

Matching Time (T) to Learning – a unifying “2T Framework” for action-based entrepreneurial education

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Abstract

There is still little consensus around how to set up and evaluate entrepreneurial education. This paper builds the argument that, for action-based entrepreneurial education, there are some main design features as well as types of learning outcomes that are relatively independent of length of education (T) as well as of participant background. The purpose, thus, is to propose and empirically illustrate a unifying “2T Framework” for action-based entrepreneurial education. The framework is illustrated through four empirical examples with T being minute, day, month and year. The analysis focuses on the relevance of the design features of the framework (Value-creation, Iteration and Team-work), what kind of Outcome- and Process-learning can be accomplished given different timeframes, and on the importance of control variables such background diversity of participants.

Introduction

While entrepreneurial education is increasingly asked for, there is little consensus around how to set up and evaluate education concerned with entrepreneurship. This paper builds the argument that, for action-based entrepreneurial education, there are main design features and learning outcomes that are relatively independent from the length of education and participant background. But, at the same time, designers of entrepreneurial education need to be mindful of what can be achieved, given a certain timeframe. In this paper, we empirically illustrate a “2T Framework”; where T is minutes, days, months and years.

A larger conceptual in entrepreneurial education can have large academic and practical relevance. Academically, there are several identified needs. Firstly, the vast variety of educational types – learning about, learning for, learning through entrepreneurship – is confusing and not necessarily helping further development (Berglund and Holmgren, 2013, Neck and Greene, 2011). One could even argue that this typology lacks relevance, as most entrepreneurial courses and programs rarely operate purely in one type (Sirelkhatim and Gangi, 2015). Rather, as soon as entrepreneurial education is action-based (i.e. students take actions to create new solutions others can benefit from), it is often argued that all types of learning are included (Lackéus, 2013, Ollila and Williams Middleton, 2011, Rasmussen and Sørheim, 2006). Thus, action-based entrepreneurial education not only implies learning through entrepreneurship but also – more or less – for and about entrepreneurship as well. The merger of learning types in action-based entrepreneurial education offers opportunities for new and more unified conceptual understandings.

Secondly, more academic relevance could be achieved if the smaller and younger field of entrepreneurial education connected more with the larger and older fields of entrepreneurship and education (Kyrö, 2015). A more contemporary understanding of the phenomena of entrepreneurship as linked to individuals and their decision-making capabilities, offers such a bridge (Rae and Wang, 2015, Sarasvathy and Venkataraman, 2011). Rather than seeing entrepreneurship as an economic function or as the creation of an organization, an individual-centric understanding of entrepreneurship helps bridge the field of entrepreneurship with an educational need to develop individual competences (Lackéus, 2013, Mueller and Anderson, 2014).

Also, by avoiding the classical and arguably non-productive disconnect between traditional education (i.e. learning about entrepreneurship) and progressive education (i.e. learning through entrepreneurship), a framework for action-based entrepreneurial education should seek to transcend the almost 200 years of debate within educational research (Lackéus et al., 2013). The argument then is that there is no need to pick sides between traditional or progressive approaches. Instead these two main educational philosophies could (and perhaps should) be combined.

The practical relevance of a unifying framework should be apparent. Educators around the world would benefit from more common ground around how to design, execute and evaluate action-based entrepreneurial education, given different resource- and especially time-constraints (Lackéus et al., 2011, Rae and Wang, 2015, Slattery and Danaher, 2015). If there were design features that are relatively stable regardless of time-frames and student background, this would then allow for much more diffusion and shared learning.

The purpose of this paper is to propose and empirically illustrate a framework for setting up and evaluating action-based entrepreneurial education. Such a framework should address the above discussed academic and practical relevance concern while also allow educators to become more insightful about what learning outcomes are obtainable given different time-frames – from minutes, hours, days, weeks and months, to years – as regards the educational format.

In the following section, an analytical framework is derived consisting of three design features – Value-creation, Iteration and Team-work; two dependent variables – Content- and Process-learning; and the independent variable of Time. The subsequent empirical section offers evidence from action-based educations conducted on four time formats – minutes, days, months and years – and across different student backgrounds (educational, national, etc.). The analysis first focuses on the stability of the design features given different timeframes and diversity of students. Thereafter, hypotheses are generated around what learning outcomes – content and process-wise – could be achieved given different timeframes and diversity of students. Finally, the relevance of a unified framework around action-based entrepreneurial education is addressed as well as needs for future research.

Theory

There is no unified view on the way in which entrepreneurial education should be designed or delivered, in part because of the divergent learning objectives of entrepreneurial education. Some educations prepare individuals for the specific practice of entrepreneurship in the form of new venture creation, some aim to develop entrepreneurial competencies in individuals by engaging them in activities linked to entrepreneurship, others gear towards inspiring students for future engagement, and still others emphasize a broader knowledge for entrepreneurial activity in various forms of enterprise (O'Connor, 2013, Peterman and Kennedy, 2003). This fragmentation and lack of clarity result in multiple challenges, not only in the 'classroom' in terms of inconsistency of learning desired and achieved, accessibility limitations, and confusion regarding desired objectives; but also at the institutional or even regional levels in terms of policy investments and objectives (Hindle et al., 2011, O'Connor, 2013).

Previous research has already pointed towards the need for more unified concepts (Bennett, 2006, Erkkilä, 2000, Fayolle, 2013, Kyrö, 2008), and proposals in terms of teaching methods (Duval-Couetil, 2013, Fayolle and Gailly, 2008) and underlying philosophy [for example the forthcoming doctoral work of M. Lackéus] have been put forth. In this paper, and in line with other's work (see for example Moberg, 2014), we will argue that using a definition of entrepreneurship as value creation (as presented by Bruyat and Julien, 2001) enables a broader appeal more viable to the multiple and somewhat diverse objectives desired when addressing entrepreneurship in education. This is in contrast to the two other main definitions of entrepreneurship: opportunity recognition (Shane and Venkataraman, 2000) and organizational emergence (Gartner, 1988), often explained as venture creation.

Besides conceptual challenges, entrepreneurial education has also been captivated by emphasis on outcome performance (Walter and Block, 2016). Education research has contributed with

experiential, experimental and ‘learning by doing’ theories [forthcoming Lackéus dissertation], but these do not fully grasp the engaged learning important to entrepreneurship focus on creating value (for others). Action-based entrepreneurial education (Rasmussen and Sørheim, 2006) is one attempt to grasp the important contribution of embeddedness in the entrepreneurial process to learning (Rae, 2005).

The original idea in action-based education was learning by actually doing new business (Rasmussen and Sørheim, 2006). It stems from universities involving students into their innovation and tech transfer activities under some educational format (Lackéus and Williams Middleton, 2015). This paper builds upon a widened understanding of “action-based entrepreneurial education” being not only about the generation of new business, but encompassing all education when students are asked and empowered to take actions to create new solutions that others can benefit from (Lackéus, 2013).

Framework for action-based entrepreneurial education

We will now derive three main design features of action-based entrepreneurial education: Value-creation, Iteration and Team-work. These features will be related to the independent variable of Time, i.e. the time-frame of the particular education, as well as to two dependent variables: Outcome-learning and Process-learning. Finally, we discuss the control variable of background diversity of students in relation to the other components of the framework. Figure 1 illustrates the framework.

The key design features that we argue are relatively independent of time-frame and other contingencies are Value-creation, Iteration and Team-work. These features are readily associated to entrepreneurship. They are also not obvious in more traditional education, with its focus on cognitive understanding (rather than on creating value for others), covering different disciplinary subject areas (rather than iterating multiple versions of solutions), and on individual learning (rather than on team-based learning).

As already stated, entrepreneurship as Value-creation is one main definition of entrepreneurship. The opportunity-based definition basically implies picking the right individual who then is expected to find and develop opportunities others do not see. This definition is difficult to translate into education. Entrepreneurship as venture creation is more relevant from an educational perspective, but also implies either relatively advanced activity of forcing students to start ventures or ask the students to simulate or learn about venturing, without necessarily experiencing it. Value-creation then is still at the core of entrepreneurship, while offering a more flexible understanding of what actions actually are creating value (Lackéus, 2016, Mäkimurto–Koivumaa and Puhakka, 2013). One could say that if a student is aspiring to create value appreciated by someone else (other than the teacher or a classmate), then this is a form of Value-creation. Of course, actually developing novel product and services through venturing is also Value-creation. Thus, Value-creation can be a first design feature in the framework, relevant for different time-scales and well-anchored in entrepreneurship.

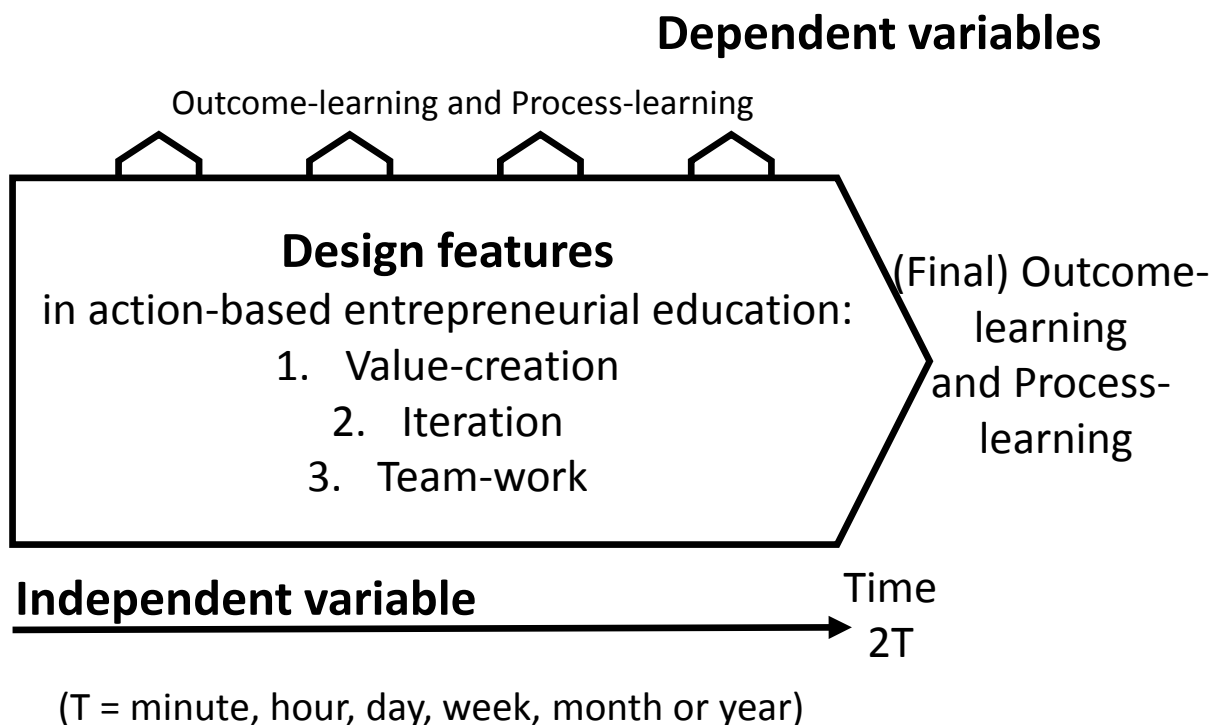


Figure 1. The proposed “2T Framework” for action-based entrepreneurial education.

Iteration has more recently been recognized as central in entrepreneurship. The experimental and pivoting approach in the Lean Startup movement is one well-known way iteration is promoted in relation to entrepreneurship (Blank, 2013). If we broaden the view, experimentation has always been a salient feature in engineering science as well as in design thinking (Müller and Thoring, 2012), spanning from engineering design, industrial design, architecture, and to the Arts. A main point behind Iteration is that it is a required way of working when there is genuine (so-called Knightian) uncertainty. Sarasvathy (2008) argues that when we are dealing with the creation of value for other humans, there is always genuine uncertainty present often requiring multiple (iterative) attempts to connect inter-personally to reduce this uncertainty. Hence, Iteration today is a design feature well-anchored in entrepreneurship as well as in related fields.

Through Iteration students will have multiple opportunities to display and communicate around outcome during the education (and not only demonstrate their knowledge through e.g. individual exams, after the education) (Williams Middleton and Donnellon, 2014). Iteration means repeatedly going back to something, but with new eyes. This is different from a traditional subject-by-subject and course-by-course approach used in most educational curricula. Iteration implies some continuity over time, as well as, a focus on creative and communicable outcome (Read et al., 2011), something beyond a traditional view focusing on internalized declarative cognitive knowledge.

A main reason to include Team-work into the framework is that it requires individuals to relate to immediate stakeholders from start to finish (Jones et al., 2012, Lackéus and Williams Middleton, 2015). Whereas potential users, customers or partners may/may-not be very present in an action-based set-up, the student team always will. Aligned with the same argument as for Iteration, Team-work helps individual's deal with uncertainty through building inter-subjective understandings and agreements (Wing Yan Man and Farquharson, 2015). This is central in the concept of effectuation (Sarasvathy, 2008) and therefore our understanding of what makes entrepreneurial processes different from more predictive and causal managerial processes.

Team-work in entrepreneurial education also takes a clear stand against the prevailing public image heroic entrepreneur perspective (Williams and Nadin, 2013). Team-work allows students to be sensitized towards this problematic image while also having plentiful opportunity to reflect upon their own entrepreneurial role and role expectations (Lundqvist et al., 2015). Such process learning would be less valuable if Team-work was not a main design feature of action-based entrepreneurial education.

Dependent variables: Outcome-learning and Process-learning

Two main dependent learning variables are suggested to the framework: Outcome-learning and Process-learning. Outcome-learning is central given the design features outlined above. Value-creation and iteration implies that there will be tangible outcomes in the form of different created solutions. When this is the case, there is plenty of room for Outcome-learning, as student teams present their solution and that others then react, ask questions and highlight concerns. Feedback can then be addressed in the next iteration.

Besides being a feedback opportunity around the specific solution, Outcome-learning also offers teams something around which to organize and be motivated (Pittaway and Edwards, 2012). Here, Outcome-learning differs from traditional studying for an individual exam. Outcome-learning enables the mobilization of engagement, commitment as well as incentivizes team-members to interact and learn from one another. The back-side of Outcome-learning is that it does not ensure competence development beyond the specific solution or context (Duval-Couetil, 2013). To compensate for this, another type of learning that we label Process-learning is proposed.

Process-learning can be defined as students accounting for their individual experiences related to value-creating, iterative teamwork. Process-learning should be individual as compared to a more team-based outcome-learning. Process-learning implies an opportunity for the student to reflect upon his/her actions, his/her role identity and expectations (Lundqvist et al., 2015), as well as around knowledge gained that might be important beyond the particular outcome and context (Morris et al., 2012). Process-learning also can be seen as a tool to give every student a voice, thereby counter-balancing any tendency of "heroic entrepreneurs" silencing others (Butler and Williams Middleton, 2014).

Time as the independent variable

To this point, we have proposed a model with relatively time-frame independent design features. However, time arguably has a large impact upon the Outcome-learning and Process-learning. The

framework is proposed to allow study of how timescales can affect such learning. This will thus be a key aspect analyzed in subsequent sections.

In suggesting the use of minutes, hours, days, weeks, months and years as a timescale, the framework deliberately avoids a more linear view. Rather, the assumption is that time in entrepreneurial education is more “logarithmic” implying that the larger qualitative shifts in Outcome- and Process-learning happens not by adding a day more or a week more, but through going from e.g. days to weeks or from months to years.

Labeling the framework “2T” is admittedly making an assumption based upon heuristics. Many academic courses are two months rather than one month. Start-up camps are rarely one day but often 2-3 days long. Master-level programs can be a year, but often they are two years long. Anyhow, the main point is not to emphasize the number “2” but to offer an intuitively appealing framework with more logarithmic (than linear) timeframes for analysis of entrepreneurial education.

Background diversity and other control variables

The “2T framework” with three design features, two dependent and one independent variable is a deliberate attempt to offer something simple and general rather than something more contextual and specific. As the framework is illustrated empirically, there is reason to search for other general variables as well as contextual and specific factors.

Background diversity of participants is one of many potentially important control variables to consider. Whether it is diversity in age, education, gender, nationality etc. – what participants bring to an education built on teamwork is likely to impact learning. The question then is *how*, and *how much*? Empirical investigation can help us understand if, for instance, too little or too much background diversity has positive or negative effects on Outcome-and Process-learning. For example, one could hypothesize that high background diversity might be less of a problem and more of an opportunity (for i.e. Team-work and social learning) than low background diversity, at least as long as the participants actually are not committing to starting a real venture together.

There are multiple other control variables that may require consideration. These include quality and amount of teaching, relevance and urgency of challenges around which participants do iterative value creation, mandatory versus elective education, and embeddedness of education within an entrepreneurial community. Perceptions of entrepreneurship and value-creation that key actors around an action-based entrepreneurial education express can also have importance. For instance, whether commercial, social and/or environmental value-creation is emphasized can impact learning.

To sum up, there has been an academic interest into action-based entrepreneurial education for little more than a decade (Rasmussen and Sørheim, 2006). However, apart from emphasis on learning-by-doing and/or aspiring venture creation, there is little understanding around any key design features or about what learning to expect and assess. This paper offers a framework to appreciate action-based entrepreneurial education with Time (2T) as the main independent variable. Time is often a given starting-point for an educator and, thus, the perhaps most important

factor to relate to when setting up realistic educational features and learning objectives. Also, by proposing design features relatively independent of time – Value-creation, Iteration and Team-work – there is also hopefully a better ground created for comparative studies of different action-based entrepreneurial educations.

The subsequent sections will offer empirical illustrations around some of the relevant time formats proposed for entrepreneurial education from 2-minutes to 2-years including examples also of 2-days and 2-months. The main questions asked in relation to these examples then are:

1. How relevant are the three design features – Value-creation, Iteration and Team-work – in the specific examples and time formats?
2. What kind of Outcome-learning and Process-learning can be expected given different time formats?
3. What is the importance of control variables, such as background diversity, in explored example(s) of action-based entrepreneurial education?

Method

Our aim is to generate more generally applicable concepts to the phenomena of action-based entrepreneurial education. We approached this through insider action-research, building from more than a decade experience from setting up, executing and evaluating these type of educations.

Our insider experiences stem primarily around a 2-year MSc venture creation program, existing since 1997; a format which has been translated into other university settings. Within this program exists a 2-month action-based 7,5 HEC course (since 2008) in real-life Idea Evaluation. A 2-day insider experience emerged from recent delivery at a Japanese university involving 30 participants from various Asian countries. For this education, the 2-month Idea Evaluation course from Sweden was compressed into a 2½-day format. Finally, a 2-minute exercise, adapted from a colleague's education in Lund, was carried out, to explore the limits of the framework.

Since the above educational experiences have been foundational for proposing the framework, they are not used for anything more than empirical illustrations, hopefully helping to legitimize and stabilize proposed concepts, but not to verify their general relevance. The anchoring of the main concepts in more or less well-received theory, can be seen as a first step to allow for discussion of analytical generality. Our ambition is that the framework can be increasingly used by researchers, allowing for verification and improvement over time.

Empirical illustrations

In this section, brief accounts will be given regarding the four time formats: 2-years (the “Venture Creation Program” or “VCP”); 2-months (the “Idea Evaluation course” or “IE-course”); 2-days (the Japanese “Camp”); and 2-minutes (the “Pitch”). The main design features of each example will be displayed along with motivations and assumptions made. Outcome- and Process-learnings

that were expected and were achieved will be described, as well as any relevant control variables.

2-years: Venture Creation Program (VCP)

The oldest and still ongoing example provided here of action-based entrepreneurial education is the 2-year international MSc in Entrepreneurship and Business Design at Chalmers School of Entrepreneurship (www.entrepreneur.chalmers.se) (Lackéus and Williams Middleton, 2015, Lundqvist and Williams-Middleton, 2008, Rasmussen and Sørheim, 2006, Williams Middleton and Donnellon, 2014). From the start in 1997, the three design features of Value-creation, Iteration and Team-based were built into the program. A critical design-parameter was to introduce venture projects as the key learning vehicle throughout the program, and to break with a traditional course-by-course structured educational format.

During the first semester, student teams iterate around a shelved case (a patented technology platform) producing multiple assignments dealing with aspects, such as IP assessment, concept design, techno-economic analysis, shareholder agreements, business models and business plans. In the second semester, students take the IE-course (the 2-month example described later), where they act as creative consultancy teams towards inventors (and their early stage inventions). Before the end of the second semester, 30 students in specific tracks of the program are put in the driver's seat to develop a promising venture idea. These students devote the entire second year towards continual iterations around their idea, including – if necessary – failing the idea and then pursuing a new one. The venture idea is provided by Chalmers Ventures, a Chalmers subsidiary responsible for technology transfer, incubation and seed-financing. As part of a 60-credit master thesis, the students compile multiple deliverables around establishing customer offerings, developing and verifying technologies, building the venture, etc.

From the start, a core Outcome-learning is expecting there to be tech-ventures generated around the selected teams. This ambition came from the desire to create a new tech-transfer mechanism at Chalmers, based upon an analysis that a key scarce-resource was entrepreneurial competence (rather than a lack of promising ideas or inaccessibility to other resources). Since the start, the VCP has kept this relatively extreme real-life Outcome-learning ambition, with relatively consistent results over time:

1. Approximately 30% of students continue with their tech-ventures as co-founders
2. 4-6 venture incorporated per year (post-graduation), totaling more than 70 firms, to date, with a survival rate of over 70%.
3. The VCP was top-ranked in Sweden (2009) by the government using an international review-board of entrepreneurship education professors, and the collaborating incubator was ranked number eight in the world and second in Europe in 2014 (UBIindex.com).

Process-learning within the VCP is asked for both in written exam questions (during the first year) and through individual reflections in assignments as well as in personal development and group development talks. Exam questions typically ask students not only to account for some method or framework but also to exemplify and reflect upon how they experienced using the method/framework within their team-based value-creation. Development talks allow the students

to extensively and repeatedly reflect upon identity development, different entrepreneurial role expectation as well as about their relationship to specific value-creation going on (Lundqvist et al., 2015). In essence, the VCP's 2-year format achieves participant development of their own entrepreneurial identity, including determination of what kind of entrepreneurship they want to pursue and – perhaps most importantly – why (Williams Middleton and Donnellon, 2014).

There are multiple control variables to be appreciated in the VCP. Firstly, Chalmers is widely recognized as an entrepreneurial university including strong networks to industrial and other competence (Jacob et al., 2003). The special admissions processes arguably attracts highly engaged and committed participants. The background diversity of the participants is relatively high: 40% female; a rough 50:50 split between students with technology vs. business background respectively, and 10-20% of the students having foreign background (not speaking Swedish). However, the age of participants is fairly similar with only few exceptions outside the range of 24-28 years old.

2-months: Idea Evaluation course (IE-course)

Since 2008, the two-month 7,5 HEC Idea Evaluation course has been a mandatory part of the 2-year VCP. It has also been an elective course for other MSc students at Chalmers, with a prerequisite of some business development competence for admission (Alänge and Lundqvist, 2013, Edgar et al., 2013). The course typically comprises 60-70 students.

Value-creation, Iteration and Team-work are fundamental to the IE-course, though also with a more traditional format of lectures and reading-material seminars twice a week. Teams of five or six (after having signed NDAs) are assigned to early-stage technical ideas, most of them potentially patentable. During the course teams apply and discuss different tools relative to the ideas, thus iterating multiple times before presenting and delivering a final seven-page idea evaluation report.

Outcome-learning from the course centers around the idea evaluation report – aimed at creating value for the idea providers by recommending important next steps. The idea providers keep all the rights around the idea and receive approximately 100 hours of student advice. Often, the IE-course stimulates further interests among idea providers to explore further opportunities, such as offering the idea to Chalmers Ventures, to then become a joint venture within the VCP, with the student teams and Chalmers Ventures as new stakeholders. Comparing the IE-course with the VCP, there are some distinctive differences:

1. The IE report is mostly analytical and thus speculative, with little actual verification of claims made, except a patent database analysis of novelty and freedom to operate (FTO), use of extensive secondary data (through Internet) and (sometimes) interactions with potential users/customers.
2. The IE-course is more focused on applying tools to the idea rather than displaying multiple versions of the business, service and/or product. However, generating the final report forces the student teams to continuously iterate around how to communicate holistically as well as figure out how to most wisely use the limited space of seven pages (predetermined by the course).

Process-learning in the IE-course is enabled at seminar debriefs occurring twice a week, consultation with faculty and idea providers, as well as through the written individual exam in the end of the course. The exam typically has five main questions, each with two to four sub-questions. One or many of the sub-questions asks the student to exemplify and/or reflect upon his/her experience of using e.g. a particular IE-tool. Comparing Process-learning from the IE-course with the VCP, the main difference is that IE-course students are not asked to act as if they were actually taking on the business. Instead a point is made around being more consultative towards the idea providers, rather than just acting as if a real venture is created. Individual Process-learning is more about experiences around the role as a counselor rather than the entrepreneurial role.

As the students and the overall environment are the same in the VCP and IE-course examples, the control variables are also similar. Background diversity is slightly higher in the IE-course due to additional elective students admitted who do not have the prior joint history the first semester (compared to the VCP students). The IE-course also has less actual resources to offer the teams compared to what is provided by the incubator (coaching, grants and other financing, office space, etc.) and VCP staff (personal development talks, group development talks, etc.) in the final year.

2-days: The Japanese “Camp”

In August 2015, the authors were invited to Fukuoka in Japan to conduct a 2-day train-the-trainer session and then a 2½-day “Camp” with a diverse group of 22 students. In order to carry out the Camp, the authors basically had to compress essentials of the 2-month IE-course into the 2½-day format.

The main design features of Value-creation, Iteration and Team-work, were kept, although with modifications. The most different feature compared to the IE-course was the way the teachers deliberately intervened into the outcomes generated by the students in each iteration. First, only one (shelved) patented technology platform was offered to all the student teams (a small fiber-optical pressure-detector with potential use in a variety of situations). This technology was portrayed in a positive way, giving little account to actual technical limits or challenges. The IE-course, on the contrary, asks the students to spend much time with the technology, its functionalities, challenges, and novelty/freedom-to-operate.

The students work in mixed teams of five to six individuals. After each team presentation, the teachers unilaterally chose which outcome all the students should continue building from in subsequent team-work assignments. For instance, the first iteration was about generating situations-of-use for the pressure sensor. Altogether, the teams generated more than 30 potential situations-of-use, many of which were overlapping between the different teams. The teachers then unilaterally chose a situation-of-use that they thought would enable the best subsequent Outcome-learning. In this case an “earthquake detector” was chosen since the participants coming from and being in Japan were expected to be able to draw upon one another’s practical experiences and tacit knowledge in subsequent assignments.

Process-learning in the Camp was limited team iterative learning through flip chart presentations and teachers asking students to reflect individually (on the spot) upon his/her experience after the final presentation. The rationale behind the personal reflection was two-fold. Firstly, the teachers

wanted to counter-balance “heroic entrepreneur” tendencies manifested in some students taking (and given) more space than others in the team presentations. Secondly, through everyone listening to a variety of different personal reflections, the individual participants were given multiple experiences to relate to and identify with. This potentially illustrated that entrepreneurial roles and identities can vary and also end up being something quite personal.

Control variables were different in the Camp, compared to the VCP and IE-course. There was a larger regional diversity across a spectrum of Asian countries (10 non-Japanese:12 Japanese), compared to the more homogenous Swedish VCP and IE-course environments (though in the VCP/IE settings, internationality crossed regional boundaries – i.e. international students were not from the Nordics, but other regions of the globe). Participants at the Camp came from the same variety of educational background (technology- or business-wise) as in the first two cases, but were more diversified across educational levels: bachelor (14 students), master (4 students), and even PhD (4 students), instead of the homogenous masters-level of the VCP and IE-course. Most participants had not met before and thus teams had no prior history. There were many local Japanese teachers in the classroom making the Camp relatively well-supplied with coaching-capacity (one faculty coach per team plus three additional faculty). However, all Camp activities were done in a classroom, though with capacity for around-the-table and break-out room team-work apart from the lecturing.

2-minutes: The “Pitch”

Inspired by a colleague from Lund University, one of the authors conducted the 2-minute “Pitch” with the current VCP class as part of a course module. The assignment involves four steps: first, write down the name of an entrepreneur; second, the name of a female entrepreneur; third, the name of a corporate entrepreneur and, finally, the name of a social entrepreneur.

The design features of the framework are utilized only partly in this short exercise. Value-creation is limited to generating and communicating names for oneself and for the class, thus limited to the classroom and its plenary discussion and short one-to-one discussions. Iteration is applied in asking different versions of the same question four times. Team-work is very limited: mainly the informal discussions happening in the classroom and during coffee-breaks.

The Outcome-learning through the Pitch is worthy of some more detailed description. The respondents of the quiz consisted of 23 students, 40:60 female to male ratio. All the students wrote responses to the first step: ‘the name of an entrepreneur’. 100% of the answers were male examples, 61% of which were Elon Musk, the founder of Tesla (and co-founder of PayPal). Other examples included other high profile individuals such as Steve Jobs and Richard Branson. Only one student wrote his own name down [given that these were students in a VCP, actively running new ventures, they could potentially all argue for listing themselves as an entrepreneur]. The students found it increasingly difficult to determine names for the other three categories: 17% were unable to provide a name for female entrepreneur, 43% were unable to provide a name for corporate entrepreneur, and 26% were unable to provide a name for social entrepreneur. The majority of female entrepreneur answers were Swedish, whereas the corporate and social examples provided were more mixed between Swedish and other nationalities. In two occurrences, a students listed another

classmate as their answer. None of the students mentioned alumni of the masters/venture creation program as answers.

A short class discussion was taken after the Pitch to reflect upon what names the students had come up with and to reflect upon why those, and perhaps not others, were present in their minds. One natural reason for an all-male response to the first question, as stated by the students, was because most popular or commonly utilized examples of entrepreneurs are male. When asked whether the education was effective in helping to provide alternative examples, the students stated that there were not sufficient alternative examples provided, but rather the perception was that the program also utilized the same popular examples as are prominent in media/society. When reminded of the various alumni companies (and entrepreneurs) that were guest lecturers or visitors during the education, some of the class recalled certain female entrepreneurs – but relative to the company name or industry area (e.g. one student said: ‘oh yeah, the algae one’) rather than the particular individual.

Process-learning in this Pitch is arguable substantial given the very short duration. The challenge of the “heroic entrepreneur” being a white male and actually in most responses the same person (Elon Musk) was made very apparent and reflected upon. Challenges of actually generating names for the subsequent questions for many also generated reflections as did the fact that very few actually thought about any female, corporate or social entrepreneur as a response to the first question. Arguably, the 2-minute Pitch generates awareness for most participants around how biased their view is around entrepreneurship and “the heroic entrepreneur”. It is not possible, however, to determine what such immediate raised-awareness actually enables in the longer run.

Analysis and discussion

The analysis will focus on the three empirical questions introduced above: 1) the relevance of the design features, 2) the learning obtained given different time formats and 3) the importance of control variables.

Relevance of Value-creation, Iteration and Team-work

The empirical examples all relied upon the three proposed design features. The only exception would be the Pitch only “creating value” within the class and, of course, very limited Team-work opportunities. Nevertheless, even in this extreme example, some (new) value is created which is arguably important for the awareness of aspiring entrepreneurial individuals. There is also use of classmates as ground for dialogue and thus for social learning, critical in more extensive Team-work. The other formats – from Camp to VCP – utilized all design features. However, notably the Camp had Value-creation appreciated only within and not outside of the classroom.

Outcome- and Process-learning given different time-frames

Outcome-learning and Process-learning display both similarities and differences in the provided examples. A main similarity is the multi-opportunity for Outcome-learning stemming from the

iterative design of the educations. This is reflected in Figure 1, which emphasizes not only final Outcome-learning but multiple intermittent Outcome- and Process-learning. A critical aspect in almost all the Outcome-learning examples is that they happen as a result of presenting an outcome and then getting feedback upon it. This social nature of Outcome-learning is probably worthy of more investigation. Exceptions from this aspect is when there are written exams used for both Outcome- and Process-learning in the VCP and IE-course. Admittedly, the written exam gets less appreciation from the students as compared to more social manifestations. There is not much feedback built into graded exam questions. So Process-learning is probably low and such examination is done more for “control” reasons to assure less individual “free-riding”.

Differences in Outcome- and Process-learning are apparent in the four empirical examples. These are outlined in Table 1. An obvious difference related to Time is the how much the Outcome-learning is novel and team-specific as in the VCP and IE-course compared to it being more shared and determined by teachers’ choices as in the Camp and Pitch. In fact, there are shared learning experiences lost in the longer time-formats, given that these formats favor the real and more-or-less novel Value-creation experience more.

However, there are still multiple ways to draw from and share insights between unique team-experiences. Process-learning in terms of asking everyone to reflect upon his or her experience, arguably works in all time-formats. The 2-year VCP naturally gives much more time to allow the participant to relate his or her identity development both to role-expectations evolving in the team and beyond as well as to the actual and more substantial value created (Lundqvist et al., 2015). The Process-learning in the IE-course and the Camp are more similar, in comparison to the VCP. Mostly the Team-work is more free and creative in shorter time-formats. The need to substantiate and deal with negative feedback from stakeholders or from technology development is not as high. Thus, the Process-learning arguably has less effect on professional identity, and more to do with experiencing and gaining trust when dealing with uncertainty. In other words, these shorter formats offer learning how to effectuate (Sarasvathy, 2008), through having to re-relate during multiple iterations within a team, around uncertain value-creation. The 2-month format, however, differs from the 2-day format, in terms of the challenge of actually creating a more novel outcome while in a format that forces the team to make many tough team-based decisions. So, the 2-month learning experience cannot be achieved in the 2-day format, if one wants to primarily have emotionally positive (rather than both positive and negative) effects.

Judging from the illustrations, control variables do not seem to have big effect upon the Framework. Background diversity of participants are admittedly similar in most examples. While age is roughly similar (20-30 year olds), the diversity in terms of education, nationality and gender is relatively high in all the examples. We thus cannot say much about younger (<20 years) or older (30+ years) participants. Nor can we analyze how less diversity and more homogeneity would affect Outcome- and Process-learning.

Time	Description	Outcome-learning	Process-learning
2 mins	A "Pitch", such as, the The four question exercise	Students relating their own perceptions with others	Raise awareness. How am I actually thinking about entrepreneurship?
2 hours	Apply method, such as the 5 principles of effectuation, with a 10 minute pair exercise on Bird-in-hand principle followed by classroom discussion.	Learn (about and briefly test) a new principle, a new method, a new approach, a new skill.	Gain knowledge, Change awareness and adopt entrepreneurial method usable for other situations.
2 days	Shorter "Camp", including multiple team-iterations of solutions to some challenge, opportunity or need.	Intense feedback on presented solutions motivating further team-work	Change perspective. How did I contribute? How did others contribute? What can this team do? How can I enable such team-work in other settings, including what role(s) should I play?
2 weeks	Longer "Camp" including some prototype development and short cycles of feedback (on the street, or with classmate).	Solutions are "for real", representing not only team-discussions but also other developments – in the field and in the lab.	Change practice. How do I (and others) deal also with negative feedback? What is an entrepreneurial mindset (for me and others)?
2 months	Elective course, such as IE-course. Iterate tools, concepts, etc. in multiple cycles within development.	Create value appreciated by external stakeholder (e.g. idea provider). Iterated use of tools. Converging solution.	Change behavior. Gain professional skills. Reflect upon team role(s) and on stake-holder value.
2 years	A master program: Iterative learning through 3 cycles.	Solutions iterated, tested and even sold to multiple stakeholder environments.	Change identity. Entrepreneurial role experiences within long term team-partnerships, affecting professional identity.

Table 1. Tentative learning related to different educational formats.

Importance of control variables

Only one empirical example was conducted outside of Chalmers University of Technology, namely the 2½-day Camp in Japan. This illustration thus holds some merit as regards the generality of the framework. The overall impression from the camp is that all components of the framework were as relevant in this setting as in the Swedish setting. Hence, asking teams to create-value and to learn from iteratively presenting outcomes while individually reflect upon the process appeared natural and fruitful in all the four examples and in both of the two geographical settings. Nothing suggested that there were cultural or other factors affecting the general validity of the framework. Of course, more research into many more settings and with other teachers need to be conducted to more safely argue that there might not be that much of contextual or other control variables at work.

On a more speculative tangent, there is reason to discuss if background diversity might be somewhat negatively related to Outcome-learning in two-year programs such as the VCP. Although with exceptions, the main rule as regards actual ventures incorporated in the VCP is that

the co-founders are Swedish. I.e. there might be challenges – language-wise and culturally – to offer the same Outcome-learning and thus also Process-learning for non-Natives in more ambitious and real-life venture creating programs. This aspect might not only be around cultural diversity. It might also relate to how much diversity there is or can be in VCP teams, for them to build sufficient trust and long-term team-learning. This issue is speculative and thus should be seen as an issue worthy of further research. In every other regards, diversity in the offered empirical examples seem to have added richness to both the Outcome-learning and Process-learning achieved. Thus, a main conclusion in action-based entrepreneurial education seem to be that background diversity generally is a positive aspect and, thus, low levels of diversity in consequence might have negative learning effects.

Conclusions and future research

The purpose of this paper is to propose and empirically illustrate a framework for setting up and evaluating action-based entrepreneurial education. To fulfil this purpose a “2T Framework” (see figure 1) has been derived and illustrated through four empirical examples. The subsequent analysis focused on the relevance of the design features of the Framework, what kind of Outcome- and Process-learning can be accomplished given different timeframes and on the importance of control variable such background diversity of participants.

The main conclusion is that the proposed “2T Framework” hold promise to function as a generally applicable framework in setting up and evaluating action-based entrepreneurial education, relatively independent upon time-frames of the education. The design-features of Value-creation, Iteration and Team-work are derived from entrepreneurship theory and appear as relevant in all empirical illustrations. While none of these design features are common or even relevant in more traditional education, they do have the potential of being even definitional features of action-based entrepreneurial education, regardless of the time-frame of such an education.

Outcome-learning and Process-learning are two distinct but interrelated learnings in action-based entrepreneurial education. Outcome-learning normally include teams presenting and getting feedback on their value-creation. Process-learning result from asking participants to reflect upon their personal experiences. Both learning can appear multiple times in an education as a result of the iterations.

Finally, control variables, such as background diversity of participants have not been detected as having any large effect. Nor has the (national) setting of an education had any major impact on how the action-based education was experienced. Thus the “2T Framework” based upon only these four empirical examples holds general promise and might not require much adaptation other than being reflective about the importance of time-frame and what to then expect in terms of Outcome- and Process-learning. This, however, needs to be further investigated, as does also the substantiation of the proposed framework.

References

- Alänge, S. & Lundqvist, M. (2013). *Sustainable Business Development - Frameworks for Idea Evaluation and Cases of Realized Ideas*, Chalmers University Press, Gothenburg.
- Bennett, R. (2006). "Business lecturers' perceptions of the nature of entrepreneurship". *International Journal of Entrepreneurial Behaviour & Research*, Vol. 12, No. 3, pp. 165-188.
- Berglund, K. & Holmgren, C. (2013). "Entrepreneurship education in policy and practice". *International Journal of Entrepreneurial Venturing*, Vol. 5, No. 1, pp. 9-27.
- Blank, S. (2013). "Why the Lean Start-Up Changes Everything". *Harvard Business Review*, Vol. 91, No. 5, pp. 64-71.
- Bruyat, C. & Julien, P.-A. (2001). "Defining the field of research in entrepreneurship". *Journal of Business Venturing*, Vol. 16, No. 2, pp. 165-180.
- Butler, C. & Williams Middleton, K. (2014). "Team Conflict contributing to Entrepreneurial Learning: Understanding conflict as positive within an Effectual Problem Space". *International Journal of Entrepreneurship and Innovation Management*, Vol. 18, No. 1, pp. 5-22.
- Duval-Couetil, N. (2013). "Assessing the Impact of Entrepreneurship Education Programs: Challenges and Approaches". *Journal of Small Business Management*, Vol. 51, No. 3, pp. 394-409.
- Edgar, B., Abouzeedan, A., Hedner, T., Maack, K. & Lundqvist, M. (2013). "Using scenario planning in regional development context: the challenges and opportunities". *World Journal of Science, Technology and Sustainable Development*, Vol. 10, No. 2, pp. 103-122.
- Erkkilä, K. (2000). *Entrepreneurial education: mapping the debates in the United States, the United Kingdom and Finland*, Garland Publishing Inc., New York, NY
- Fayolle, A. (2013). "Personal views on the future of entrepreneurship education". *Entrepreneurship & Regional Development*, Vol. 25, No. 7/8, pp. 692-701.
- Fayolle, A. & Gailly, B. (2008). "From craft to science: Teaching models and learning processes in entrepreneurship education". *Journal of European Industrial Training*, Vol. 32, No. 7, pp. 569-593.
- Gartner, W. B. (1988). "Who is an Entrepreneur?" Is the Wrong Question". *Entrepreneurship Theory and Practice*, Vol. 12, No. 4, pp. 11-32.
- Hindle, K., Yencken, J. & O'Connor, A. (2011). "An entrepreneurship policy framework for high-growth firms: navigating between policies for picking winners and market failure". *International Journal of Entrepreneurial Venturing*, Vol. 3, No. 4, pp. 324-343.
- Jacob, M., Lundqvist, M. & Hellsmark, H. (2003). "Entrepreneurial transformations in the Swedish University system: the case of Chalmers University of Technology". *Research Policy*, Vol. 32, No. 9, pp. 1555-1568.
- Jones, C., Matlay, H. & Maritz, A. (2012). "Enterprise education: For all, or just some?". *Education and Training*, Vol. 54, No. 8, pp. 813-824.
- Kyrö, P. (2008). "A theoretical framework for teaching and learning entrepreneurship". *International Journal of Business and Globalisation*, Vol. 2, No. 1, pp. 39-55.
- Kyrö, P. (2015). "The conceptual contribution of education to research on entrepreneurship education". *Entrepreneurship & Regional Development*, Vol., No., pp. 1-20.
- Lackéus, M. (2013). *Developing Entrepreneurial Competencies: An Action-Based Approach and Classification in Education*. Licentiate, Chalmers University of Technology.
- Lackéus, M. (2016). Two frameworks for sense-making value creation based entrepreneurial education. *ECSB Entrepreneurship Education Conference*. Leeds, UK.
- Lackéus, M., Lundqvist, M. & Williams Middleton, K. (2011). Obstacles to Establishing Venture Creation Based Entrepreneurship Education Programs. *Nordic Academy of Management (NFF)*. Stockholm, Sweden.

- Lackéus, M., Lundqvist, M. & Williams Middleton, K. (2013). How can Entrepreneurship Bridge Between Traditional and Progressive Education? *ECSB Entrepreneurship Education (3E) Conference*. Århus, Denmark.
- Lackéus, M. & Williams Middleton, K. (2015). "Venture Creation Programs: bridging entrepreneurship education and technology transfer". *Education + Training*, Vol. 57, No. 1, pp. 48-73.
- Lundqvist, M. & Williams-Middleton, K. (2008). Sustainable Wealth Creation beyond Shareholder Value. In: Wankel, C. & Stoner, J. (eds.) *Innovative Approaches to Global Sustainability*. Palgrave MacMillan, New York, NY pp. 39-62.
- Lundqvist, M., Williams Middleton, K. & Nowell, P. (2015). "Entrepreneurial identity and role expectations in nascent entrepreneurship". *Industry and Higher Education*, Vol. 29, No. 5, pp. 327-344.
- Moberg, K. (2014). *Assessing the Impact of Entrepreneurship Education: From ABC to PhD*. Copenhagen Business School Copenhagen Business School, Institut for Strategi og Globalisering Department of Strategic Management and Globalization.
- Morris, M. H., Kuratko, D. F., Schindehutte, M. & Spivack, A. J. (2012). "Framing the Entrepreneurial Experience". *Entrepreneurship Theory and Practice*, Vol. 36, No. 1, pp. 11-40.
- Mueller, S. & Anderson, A. R. (2014). "Understanding the entrepreneurial learning process and its impact on students' personal development: A European perspective". *International Journal of Management Education*, Vol. 12, No. 3, pp. 500-511.
- Müller, R. M. & Thoring, K. (2012). "Design thinking vs. lean startup: A comparison of two user-driven innovation strategies". *LEADING THROUGH DESIGN*, Vol. 151, No., pp.
- Mäkimurto–Koivumaa, S. & Puhakka, V. (2013). "Effectuation and causation in entrepreneurship education". *International Journal of Entrepreneurial Venturing*, Vol. 5, No. 1, pp. 68-83.
- Neck, H. & Greene, P. (2011). "Entrepreneurship Education: Known Worlds and New Frontiers". *Journal of Small Business Management*, Vol. 49, No. 1, pp. 55-70.
- O'Connor, A. (2013). "A conceptual framework for entrepreneurship education policy: Meeting government and economic purposes". *Journal of Business Venturing*, Vol. 28, No. 4, pp. 546-563.
- Ollila, S. & Williams Middleton, K. (2011). "The venture creation approach: integrating entrepreneurial education and incubation at the university". *International Journal of Entrepreneurship and Innovation Management*, Vol. 13, No. 2, pp. 161-178.
- Peterman, N. E. & Kennedy, J. (2003). "Enterprise Education: Influencing Students' Perceptions of Entrepreneurship". *Entrepreneurship Theory and Practice*, Vol. 28, No. 2, pp. 129-144.
- Pittaway, L. & Edwards, C. (2012). "Assessment: examining practice in entrepreneurship education". *Education + Training*, Vol. 54, No. 8, pp. 778-800.
- Rae, D. (2005). "Entrepreneurial learning: a narrative-based conceptual model". *Journal of Small Business and Enterprise Development*, Vol. 12, No. 3, pp. 323-335.
- Rae, D. & Wang, C. L. (2015). *Entrepreneurial Learning: New Perspectives in Research, Education and Practice*, Routledge, New York, NY USA.
- Rasmussen, E. & Sørheim, R. (2006). "Action-based entrepreneurship education". *Technovation*, Vol. 26, No. 2, pp. 185-194.
- Read, S., Sarasvathy, S. D., Dew, N., Wiltbank, R. & Ohlsson, A.-V. (2011). *Effectual Entrepreneurship*, Routledge, London.
- Sarasvathy, S. D. (2008). *Effectuation: Elements of Entrepreneurial Expertise*, Edward Elgar, Cheltenham, UK.
- Sarasvathy, S. D. & Venkataraman, S. (2011). "Entrepreneurship as Method: Open Questions for an Entrepreneurial Future". *Entrepreneurship Theory and Practice*, Vol. 35, No. 1, pp. 113-135.
- Shane, S. & Venkataraman, S. (2000). "The Promise of Entrepreneurship as a Field of Research". *The Academy of Management Review*, Vol. 25, No. 1, pp. 217-226.

- Sirelkhatim, F. & Gangi, Y. (2015). "Entrepreneurship education: A systematic literature review of curricula contents and teaching methods". *Cogent Business & Management*, Vol. 2, No. 1, pp. 1052034.
- Slattery, G. & Danaher, M. (2015). "Curriculum design: A gestalt approach to the pedagogy of entrepreneurship education with postgraduate student teachers in an Irish university". *Journal for Educators, Teachers and Trainers*, Vol. 6, No., pp.
- Walter, S. G. & Block, J. H. (2016). "Outcomes of entrepreneurship education: An institutional perspective". *Journal of Business Venturing*, Vol. 31, No. 2, pp. 216-233.
- Williams, C. C. & Nadin, S. J. (2013). "Beyond the entrepreneur as a heroic figurehead of capitalism: re-representing the lived practices of entrepreneurs". *Entrepreneurship & Regional Development*, Vol. 25, No. 7-8, pp. 552-568.
- Williams Middleton, K. & Donnellon, A. (2014). "Personalizing Entrepreneurial Learning: A Pedagogy for Facilitating the Know Why". *Entrepreneurship Research Journal*, Vol. 4, No. 2, pp. 167-204.
- Wing Yan Man, T. & Farquharson, M. (2015). "Psychological ownership in team-based entrepreneurship education activities". *International Journal of Entrepreneurial Behavior & Research*, Vol. 21, No. 4, pp. 600-621.