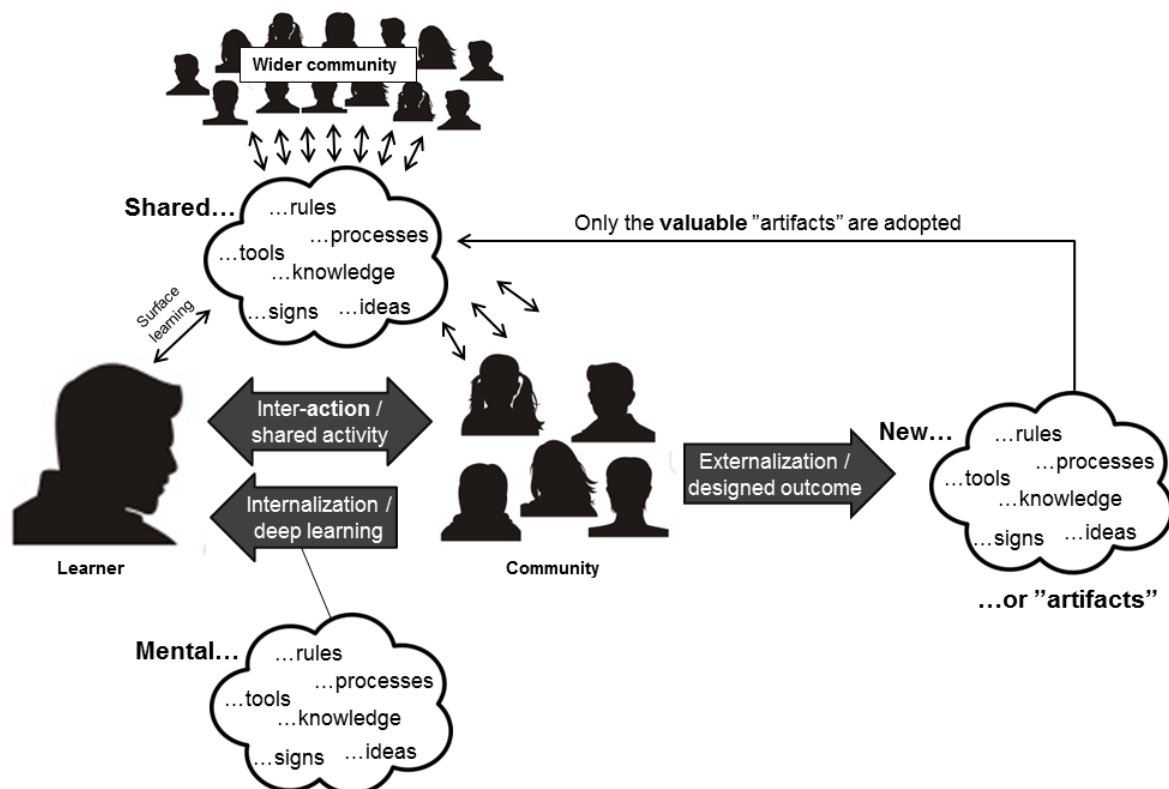


Figure 11. Conceptual model for learning-by-doing. Outlines how learning and value creation are interconnected in learning-by-doing and how they reinforce each other. (Lackéus, 2013)

60. This framework shows how learning (internalization) and value creation (externalization) are interconnected and can reinforce each other. The importance of a learner perspective for value creators such as entrepreneurs has been acknowledged before (see for example Cope, 2003). The importance of

a value creation perspective for learners has also been acknowledged before (see for example Blenker et al., 2011), and is perhaps one of the most important contributions that entrepreneurship can make to the educational domain. Psychology research also explains why a learning-by-creating-value approach can increase motivation, having shown that student motivation and enjoyment is enhanced through actions that are perceived both as controllable and valuable (Pekrun, 2006), and that participation in valued and challenging goal-oriented activities can result in strong feelings of confidence, happiness and motivation (Cantor and Sanderson, 2003). In fact, entrepreneurship has been described as altruistic acts of helping others (Gilder, 1981). The author of this report has labeled this an “altruistic paradox” in that we get much more motivated by doing good for others today than by doing good for ourselves in a distant future (Lackéus, 2013, p.35).

61. This framework for learning-by-doing also allows us to connect wide definitions of being entrepreneurial to the process of learning-by-doing. Mahieu (2006) has described the entrepreneurial culture promoted by OECD since 1989 as consisting of qualities such as habits of “learning, curiosity, creativity, initiative, teamwork and personal responsibility” (p.63). A learning-by-doing approach as framed here fosters habits of learning by default through its deep learning component. It also promotes initiative and responsibility, since it encourages people to take initiative to inter-action of the kind that leads to meaningful outcomes, sometimes even valuable to a wider community (i.e. taking responsibility). It is inherently teamwork based due to its reliance on interaction, and if the outcome is both novel and valuable to others it also fulfills what commonly is defined as creativity (Amabile and Khairé, 2008).

4.3 Some tools that can support the value creation process

62. The entrepreneurship domain is replete with models and frameworks outlining how entrepreneurs can go about creating value. Some of the more contemporary models and theories have a more explicit focus on value creation rather than venture creation, and can therefore be more easily used in general education. Three of them are outlined in table 6 and contrasted to the four basic kinds of activity outlined in the unified progression model earlier that have been shown to trigger development of entrepreneurial competencies. Also outside the entrepreneurship domain there are a few models and framework that can assist in value creation. Three of them deemed to be particularly helpful in entrepreneurial education are also outlined in table 6 and contrasted to the same four kinds of activity.

4.3.1 Effectuation

63. The concept of *effectuation* represents a quite practical and hands-on approach to teaching “through” entrepreneurship. It has been developed by Saras Sarasvathy and colleagues (see for example Sarasvathy, 2001, Sarasvathy and Dew, 2005, Sarasvathy and Venkataraman, 2011). Effectuation is described as an iterative process of decision making and active commitment seeking that results in creation of new value, where each iteration is started with questions such as “Who am I?”, “What do I know?” and “Whom do I know?”. Sarasvathy and Venkataraman (2011) propose that entrepreneurship could be regarded as a generic method for creating potentially valuable change by unleashing human potential, and has contrasted this to the scientific method designed to harness mother nature. Viewing entrepreneurship as a generic method holds much promise for the field of entrepreneurial education, but requires emphasis on taking action, value creation and using creativity tools (Neck and Greene, 2011).

Table 6. Tools, models and theories helpful for entrepreneurial education teachers. *Three concepts from the entrepreneurship domain and three concepts from other domains that could offer robust advice to teachers on various aspects of how to design innovative and iterative value creation processes.*

	Value creation	Interaction with outside world	Team work	Action
Some tools, models and theories from the entrepreneurship domain				
Effectuation (Read et al., 2011)	“Begin with a simple problem for which you see an implementable solution – or even something that you simply believe would be fun to attempt” (p.19)	“Meeting someone new changes ‘who you know’, ... ‘what you know’ and perhaps ‘who you are’” (p.145)	“Those who choose to join the venture ... ultimately make the venture what it is” (p.113)	“Action trumps analysis - ... mundane ideas can lead to successful businesses simply by doing the next thing and the next thing and the next.” (p.50)
Business Model Canvas (Osterwalder and Pigneur, 2010)	“A business model describes the rationale of how an organization creates, delivers and captures value” (p.23)	“What does [the customer] see? ...hear? ...think and feel? ...say and do? What is the customer’s pain? ...gain? ” (p.131)	“The business model canvas works best when printed out on a large surface so groups of people can jointly start sketching and discuss” (p.42)	“The starting point for any good discussion, meeting or workshop [is] a concept that allows you to describe your [idea]. (p.15)
Customer development / Lean Startup (Blank and Dorf, 2012)	“What is the smallest or least complicated problem that the customer will pay us to solve?” (p.80)	“There are no facts inside your building, so get outside ... and into conversations with your customers” (p.24/ 31)	-	“Conduct experiments to test your ‘problem’ hypothesis” (p.67)
Some tools, models and theories from other domains				
Appreciative Inquiry (Bushe and Kassam, 2005)	“Rather than focusing on problems that need solving, appreciative inquiry focuses on the examples of the system at its best” (p.165)	“Inquiry is intervention, ... as we inquire into human systems, we change them.” (p.166)	“Sentiments like hope, excitement, inspiration, camaraderie, and joy are central to the change process” (p.167)	“the inquiry should create knowledge, models, and images that are compelling to system members and provoke people to take action. (p.165)
Service-learning (Kenworthy-U’Ren et al., 2006)	“Creating tangible and intangible benefits for involved participants” (p. 122)	“students engage in real-world, concrete, professional, semester-long consulting experiences” (p.128)	“involves faculty, students and community working together.” (p. 122)	“thinking and action are inextricably linked” (Giles and Eyler, 1994, p.80)
Design thinking (Dunne and Martin, 2006)	“visualizing and imagining something that does not now exist that would take care of users’ needs” (p. 514)	“go out and understand users, understand everything they can about users, ... skills of observation and inquiry.” (p.514)	“collaboration with peers play an important part in the process.” (p.519)	“focus on the relation between creation and reflection-upon-the-creation that allows for constantly improved competence” (Johansson-Sköldberg et al., 2013, p.124)

64. Effectuation constitutes a useful toolbox for teachers in any domain and on any educational level. A student team can be asked to identify a simple problem in real life they would like to address. Preferably this problem is identified by taking into account the team's diverse interests, competencies and previous experiences. By interacting iteratively with the outside world they can learn more about the problem, the people affected by it and how they can help. They need not be anywhere near a solution when initiating the process, they only need to focus on the next step that needs to be taken to approach the problem and learn more about it. A book by Read et al. (2011) targeted to teachers and practitioners provides ample practical advice when using the effectual approach. This book and its concepts is somewhat venture creation focused, but many of the principles can be applied to value creation processes in all stages of education.

4.3.2 Business Model Canvas

65. The Business Model Canvas outlined by Osterwalder and Pigneur (2010) consists of nine basic building blocks needed when creating value to external stakeholders. This could be viewed as a simple checklist that students can use when planning their value creation attempts, asking them to provide answers to key value creation questions such as "Who do you help?", "How do you help?", "Who helps you?" and "What do you do?". It is particularly useful when working in groups allowing for sketching and discussing around ideas outlined by the team. Here too the language is business biased, but the principles are applicable to a wider context than venture creation. In fact, Osterwalder and his colleagues have written a book on how to apply these nine building blocks to personal development, which is well in line with a wide definition of entrepreneurship (Clark et al., 2012).

4.3.3 Customer development / Lean Startup

66. From Silicon Valley in United States comes two concepts that have quickly reached worldwide adoption among entrepreneurs; customer development (Blank and Dorf, 2012) and lean startup (Ries, 2010). These two concepts share many basic ideas and concepts and emphasize the need for quickly validating a hypothesis of whether some product or service creates value to people. The books by Blank, Dorf and Ries contain a wide variety of perspectives, methods and tools that help entrepreneurs take action through experimenting with real world stakeholders instead of getting stuck in planning and analyzing what might happen. These tools can also be applied to the educational domain allowing teachers to give robust advice to students on how to manage a value creation process involving outside stakeholders. Students can ask themselves questions such as "What can we ask a prospective customer *today*?", "How can we test our guesses on real people outside school?" and "How can we expose ourselves to the risk of being proven wrong?". While useful for supporting taking action and interacting with the outside world they however do not give any firm advice on team work issues.

4.3.4 Appreciative Inquiry

67. Appreciative Inquiry (AI) is a theoretical framework having its origins in the domain of organizational behavior. It has been identified as useful in the entrepreneurial education domain due to its emphasis on opportunities rather than problems (Blenker et al., 2011). As entrepreneurship has been defined as the crossroad between individuals and opportunities (Shane, 2003), AI is a theoretical framework implicitly anchored in entrepreneurship. It has been described as a method suitable for generating new ideas triggering action and "a new lens for seeing old issues" (Bushe and Kassam, 2005), and can lead to questions such as "What methods have been successful before?", "What can we learn from what works well?", "How can we get more of what is good in the future?" and "What do we need to do to realize our dreams?". A unique contribution of this theory is its strong capacity to infuse inspiration, joy and motivation into the teams working with a value creation process which

often requires coping with change. Positive energy and motivation are key in change processes, since people's resistance to change is well documented (Beer et al., 1990, Kotter, 1995). Such a source of motivation is important in education since learning and motivation are strongly linked (Boekaerts, 2010).

4.3.5 Service-learning

68. Service-learning has been defined as “an organized educational experience that both meets needs of the community and fulfills learning objectives” (Steinke and Fitch, 2007, p.24), i.e. classroom instruction integrated with community service such as cleaning parks, visiting elderly and providing food to people in need (Spring et al., 2008). It has been described as an approach somewhere in between internships, practica and volunteerism (Kenworthy-U'Ren et al., 2006). The approach has been applied in many educational disciplines, such as nursing, literacy learning, computer science, engineering, teacher education and business (Desplaces et al., 2009). It shares theoretical roots with entrepreneurial education in that both approaches have been stated to branch out from the educational philosophy of John Dewey (Giles and Eyler, 1994, Pepin, 2012). Still, very little research has been done on the interaction between them (For some exceptions, see Desplaces et al., 2009, McCrea, 2009, Litzky et al., 2009). Teachers interested in working with entrepreneurial education could probably learn much from service-learning initiatives, such as components of successful service-learning programs (Kenworthy-U'Ren et al., 2006) and factors that motivate and deter use of a service-learning approach in educational institutions (Abes et al., 2002). A common challenge for teachers in service-learning is how to create an activity that truly matches the needs of the community with the learning needs of the student.

4.3.6 Design Thinking

69. Design has been defined in many ways. Design could mean the creation of artefacts, it could mean problem-solving activity, it could mean a way of reasoning, reflecting and creating meaning (Johansson-Sköldberg et al., 2013). For the purpose of developing a curriculum for entrepreneurship, Boni et al. (2009, p.409) defined design as “a process of actions and decisions aimed at producing products, services, environments, and systems that addresses a problem and improves people's lives”, i.e. an inherently action-based approach to value creation. Brown (2008) pictures design thinking as a team-based iterative three-step process of 1) being inspired by the world through observing it closely looking for problems and opportunities, 2) brainstorming around plausible ideas for concepts that can help people and 3) testing these ideas on users through prototypes. Design thinking focuses on a creative search for what might be, instead of being limited by what is and what “should” be (Dunne and Martin, 2006). For teachers, design thinking represents yet another field where an emerging set of practices, tools and methods could be transferred and contextualized to an educational setting, supporting student learning and creativity. Students can ask themselves questions such as “How can we observe people in their authentic environment and reflect on their needs?” and “How can we solve their problems differently from anyone else?”.

4.4 Scaling entrepreneurial education

70. Educational reform often aims to achieve large-scale spread of good educational practices to classrooms. Most initiatives however fail in impacting classrooms and teaching practices (Kliebard, 1988, Fullan, 2007). The core of schooling remains relatively stable despite massive changes in the surrounding structures. This is due to teacher resistance, lack of incentives for change and institutions protecting the classroom from the ebb and flow of recurring educational reform (Elmore, 1996, Cuban, 2007, Cuban, 1990). If entrepreneurial education is to be scaled to something more than pockets of

excellence in isolated classrooms and schools, a number of key success factors of educational reform need to be taken into account.

71. Elmore (1996) has given some general recommendations based on previous major failures in educational reform, which can be applied to entrepreneurial education. Strong normative structures in entrepreneurial education for good teaching, evaluation, monitoring, inspection and feedback to teachers need to be established by multiple levels of authority external to schools and universities. Small groups of teachers consisting of both committed and skeptical teachers need to be established. These groups need to be given strong encouragement, support, time for focus and access to special knowledge. Teachers further need to be given the opportunity to iteratively and in teams learn by doing in their own classroom and by observing in others' classrooms, finding and honing an approach to entrepreneurial education that fits their particular context. A compelling reason to change practice also needs to be present, such as strong evidence for significant improvements in student learning. Elmore strongly dismisses the common practice of sending teachers off to training and expecting them to come home to their school and radically change their way of teaching.

72. Service-learning literature contributes with recommendations similar to Elmore's on how to support teachers (Abes et al., 2002). Mentoring, advice from colleagues, supporting office and professional organizations / conferences were the most important support factors stated by practicing teachers. The most important challenges to working with a service-learning approach was time, logistics, funding and incentive structures. Elmore's reasoning also explains why emphasizing job creation, economic success and renewal needs of society will perhaps never become a compelling reason for teachers to adopt entrepreneurial education practices. Many teachers will probably reason that what is good for society long-term is not necessarily good for student learning short-term, and on those grounds dismiss entrepreneurial education. Benefits such as joy, engagement, creativity and learning by taking on societal challenges could however be much more viable reasons for teachers to adopt entrepreneurial education practices, especially if proven that they contribute to strengthened academic mindsets and resulting academic performance. Emerging proof of this kind is coming from research both on entrepreneurial education (Deuchar, 2007, Surlemont, 2007, Mahieu, 2006, Nakkula et al., 2004, Moberg, 2014a) and on non-cognitive competencies (Farrington et al., 2012, Morrison Gutman and Schoon, 2013, Levin, 2013).

73. An important factor for change is also that new teaching practices are supported by laws, policies or regulations in line with broad social and political forces in society (Kliebard, 1988). In Sweden the addition of the word "entrepreneurship" (without even being defined or explained) in one single instance in a 281 pages long curriculum document issued by the Swedish National Agency for Education (Skolverket, 2011) has made a significant difference to the discussion and interest around entrepreneurial education among school teachers, principals, policymakers and other stakeholders (see further in Hörnqvist and Leffler, 2014).

4.5 Organizing interaction with the outside world

74. Interaction with the outside world is a key aspect of entrepreneurial education (Lackéus, 2013, Gibb, 2008). The most developed systems for facilitating educational institutions' interaction with the outside world can be found on university level. In a research string labeled "the entrepreneurial university" it is outlined how increased collaboration between universities, government entities and industry can be facilitated in accordance with a "triple helix model" (Etzkowitz and Leydesdorff, 2000). This is supposed to lead to economic growth, more entrepreneurial people and increased practical utilization of the knowledge generated at universities. This is called the "third mission" of universities (Philpott et al., 2011), and is often organized through "technology transfer offices" (TTOs) responsible for acting as an interface between the university

employees and the outside world. Common outputs of TTOs are licensing and royalty agreements for research-based intellectual property, informal transfer of know-how and product development collaboration (Siegel et al., 2003).

75. The role of students and learning in such interactions with the outside world has however not been a focus area for research nor for practice, rather the exception. There is almost no overlap between research on entrepreneurial education and research on technology transfer (Nelson and Byers, 2010). Only recently the opportunity of combining learning and value creation on university level has started to get noticed and acknowledged (Moroz et al., 2010, Meyer et al., 2011). One approach that is growing is the “venture creation approach” (Ollila and Williams-Middleton, 2011) where students get to create real-life ventures with intention to incorporate them after graduation. This approach has been shown capable of both increasing the entrepreneurial capacity available in a region, create jobs and alleviate the challenges with early stage university commercialization, often termed a “valley of death” (Lackéus and Williams Middleton, 2014, Barr et al., 2009). While this is early stage development, it represents cases from which other educational institutions can learn more about how to combine student learning and value creation. Some challenges identified are false perceptions of students’ inability to create value, allegations of being too practice oriented thereby losing out on content and theory, low levels of predictability in the learning process and challenging resource demands (ibid). Some requirements for successful combination of learning and value creation have also been identified, such as the presence of strong top management support, financial resources and operative champions managing the change process (Lackéus et al., 2011).

76. The most important factors for interaction with the outside world on primary and secondary levels of education are similar to those on university levels. Key factors are support from the school management, capacity to build organizational strength and clear goals and incentives (Sagar et al., 2012). Other important factors include a flexible time schedule with students allowing for longer uninterrupted lessons, time allowed for pedagogical discussions among teachers, time allowed for managing the change process and individual reflections needed to shape a new way of teaching. The teacher’s and his/her colleagues’ personal character traits and dispositions are also key factors since it takes courage to let go of the control when introducing uncertainty and ambiguity into educational processes. A well-functioning teacher team is seen as a requirement whereas skeptical colleagues are seen as barriers (Sagar et al., 2012). Since entrepreneurial education stipulates interaction with outside world for all levels of education, there should be opportunities for primary and secondary education levels to learn from the more advanced support structures found on higher education levels, given certain contextualization to school environments.

4.6 Future answers to the question “How to do entrepreneurial education?”

77. In the future we can hope for increased understanding of when, how and why learning-by-doing works and how it can be integrated into education on all levels and for most (if not all) subjects. The tools, methods and concepts presented in this chapter have hopefully been contextualized to education resulting in curriculum material supporting teachers and students, a task preferably accomplished through close collaboration between experienced and committed teachers on all levels of education and researchers in entrepreneurship *and* education, in line with recommendations by Elmore (1996). A more comprehensive list of tools, methods and concepts useful for iterative student-driven value creation processes in education will hopefully be compiled, together with illustrative case studies outlining generalizable features. The code will hopefully be found for how to unlock the door to the classroom, leading to teachers widely adopting effective and efficient entrepreneurial education pedagogy. If so, it will have happened through a concerted effort involving teachers, students, parents, principals, policymakers, researchers, authorities, international associations and other key stakeholders, all playing their important role in the substantial challenge of succeeding in educational

reform. In the future we will hopefully also see the establishment and strengthening of explicit support structures in schools, colleges and universities as well as other crucial management and organizational structures, supporting teachers and students in the task of interacting with the outside world leading to tandem learning and value creation.

5. CONCLUSIONS

78. This report has discussed many of the opportunities with entrepreneurship in education, such as its capacity to trigger deep learning and instill engagement, joy, motivation, confidence and feelings of relevancy among students, but also its stated and to some extent evidenced effects on job creation, economic success, renewal and innovation for individuals, organizations and society at large. The many challenges have also been discussed, such as lack of support, time and resources in educational institutions, assessment difficulties for both teachers and researchers, definitional confusion partly due to absence of a progression approach, the considerable challenges any novel educational reform faces and the lack of firm advice to teachers searching for answers to the crucial question of learning-by-doing-*what*?

79. In an attempt to remedy some of these challenges an idea of putting value creation at the heart of entrepreneurial education has been put forward in this report. Theoretical foundations, related research and practical implications of this idea have been put forward, along with contrasting of entrepreneurial education defined this way to other pedagogical approaches, debates and frameworks. Six different tools, methods and approaches from various fields have been outlined and stated to be capable of contributing with practical advice to teachers and students in their attempts to create value to external stakeholders as formal part of curriculum.

80. The report has also outlined some hopes for the future in terms of how entrepreneurial education will be perceived in the future, why it will be deemed to be relevant and effective, when it will be applied and how it will be done in practice by future teachers and related stakeholders. Some important areas for future improvement have been put forward, such as a need to increase awareness of entrepreneurial education as a pedagogical approach relevant to all students and on all levels of education, a need for more and closer collaboration between researchers and practitioners in the two domains of education and entrepreneurship, a need for closing the gap between stated and desired effects of entrepreneurial education and a need for increased understanding of when, how and why entrepreneurial education can develop entrepreneurial competencies, especially on primary and secondary levels of education and with an embedded approach.

81. Despite its promising effects on students and society, it is important to keep in mind that the field of entrepreneurial education is in a quite early stage of development. It is still regarded as an innovative but marginal pedagogical approach spurring much interest but also much confusion among various stakeholders. There is tremendous work remaining if we are to succeed in making effective and efficient entrepreneurial education available to a majority of people in the educational systems of the world. And the road to achieving such an ambitious goal is still long, winding and risky. Hopefully this report can constitute some guidance to committed drivers on this road.

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Paper 6

Two flavors of entrepreneurial education

- happiness empowerment versus meaningful creativity

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1 Introduction

Entrepreneurial education has been stated to promote capitalism through its alleged connections to neoliberalism (Erkkilä, 2000, p.124-126). Some teachers see it as a way to covertly introduce capitalist values into the education system, thereby clashing with traditional humanistic values in education such as equity, participation and the common good (Korhonen et al., 2012; Rose, 1998; Komulainen et al., 2011). Neoliberalism celebrates market mechanisms through privatization, competition through the exercise of 'freedom of choice' and self-sufficient individuals taking own responsibility for their life's necessities (Castree, 2010). In a neoliberal state, collective well-being is maximized when each individual focuses on his or her happiness through constant strategizing and making profit versus loss calculations for oneself (Rose, 1998).

The alleged connection between neoliberalism and entrepreneurial education can be seen as valid when the ultimate goal of entrepreneurial education is to empower students to achieve happiness for themselves through entrepreneurship. However, when the ultimate goal of entrepreneurial education is to let students engage in creative activities aiming to change the world into a better place, the alleged connection seems much less valid. Recent research in psychology and philosophy has pointed out some key differences between happiness and meaningfulness (Baumeister et al., 2012; Metz, 2009; Wong, 2014). Whereas happiness is about pleasant experiences for oneself through means of our five senses, meaningfulness is about the creative actions we take and the benefits they generate for others (Frankl, 1985; Feldman and Snyder, 2005; Metz, 2009). This paper explores these two quite different goals of human activity as outlined in well-being theory and motivation theory, and relates this to different forms of entrepreneurial education. Two distinct prototypic flavors of entrepreneurial education are outlined, where one aims to produce empowered individuals maximizing their own happiness through goal-directed achievement, and the other aims to produce creative citizens striving to instigate meaningful change for society even if it comes at a cost in reduced happiness for themselves.

This article proceeds as follows. First we look at how neoliberalism and entrepreneurial education have been defined and how their commonalities have been described in extant literature. Then we outline a new lens based on well-being and motivation theories, to use in our study of the relationship between entrepreneurial education and neoliberalism. Finally we apply this lens in order to try to shed some new light on two distinct flavors of entrepreneurial education, and discuss implications for entrepreneurial education as well as for education more in general.

2 Neoliberalism and entrepreneurial education

In this section we outline basic tenets of neoliberalism, entrepreneurial education and the alleged interaction between them.

2.1 Neoliberalism

The key idea of neoliberalism is to let governments pass legislation that lets autonomous entities such as individuals, groups and organizations self-organize and freely determine the best way forward for themselves, and at the same time by power of micro level market-like optimizations through such free choice maximize the total well-being in society (Rose, 1998). Castree (2010) has outlined seven principal characteristics of neoliberalism; privatization, marketization, state deregulation, market-friendly regulation, use of market proxies in government sectors, encouragement of NGOs to assume social responsibility and the creation of self-sufficient individuals. At its best, neoliberalism combines freedom of choice for the individual with optimal use of expertise to result in a higher level of wealth, health, well-being and efficiency in society than other policies could offer (Robinson, 2010; Rose, 1998). At its worst, it leads to governments handing over the power of nations to profit-maximizing multinational corporations, leading to commercial values overruling human needs, neglect of the common good and indoctrination of anti-democratic values (Down, 2009; Giroux, 2005). Being a pejorative term itself, neoliberalism has been stated to be the root of a multitude of evils in society, such as plundering of society for profit, looting of public lands, allowing for war profiteers to flourish, facilitating pollution of the environment, turning schools into shopping malls and reducing education to mere preparation for standardized tests (Giroux, 2005).

Neoliberalism is often associated with an emphasis on enterprising individuals taking autonomous responsibility for their life, exercising their freedom to choose whichever path in life that optimizes their own happiness and self-esteem (Rose, 1998). The social domain is rephrased as an economic domain where economic individuals (*homo oeconomicus*) make constant cost-benefit calculations to optimize their private life as well as their work life (Lemke, 2001). At their disposal are a plethora of "technologies of the self", i.e. therapeutic systems that can help people attain happiness, wisdom or perfection (Foucault, 1988, p.18). What constitutes happiness is further defined by self-help experts articulating appropriate life-styles for citizens, leading to a hedonistic and individualistic "cult of the self" (Rose, 1998). While compelling to many lay people, the resulting flip side of neoliberalism is that when the state withdraws from explicitly taking care of its population, each citizen needs to assume responsibility for the consequences of his/her choices and non-choices. This includes success but also potential failure, leading to a "no excuses" culture of blaming unsuccessful citizens for their own failure (Petersen and O'Flynn, 2007). This has been labeled the "price-tag" of neoliberalism (Lemke, 2001). Such a meritocratic society increases inequality by being more beneficial to the people in possession of the traits and resources conducive to success, such as the "right" class, race and gender (Gill, 2014). Such effects have also been shown to impact educational institutions in terms of neoliberal policies leading to increased inequality in schools (Apple, 2001; Hursh, 2007).

2.2 Entrepreneurial education

Entrepreneurial education is a unifying term for entrepreneurship education and enterprise education (Erkkilä, 2000). Entrepreneurship education has been defined as developing competencies necessary to set up a new venture or business (QAA, 2012). Enterprise education has been defined as developing competencies necessary to generate and realize ideas (ibid). In line with this, Mahieu (2006), has proposed a narrow definition of entrepreneurship as focusing on starting a company and becoming *an entrepreneur*. A wider definition of entrepreneurship focuses on personal development, creativity, self-efficacy, initiative-taking, proactiveness and perseverance, i.e. becoming *more entrepreneurial*. By disregarding differences in organization creation implications of these two views, a common core of entrepreneurship has been articulated as creating new kinds of value for others (Bruyat and Julien, 2001; Fayolle, 2007). A

corresponding definition of entrepreneurship as new value creation for others has been stated to be particularly suitable for the educational domain, since it avoids the potential definitional confusion resulting from two very different forms of entrepreneurial education (Lack us, 2015). Any educational intervention that allows students to learn by creating new kinds of value to others is thereby deemed entrepreneurial.

Entrepreneurial education has been positioned as the answer to a multitude of societal challenges, such as the need to create economic growth (Kuratko, 2005; Gorman et al., 1997; Hindle, 2007), develop key competencies (Henry et al., 2005; Hytti and O’Gorman, 2004), increase student engagement in schools (Moberg, 2014) and increase citizens’ ability to address societal challenges (Volkman et al., 2009; Rae, 2010). On an individual level, entrepreneurial education has been stated to allow for fostering self-reliant and opportunity-seeking individuals with an enterprising attitude to work and life (Mwasalwiba, 2010). What is seldom specified is whether the focus is on opportunity-seeking for oneself or for others. In today’s prevailing “cult of the self” in many Western countries (Hofstede, 1983) one could assume that all entrepreneurial opportunities are implicitly stated to be opportunities for oneself, but in accordance to a value creation based definition of entrepreneurship the value is by definition created for someone else. What is meant by self-reliance is also usually implicit, not specifying whether it is a self-reliance in terms of providing for one’s own income and well-being or self-reliance in terms of possessing a strong capability to independently initiate creation of new kinds of value to others. In later sections of this article we will come back to this perceived gap in the literature on entrepreneurial education.

2.3 The alleged links between neoliberalism and entrepreneurial education

Komulainen et al. (2011) have pictured the policy pressure for entrepreneurial education as an attempt to restructure the educational system in line with neoliberal values. Seeing education as a means towards often economic ends, rather than an end in itself, is stated to represent a neoliberal vocationalization of education, converting teachers to customer service agents of a human capitalist system. Based on the stereotypic teacher perception of entrepreneurs as self-reliant and risk-taking male heroes, they picture emphasis on entrepreneurial education as a means to preserve and strengthen outdated but widespread views on what entrepreneurship is. Thus, when policy-makers ask of teachers to develop students’ entrepreneurial competencies, they at the same time spur a reproduction of the male hero myth of entrepreneurship (cf. Ogbor, 2000), leading to increased gender, class and race inequality.

Berglund (2013) claims the enterprising self to be at the core of entrepreneurship and entrepreneurial education. She outlines this particular ideal of an individual as someone seeking to maximize her own power, her own happiness and her own quality of life. Here, the UK mobilization towards enterprise education and other European examples are used to illustrate a trend towards educating rational choice focused individuals optimizing their own employability, flexibility and self-responsibility, well in line with the goals of neoliberalism.

The link between neoliberalism and entrepreneurial education relies upon the core idea of self-optimizing individuals, by means of the centrality of *homo oeconomicus* in neoliberalism (Lemke, 2001). This is in line with egoistic, heroic and individualistic views of entrepreneurship, but does not align with more altruistic (Gilder, 1981), collectivistic (Tiessen, 1997) or communitarian (Deuchar, 2007) views of entrepreneurship, nor with Bruyat and Julien’s (2001) definition of entrepreneurship as the creation of new kinds of value for other people.

3 Establishing the analytic lens of well-being and human motivation

In this section we outline theory and literature from the domains of well-being, positive psychology, motivation theory and entrepreneurial motivation theory. Table 2 summarizes some key aspects relevant to this article. This will later be used as a lens for analyzing and discussing two different flavors of entrepreneurial education.

3.1 Well-being research on what constitutes "a good life"

Scholarly attempts to increase our understanding of what constitutes "a good life" is usually labeled well-being research or positive psychology. Such research has potential to impact a wide array of dimensions in society, since many change efforts in society are aimed at improving the daily life of people and can gain clarity and effectiveness by having a clear view of what is aimed for (Ryan and Deci, 2001). A common construct used is *quality of life*, stated to consist of *objective human needs* and *subjective well-being* (Costanza et al., 2007). Some basic human needs are food, water, rest, shelter, reproduction, security, affection and freedom. Subjective well-being has been defined by Seligman (2012) as consisting of five measurable elements; positive emotion, engagement, relationships, meaning and achievement, abbreviated as PERMA. Positive emotion is interpreted as a mood induced by a pleasant life. Engagement is interpreted as being in "flow", being completely absorbed by a task and losing track of time. Relationships is interpreted as meaningful experiences shared with other people, often in close and long-term relationships. Meaning is interpreted as belonging to and serving something that is bigger than the self, often despite its sometimes detrimental impact on other elements of PERMA. Achievement (or accomplishment) is interpreted as achieving one's goals solely for their own sake, isolated from any eventual resulting impact on the four other elements of PERMA, i.e. winning just for the sake of winning.

In 20:th century's prevailing behaviorist and cognitivist research paradigm, positive feelings were not a legitimate object of scholarly studies (Kahneman et al., 2003). Focus was instead on pathology and psychological disorder, neglecting what makes life worth living (Seligman and Csikszentmihalyi, 2000). Humans were regarded as passive vessels responding to stimuli, rather than active individuals with a free will to choose among multiple alternatives for purposive action (Seligman et al., 2013; Seligman and Csikszentmihalyi, 2000). This led to well-being and positive psychology remaining under-researched concepts for many decades, neglecting the potential of creative humans performing at their best and in "flow" (Csikszentmihalyi, 1991). In the 21:st century, positive psychology has grown rapidly and has been applied to a wide range of disciplines and professions such as education, healthcare, economics, political science, leadership, management and social services (Donaldson et al., 2011). A subdomain has been labeled positive education, defined as integrating principles of positive psychology into the academic curriculum in order to improve students' well-being and mental health (Norrish et al., 2013; Seligman et al., 2009). Kristjánsson (2012) has provided an overview of critique against this movement, tentatively labeling it as old wine in new bottles based on its many similarities with previous research in educational psychology. There is also a general critique of positive psychology provided by Lazarus (2003), claiming that it is a shallow and slogan based movement based on sloppy research methods and merely reframing old insights from psychology.

A common method to assess quality of life has been to ask a question such as "'How satisfied are you with your life as a whole these days?'" (Schwarz and Strack, 1999, p.61). The responses given are however too context dependent and culturally biased to give reliable information that can guide public policy. Increasing focus has therefore been given to moment-by-moment assessment of well-being in terms of momentary experiences of well-being (Diener, 2000). The experience sampling method (ESM) is a common method consisting of short surveys capturing respondents' experiences directly in their natural environment, attempting to capture the "flow" of everyday experience (Hektner et al., 2007). This leads to

a high level of ecological validity (Reis et al., 2014), and reduces or eliminates the cultural norms based retrospective bias of people reporting their life experiences (Oishi, 2002).

Emerging evidence in well-being research has illustrated the shortcomings of the usual economic assumption that people will and should always optimize their self-interest (Kahneman et al., 2003). People act in unselfish and helping pro-social ways for many reasons despite at times considerable cost for themselves (Batson et al., 2008). And even if they would indeed optimize on self-benefit in terms of economic wealth, this will still not increase their well-being unless they were previously very poor (Myers and Diener, 1995). Research has shown that the degree of well-being of wealthy people is largely similar to that of non-wealthy people, and that the well-being of wealthy people is more related to the enjoyment and involvement in the work that has made them wealthy than to the resulting spending power of the money they made from it (Diener et al., 1985).

3.2 Contrasting happiness and meaningfulness

A key aspect unrecognized by Seligman's PERMA model of well-being is the potential conflict between happiness and meaningfulness (Wong, 2014). A classical example is the parenthood paradox (Baumeister, 1991), where a decrease in perceived happiness among parents due to stress and increased burden is accompanied by an increase in perceived meaningfulness due to a greater purpose in life (Rizzo et al., 2013). In order to truly pursue meaningfulness with others we often need to sacrifice happiness for ourselves, at least to some extent short-term but perhaps also significantly long-term (Wong, 2014). Some state that humans' inclination to opt for such a meaning-seeking sacrifice, exemplified by people such as Mahatma Gandhi, Oskar Schindler, Raoul Wallenberg, Mother Teresa and others (Batson et al., 2008), is what ultimately makes us human (Frankl, 1985; Baumeister et al., 2012). While the PERMA model posits meaningfulness as an instrumental goal to achieve the ultimate goal of personal well-being, Frankl (1985) states meaningfulness to be an ultimate and deeply rooted spiritual goal in itself (Wong, 2014).

Metz (2009) defines happiness as *pleasant experiences* as felt by means of our five senses, whereas meaningfulness is defined as stemming from human *acts of creativity* that result in benefit for others. This is in line with Frankl's (1985) famous logotherapy theory of psychotherapy emphasizing humans' strive for meaning, in contrast to Freud who emphasized will to pleasure and Nietzsche who emphasized will to power (Frankl, 1985, p.99). Baumeister et al. (2012) have empirically linked happiness to being a taker by selfishly focusing on satisfying one's own natural needs and wants here and now, whereas meaningfulness was linked to being a giver by culturally expressing one's identity through involvement in difficult undertakings in order to make significant contributions to society. Such a search for meaning by embracing difficulties often resulted in worry, stress, anxiety and bad experiences, thereby leading to a sacrifice in happiness. By contrasting the meaningful but unhappy life to the happy but meaningless life they called for more research in positive psychology that advances our understanding of human's search for meaning. A terminology anchored in ancient Greek philosophy sometimes used for emphasizing these fundamental differences is the dualistic separation between hedonic and eudaimonic aspects of well-being, i.e. differing between feeling good and functioning well (Huppert and So, 2013; Fredrickson et al., 2013; Ryan and Deci, 2001).

A key difference between happiness and meaningfulness according to Metz (2009) is temporal. Happiness is experienced momentarily whereas meaningfulness can be derived from past actions, even if the acting person has died. An example is Vincent van Gogh who led an unhappy but meaningful life, where the perception of meaningfulness was posthumously attributed to his life due to the fame of his artwork occurring after his death from suicide in 1890. A perceived lack of meaning and purpose in life can in fact drive people to commit suicide (Frankl, 1985; Seligman et al., 2013; Lester et al., 2011).

3.3 Motivation theory

Just like Baumeister's PERMA concept, motivation research has also classified humans' strives into five distinct core motives. According to Fiske (2008), motives differ depending on whether we study patients on the psychoanalytic couch, examine our own consciousness, watch students in the classroom, use the computer as a metaphor for cognitive understanding or study group members in a collective. On the psychoanalytic couch people appear hedonistically self-focused on maximizing pleasure and avoiding pain. When studying people's conscious experiences they appear optimistic, future-oriented, trust-based and focused on functional potential to get things done. In the classroom the clear-cut incentives in a constructed learning environment make for behavioristic motives based on students' *expectance* to achieve a goal and the perceived *value* if successfully achieved. When using the computer as a metaphor for researching human cognition, scientists have studied mental and social aspects of how people process information in order to reach a coherent understanding. When studying groups the motives for belonging to a collective seem endless, ranging from surviving, reproducing and conforming to collectively acting, understanding and sympathizing. Table 1 is an attempt to summarize five different foci in well-being and motivation theory.

Table 1. Five different foci in well-being theory and motivation theory.

Focus	Well-being theory (Seligman, 2012)	Motivation theory (Fiske, 2008)	Will to... (Frankl, 1985)
Self-analysis	Positive emotion	Psychoanalytic couch based hedonistic self-focus	...pleasure
Action-taking	Engagement / flow	Conscious focus on future-oriented functional action	...meaning
Belongingness	Relationships	Coordinated and interdependent teamwork and relationships	...meaning
Processing	Meaningfulness	Mental / social processes of reaching coherent understanding	...meaning
Goal / power	Achievement	Expectancy-value theories of goal prediction and control	...power

3.4 Prosocial motivation theory

Batson (2008) has outlined four categories of prosocial motives, outlining why humans help others. The four categories are altruism, collectivism, moral principles and sophisticated forms of egoism. Egoistic motives are further categorized into three different sub-categories; gaining material and social rewards, avoiding material and social punishments and escaping situations triggering negative emotions. While some claim that altruism does not exist, others claim that altruism indeed exists and is a result of empathy or sympathy for another person due to perceiving a need or by genuinely valuing the other's welfare (ibid). The existence of collectivist motives for helping a group has also been debated by scholars. Some claim that helping acts that benefit a group are reducible to enlightened long-term egoism, while others claim that collectivist motivation can exist independently of egoistic motives (ibid). A famous experiment attempting to uncover the nature of altruistic and collectivist human motives is the prisoners' dilemma, where two prisoners isolated from each other are given punishments depending on their own and the other prisoner's choice between betrayal or cooperation. Principlism is defined as prosocial motives based on upholding certain basic moral principles, such as treating people fairly, helping others, avoiding harm to others and respecting the views, choices and actions of others (McCarthy, 2003).

3.5 Entrepreneurial motivation theory

80 years ago one of the most famous researchers on entrepreneurship Joseph Schumpeter articulated three main entrepreneurial motives; the will to found a private kingdom, the will to win and conquer, and the

joy of creating (Goss, 2005). More recent research on entrepreneurial motivation has been focused primarily on trait-based motives such as people's need for achievement, risk-taking and independence (see for example Shane et al., 2003; Shaver and Scott, 1991). A recent literature review by Murnieks (2007) called for more research on other kinds of entrepreneurial motivation. Morris et al. (2012) have summarized some key motives for people engaging in entrepreneurship; survival, income generation, wealth build-up, independence, achieving a dream, improving a community and changing the world. They also state that entrepreneurial motives change over time, and differ between times before, during and after the actual entrepreneurial process. An important source of entrepreneurial motivation during the process is stated to be the experience of being in flow, sensing meaningfulness and enjoying peak performance. Some entrepreneurs, primarily men, engage for reasons connected to neoliberalism, such as wealth creation, but such goals are often not the main entrepreneurial motive (Douglas and Shepherd, 2002; DeMartino and Barbato, 2003; Morris et al., 2012). Morris et al. (2012, p.208) state that research on entrepreneurship as a way to reach meaningfulness and a higher purpose in life represents "a departure from the traditional emphasis on entrepreneurship as a vehicle for wealth generation, job creation, economic development, and innovation".

4 Applying the lens - Two flavors of entrepreneurial education

In this section we will explore some examples of entrepreneurial education and try to position them in a continuum consisting of the two extremes happiness empowerment for oneself versus meaningful creativity with others. Such a continuum leans on the previously outlined key differences between a happy and a meaningful life. We will try to point out how the described examples align or misalign with neoliberal values. Table 2 summarizes some key aspects from this section categorized in either happiness or meaningfulness.

4.1 Examples of entrepreneurial education as happiness empowerment for oneself

Much emphasis in entrepreneurial education is on the wealth creation and profit making capability of entrepreneurs (Hytti and O'Gorman, 2004; Hytti, 2003). This is particularly evident in the IT industry with powerful and wealthy role models such as Bill Gates, Steve Jobs and Larry Page. On university level this has resulted in business schools taking the lead in entrepreneurial education, teaching students about entrepreneurship by discussing and generalizing from tales of successful entrepreneurs. A common format is guest speakers sharing their entrepreneurial war stories to students in an attempt to inspire them to later take the leap into entrepreneurship (Fiet, 2001a; 2001b; Neck et al., 2014). This has fuelled the hero myth of entrepreneurship and implicitly anchored entrepreneurial education with neoliberal values of individual self-realization. A focus on successful results of heroic entrepreneurs represents a façade of individual entrepreneurial achievement concealing the often collective and exhausting process of struggling towards entrepreneurial success. Neck and Greene (2011) also remind us that for each Bill Gates there is a million failed entrepreneurs.

On secondary education level the most widespread entrepreneurial education activity is Young Enterprise, which lets students establish mini-companies (Dwerryhouse, 2001). Immediate desired outcomes are skills development and increased student engagement, whereas more long-term desired outcomes are enhanced alumni employability, higher salaries and increased rate of alumni starting a business later in life (Chatzichristou et al., 2015; Elert et al., 2014). In the articulation of desired outcomes there is an implicit link to neoliberal values in terms of a financially related self-enhancement focus on earning more and becoming self-employed. The Young Enterprise approach seems to contain both extremes of the happiness empowerment versus meaningful creativity continuum. The goal is to create self-reliant and happy individuals in terms of self-employment and high salary. The process is team-based and frequently leads to the creation of artifacts valuable to others, thereby promoting a sense of meaningfulness for the students.

The focus is on business ideas, indicating that emphasis is perhaps more on making money for the company than making a difference in society (Chatzichristou et al., 2015), placing Young Enterprise more towards the happiness empowerment end of the continuum explored in this article.

An illustrative example of neoliberalism at work in secondary education has been provided by Petersen and O'Flynn (2007), outlining the Duke of Edinburgh award scheme that gives students bronze, silver and gold awards based on their achievements related to volunteering, expeditions, skills development and physical recreation. Petersen and O'Flynn (2007) show how the award scheme is designed to promote youth community service, but instead is perceived by the students as a path to enhancing one's productivity and employability, i.e. a focus on self-improvement rather than on meaningful creative activity with others. The organizers also emphasize the many benefits for the individual such as increasing self-confidence, improving one's CV, getting an award and having fun. Petersen and O'Flynn (2007) conclude that the award scheme promotes neoliberal values by emphasizing self-governance, responsabilization and self-motivation. On a happiness empowerment versus meaningful creativity continuum, this example seems to be positioned towards the happiness end, especially given its structured levels of individual achievement awards useful when competing for good jobs on the labor market.

A general pattern among the above given examples is an alignment with the entrepreneurial motives of generating income, wealth creation and being / becoming independent. This is in alignment with the goal of maximizing own happiness by empowering the individual to create her own success.

4.2 Examples of entrepreneurial education as meaningful creativity with others

At university level an approach similar to Young Enterprise is the venture creation approach (Ollila and Williams-Middleton, 2011). This entails letting students start a real-life venture as formal part of curriculum with an intention to continue running the venture after graduation. Such venture creation programs are rare on a global level (Lackéus and Williams Middleton, 2015), but often include a team-based approach and frequent in-depth collaboration with stakeholders outside the program. In some of the venture creation programs students are coupled with idea providers such as university researchers and industry innovators. Such a 'surrogate' entrepreneurship coupling mechanism has shown to result in substantial increase in value created by students (Lundqvist, 2014). The venture creation approach markedly departs from a happiness empowerment focus through its focus on delivering real-life long-term value through innovative and creative but very exhausting and at times frustrating co-creation processes (Lackéus, 2014). Mechanisms facilitating emotional and financial ownership, co-creation with external stakeholders, surrogacy with idea providers add substantially to the degree of students' perceived meaningfulness and also potentially generate innovative solutions to real-life problems in society. When students choose to continue with their ventures they frequently turn down highly lucrative job offers (i.e. happiness for oneself), instead exploring the venture as a way to make a difference in the world (i.e. meaningfulness with others) (Lackéus, 2014).

A way to reach even more towards meaningful creativity for these venture creation programs is to add components of societal entrepreneurship, putting value creation for society at the heart of desired outcomes. A social entrepreneurship focused venture creation program at Colorado State University in USA teaches entrepreneurship by asking students to find market-based solutions to societal and environmental challenges (Sarason et al., 2014). Some challenges addressed include women's health issues in developing countries, solar lighting technology in rural areas and irrigation technology suitable for conditions in rural India (Lackéus, 2012). Also at the venture creation program at Chalmers University of Technology in Sweden there is a focus on sustainability and societal entrepreneurship (Henricson and Palmås, 2012; Lundqvist, 2009). Societal challenges are addressed in three different ways connected to education; initiating student-led start-ups with a societal mission, initiating whole-class societal entrepreneurship projects, and letting

student teams explore novel solutions to complex societal challenges together with industry (Williams Middleton, 2013; Henricson and Palmås, 2012; Holmberg, 2014). Topics have included technology for blocking of child pornography, tidal water energy harvesters, inspiring teenagers about science, helping teenagers in deprived areas with mathematics homework, improving conditions in Africa and improving the home city's transportation system (Lundqvist, 2009; Holmberg, 2014).

On secondary education level Surlemont (2007) outlines an illustrative example of entrepreneurial education from Belgium where secondary education students were assigned the role as teachers for primary education students. The older students gave a course to younger students on waste problems in society, applying novel pedagogical approaches that impressed their teachers. They displayed very high levels of creativity, engagement and motivation, invested heavily in the process and acquired a higher level of subject matter knowledge than a control group of students. Another example of mutual value creation explored in the same research study outlined by Surlemont (2007) was a linguistic exchange project where students from two different language zones in Belgium helped each other with learning the other person's native language. Common to these two examples is the complete absence of business ideas and wealth creation issues. Instead focus was on students helping other students to achieve new insights into waste problems and language skills, resulting in high perceived meaningfulness and high levels of student engagement. Both examples show how entrepreneurial education can result not only in developed entrepreneurial competencies such as risk-taking, perseverance and initiative, but also promote learning of more theoretical and declarative knowledge such as waste management and language. Both examples also illustrate an emphasis on meaningful creativity with others rather than happy empowerment for oneself, in terms of engaging fully in the task of doing good for others.

In a study of Scottish primary school teachers applying entrepreneurial education for a period of three years, Deuchar (2007) explored the use of individualist versus collectivist discourses around motives for entrepreneurial education. He concluded that teachers' reflections around the purpose of entrepreneurial education represented both neoliberal and collectivist perspectives. Some reflected around the need to equip students with skills to market themselves. Others reflected around the potential to instill collectivist values and work in teams towards a common goal. Many expressed a dual goal of entrepreneurial education as covering both individual rights and collective responsibilities, aiming at uniting conflicting values such as ambition versus compassion and determination versus respect. Teachers stated that some students were in need to learn more about taking collective responsibility, whereas other students were perhaps a bit too self-denying. Deuchar concluded (2007, p.49) that "seemingly opposing agendas were often comfortably reconciled" by the teachers.

A general pattern among the above examples is an alignment with the entrepreneurial motives of meaningful activity, improving the community and changing the world into a better place. This is in alignment with the goal of engaging in meaningful acts of creation that result in benefits for other people.

Table 2. Summarizing key aspects of happiness and meaningfulness in the domains of psychology, philosophy, entrepreneurship and entrepreneurial education.

Happiness for oneself detached individualized living	Meaningfulness with others attached social living	References
Psychology / philosophy		
Happiness for oneself, being a taker, satisfying physical self	Meaningfulness with others, being a giver, reflecting own identity	(Baumeister et al., 2012)
Experiences through own senses	Acts of creativity and their consequences for others	(Metz, 2009)
Vitality, optimism, resilience, positive emotion, self-esteem	Engagement, competence, meaning, relationships	(Huppert and So, 2013)
Experiential values – see, touch, taste, smell, hear	Creative values – write, sketch, erect, give birth to	(Frankl, 1985; Feldman and Snyder, 2005)
Individualism: Personal ambition. Sacredness of personal interests. Task achievement.	Collectivism: Self-image based on others' reactions. Shared well-being. Interdependence.	(Wagner, 2002)
Entrepreneurship / education		
Neoliberalism	Communitarianism	(Deuchar, 2007)
Neoliberalism, business driven, masculine aggression, profit	Many value forms, sustainable, feminine relational / collaborative	(Rae, 2010)
Inspiring students by talking about wealthy IT tycoons, sharing war stories and nurturing the hero myth	Making a difference by starting a real-life company / taking on a societal challenge.	(Neck and Greene, 2011; Lundqvist, 2009; Henricson and Palmås, 2012)
Learning by starting mini-companies leading to self-employment and higher salary. Handing out awards for people having fun.	Learning in a more engaged way by helping others to learn.	(Chatzichristou et al., 2015; Elert et al., 2014; Petersen and O'Flynn, 2007; Surlemont, 2007)
Wealth creation	Meaningful activity	(Morris et al., 2012, p.208)
Build wealth, be independent	Achieve a dream, improve the community, change the world	(Morris et al., 2012, p.16)
Individualist entrepreneurship – independence, competition.	Collectivist entrepreneurship – co-creation, team effort.	(Tiessen, 1997; Read et al., 2009; Sarasvathy and Venkataraman, 2011)
The hero myth of individual entrepreneurship	Entrepreneurship as collective action in social context	(Dodd and Anderson, 2007)

5 Discussion

In order to analyze how two different flavors of entrepreneurial education are received in educational institutions we first need to discuss the climate and motivational characteristics of today’s typical classrooms. This constitutes the starting point in terms of the context either flavor of entrepreneurial education is to be infused into.

5.1 An education system fuelled by will to power and pleasure

According to Fiske (2008), student motivation in the classroom is often regulated by clear-cut incentive structures aimed to regulate their behavior. Tests, grades and detailed learning goals are ubiquitous in the educational landscape. Biesta (2009) states that we are living in an age of measurement focus in educational institutions. According to Fiske (2008) this goes back to behaviorist Thorndike’s law of effect (1927) stipulating that desired behavior can be fostered by rewarding with pleasant consequences and that unwanted behavior can be avoided by punishing with painful consequences. According to the often applicable set of expectancy-value theories of motivation (see for example Pekrun et al., 2007; Thompson and Schlehofer, 2008; Senko et al., 2008), student motivation is regulated by their *expectation* to reach a goal and the perceived *value* of reaching it. Students’ *expectations* to reach an academic goal are recursively related to preceding academic outcomes, leading to positive or negative spirals of academic achievement (Farrington et al., 2012). The *value* of reaching the goal is extrinsically determined by society, since grades are used as a competitive selection mechanism later in students’ journey throughout the education system, determining levels of pleasure or pain to be expected in later stages of life. Further, the main goal of educating students is for them to “take” what they need in terms of acquiring competencies in order to be happy, employable and competitive on society’s human labor market.

We posit that the current system of artificial achievements is well aligned with neoliberalism as well as with Frankl’s (1985) will to power and pleasure, see table 1. Students are encouraged to strive for achievement in accordance with a construed set of rules representing a well-established gamification of education, counting points based on academic achievements. Desired student behavior is rewarded with high grades leading to future pleasure in life, and undesired student behavior is punished with low grades leading to future pain in life. While it is easy to measure artificial achievements in a seemingly equal way, the long-term implications are increased inequality in society due to certain student groups being more disposed to flourish in an achievement-oriented power / pleasure culture (Boekaerts, 2010). Inequality comes in terms of gender, class and race differences, well in line with the neoliberal “price-tag”.

What is not as evident in today’s educational landscape is Frankl’s (1985) will to meaning. We posit that the three motivational categories outlined in Table 1 of engaged action-taking, team-based belongingness and meaningful collective understanding are underrepresented in today’s educational institutions. While they have indeed been more present in previous decades throughout educational history (Labaree, 2005), the current neoliberal climate in society has forced teachers to focus on what is measured by the state and what is valued by the system. Meaningful activity is not as easy to measure and assess as declarative knowledge, and has therefore been deprioritized by reluctant teachers in the wake of school inspections and high-stakes testing (Ball, 2003; Jeffrey and Woods, 1998; Hursh, 2007).

5.2 Entrepreneurial education in a power / pleasure based “student-as-taker” climate

In the current prevailing “achieve now, become happy later” focused and “student-as-taker” based educational climate, entrepreneurship can be presented as a path to individual success in life, or in Foucauldian terms (Foucault, 1988), as an educational technology to be applied to oneself. Entrepreneurial education can help students learn how to optimize their future prospects by becoming more proactive, action-oriented, creative and self-opportunistic, and thereby be better off in the stiff competition for society’s scarce resources. The hero myth of entrepreneurship is flourishing in such an educational climate

(Korhonen et al., 2012; Williams Middleton, 2013) as well as in popular press (Gill, 2014). At business schools war stories and anecdotal successes are often used when presenting entrepreneurship, often in the shape of admiring male heroic IT tycoons (Neck et al., 2014). Such a flavor of entrepreneurial education is well aligned with neoliberal values in terms of promoting and supporting self-serving and self-optimizing behaviour in order to maximize own future power and happiness. Given the current popular image of self-made heroic entrepreneurs (Ogbor, 2000), it is not surprising that entrepreneurial education and neoliberalism have been perceived as very much complementary to each other. Indeed, this flavor of entrepreneurial education is well in line with the neoliberal values already having been imposed onto the education system by policy-makers, and can also be found in national and international policy documents on entrepreneurial education (see for example European_Commission, 2012; Volkmann et al., 2009).

5.3 Entrepreneurial education as a path to a meaning-laden “student-as-giver” community

We have provided examples of entrepreneurial education as a way to infuse substantial levels of meaningfulness and purpose in students’ lives, at times so pivotal that they change their whole identity and self-image (Donnellon et al., 2014; Lackéus, 2014). The high engagement levels among students are not so much caused by the traditional achievement-based will to pleasure or desire to win, but rather due to their status as meaningful activity in terms of making a difference, being fully engaged and taking part in a creative and action-based team effort to help people outside their own class or school.

These examples illustrate the possibility of entrepreneurial education to constitute a fundamentally different approach to education not at all in line with typical neoliberal values, but rather in stark opposition to them. Given the striking impact on student engagement, learning and creativity, these examples rather force us to ask the question of why it is so rare for teachers to ask students to learn this way, i.e. by using their knowledge to create something valuable to people outside their own classroom. One possible explanation could be that today’s teachers view themselves as suppliers of knowledge and view their students as customers, i.e. a “students-as-takers” culture. Another explanation could be that adults don’t perceive youths as capable of delivering value to outside stakeholders, and therefore seldom give them a chance to even try. This view has been forwarded by some managers of venture creation programs (Lackéus and Williams Middleton, 2015). Finally the hero myth of entrepreneurship could result in many teachers neglecting the opportunity that entrepreneurial education may constitute to them and their students.

Establishing a “student-as-giver” culture in educational institutions could perhaps paradoxically lead to many of them acquiring more knowledge than in a traditional “student-as-taker” culture, and in a more engaging way. This could be especially true for those students who are not comfortable with the neoliberal achievement-oriented culture of today’s education system. Starting a venture has been compared with becoming a parent in that an entrepreneur often relates to her creation as her own “baby” (Cardon et al., 2005). Perhaps we can make our students experience an entrepreneurially related parenthood paradox already during their education by giving them a chance to initiate a value creation project that they can own and treat as “theirs”. This could provide them with a sense of greater purpose in their educational life, and at the same time help them better fulfil academic goals. The examples given above illustrate that such endeavors are coupled with increased stress and higher burden, but that this is a sacrifice many students are more than willing to make. Meaningful activities also transcend the temporal moment in time when they are experienced (Metz, 2009), leading to a possibility that they could infuse a sense of purpose to other more traditional educational activities.

To summarize, while neoliberalism emphasizes the *choices we make* for ourselves, a meaningful creativity flavor of entrepreneurial education rather emphasizes the *actions we take* for others. By applying such a flavor, entrepreneurial education can be seen as an equalizer in two levels; first for the student struggling with today’s neoliberal achievement culture now instead getting a chance to learn in a different way,

secondly for the receiver of value who can be selected based on its equalizing impact. Teachers could ask students to learn by creating value to people not being served by today's neoliberal marketized society.

5.4 Does entrepreneurial education lead to more or less neoliberalism in education?

The question of whether entrepreneurial education leads to more neoliberalism in our society can now be modified. The question is rather what flavors of entrepreneurial education that lead to even more neoliberalism in education, and what flavors of entrepreneurial education that can mitigate some of the already strong tendencies towards neoliberalism in educational institutions of today. Perhaps a "student-as-giver" based flavor of entrepreneurial education is rather an antidote to a capitalist and neoliberal values immersed society. Our discussion has shown that entrepreneurial education could be perceived as a way to infuse collectivist, altruistic and communitarian values into an education system currently severely plagued by the impact of neoliberal values (cf. Robinson, 2010). It however requires fighting the currently prevailing hero myth of entrepreneurship, replacing it with a view of entrepreneurship as meaningful creation of value to others in line with Bruyat and Julien (2001), and a more explicitly articulated definition of entrepreneurial education as being about letting students learn by using knowledge to create value to people outside the classroom (Lackéus et al., 2015). It also requires an in-depth exploration of the meaning of words used when defining entrepreneurship in its wide sense. Words such as creativity, initiative, self-reliance, perseverance and proactiveness need to be explicitly defined in a more "student-as-giver" way than would be the case if they were left unexamined. A source of increased insight when addressing these areas of development could be to draw from research on prosocial motivation as outlined by Batson et al. (2008).

5.5 Disentangling doing well from doing good

A limitation with the argumentation developed above is that it is difficult to separate happiness from meaningfulness, or in entrepreneurial terms, to separate doing well (i.e. making money) from doing good. The rules of society stipulate that any venture aiming to improve the society, for-profit or non-profit, will need to cover its monetary costs in order to be long-term sustainable. Indeed Baumeister et al. (2012) acknowledge that there is a large overlap between the two constructs happiness and meaningfulness. But as in the case of Baumeister et al., the focus here has been on the differences between making money and helping others and the implications of such differences. In addition, most students do not have to make money while they create value for others, since they rely on their parents or the state for their objective human needs such as food and shelter while they get educated. Their contribution when learning by creating value can be appreciated and rewarded in other than monetary terms such as access to exciting communities of practice, opportunities to be seen as valuable citizens, getting to learn in more engaging ways and being included in a collective effort to improve the world. This opens up for new forms of educational entrepreneurship more tailored to the needs and contexts of educational settings where learning outcomes are more important than the created value. Given the harmless and unconditional goodness of students, they can also acquire resources to their project in quite different ways than the typical business entrepreneur. If "student-as-giver" forms of entrepreneurial education are allowed to thrive in a future educational system, life as a student could perhaps be a quite meaningful and purposeful time in life, and a time when people get full support in their search for meaning in life.

5.6 The role of entrepreneurship research in education

If letting students learn by helping others is a viable way to increase learning and engagement, entrepreneurship research has a key role to play in education (Lackéus et al., 2015). Entrepreneurship research has articulated many tools, methods, practices and processes that can be used for making the process of creating value to others more explicit. Some examples are effectuation (Sarasvathy and Venkataraman, 2011), customer development (Blank and Dorf, 2012), design thinking (Brown, 2008; Johansson-Sköldberg et al., 2013) and bricolage (Baker and Nelson, 2005). These and other practices can be adopted by teachers in their efforts to support student value creation for others.

6 Conclusions

This article set out to contrast two different flavors of entrepreneurial education. One flavor in line with neoliberal values based on a view of “students-as-takers”, inculcating competencies that improve students’ future happiness and salary. Another flavor in line with collectivist values based on a view of “students-as-givers”, allowing for a competence-building search for meaningful acts of creation for the benefit of others.

Different strands of literature such as well-being theory, positive psychology theory and motivation theory were explored and related in order to create an analytic lens used to contrast these two distinct flavors of entrepreneurial education. A key tenet was drawing on some key differences between a happy and a meaningful life, or in entrepreneurial terms, some key differences between doing well and doing good. Examples from primary, secondary and tertiary education levels were given for either flavor of entrepreneurial education, illustrating how fundamentally differently entrepreneurial education can be designed in order to get more, or indeed less, focus on neoliberal values in education.

Our analysis has shown that entrepreneurial education can be perceived as a close companion to neoliberalism if it is designed in line with the stereotypic image of entrepreneurs as self-made lone male heroes building wealth for themselves. The current educational climate of “achieve now, become happy later” is reinforced by entrepreneurial education emphasizing self-opportunistic and profit-maximizing behavior leading to enhanced competitiveness on the human capital market.

But our analysis has also shown that a do-good flavor of entrepreneurial education can be perceived as an antidote to the currently prevailing neoliberal values imposed upon teachers by today’s political climate, where educational performativity and a measurement culture dominate schools and universities. By giving students assignments to learn by using their knowledge to create value to people outside the classroom, teachers can enjoy highly engaged and creative “students-as-givers” that acquire both entrepreneurial competencies and declarative knowledge more in-depth than they probably would in a “student-as-taker” culture. The question rather becomes why teachers so seldom trust their students with assignments to create value to external stakeholders. Some attempts to answer this question have been provided.

Based on this we posit that the ubiquitous ideal of the neoliberal *homo oeconomicus* emphasizing the *choices we make* for ourselves should instead be replaced by entrepreneurial education allowing students to learn from the *actions we take* for the benefit of others. Articulating such a difference seems to us to be crucial for advancing the field of entrepreneurial education. While it is challenging both in theory and practice to disentangle doing well from doing good, it could constitute a key not only to the hearts of school teachers and students, but also represent a way to make entrepreneurial education relevant to a much wider audience than today. It could also represent a more viable way to responsabilize citizens than the neoliberal way of encouraging them to selfishly mind their own business.

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