

Article

Putting Entrepreneurial Process Competence into the Focus in Entrepreneurship Education: Experience from Estonian Universities

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Abstract: Although entrepreneurship at the university level has constantly been evolving, little research has been done on what competencies should be developed in entrepreneurship education (EE) and how EE relates to the core of entrepreneurship—the entrepreneurial process competence. This article seeks to develop and empirically measure the entrepreneurial process competence in the context of EE. A self-assessment questionnaire based on the ‘generic’ entrepreneurship competence model, improved with the section on entrepreneurial process competence, was used to assess the impact of EE intervention in major Estonian universities. The survey took place in two stages: the same questions were repeated at the beginning and end of the course in the 2019 autumn semester. It gave the responses of 355 students and showed the varied and small positive individual-level impact of entrepreneurship courses on minor aspects of ‘generic’ competences in different universities, depending on training methodology, study volume and contact hours. At the same time, all the competencies of the entrepreneurial process grew significantly. Readiness to start own business did not change. The article recommends focusing on entrepreneurial process competencies and their acquisition for development and metrics of entrepreneurship learning progression.

Keywords: entrepreneurship education; impact; entrepreneurial competence; generic competence; competencies; entrepreneurial process; self-assessment



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1. Introduction

Entrepreneurial competencies at university have evoked a broader debate on entrepreneurship and entrepreneurship education (EE). The content of the generic entrepreneurship competence framework, EntreComp, is related to this issue (Bacigalupo et al. 2016; Silveyra et al. 2021) in a broader societal context. There is less discussion about what and how to teach and learn entrepreneurship. University EE and training, especially in non-economics and non-business specialities, are increasingly moving towards experiential learning (Corbett 2005; Bandera et al. 2018; Lackéus 2020) by implementing a social-constructivist approach (Löbner 2006). Frequently, researchers measure entrepreneurial intention as the learning outcome (Krueger et al. 2000; Sánchez 2013; Fayolle and Gailly 2015).

Entrepreneurship teachers at universities face the challenge of setting learning goals and evaluating EE learning outcomes. Traditionally, the assessment of learning outcomes at university is based on the Bologna Declaration and the European Qualification Framework (EQF) tripartite (knowledge-skills-attitudes) model (e.g., Tauch 2004). EE’s tripartite learning outcome model has recently been approved empirically (Kozlinska 2016). However, there are no addressed competencies specific to entrepreneurship as a process phenomenon. (Merriam-Webster Dictionary (n.d.) defines process as “a natural phenomenon marked by gradual changes that lead toward a particular result”). This competence means the

entrepreneur's ability to cope with changes within the entrepreneurial process, from opportunity recognition to exploitation. The entrepreneurial process defines the nature of entrepreneurship (Shane and Venkataraman 2000; Shane 2012), and its competence should therefore be a core of EE.

Over the last thirty years, research in EE and pedagogy has become a branch of entrepreneurship and education studies (see, e.g., Sirelkhatim and Gangi 2015; Welsh et al. 2016). Much research is devoted to process-based EE and entrepreneurial competencies focusing on the learning process (Hägg and Gabrielsson 2020), but not on (the competence of) the entrepreneurial or venture creation process, which is also a process of entrepreneurial learning (Cope 2005; Politis 2005; Dimov 2007) and could be at the heart of experiential learning. A literature search using the keyword "entrepreneurial competence" in the Google Scholar environment (without citations) provides more than seven and a half thousand ("entrepreneurship competence"—nearly three thousand, March 2022) publications, of which over three hundred (over two hundred in the last five years) are represented in the Scopus databases. Surprisingly, none of these publications reflect the competencies of the entrepreneurial or entrepreneurship process, although some researchers have found this knowledge necessary (e.g., Lackéus and Middleton 2015). This does not mean that the entrepreneurial process is not included in EE. Many experiential entrepreneurship courses are built on the venture creation process (Mets et al. 2013), but mastering it has not reached the measurement of relevant process competencies. We can state that the competencies of the entrepreneurial process have been neglected in EE research and the corresponding studies remain fragmented (Matlay 2006). Whether it could be explained by the fact that research on the entrepreneurial process in the entrepreneurship discipline field is underdeveloped (Davidsson and Gruenhagen 2020) or that the dynamics of this process, including its temporal progression, are still poorly understood (Mets 2022), needs further analysis in the EE context.

The article aims to develop and empirically measure the entrepreneurial process competence in the context of EE intervention. Traditionally, the learning outcomes of EE are so-called generic competences, as noted above. Measuring the competences of the entrepreneurial process is novel in EE studies. The reliability of such a measurement will be enhanced by developing an appropriate framework and comparing it with the generic competences already known. It would also answer the question: what is the impact of EE's intervention on the competence of the entrepreneurial process compared to traditional generic entrepreneurship competences?

Reaching the set goal means the need to:

1. Open the approach to entrepreneurial generic and specific competences in the context of entrepreneurship discipline;
2. Disclose the assessment of entrepreneurial competencies as a learning outcome of EE intervention;
3. Open the entrepreneurial process competence in the system of entrepreneurial competences from the point of view of EE;
4. Create a tool for measuring and evaluating the competence of the entrepreneurial process;
5. Measure and assess the impact of EE intervention on students' entrepreneurial generic and process competences comparatively.

Our study proceeds from the axiom that the entrepreneurial process as a feature of entrepreneurship discipline (see, e.g., Shane 2012) is also at the heart of EE. To achieve the goal of our study, we: (1) contribute to the discussion of the concept and characteristics of entrepreneurship in the context of EE, (2) analyse theoretically different approaches and models of competencies, (3) briefly discuss EE in the context of teaching/learning methodology, (4) measure changes in student competencies during the training course using the students' original self-assessment questionnaire at the beginning and end of the EE intervention, and (5) the main results of the study are briefly opened and recommendations are developed in assessing the impact of the EE intervention on entrepreneurship competence(s).

In an attempt to answer the question of what competencies we should develop in EE, we will use the data of the 'Edu & Tegu' (E&T, 'Success & Action') programme in Estonia. It is based on the Comprehensive Entrepreneurship Competence Model (CECM) (Venesaar et al. 2018, 2022), similar to the EntreComp framework, and cultivates a so-called 'broad approach' to entrepreneurship and EE. We supplemented the questionnaire, which measures 'generic' competencies based on the CECM model, with statements about the entrepreneurial process in a dynamic context. The survey of major Estonian universities mapped the impact on competencies of 355 students with a minor or elective course in entrepreneurship before and after EE intervention. The article's main contribution is drawing attention to entrepreneurship as a process phenomenon that should be taken into account in the methodology of EE and the development of entrepreneurial competence generally.

2. The Entrepreneurial Process Competence and Entrepreneurship

In the first parts of this section, we open the context of entrepreneurship and the content of entrepreneurship competences in EE as a brief literature review. The following two subsections link entrepreneurship generic and entrepreneurial process-specific competencies to the EE process and learning outcomes. General hypotheses of the study are developed.

2.1. The Context of Entrepreneurship

The creation of new economic activity is widely understood as entrepreneurship (Davidsson 2016). Some critics (e.g., Lilleväli and Täks 2017) argue that entrepreneurship is defined as a "narrow" concept "when creating and developing a new business" and "based on the broad approach, entrepreneurship is seen as a daily activity of value creation in society" (Venesaar et al. 2018, p. 119; see also Bacigalupo et al. 2016). The appropriateness of these views can be judged based on sources that shape perceptions of entrepreneurship as a discipline. Gartner (1990) identifies eight main themes in entrepreneurship: entrepreneur, innovation, organisational creation, value creation, profit or non-profit, growth, uniqueness and owner-manager. In line with these themes are the traditional establishment of businesses, the creation of non-profit associations and government organisations, and the launch of an (innovative) enterprise in an existing organisation.

Consequently, we find different types and approaches to entrepreneurship in different fields, such as social, societal, corporate, organisational, political, team and internal entrepreneurship. Many subsequent publications on the nature of entrepreneurship (e.g., Shane and Venkataraman 2000) also align with (or at least are not in conflict with) this view. Some authors, indeed (e.g., Davidsson 2016), delimit their field of research more narrowly and delve deeper into the topic, but do not deny entrepreneurship as being a 'broader' field.

Defining entrepreneurship through value creation (Venesaar et al. 2018) or some other individual activity in this so-called 'broad' framework seems rather 'narrow' in the context of Gartner (1990) approach. In addition, there are many activities related to value creation that we do not consider to be entrepreneurship; for example, a work of art is a value that we are not used to seeing as an expression of entrepreneurship in itself. The same can be said for many work processes in service or production, which, while creating value, are not entrepreneurship. Consequently, there is a risk that the so-called 'broad' approach to entrepreneurship will lead to incorrect results if we are not aware of the intrinsic features of entrepreneurship.

In order to find an explanation for the origin of the 'narrow' approach to entrepreneurship, it is necessary to turn to the current practice of EE and training. Current courses, considering both the limited volume and the preferences of the lecturers, are based mainly on the creation of a business idea and model and the preparation of a business plan. Of course, there are also specialised courses—such as social entrepreneurship, rural entrepreneurship and intrapreneurship—but they are in the minority compared to the so-called 'mainstream' approaches. Understandably, the direction of political or intra-organisation en-

entrepreneurship is more challenging to implement in a university or school. The experience of young students does not allow them to cover these specific areas. Additionally, in the register of organisations, non-profit social and political institutions are in a clear minority compared to companies, accounting for at most a few percent of the total (e.g., e-Business Register: <https://ariregister.rik.ee/index?lang=eng>, accessed on 1 December 2021). It also explains the pre-dominance of a “narrow” approach to understanding and teaching entrepreneurship.

Entrepreneurship cannot be characterised by a single individual activity or the application of a single ability, e.g., creativity, to create and develop a new (work of art, product, service) idea. Like innovation, entrepreneurship is the process from the conception of an idea and opportunity to developing and implementing an undertaking—regardless of the organisational form in which it is done. As a result of the entrepreneurial process, a new value is also revealed to society in a broader sense, and it can take place in many areas of life. In conclusion, we can say that the hallmark of entrepreneurship is the entrepreneurial process (see also, e.g., [Moroz and Hindle 2012](#); [Shane 2012](#)). The concept and content of the entrepreneurial process in the entrepreneurship discipline and EE context will be explained in the following sections.

2.2. What Are Entrepreneurship Competences?

Entrepreneurship competences can be divided into different partially overlapping subcategories (based on [Morris et al. 2013](#)): functional (e.g., marketing, sales, management, etc.), cognitive (e.g., knowledge, conceptual ability), personal and personality (commitment, perseverance, competitiveness, and ethics), activity-based (e.g., starting a business, raising resources, organising), and many others. We also use the term “competence” to denote a more holistic set of learning outcomes (skills–knowledge–attitudes) and “competency” to cover a particular part of the field ([Le Deist and Winterton 2005](#); [Khan and Ramachandran 2012](#); [Ustav and Venesaar 2018](#); [Pöder et al. 2019](#)). Competencies in the context of skills can also be presented as a so-called pyramid of competencies: personal, academic, job, management and technological skills ([Moustaghfir and Secundo 2016](#)). Several authors ([Kyrö et al. 2011](#); [Morris et al. 2013](#); [Mindt and Rieckmann 2017](#); [Ustav and Venesaar 2018](#)) present different competencies integrated as meta-competencies. It is possible to distinguish, e.g., cognitive, conative and affective (meta-)competencies. At the same time, meta-competence is at a higher level of generalisation than integrated (sub-) competencies (see, e.g., [Ustav and Venesaar 2018](#)).

The European Commission has published EntreComp, a theoretical framework for entrepreneurship competence ([Bacigalupo et al. 2016](#)). It includes three areas (competences): ideas and opportunities, resource management and action, each covered by five competencies. Their list includes behavioural (initiation, planning, self-management, cooperation, learning), attitudinal (self-belief, motivation) and skills-related competences. As a critique of this model, we argue that all of these competencies may be required by an entrepreneur in the longer or shorter term. However, the mere existence of these competencies (aggregation, integration) may not form a whole—an entrepreneurial competence with its main feature—entrepreneurial process competence.

Partly the EntreComp framework has inspired the creation of the Model of Teachable Entrepreneurship Competencies (M-TEC), the scales of which have been validated ([Silveyra et al. 2021](#)). The model consists of competencies divided into four dimensions: entrepreneurship, leadership and business, human resources, and interpersonal competencies. Going deeper into the statements of the entrepreneurship dimension of the article (*ibid*), one cannot find anything related to the entrepreneurial process and its dynamics. There are also no data on the impact assessment of the EE intervention using the model.

An attempt has been made to go deeper into a generic model during the EE Programme “E&T” research project in Estonia, similar EntreComp. The generic model CECM entitled “Entrepreneurial value creation” includes four areas of competence and the following competencies ([Venesaar et al. 2018, 2022](#)):

1. Self-management: Growth Mindset/Developmentalism, Autonomous Motivation/Autonomy, Coping with Emotions, and Meta-cognition;
2. Managing/Solving social situations: Personal initiative/Initiation, Communication, and Cooperation;
3. Creative Thinking (and Finding Solutions): Creativity, Problem Solving, Planning, Ethics and Sustainability;
4. Acting upon opportunities (and ideas): Understanding Environment, Opportunity Discovery and Exploitation, and Financial Literacy.

The generalisation of the competencies listed in the model to the whole and the meta-competence corresponding to entrepreneurship is confusing if it should be understood as an inherent process competence. While the first three groups of competences cover mental, behavioural and skill-related competencies, the fourth item in the list of functional competencies appears to be incomplete compared to some previous approaches (Shane 2003; Gemmell et al. 2012). There are no temporal and other functions involved in implementing and running the process, i.e., entrepreneurial process competence as a whole. Although the scale 'Opportunity Discovery and Exploitation' as a generalised (meta-?) competence seem to cover it, in essence, none of the (sub-)competencies contains a (dynamic) component of the process time-dependence and feedback, and it does not link the process as a whole.

To generalise, the list of E&T competencies belongs to the so-called personal characteristics traits (Need for Autonomy, Creativity, Self-efficacy see, e.g., Baum and Locke 2004; Oosterbeek et al. 2010; Salmony and Kanbach 2022), transferable skills (e.g., Smith and Paton 2014) and competencies that are only partially related to the entrepreneurial process, without covering the most essential holistic and dynamic aspect of the process. The above list of competenc(i)es raises the legitimate question of which should be direct components of EE and how these competenc(i)es can be developed in the learning process.

2.3. Entrepreneurial Competence as Learning Outcome to Measure

EE's goals and task setting depend on how entrepreneurship teachers interpret their activities. Hence, the question of whether the main topic of the course should be (1) developing "broad" competencies according to the EntreComp or CECM scheme (Bacigalupo et al. 2016; Venesaar et al. 2018) or (2) developing the nature of entrepreneurship—mastery of the entrepreneurial process (and relevant competencies) using methods that also involve the development of EntreComp's competences. However, the latter is usually regulated in universities by a higher education standard based on Bloom's taxonomy and the EQF (Kumpas-Lenk et al. 2018). In both cases, what matters is what is expected of the student and what is valued.

It is generally accepted to apply experiential learning to reach the targets of EE (Corbett 2005; Kozlinska 2016; Bandera et al. 2018, among others). Lackéus (2020) distinguishes three different experiential approaches to EE: 'Idea and Artefact-Creation Pedagogy', 'Value-Creation Pedagogy' and 'Venture-Creation Pedagogy'. The first two could be a prerequisite and an ingredient for the third. Experiential learning (ibid) includes a range of competencies and skills (altogether 32), lacking competence in the entrepreneurial (venture creation) process.

Different approaches can be used in EE—both traditional academic/theoretical (about entrepreneurship) and experiential (through entrepreneurship and everyday practice) (Hytti and O'Gorman 2004; Hytti 2008; Bridge et al. 2010; Blenker et al. 2012; Kozlinska 2012; Lackéus 2020)—to develop knowledge about entrepreneurship and to create the pre-conditions for becoming an entrepreneurial citizen and entrepreneur. The latter approach is prevalent in developing transferable (entrepreneurial) competencies. The problem in teaching entrepreneurship is the feedback nature of the entrepreneurial process and its parts (see, e.g., Bhave 1994; Mets et al. 2013, 2019) requiring mastery of both the whole and its parts. At the same time, the (functional) mastery of both sub-competencies (of sub-processes) and the whole (entrepreneurial process) are interdependent and develop only as an iterative process when the whole is achieved. In the intermediate phases, the

perception of partial competencies is subjective—whether the corresponding acquired (sub-)competency corresponds to the whole depends on the final result (McMullen and Dimov 2013). Such learning through a process where there are no right or wrong answers and the methods/techniques (finding/developing an opportunity, idea, concept, etc.) that are better or worse due to the subjective decision(s) are essential, creating uncertainty. Uncertainty, an integral part of the entrepreneurial process, accompanies both the entrepreneur and the student and creates stress. Without understanding this fact (as is characteristic of the entrepreneurial learning process), it is difficult for the student to plan the actual course of the process, which may become a source of additional stress (Chang and Rieple 2013; Rauch et al. 2018).

Although the development of competencies has been extensively studied using post-test self-assessment, there are far fewer attempts to measure the impact of EE intervention on competencies. Many EE studies (e.g., Krueger et al. 2000; Sánchez 2013; Fayolle and Gailly 2015) based more or less on Ajzen (1991) theory of planned behaviour focus on measuring entrepreneurial intent as a learning outcome. Different entrepreneurship/business traits (e.g., Oosterbeek et al. 2010) and individual competencies are also measured (e.g., Venesaar et al. 2018; Pöder et al. 2019). The triadic model based on Bloom's taxonomy 'knowledge-skills-affection/attitude' (Kozlinska et al. 2020) post-course study best fits the assessment system used at university. Typically, in such a study, students' self-assessments are on a positive Likert-type scale (e.g., 1, . . . , 5), and the standard deviation of the answers is (significantly) lower than the mean (see, e.g., Kozlinska 2016). This suggests that the EE course positively affects an individual's entrepreneurial competencies.

One of the few studies that use pre- and post-course measurements (questionnaires) to assess the impact of EE intervention on individual competencies was recently published (Colombelli et al. 2022). The participants were master's and doctoral students from different countries and disciplines to develop technologically challenging real projects (inventions). That is, it was experiential learning. Despite the small sample size (34 students), some impact assessments were statistically significant: Entrepreneurial Self-Efficacy, Financial Literacy, Marshalling of Resources, and Planning. The impact was slightly positive or negative for several competencies: Entrepreneurial Intention, Entrepreneurial Attitude, Entrepreneurial Mindset, Core Self Evaluation, Creativity, and Teamwork.

Such a self-assessment of the (missing) dynamics in some of one's competencies due to experiential learning may seem surprising. This makes it necessary to make sense of individual experience and competence development as a result of EE's intervention. However, based on the goals of the entrepreneurship teacher and the prerequisites for learning, we formulate the hypothesis that has seemed natural so far:

Hypothesis 1 (H1). *EE intervention has a positive impact on students' generic entrepreneurship competences.*

Since generic competences can be structured into a set of (sub-)competencies, hypothesis H1 is extended to all generic (sub-)competenc(i)es.

2.4. Entrepreneurial Process—The Core of Entrepreneurship and Experiential EE

Although the widespread use of the concept of the entrepreneurial process should be studied in-depth, the actual situation shows significant shortcomings in understanding the dynamics of the process in entrepreneurship studies (Mets 2022). If there are problems with the basic concept of the entrepreneurship discipline, there is no reason to believe that it has been exceeded in EE. Current approaches to the entrepreneurial process are largely static based on the theory of variables (see, e.g., Moroz and Hindle 2012). The number of studies on the dynamics of the entrepreneurial process—in the sense of the entrepreneurial journey (in the sense of a construct, not a metaphor; e.g., McMullen and Dimov 2013) is limited to 5–7 publications (Mets 2022). The competence of the entrepreneurial process has been little

studied in EE context. This concept has only been superficially touched on in a dynamic context (e.g., [Pittaway and Edwards 2012](#); [Lackéus and Middleton 2015](#)) or not at all.

It is therefore necessary to open an entrepreneurial process—an entrepreneur's operations based on intentions and ideas until the opportunity realization, which is the idea of experiential EE ([Lackéus 2020](#)). Depending on the real-life connection, from interviewing a potential customer and testing a business model to attracting investment and starting a business, EE contains a more or less experiential element. Students often do not start a business during the course, experience is gained at individual parts of the process and a large part of the entrepreneurial process is simulated ([Pittaway and Cope 2007](#)).

[Bhave \(1994\)](#) as well as [Cunneen and Mankelaw \(2007\)](#) present entrepreneurship (learning) as a feedbacked step-by-step process. This process is driven by causal logic and feedback-feeding effectuation decisions [Sarasvathy \(2008\)](#) discussed. These approaches are summarised in a dynamic entrepreneurial process stage model, which is generalised in [Figure 1](#).

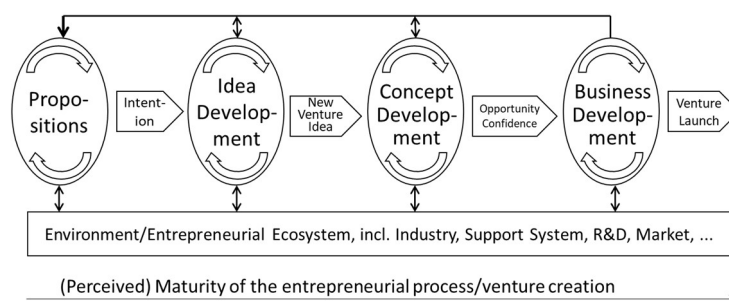


Figure 1. A dynamic stage model of the entrepreneurial process, based on [Mets et al. \(2019\)](#).

The process follows each stage in the causal sequence of Propositions, Idea Development, Concept Development and Business Development. The stages are linked in series with the entrepreneurial acts—artefacts. The outcomes—artefacts of these stages are Intention—perceived opportunity, New Venture Idea—filtered opportunity, Opportunity Confidence—business concept and, finally, Venture Launch, which can be understood as the decision to exploit the opportunity. The process is complicated because any subsequent stage based on objective information can identify that changes should be made to the previous stage, e.g., the business concept does not fit the market need or the resources available, and idea/target opportunities/goals need to be reshaped. [Sarasvathy \(2008\)](#) counts tens of such (effectuation) decisions within one particular entrepreneurial process.

In experiential learning, the student follows the entrepreneurial process ([Trabskaia and Mets 2021](#)). The feedback within the natural entrepreneurial process and process-based learning may indicate that the same component/aspect of the business has to be re-decided and re-done several times.

At the same time, whether the chosen solution is expedient becomes apparent when the process reaches the end—maturity for starting a real business. Until then, both the entrepreneur and the student operate in the conditions of perceived maturity of the process. This perception may be erroneous, and (usually) the (startup) entrepreneurial process may fail. At best, it is possible to start again.

Understandably, during the course, the student may not go through the entire entrepreneurial process due to time constraints, limited resources and the purpose of university studies generally. This means the training cannot be fully experiential in terms of the entrepreneurial startup process reaching a real business at the end of the course. At the same time, there are examples where the startup process triggered during the course becomes a real company (e.g., [Mets et al. 2013](#)). Implementing some part of the process and partial imitation of the rest during the course allows the student to gain experience that theory-based learning does not provide.

In summarising the learning based on the entrepreneurial process, we have formulated another general hypothesis (which also applies to sub-competencies):

Hypothesis 2 (H2). *EE intervention has a positive impact on the entrepreneurial process competences of students.*

3. Methodology and Sample

An instrument for the empirical study was developed in collaboration by two working groups around two parts of the questionnaire. The most significant part of this was the questionnaire mapping the model CECM of generic entrepreneurship competencies, which was later (in 2019) supplemented by a section of statements for assessing the competencies of the entrepreneurial process. The questionnaire structure followed the logic of the CECM hierarchy: entrepreneurship competence consists of area (sub-) competencies; the latter are divided into competencies (scales), the components of which—sub-competencies—were mapped with a single item statement/question.

What makes this study special is mapping the impact of EE intervention at the individual level. This is not very easy by the need for double (pre- and post-) collection and personalization of data, as only those forms where identity is guaranteed are applicable.

3.1. Questionnaire Design for Mapping Generic Entrepreneurial Competences

The components (sub-competencies) of the entrepreneurship competence model listed above are based on the results of many former studies where they are fully or partially validated (references of this sub-section are based on [Venesaar et al. 2018, 2022](#)). It also makes it easier to understand and measure the respective areas of competence, as many instruments have already been tested on the sub-competencies level. The task of the working group developing the questionnaire was, in particular, to develop and integrate all these approaches into a coherent whole in the entrepreneurship context.

Among the competencies in self-management, the growth mindset is based on the work of [Keating and Heslin \(2015\)](#), [Murphy and Dweck \(2010\)](#) and [Dweck and Leggett \(1988\)](#). The treatment of individual motivation comes from the study of [Deci and Ryan \(2000\)](#), metacognition from [Efklides \(2011, 2014\)](#) and [Flavell \(1979\)](#), as well as [Ustav \(2018\)](#) and [Ustav and Venesaar \(2018\)](#). The approach to coping with emotions, including from an entrepreneurial perspective, comes partly from [Patzelt and Shepherd \(2011\)](#).

Four competencies cover competence in creative thinking. Among other things, the concepts of creativity, problem-identifying and problem-solving competencies come from many different authors ([Kelley 2001](#); [Scott et al. 2004](#); [Moore 2007](#); [Sawyer 2012](#); [Kikas 2015](#)). Different studies cover planning skills ([Mazzarol et al. 2014](#), among others). Ethical and sustainable thinking roots come from broad-based global societal developments in this direction ([OECD 2018](#)).

Skills (competence) in managing social situations include communication and cooperation. This means understanding the companion (e.g., [Dube and Marnewick 2015](#)) and regulating emotions in communication. In entrepreneurship, this represents the ability to negotiate and sell own ideas to stakeholders ([Bacigalupo et al. 2016](#)). Cooperation as a successful collaboration requires a joint team effort to achieve common goals ([Salas et al. 2008](#)) and the corresponding teamwork competencies and commitment ([Baker et al. 2006](#)). The personal initiative includes identifying and using (promising) opportunities (e.g., [Frese and Fay 2001](#)), inspiring, engaging and taking calculated risks ([Bartram 2005](#)).

Competence in implementing business ideas is seen as opportunity discovery and exploitation ([Shane and Venkataraman 2000](#)), which includes market knowledge, understanding of the environment ([Rasmussen and Nybye 2013](#)) and financial literacy ([OECD 2016](#)).

A student self-assessment questionnaire was developed to assess the impact of EE on the CECM competencies. This measures each competency with 3–8 statements (items) on the Likert scale: 1—totally disagree, 2—somewhat disagree, 3—agree and disagree, 4—somewhat agree, and 5—totally agree. The first measurements after the entrepreneurship course

took place in 2017–2018 with about 1350 respondents. In the next phase, in 2019, the E&T working group further developed the questionnaire by adapting it for use at the beginning and end of the course to measure the impact of the EE intervention on competencies. For ease of use, the questionnaire was shortened, and the number of statements mapping particular competencies decreased to 2 to 4 items per scale. The development, content and validation of this questionnaire have been partly discussed previously (Venesaar et al. 2018) and could continue in separate publications in the future. Therefore, only the statements reflected in the current study results will be disclosed below.

3.2. Mapping Entrepreneurial Process Competences

The authors of this article suggested that competencies related to the (dynamic) entrepreneurial process should be included in the E&T questionnaire. It was a somewhat unusual idea. Like most competencies based on Bloom's taxonomy as an output of training and learning (Kozlinska 2016), the above is primarily static in nature, i.e., although these competencies may and usually do change over time, they generally describe a relatively permanent phenomenon or characteristic (or trait) of a person of a particular nature at some point in time. Such competencies in the E&T questionnaire are Growth Mindset, Meta-cognition, Financial Literacy, etc. The traditional learning outcomes of the "knowledge-skills-attitudes" subject also serve the same purpose. Our challenge here was to formulate generalised learning outcomes and indicator(s) to assess them as a dynamic phenomenon—entrepreneurship as a process.

In order to get an idea of the impact of the entrepreneurship course on students' learning outcomes in the entrepreneurial process, we developed six statements that should link the understanding of the parts of the process as a whole and the feedback processes (see Figure 1). We proceeded from the assumption that most students have not been in contact with entrepreneurship and EE. It also means that the learner is not familiar with the approaches to effectuation (Sarasvathy 2001), feedback-driven entrepreneurial process (Bhave 1994) and the entrepreneurial journey (McMullen and Dimov 2013). The art of formulating such questions/statements was to provide the respondent as accurately as possible with information about a phenomenon he or she had probably not studied or experienced before.

Due to the complexity of the entrepreneurial process, it was not possible to focus on only one narrow competency that supports the completion of the process. Thus, we had to find the most general and functional and, at the same time, a meaningful statement about the entrepreneurial process possible in response. The first generalisation was as follows: "Please evaluate your competence in the entrepreneurship process from opportunity identification and business idea development to reaching the market and earning profit". To answer, we offered the ends of the scale and students the opportunity to position themselves on this scale: "1—I have no understanding of the whole entrepreneurship process . . . 5—I have a very good understanding of the whole entrepreneurship process because I have experience in entrepreneurship and of going through the entrepreneurial process".

The rest of the self-assessments focus on the stages (Figure 1), including the progression of the entrepreneurial process, the basic concepts and the working mechanisms: (entrepreneurial) business opportunity, business idea and concept, product development, finance and feedback processes. In this way, these statements also map the course/progression of the entrepreneurial process. Specific statements are set out below with the results.

The present study mainly used quantitative questionnaire data, but the need for additional qualitative information to understand and interpret the results was maintained. For this purpose, information from authors' experience and previous studies (e.g., Kozlinska 2016) was used in part, which was supplemented and refined. The sources of information were the study information systems of the studied universities and short interviews with the lecturers. Students' answers to the free-response items of the questionnaire were also available.

3.3. Survey Sample

The “E&T” online questionnaire design with 48 items (+demographic data) was completed being ready for implementation in February 2019. In the empirical study, we used a survey at different universities in the autumn semester of 2019. The E&T team mapped the same student’s questionnaires at the beginning and end of the course. The anonymity of the respondents was maintained during the collection of responses. Many answers were received at the University of Tartu, Tallinn University of Technology and Estonian University of Life Sciences. Estonian Entrepreneurship University of Applied Sciences (private) provided 23 and Tallinn University—8.

Only questionnaires containing the answers of a specific person in both rounds were included in the study. After identification based on the agreed code, the responses were cleared of personal identification data. We received 386 questionnaires with answers both at the beginning of the course and after the course. Unfortunately, the last two schools did not provide statistically reliable information on the performance (impact) of courses in these schools.

Three hundred and fifty-five (355) respondents remained in the sample, all from the three most prominent public universities. These are higher education institutions, where entrepreneurship in Estonia is mainly taught. They cover 57.7% of higher education students in Estonia. For confidentiality reasons, the names of these universities are not mentioned below.

Among University A students, 35% were women, and 63% were men (3 people did not answer the question), with an average age of 24 years. Among the 94 bachelor’s and 39 master’s students, there are 64 students in informatics and IT fields and 35 in business, remaining in other specialities such as electronics and telecommunication, electrical energy, chemical technology, etc. Response rate—about 40%.

Overall, 52% of the University B students were women and 48% men, with a mean age of 21 years. Among them, 164 were bachelor students majoring in economics (60), journalism and communication (48), informatics and IT (39), with other disciplines less represented—ecology, psychology, pedagogy, philology, semiotics, theology, administration, and law. Responses were collected from 170 students from one course, 3 ECTS, with 189 participants. The response rate was up to 90%.

Among students of University C, 82% were women, 18% were men, and the average age was 23 years. All studied at the bachelor level, the largest speciality group of 19 was from Rural Business and Financial Management, with other specialities in ecology, forestry, animal husbandry and horticulture. Response rate: 37%.

As there were many questionnaires from only one round of courses at A and C, they were not available for impact assessment. In both universities, the response rate was similar. At University B, most responses were received in one with a large number of participants course, where a team of teachers explained the need to complete the questionnaire. Only students who were absent from the first lecture did not qualify for the final sample. The percentage of responses at University B was significantly higher.

As the same questionnaire was used twice, at the beginning and the end of the course with an interval of 4–5 months, it was an excellent opportunity to assess the impact of the course on a specific (sub-)competence assessment. The significance of the effect of the change was checked by a standard *t*-test (SPSS 26). Since the SPSS software provides a *t*-statistic estimate and a significance level of the difference between the mean values of the two data samples simultaneously (e.g., [Gerald 2018](#)), the latter is used. That is, the competency growth hypothesis is considered satisfied if the difference between the pre- and post-measurement results corresponds to the selected significance level. In addition to the single-statement test, competence scales were analysed using unweighted composite variables to generalise the results. In the analysis, we focus on interpreting theoretical and empirical material. In order to better interpret the results, we consulted with both lecturers and students and analysed EE programmes. Conclusions will be developed to assess teaching methodology and measure learning outcomes.

3.4. Unintended Experiment

Entrepreneurship was a minor or elective for students. Although Universities A and B tried to synchronise the content of the courses, learning in practice differed significantly. The main reason is the different course volumes and the number of contact hours per credit point. A provides mainly elective EE courses 4–6 ECTS for up to 11 h per credit. At B, respondents participated in the elective course 3 ECTS with six academic hours per ECTS. University C provided courses 4 ECTS, with about 13 h per credit. Individual work varied from 14 to 21 h per ECTS.

Passing the entrepreneurial process (at least in part) with the student's own idea made the course more or less experiential. In University A, significantly more time was devoted to opening the content of 'broad' competencies of entrepreneurship covering the list above. University B could be limited to only a few competencies (Environment, Financial Literacy and Entrepreneurial Process). At University B, learning based on the entrepreneurial process is traditional. The University C entrepreneurship programme includes mainly business aspects, and the entrepreneurial process is not mentioned. Thus, the conditions of the unintended experiment developed.

4. Findings and Interpretation of Results

4.1. General Findings

As one of the aims was to investigate the use of the questionnaire in assessing the effectiveness of EE, we compared the changes in students' self-assessments of competencies in pairs "before-after" (Start–End) of the course. The difference between these two self-assessments as an impact of EE training showed that only 15 sub-competencies (statements) at University A and 15 at University B of the 48 grew (statistically) significantly after the course. The increase in entrepreneurial process competencies in all six statements is 2–5 times higher than in the remaining nine of the 48 "employed" statements (see, e.g., 14—Entrepreneurial Process, Figure 2).

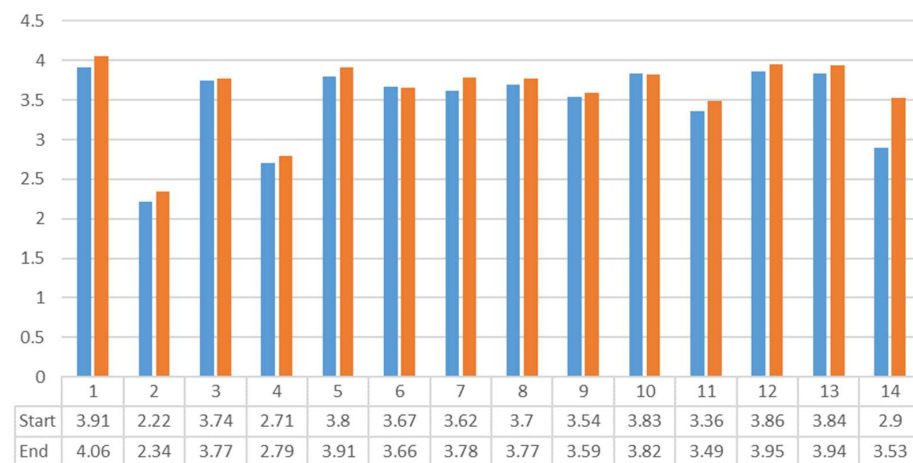
However, since the changes in EEU and Tallinn University, the estimates were not statistically reliable (partly because of the small numbers of responses), and in the case of University C, the result was reliable only for the last six statements (about the entrepreneurial process). The answers in University C about the nature of the entrepreneurial process (the first and the last statement) showed 2–3 times less growth than at A and B. Methodologically, A and B, the two most prominent universities, as the leading institutions in the E&T project, represent the so-called mainstream EE. Comparative data of (composite) competencies' self-assessment of these two universities are presented in Figure 2.

As with the individual statements (analysed below), the confidence levels of the composite variables differ significantly between the two universities (Figure 2). We observed that the same items were perceived differently in both universities at the beginning and end of the course, as shown by Cronbach's Alpha variability (Table A1, Appendix A). The content of the training could explain part of these variations. Some questions still need more explanations. For this purpose, we interviewed some teachers. In four of the fourteen generalised competencies' scales, the effects of the course are similar, with slight variations in both universities. Among them, the topics of Entrepreneurial Process, Environment, Recognition of Business Opportunities and Sustainability are the competencies to learn according to the programme. These belong to the main topics of the training.

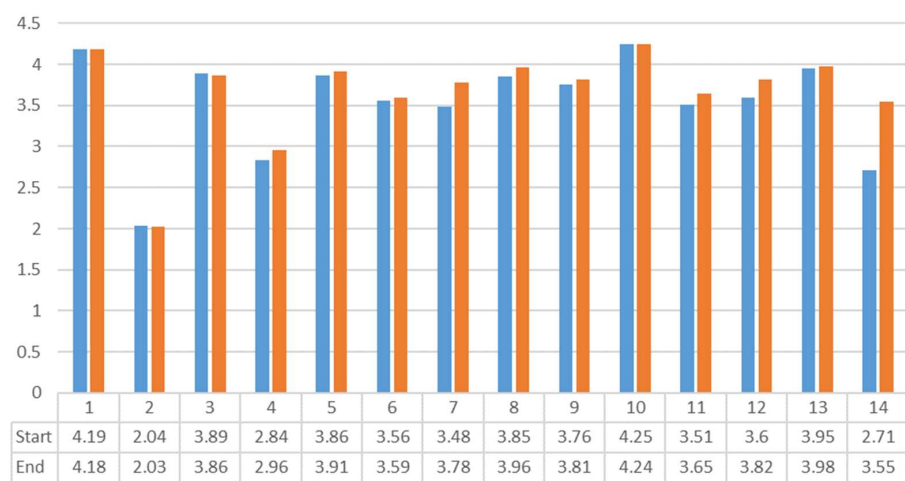
Some competencies grew significantly at only one university: Metacognition and Problem-Solving at A and Creativity and Autonomy at B. At University A, teachers focused on opening up the content of metacognition and growth/developmental belief. At the same time, at B, where there were time constraints, some tools were offered to open up and apply students' creativity for business ideas and opportunity recognition. We suppose that the increase in Autonomy was a side effect of this.

However, Planning and Financial Literacy, which should also be learned, did not significantly change. The first at A might be that the main entrepreneurship courses have/are prerequisite courses for other courses covering the topic. Nevertheless, at B,

the reason might be the application of ready templates of financial projections. Areas of Growth Mindset, Personal Initiative, Coping with Emotions and Cooperation did not show statistically significant changes. We explain that these are related to relatively persistent attitudinal and personality traits, which have developed into a stable shape before early adulthood (see, e.g., Elkins et al. 2017).



University A: N=134



University B: N=170*

■ Start ■ End

Figure 2. Entrepreneurship composite competencies (self-)assessed by students at the Start and End of the EE intervention: 1—Metacognition; 2—Growth Mindset; 3—Coping with Emotions; 4—Autonomous Motivation; 5—Problem-Solving; 6—Planning; 7—Ethics and Sustainability**; 8—Creativity; 9—Personal Initiative; 10—Cooperation; 11—Business Opportunities**; 12—Environment**; 13—Financial Literacy; 14—Entrepreneurial Process**. Note: * For Entrepreneurial Process competencies N = 132; ** Impact patterns’ similarity/overlap at universities A and B ($p < 0.05$).

Similar results were received from comparing single statements of the questionnaire (Table 1). Here, only statements have been shown in which the responses of at least one school gave a statistically significant impact/change. It is interesting to note that these statements-sub-competencies coincided in nine cases, including, for all six indicators of the entrepreneurial process and, similar to them—opportunity recognition. This means that for only two so-called generic competencies, the impact pattern of the entrepreneurship course was similar in both universities. Additionally, the initial estimates and the changes in estimates at the end of the course were often significantly different.

Table 1. Self-assessment by university A and B students at the start and impact/change Δ at the end of the EE course.

Competency	Statements (Sub-Competency Level)	A, N = 134			B, N = 170 *		
		Start Value	Impact Δ	Sig. <i>p</i>	Start Value	Impact Δ	Sig. <i>p</i>
Meta-cognition	I analyse what I already know about this situation	4.105	0.187	0.011	4.447	−0.100	0.084
	I am aware of how I am thinking about this situation (prejudices, etc.)	3.575	0.179	0.027	3.894	0.141	0.038
Growth Mindset	Without natural talent, you cannot be successful in entrepreneurship even when you try hard	2.045	0.194	0.025	2.018	−0.112	0.140
Creativity	I think that I can manage with proposing original ideas and solutions to problems	3.619	0.037	0.598	2.594	0.176	0.007
Autonomous Motivation	I do things in order to avoid feeling badly about myself	3.410	0.022	0.811	2.641	0.229	0.009
Problem Solving	I strive to look at problems from different perspectives and generate multiple solutions	3.858	0.157	0.048	3.979	0.093	0.214
Ethics & Sustainability	I understand the principles of sustainable development	3.493	0.179	0.053	3.277	0.647	0.000
	I can identify well the opportunities of sustainable development	3.440	0.224	0.007	3.259	0.494	0.000
	I try to follow the long-term economic, social and ecological principles in my everyday life	3.634	0.224	0.005	3.382	0.135	0.098
Discovering & using business opportunities	I often see connections between previously unconnected domains of information	3.358	0.134	0.112	3.406	0.212	0.007
	I can recognise the untapped opportunities (e.g., in the market)	3.134	0.231	0.005	3.406	0.165	0.026
Understanding the environment	I can specify the environmental factors (cultural, political, economic, environmental) that influence the development of my business idea	3.515	0.119	0.128	3.477	0.382	0.000
	I am aware of the development trends in my speciality/area of activity	3.791	0.179	0.005	3.724	0.059	0.463
	I understand how to act environmentally friendly as an entrepreneur	4.269	−0.022	0.693	3.600	0.218	0.003
Financial Literacy	It is important for me to monitor what is happening in the economy and the overall economic situation	3.037	0.201	0.027	3.447	0.118	0.107
Entrepreneurial Process: Knowledge and skills on the entrepreneurial process	1. Please evaluate your competence about the entrepreneurship process from opportunity identification and business idea development until reaching the market and earning profit	3.022	0.731	0.000	2.794	0.912	0.000
	2. Please evaluate your skills regarding opportunity identification	3.052	0.515	0.000	3.076	0.553	0.000
	3. Please evaluate your skills on the development of a new business idea and business concept	3.082	0.515	0.000	2.826	0.886	0.000
	4. Please evaluate your skills for developing a product or a service and bringing it to the market	2.821	0.724	0.000	2.652	0.848	0.000
	5. Please evaluate your skills regarding budgeting and financial analyses	2.537	0.634	0.000	2.371	0.788	0.000
	6. Please evaluate your understanding on how the results of market and profitability analysis of a business affect the (preliminary) business concept	2.910	0.642	0.000	2.538	1.030	0.000

* For the last five statements N = 132; Remark: Values in *Italics* with the impact significance level $p > 0.05$.

Although efforts were made to coordinate the learning content of both schools, this was not possible due to the different number of contact hours and, presumably, the partly different methodological traditions. There is also no reason to believe that the students in both samples had the same readiness, attitudes, abilities and experience for entrepreneurship. Different experiences so far may be why the initial assessment of one's competency at the beginning of the course was somewhat overestimated when falling at the end of the course. For example, 23.1% of the respondents from A and only 10% from B gave a negative impact assessment, as a result of the course, to the statement 'I know the principles of sustainable development', while 36.6% and 53.5%, respectively, gave a positive assessment (Figure 3).

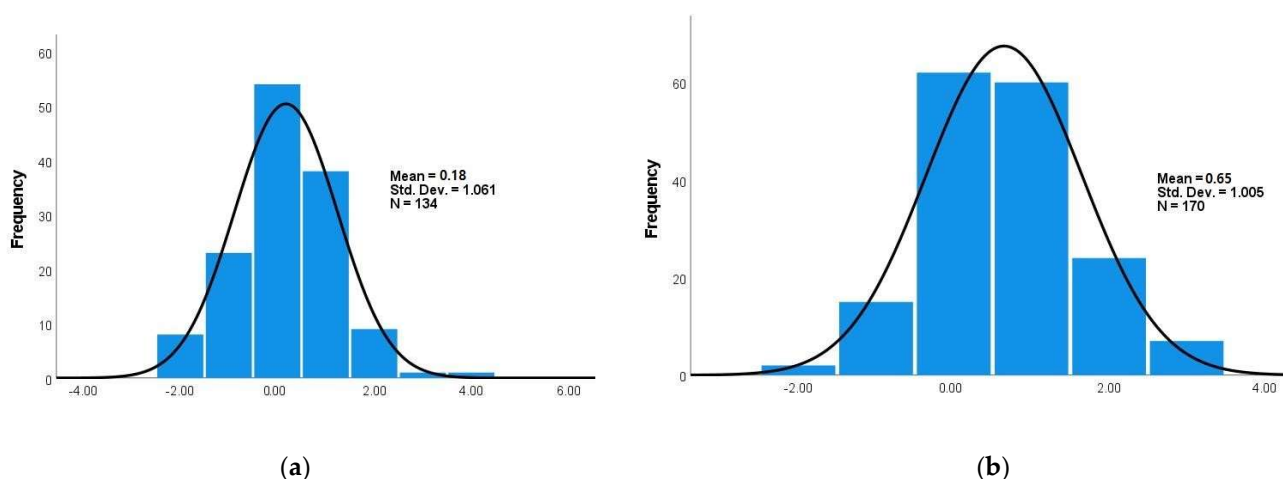


Figure 3. Impact of the course on the statement "I understand the principles of sustainable development". (a) University A; (b) University B.

Additionally, although University A devoted significantly more time to understanding and developing "generic" competencies during the course, without process-related items, there was a significant positive impact on the nine indicators (Table 1) out of 42 (without six process-related statements). As a result of a much shorter (in terms of contact hours) course at University B, the impact assessment was the same with 15 items. The universities show direct overlap in the learning outcomes' pattern of only three generic competencies, but complete overlap in the entrepreneurial process.

4.2. Interpreting Findings

The comparison of universities A and B results may indicate different methodology and performance by lecturers of the courses in addressing different topics (see, e.g., 'Understanding the Environment'—Table 1). However, this may also be due to the different attitudes of students, although this does not seem to be directly reflected in the answer to the question: "Have you thought about founding your venture as a career choice, or you have founded a company already?" The answer "Yes, I have a specific plan on what to do to start my own company" was given or have already been an entrepreneur or have started a company by 15.7% of A and 14.7% of B students. Together with those who have had this idea repeatedly, the number of students with a positive attitude is more than half (A: 53%, B: 53.5%).

The general pattern seems to be inherent in most of the changes of components of the so-called generic competence "Meta-cognition", "Growth Mindset", "Creativity", "Autonomous Motivation", "Problem Solving", "Financial Literacy" and "Understanding the Environment", without mentioning the items not represented in Table 1. These are many times lower than the estimates given on the growth of entrepreneurial process-related knowledge and skills. It should be noted that the initial assessments of entrepreneurial (process) competencies are generally lower than for previous so-called "generic compe-

tencies". A stronger increase in the perception of the entrepreneurial process can be an indicator of both the quality of the statements in the questionnaire and the content of the EE training.

The assessments of sustainability awareness showed the most significant increase on the individual level at B (Table 1, Figure 2), which, like "Understanding the Environment", is closely related to the business environment. It is interesting to note that the overall assessment of initial competencies related to business opportunities (Discovering and Using business opportunities) is significantly higher (overestimation?) than the same in the context of the entrepreneurial process (Please evaluate your skills regarding opportunity identification). This may indicate that the scale meter worked more accurately in the case of process understanding. However, this may signal the need to generally put competence assessment into the (entrepreneurial process) context.

Students' assessment of the understanding of the iterative nature of the entrepreneurial process increased the most (Figure 4), although the share of negative assessments was also higher at A (13.4%) than at B (7.6%).

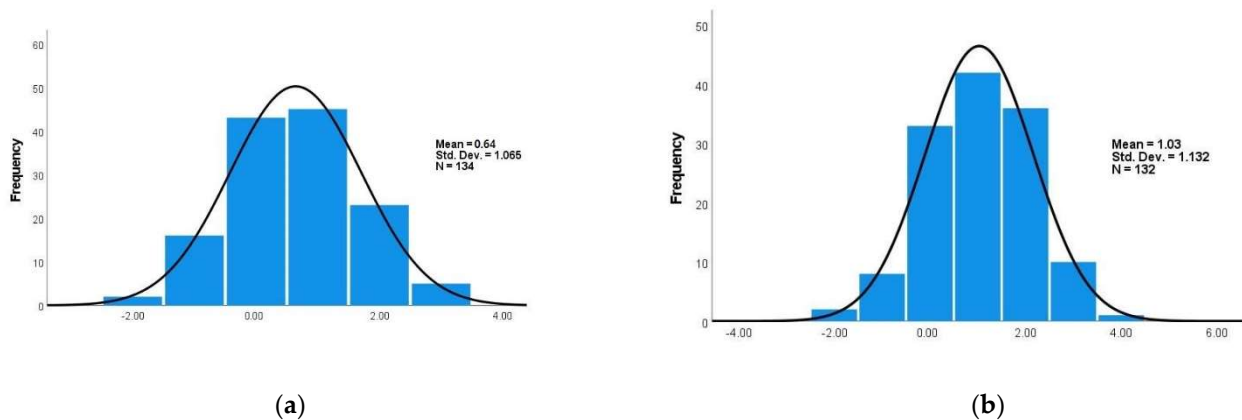


Figure 4. Changes (impact of the course) in estimates of how the results of market and profitability analysis affect the (initial) business concept. (a) University A; (b) University B.

Overestimation of one's competencies at the beginning of the course or low performance is manifested in negative answers to the self-assessment questionnaire at the end of the course. It is not clear which of these factors is more decisive. The correlation of changes of process competencies with their initial values is moderately and strongly negative (-0.582 to -0.703 , University B), and the correlation with the final value of the same indicator is positive (0.336 to 0.480). This fact can also be a critique of this type of self-assessment. The assessment of generic competences can still be more objective after a deeper understanding of the phenomenon as a result of the course. Personal characteristics (traits), which are more permanent, may not change significantly over a few months.

The division of competencies into instrumental and value-based (see, e.g., [Virtanen 2000](#)) deserves separate examination. In our study, this relationship was expressed through the training using, among other things, the creativity method/instrument, resulting in students' higher assessment of creativity. A similar result is shown by previous studies showing a correlation in "knowledge-skills-attitudes" (e.g., [Kozlinska 2016](#); [Kozlinska et al. 2020](#)), where skills mediate knowledge increased attitudes.

A comparison of participants in the previous entrepreneurship course with non-participants at the beginning showed significantly higher marks for the entrepreneurial process (4 items). The impact of four other competencies was represented by one statement. The composite variables of recurrent students were significantly higher in the process indicators alone. At the end of the course, the self-assessments of both groups were harmonised. The same was observed for the composite variables, with no significant difference between the two groups at the end of the EE course. This may also conclude

that EE's specific methodological (e.g., process-instrumental) components leave a more permanent mark on the learner's competence pattern.

Statements 2–5 of the questionnaire related to the progression of the Entrepreneurial Process (Table 1) showed a significant change in the training courses of all three universities (A, B and C). This confirms their usability and the measurability for the entrepreneurship course's core (instrumental) competence.

We also examined the effect of students' attitudes on self-esteem. As a sign of the attitude, we used the answer to the question "Intentions immediately after studies" to continue as an entrepreneur (company founder). At A, the answer was "Yes" 42 times; at B, this indicator was 60. At the beginning of their studies, these A students' self-esteem exceeded the rest of the student group by more than 10% in nine competencies, including all six entrepreneurial process competencies. B had the same indicator in five competencies, including three process indicators.

5. Limitations and Future Research

In addition to the aspects outlined in the previous and following sections, we make some more general observations about the limitations of the article. The survey in universities was conducted only in partially comparable conditions. There were significant differences in the target group, the methodological teaching approach used, and EE intervention volume. As these background conditions are not unambiguously comparable, this is not, strictly speaking, a complete experiment. At the same time, knowing these background circumstances allows for planning more correct experiments in the future.

Applying the same self-assessment questionnaire of competencies at the beginning and end of the course creates biased outcome indicators, especially among students who have not previously studied or experienced entrepreneurship. It is also a problem to formulate self-assessment questions to be perceived consistently by the respondent at the beginning and end of the course. The consistency of responses grows together with thematic awareness by students. For example, Cronbach's Alpha grew from 0.47 to 0.65 for the scale of Cooperation due to the course, although there were no changes in the average value of self-assessment. This is a challenge for the compilation of the 'before-after' course self-assessment questionnaire.

The entrepreneurship courses for which the questionnaire was used differed significantly. To understand the different impacts of the two universities' entrepreneurship courses on students, the content and methodology of these programmes and the student-related aspects should be further analysed. The issues of self-esteem during learning should be addressed separately.

In a limited time (resource), the course at University B developed generic entrepreneurial competencies almost as well as at University A, where it was dealt with in-depth. This suggests that entrepreneurial process-based learning equivalently develops generic competencies by using appropriate training methodologies, but perhaps even better. This assumption requires a corresponding methodological study in the future.

Although the evaluation of the performance of the course takes place in two steps (Start-End) and takes into account changes in some sense, it is not enough to open the context of the dynamics of competence development within the entrepreneurial journey. This means that such a study should be conducted in the future by repeatedly mapping students' perception of competencies in the experiential learning process in sync with the distinct entrepreneurial (venture creation) process(es).

The shortcomings of this article are partly due to previous approaches to entrepreneurship competence models (Bacigalupo et al. 2016; Venesaar et al. 2018, 2022). Although innovation is considered an essential function of entrepreneurship, the above list of competencies is incomplete compared to a similar list in the field of innovation (Cuenca et al. 2015). The integration of entrepreneurship and innovation continues to be a challenge for researchers (Landström et al. 2015). The combination of competences in these two (discipline) areas at the university deserve further research.

6. Discussion

The study's findings are discussed and generalized here to assess the conformity of the findings with the hypotheses. The questionnaire data is mainly used, but background information and information from primary sources are used to explain the highlights.

Only one-quarter of the self-assessments of generic competencies at the beginning and end of the course showed statistically significant changes in students' competencies in the leading Estonian universities in EE. Whether this change, reflected in the measurement, is also an actual outcome of the course hereby requires further analysis. Most assessments of (sub-)competencies remained virtually unchanged during the course. The impact of the course on different competencies was also distributed differently between universities. It can be concluded from this that hypothesis H1 (Table 2) about the impact of the EE intervention on the generic competences was only partially supported and is potentially strongly dependent on the course details as described above. At the same time, entrepreneurial intentions did not show growth and are not suitable for assessing the performance of EE intervention. This indicates that the development of any hypothesis in the context of EE requires the identification of many influencing factors and the purity of the experiment to ensure comparability. It also indicates the need to distinguish between instrumental, attitudinal and personality traits origin competencies. Competencies of different origins will then be tested under better-controlled conditions than in the present study. It also requires the study to focus on fewer competencies covered in one article.

Table 2. Summary hypotheses test (based on Tables 1 and A1, Appendix A).

Sub-Competence	Composite Competency	University A		University B		Total Number of Items
		Items Supported	Composite Level	Items Supported	Composite Level	
<i>H1. EE intervention has a positive impact on students' generic entrepreneurship competences.</i>						
Self-management	Metacognition	2	Supported	1	Not supported	3
	Growth Mindset	1	Supported	-	Not supported	3
	Coping with Emotions	-	Not supported	-	Not supported	4
	Autonomous Motivation	-	Not supported	1	Supported	2
Creative thinking	Problem-solving	1	Supported	-	Not supported	3
	Planning	-	Not supported	-	Not supported	4
	Ethics and Sustainability	2 + 1 *	Supported	2	Supported	4
	Creativity	-	Not supported	1	Supported	3
Managing social situations	Personal Initiative	-	Not supported	-	Not supported	3
	Cooperation	-	Not supported	-	Not supported	2
Acting upon opportunities and ideas	Business Opportunities	1	Supported	2	Supported	4
	Environment	1	Supported	2	Supported	3
	Financial Literacy	1	Supported	-	Not supported	4
<i>H2. EE intervention has a positive impact on the entrepreneurial process competences of students.</i>						
Entrepreneurial Process		6	Supported	6	Supported	6

* Significance level: 0.053 (see Table 1).

The section of the questionnaire measuring the competencies of the entrepreneurial process worked much better. This unequivocally indicated an increase in the corresponding (instrumental) competencies resulting from the course while also indicating the orientation or lack of the course's orientation to the entrepreneurial process (see also the explanation about the University C above). Thus, we can conclude that hypothesis H2 was supported in our study.

The E&T project implemented an adapted questionnaire to assess the results of EE in upper secondary schools and vocational schools (Elenurm et al. 2020). Only the first

entrepreneurial process question/statement was used (Table 1). The result was similar to the answers received at the university. This may indicate the need for research into (generic) EE and pedagogy on a much broader age scale than we have conducted to date. Although the reasons for this phenomenon can be very diverse—from the learning methodology, the students' self-critical assessment as a result of the course and the assessed learning outcomes to the student body's characteristics—some essential conclusions can be drawn from this study. These findings are also theses (propositions) for the following in-depth studies of particular competenc(i)es.

1. Repeated self-assessment at the beginning and end of the entrepreneurship course for assessing the impact of educational intervention on entrepreneurship competences is only a partially relevant method. Assessing the impact of the (partly experiential) course at the two largest universities in Estonia yielded more reliable results in all assessments of Entrepreneurial Process competence as well as Understanding Environment, Discovering and Using Business Opportunities and Sustainability issues, which are related to it. These are the topics that directly belong to the EE programme and include relevant instruments for particular competence development.

2. The assessments of partly trait-related 'generic' (transferable) competencies, e.g., Metacognition, Growth Mindset, Creativity, Autonomous Motivation and Problem-Solving, turned out to be chaotic, depending on the school, with minimal overlap. Behind the impact of the course on these competencies, in teaching methodology, we see the potential in providing instruments to support the application of specific competency, e.g., the creative method for idea generation also increased students' self-esteem in terms of creativity.

3. The effect of the entrepreneurship course at the university level is manifested primarily in the growth of instrumental competencies and less in value-based aspects. At the same time, the development of instrumental skills raises the assessment of competencies arising from one's abilities. The effectiveness of an entrepreneurship course must be seen primarily in the development of entrepreneurship as a process competence and the competencies that are functionally (instrumentally) related to it. This view is supported by both the results of the self-assessment of students and the nature of the entrepreneurial process.

4. Self-assessment of trait-based value-oriented competencies, e.g., 'Coping with Emotions', 'Cooperation' or 'Personal Initiative', showed less or practically missing changes due to EE intervention. This result supports the studies that have found that personality traits are formed mainly before early adulthood and no longer change quickly within university EE.

5. The impact, i.e., the efficiency of EE intervention at the university level, is the highest in the key competences of entrepreneurship—entrepreneurial process and related instrumental competencies. Instrumental methodologies also allow for better use of students' abilities, including enterprise and other social competencies. Hence, the main task of the university is to train students in entrepreneurship; enterprise education focus might take place at previous educational levels.

The observations made and the results of the discussion and analysis point to the complexity of EE and pedagogy—how to cope with limited resources and time to develop entrepreneurship in the university in the best possible way. We are convinced that despite many studies in the field, the scope of EE continues to deepen.

7. Conclusions

As the literature review shows, previous studies link too little EE to entrepreneurship context as a fundamental discipline for its training. EE studies also do not pay enough attention to one of the main features of entrepreneurship—the entrepreneurial process. The development of the necessary entrepreneurship competence is best done through experiential learning based on the entrepreneurial process. This article recognizes the competence of the entrepreneurial process as one of the main learning outcomes complementing the list of competencies developed using EE intervention.

In summarising the survey's preliminary results, we conclude that the most reliable outcomes of EE intervention at the university level are entrepreneurial process competencies, the methodologically suitable development of which also increases general social competencies. In addition, evaluation of the performance of the entrepreneurship course comes from the entrepreneurial process and its progress indicators. These are the preliminary conclusions that we wish to contribute to the ongoing discussion on developing both EE and entrepreneurship development policy.

The main conclusion on EE pedagogy and policy in higher education within the context of EntreComp, CECM and other models comes from the discussion above. This indicates that we should teach and develop entrepreneurship as an integral competence by applying the best tools to use and support a wide range of entrepreneurial process competencies. This means putting the entrepreneurial process as the main feature of entrepreneurship into the focus of the development and assessment of EE and its outputs–competencies.

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Appendix A

Table A1. Entrepreneurship sub-competencies and composite competencies assessed by students at the start and end of the course, universities A and B.

Sub-Competence	Composite Competency	A, N = 134						B, N = 170 ***						Number of Items
		Start		End		Impact Δ	Sig. <i>p</i>	Start		End		Impact Δ	Sig. <i>p</i>	
		Value	Alpha	Value	Alpha			Value	Alpha	Value	Alpha			
Self-management	Metacognition	3.91	0.50	4.06	0.62	0.15	0.002 "	4.19	0.57	4.18	0.70	−0.01	0.784	3
	Growth Mindset	2.22	0.80	2.34	0.84	0.12	0.063 *	2.04	0.78	2.03	0.84	−0.01	0.840	3
	Coping with Emotions	3.74	0.72	3.77	0.80	0.04	0.501	3.89	0.72	3.86	0.71	−0.03	0.481	4
	Autonomous Motivation	2.71	0.64	2.79	0.60	0.08	0.284	2.84	0.58	2.96	0.70	0.13	0.000 "	2
Creative thinking	Problem-solving	3.80	0.54	3.91	0.69	0.12	0.031 **	3.86	0.53	3.91	0.67	0.05	0.371	3
	Planning	3.67	0.60	3.66	0.66	0.00	0.951	3.56	0.52	3.59	0.65	0.03	0.529	4
	Ethics and Sustainability	3.62	0.73	3.78	0.74	0.16	0.005 "	3.48	0.79	3.78	0.84	0.30	0.000 "	4
	Creativity	3.70	0.80	3.77	0.78	0.07	0.208	3.85	0.77	3.96	0.81	0.11	0.011 **	3
Managing social situations	Personal Initiative	3.54	0.56	3.59	0.57	0.04	0.396	3.76	0.58	3.81	0.66	0.05	0.335	3
	Cooperation	3.83	0.47	3.82	0.66	−0.01	0.866	4.25	0.69	4.24	0.65	−0.01	0.844	2
Acting upon opportunities and ideas	Business Opportunities	3.36	0.73	3.49	0.80	0.13	0.015 **	3.51	0.76	3.65	0.79	0.14	0.010 **	4
	Environment	3.86	0.45	3.95	0.56	0.09	0.042 **	3.60	0.72	3.82	0.65	0.22	0.000 "	3
	Financial Literacy	3.84	0.73	3.94	0.80	0.10	0.099 *	3.95	0.78	3.98	0.78	0.03	0.441	4
Entrepreneurial Process		2.90	0.85	3.53	0.83	0.63	0.000 "	2.71	0.89	3.55	0.88	0.84	0.000 "	6

*** For Entrepreneurial Process competencies N = 132; * $p < 0.1$; ** $p < 0.05$; " $p < 0.01$; Remark: Values in *Italics* with the impact significance level $p > 0.1$.

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