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Assessment of transversal competencies in entrepreneurial education: a literature review and a pilot study

La valutazione delle competenze trasversali nella formazione all'imprenditorialità

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Abstract

The concept of entrepreneurial competencies is complex, comprising components that can be acquired and changed through experience, training and education (Man, Lau & Chan, 2002). The relevance of such competencies for education calls for a better understanding of two issues: (i) what such competencies are, and (ii) how they can be assessed. In fact, given the inherent complexity in defining entrepreneurial competencies as an umbrella term for different elements, there is a certain risk of ambiguous and non-unique conceptualizations of them (Chell, 2013; Mitchelmore & Rowley, 2010). In this paper we first carry out a literature review regarding the conceptualization and measurement of entrepreneurial competencies. In the second stage, we develop a set of tools to assess the competencies identified and carry out a pilot study on a sample of 60 students attending entrepreneurship education courses in five European countries.

Keywords: assessment; transversal competencies; entrepreneurship education; pilot study.

Abstract

Il concetto di competenze imprenditoriali è complesso e comprende componenti che possono essere acquisite e implementate attraverso l'esperienza, la formazione e l'istruzione (Man, Lau & Chan, 2002). La rilevanza delle competenze imprenditoriali per le politiche di istruzione e formazione richiede una migliore comprensione di due questioni: (i) l'identificazione di tali competenze e (ii) la valutazione delle stesse (Chell, 2013; Mitchelmore & Rowley, 2010). Questo lavoro presenta un'analisi della letteratura riguardante la concettualizzazione e la misurazione delle competenze trasversali legate all'imprenditorialità, una serie di strumenti che sono stati individuati per valutare le competenze identificate e uno studio pilota su un campione di 60 studenti universitari coinvolti in corsi di formazione all'imprenditorialità in cinque paesi europei.

Parole chiave: valutazione; competenze trasversali; educazione all'imprenditorialità; studio pilota.

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1. Introduction

The increasing number of educational programmes offered for entrepreneurship (Boffo & Palumbo 2018; Consolini, Di Saverio, Loasses & Richini, 2013; Fayolle, Verzat & Wapshott, 2016; Kuratko, 2005) is matched by growing demands for accountability from educational stakeholders and accreditation organizations (Duval-Couetil, 2013). However, despite the acknowledged importance, there is still a lack of research regarding the assessment of outcomes in entrepreneurship education programmes (Fayolle, 2013; Pittaway, Hannon, Gibb & Thompson, 2009).

The assessment of entrepreneurship education is particularly difficult since it is a relatively young discipline characterized by conceptual and methodological debates (Duval-Couetil, 2013; Fayolle, 2013). One important issue, in this regard, is that entrepreneurship education not only comprises educating *about* entrepreneurship and enterprise focusing on the creation of new ventures and small business management, thus narrowing the training in technical and business-related contents. It also emphasizes the importance of educating *for* entrepreneurship, thus focusing on a wider set of skills, knowledge, and experiences, aimed at teaching individuals to become more enterprising (Kirby, 2004). Ultimately, *entrepreneurship education* can be distinguished from *small business education* in terms of its major objectives in developing enterprising people rather than solely stimulating business ownership and growth (Boffo, 2017; Gibb, 1993; 2002; Morselli, 2016; Morselli & Costa, 2015). From this perspective, the assessment of entrepreneurship education at a student level, should be based on appropriate tools to evaluate *transferable*, *soft*, or *transversal* entrepreneurial competencies[2] (Man, Lau & Chan, 2002). To date, this has been problematic. While the literature has provided several classifications and lists of entrepreneurial competencies, there are no validated tools and methods to clarify how teachers and instructors can assess these competencies in a teaching environment.

Using this as a starting point, the European project, SOCCES (SOCial Competencies, Entrepreneurship and Sense of Initiative – Development and Assessment Framework) was introduced to develop and pilot a framework for the methodical assessment of two competencies that are very important for the working life. Namely, the *sense of initiative*, and *entrepreneurship and social competencies*. The project was led by six higher education institutes (Coventry University, UK; University of Bologna, Italy; Veliko Tarnovo University, Bulgaria; University of Montpelier, France; Laurea University of Applied Sciences, Finland and NHTV University of Applied Sciences, the Netherlands) together with a European quality assurance consultancy company (called Savares Ltd.).

The objective of this paper is to present the baseline analysis and a case study that was conducted during the project, drawing conclusions based on the results achieved.

In this paper, we adopt the concept of entrepreneurial competencies as a description for something that a person should be able to demonstrate or achieve to successfully practice entrepreneurship (Mitchelmore & Rowley, 2010). While the concept of entrepreneurial competencies might appear too vague and lack clarity, it has been extensively adopted by policy-makers (European Parliament and Council, 2006; OECD, 2012), researchers in education and management (Man, Lau & Snape, 2008; Mitchelmore & Rowley, 2010; Morris, Webb, Fu & Singhal, 2013). Focusing on transversal entrepreneurial competencies is therefore appropriate and relevant since they are key to careers and work. This is true in

[2] In this paper, we deal with these terms interchangeably (OECD, 2012) and use the term *transferable* as a summation of the three terms.

both corporate and self-employment contexts (European Parliament and Council, 2006) given that they are directly correlated with business performance (Mitchelmore & Rowley, 2010).

2. Transversal Skills and Entrepreneurship

The *Sense of Initiative and Entrepreneurship*, as aforementioned, represents one of the key competencies defined by the European Union (European Parliament and Council, 2006). Such a competence is defined as an "Individual's ability to turn ideas into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives. This supports individuals, not only in their everyday lives at home and in society, but also in the workplace […] in contributing to social or commercial activity. […] This should include awareness of ethical values and promote good governance" (ivi, p. 17).

Consequently, the word *entrepreneurship* implies the notion of *being enterprising*. Heavily emphasizing the self-entrepreneurial impacts rather than the ability to build a business. Moreover, it sees workplaces as learning organizations, firmly related to life contexts, with a stress on the ethical commitment of entrepreneurship (Ibidem). The skills related to the Sense of Initiative and Entrepreneurship competence are mostly transversal, enabling people to become pro-active, independent and innovative in their personal life as well as in the workplace (Ibidem).

The debate on entrepreneurial competencies is abundant in the literature. Komarkova, Conrads and Collado (2015) analysed the current concepts, policies and initiatives in a comprehensive report. They recognized several contributions to the current debate in the definition of competencies and skills for entrepreneurship. Nearly every classification taken into account contains a certain amount of transversal, transferrable, or soft skills for entrepreneurship.

Cheetham and Chivers' classification of (strictly interrelated) entrepreneurial competencies (1996; 1998) consists of: (i) cognitive competencies: (work-related knowledge and ability); (ii) functional competencies: (job-related tasks); (iii) personal competencies: (the characteristics of an individual that enable him/her to produce superior performance); (iv) meta-competencies: (a set of soft skills and other individual characteristics that tend to be associated with superior performance in adversity, including: flexibility, tolerance for ambiguity, the ability to learn, *judgement and intuition*, creativity, and analytical and problem-solving capacities). In this classification, the number of skills that we can consider transversal is even higher than the so-called hard or professional skills.

Mitchelmore and Rowley (2010) developed a framework of competencies, knowledge and skills by outlining the portrait of a successful entrepreneur. This broad model included: (i) personal background and experience; (ii) socio-economic factors; (iii) management skills; (iv) personal profiles and qualities; (v) behavioural characteristics; (vi) modes of interaction and communication. In this framework, transversal skills are strictly linked with all the other key competencies.

In the approaches proposed by Le Deist and Winterton (2005) and Winterton, Delamare-Le Deist and Stringfellow (2006), the two traditionally distinguished *outcome-based approaches* and *attribute-based approaches* are placed side by side. The authors emphasized the complementarity between competencies referring to functions and focused

on action, performance, assessment, and competencies related to behaviour, motivation and personal traits. Such apparently distant dimensions were matched in a matrix, stressing the strong relationship between hard and soft skills.

The study *Entrepreneurship Competence: an overview of existing concepts, policies and initiatives* (OvEnt) funded in 2015 by EU Joint Research Centre (IPTS), traced a broad overview on the topic of entrepreneurship competence, identifying and comparing different theoretical approaches from both academic and non-academic environments (Komarkova, et al., 2015). The framework presents, according to the literature and an analysis of the current situation, the most frequently occurring key entrepreneurship elements and clusters within two groups of competencies and skills.

The European Entrepreneurship Competence Framework: EntreComp (Bacigalupo, Kampylis, Punie & Van den Brande, 2016) represents the final outcome of the previous studies; a document presenting a framework of entrepreneurship competence and set of guidelines on the topic. The EntreComp framework emphasizes the idea that entrepreneurial competencies and skills are resources for growing innovation, creativity and self-determination. Built upon a wide baseline analysis (review and case studies) EntreComp defines entrepreneurship as a transversal competence. This applies to all spheres of life; from nurturing personal development, to actively participating in society, to (re)entering the job market as an employee or a self-employed person and also start-ups (cultural, social or commercial) (Bacigalupo et al., 2016).

In the context of the EntreComp study, entrepreneurship is understood as a transversal key competence applicable to individuals and groups (Bacigalupo et al., 2016).

As mentioned earlier, from the previous and brief analysis of the current situation, every recent definition, framework or set of guidelines concerning entrepreneurship competence emphasizes the importance of transversal skills as a component of a vast entrepreneurial competence. However, even recognizing the assessment of such competencies remains a challenge for the Educational Sciences.

3. Assessing transversal/transferrable competencies

The assessment of *transferrable competencies* is built around the notion of such competencies, which are not easily definable but are not completely separate from competencies related to contents. As Gibb stated (2014), soft or transferrable skills represent a broad set of competencies referring to many complex constructs and lead to the definition of multiple related skills. Gallivan, Truex and Kvasny (2004) recognize at least six areas of soft skills. Namely: *communication skills*, *interpersonal skills*, *leadership skills*, *organizational skills*, *self-motivation skills* and *creativity skills*.

Kluger and De Nisi (1996) and Gibb (2014) identify three theories that lie beyond the concept of life skills and that can necessarily influence the assessment procedure since they can guide and inform thinking and study on the cognitive, emotional and social aspects of soft skills:

- the first theory considered relevant to understand soft skills assessment is the Control Theory (Carver & Scheier, 1982) derived from Thorndike's Law of Effect (Thorndike, 1927). This approach considers control and self-regulation as key aspects of human behaviour; the control is given by continuous feedback between information and action. In this perspective, the assessment of soft skills requires a

precise definition of parameters and indicators, specifying, in as much detail as possible, exactly what soft skills are. This leads to the design of accurate maps or a repository of competencies (Winterton, 2009), allowing very precise feedback on behaviour and performance;

- This approach has been negatively criticized since it can reduce motivation and self-regulation, which are fundamental parts of the potential of assessment and run the risk of ignoring social issues, especially when evaluating emotional skills (Harris, 2006). Soft skills are not nearly as operationalizable as hard skills are. Complex competencies such as good communication or teamwork include a broad mix of implicit and explicit beliefs on the part of the assessor and the assessed (Gibb, 2014);
- the second theory that Gibb (2014) recognized as relevant in investigating soft skills' assessment is the Goal-Setting Theory. This theory relates human behaviour in its cognitive, emotional and social dimensions with specific goals (Locke & Latham, 1990; 2006). This approach emphasizes the social dimension and the involvement of social actors and stakeholders when setting standards for assessment. What appears very effective in this theory is the emphasis on several dimensions concerning motivation. These are: commitment to goal achievement, the consequent self-defensive attitude towards the ego or sense of self and the social pressure to conform to significant others' expectancies or impressions, (Ashford, Blatt & Van de Walle, 2003);
- the third theory is the Attribution Theory, which explains cognitive, emotional and social behaviour (with reference to internal and external attributions of causality) (Eberely, Holley, Johnson & Mitchell, 2011). An internal attribution of causality is an acknowledgement of self, while an external attribution of causality is an attribution to others or to the situation. Favourable outcomes and results tend to be internally attributed, while unfavourable outcomes or results tend to be externally attributed. Consequently, success is normally interpreted in a self-validating way and failure is more often attributed to external causes. The heart of this topic relies on understanding and reorienting the attributions that individuals tend to make in social settings when receiving positive and negative feedback, or a mix of these, (Gibb, 2014). Illeris (2006) extended this concept and distinguished between two forms of mindset. The first is self-validating and the second is self-improving. The first focuses on demonstrating capability and acquiring success, while the second is considered a learning mindset, associated with a desire to obtain feedback and change.

Gibb (2014) compared the three theories according to the conceptions of the learner, the role of the social context, and effectiveness in educational assessment, and proposed a wider view of *life skill assessment*, moving from a deeper understanding of these complex competencies and providing educational guidelines for evaluation.

Self-validation or self-improvement mindsets significantly affect learning, especially when dealing with soft skills. Self-improvement orientation is associated with learners who have an adaptive response pattern to *failing* in the course of a soft skills assessment and receiving negative, formative feedback. Self-improvement is recognized in learners who persist in efforts to engage in change and to behave differently (Gibb, 2014).

The background to this kind of reflection is an idea of lifelong learning promotion, which enhances the cognitive and emotional dimensions as well as the social dimensions of learning (Illeris 2003).

Moreover, Gibb (2014) given the integration cited above, suggested three paths for empirical research dealing with soft skills assessment focused on the related contexts, content, and consequences. When dealing with *context* or *inputs*, Gibb claimed a clear specification of soft skills in order to define *good performances* and to contextualize these within the educational or organizational goals characterizing the broader learning environment. This allows the provision of punctual, valid and reliable feedback to learners which ought to improve their performance.

The *content* of soft skills assessment, in Gibb's view, is related to *quality* and asks for fair methods and tools to evaluate such competencies, using observation, data and inferences, and quality information. This allows, on the one hand, to treat the information fairly and objectively and, on the other, to collect an adequate amount of information to give positive as well as negative feedback to support and orient learners.

The *consequences*, or *outcomes*, of soft skills assessments should mean making learners aware of their behaviour, reflect on their own experiences, self-motivate, and embark on a path of formative assessment to receive constant feedback for self-improvement. At the same time, soft skills assessment outcomes have a formative impact on further teaching and training activities (Gibb, 2014).

In the same perspective, starting from Binkley, et al. (2012) and Kechagias (2011), there are a small number of principles recognized for soft skills standards and assessment, summarized in the following list. All of these recommendations emphasize the importance of building a valid, reliable assessment system, taking into account the complexity of these kinds of competence in their different contexts and situations of applicability. At the same time, all the authors cited claim that a formative use of assessment has an impact on learners, teachers and learning processes but also on the educational policies to improve soft skills in curricula.

Given these premises, the authors agree on the fact that one way of assessing soft skills cannot possibly fit all. Kechagias (2011) suggested being extremely clear in defining soft skills since the definition of the constructs determines the kind of information collected. Which is why the author proposes that the definitions address related questions; the unit of analysis (individuals, large groups, or both?), the age span (compulsory, higher, or lifelong education?), the eventual susceptibility to cultural differences and the dependence on or independence from a certain domain.

With the premises of validity, reliability, precision and authenticity, Curtis (2004; 2010) reviewed and summarized four models to assess transferrable skills (in this case labelled as generic skills); holistic judgement model, portfolio assessment, workplace assessment and standardized instrumental assessment. These approaches are not alternatives but are complementary: *Holistic Judgements Assessment* (McCurry & Bryce, 1997; 2000) *Portfolio assessment* (Troper & Smith, 1997) *Workplace Assessment* (Australian National Industry Education Forum, 2000; Robertson, Harford, Strickland, Simons & Harris, 2000); *Standardized Instrumental Assessment* (Curtis, 2004; 2010; Herl et al.,1999).

Once again, this overview of the four models reviewed underlines the importance of an integrated and holistic approach to soft skills assessment.

This project focused on assessment of transversal skills for entrepreneurship and was inspired by the perspective on the meaning and potential of entrepreneurship education; a way to enhance competencies that are fundamental in a knowledge-based society to meet the needs of the labour market, and to achieve social cohesion and active citizenship.

4. Study Method

To advance our knowledge of the assessment of transversal entrepreneurial competencies and to propose a practical set of tools to measure them, we adopted an interdisciplinary approach (Fayolle et al., 2016) merging education with a management-science view on the topic. Our method followed a three-phase research design.

To develop this assessment framework, a method was adopted that included the following steps, which can be divided into three main phases.

Phase 1 consisted of a baseline analysis aimed at mapping: (i) current educational environments and practices at SOCCES Project partners' institutes, their perceived main development needs regarding the assessment framework and the defined competencies; as well as (ii) the approach and methods in teaching transversal entrepreneurial competencies, available assessment methods and tools at the European level, through a review of existing programmes, policy documents, and literature on entrepreneurial skills and competencies.

Most of the SOCCES partners have formulated, or have at least begun to implement, policies that move their educational systems from being predominantly input-led and subject-oriented towards curricula that include competencies, cross-curricular activities, active and individual learning, as well as a focus on learning outcomes, which is one of the main aims of the European Commission (European Commission/EACEA/Eurydice, 2016).

A commonly noted approach to teaching transferable competencies is to provide interactive technology-enhanced learning environments that facilitate active learning, collaboration and multidisciplinary practices. However, the provision of such learning environments alone is not sufficient; the activities need to be supported by *scaffolding* and by explicit instructions, where relevant.

Based on the second study conducted, two major issues were identified. Firstly, when learning outcomes are over-specified, holistic competencies become reduced and fragmented. Teaching, learning and assessment are then characterized by the following of scripts provided by long checklists of actions and behaviour. However, competence-based education should be more than an effort to describe or list educational and behavioural objectives. Secondly, the need for assessment to be relevant to complex contexts, including occupational and more general social contexts, means that assessors need to operate with a complex, internalized, holistic model (Cedefop, 2010).

The precise balance between the specification of learning outcomes and the judgement of assessors will also partly depend on the assessment purpose. Thus, the learning outcomes for summative assessment of a qualification will be more stringently specified than the learning outcomes for formative assessment within a university curriculum. Another remark worth making is that the focus is on a development-oriented approach of learning and testing. Assessment supports learning and learning supports assessment.

The study clearly shows that summative assessment provides limited steering of the learning process. Moreover, it is evident that formative assessment influences students' learning behaviour to a greater extent.

The study also confirmed that using a mixed method for assessment is essential to offset the strengths and weaknesses of reliability and validity tests.

Founded on the baseline analysis described above, as well as on group discussions during the second project meeting of the consortium, using co-creative methods such as the World Café (in the format of an EU café), a first draft framework and methodology was developed.

This included the choice of the key elements of the framework and the assessment methodology.

The proposed assessment framework was designed to assess transferable social and entrepreneurial competencies in the following five areas:

1. positive attitude and initiative: referring to the capacity to reflect on needs, aspirations, personal strengths and weaknesses, believing in their abilities to influence the course of events, despite uncertainty, and overcome setbacks and failures (Bacigalupo et al., 2016);
2. communication and interaction: referring to the capacity to convey effective messages to external audiences, either orally or in written forms, the basis for persuasion, negotiation, and leadership (Bacigalupo et al., 2016);
3. teamwork and collaboration: referring to working collaboratively with others to achieve group goals and objectives (Bacigalupo et al., 2016; Komarkova et al., 2015; Mitchelmore & Rowley, 2010);
4. critical and analytical thinking or problem-solving, including risk assessment, and decision-making capabilities with regard to new ideas and opportunities in an uncertain environment (Bacigalupo et al., 2016; Chell, 2013). Such competencies refer to the ability to relate previously unrelated objects or variables to produce novel and appropriate or useful outcomes (Morris et al., 2013) through a process or problem identification, new idea generation and implementation;
5. creativity and Innovation: this competence encompasses the development of new ideas to create value, including better solutions to existing challenges (Bacigalupo et al., 2016; Moberg et al., 2014) while innovation concerns the introduction and application of new or improved ideas, processes, products or procedures (West, 2002).

Phase 2 was actually the part that encompassed the pilot testing of the assessment framework, as well as an analysis of the pilot studies conducted. This served as a foundation for the viability and feasibility of the designed framework and its application in the context of higher education transversal competence assessment.

The pilot testing of the assessment framework used two business cases, namely, the Helsinki City Library and Sustainable Technologies. These two situations virtually enabled real-life business cases intended as case studies to assess the defined transversal competencies, with the aim of providing a common monitoring and assessment tool that could be used in different curriculum settings.

The Helsinki Central Library's design of the business case and pilot study was prepared by the Laurea University of Applied Sciences, Finland. The study was scheduled to begin on February 15, 2016 and to end on March 18, 2016.

The design of the second business case – *Sustainable Technologies* – was led by the University of Coventry (COV). The pilot study was scheduled to begin on February 29, 2016 and to end on March 30, 2016. The scheduling of the study was agreed to be feasible, fitting in with existing courses and taking into account the students' and teachers' commitments to other assignments.

The participating students were recruited from Bachelor and/or Master courses in the respective universities. The pilot study was added to existing courses, part of the respective curricula for obtaining study credits. In both universities, groups of students were formed, working on the pilot study, referred to within the study as *teams*.

The Fair Share virtual environment was jointly set up by the respective participating universities.

5. Results

Overall, the implementation of the pilot studies went smoothly. The students were able to follow the prescribed activities and deliver all the expected outcomes. The students, as well as the teachers, found the virtual platform (Fair Share) to be user-friendly (e.g., everything easy to find, easy login, easy uploads). Laurea offered free access to the teaching and learning platform (Fair Share.eu). The VTU was in charge of setting up students' and teachers' accounts for the virtual platform. NHTV and UNIBO prepared the assessment questionnaires (assessment of competencies and evaluation of pilot studies), produced a digitized version, and provided the links for the pre-test and post-test questionnaires.

1. Analysis of data from the pilot testing of the assessment tools.

Below are the quantitative and qualitative assessments of the two pilot studies, based on the questionnaires[3] completed by participating teachers and students, and also on additional reflections of members of SOCCES partner institutions. As a summary overview of the pilot study, the students' and teachers' evaluations were very positive.

In short, the findings highlighted, for each pilot test, the overall effectiveness in raising awareness of transversal entrepreneurial competencies for both students and teachers. However, while the pilot studies were especially effective with regard to communication and teamwork, they were less effective in raising the awareness of risk assessment, critical thinking, problem-solving, and creativity competencies. This is summarized in Figure 1.

	Teamwork	Critical thinking	Problem Solving	Risk assessment	Communic.	Creativity	Positive attitude
Teachers	1,31	2,63	2,50	3,81	1,63	2,69	2,25
N.	10	10	10	10	10	10	10
Students	1,96	2,31	2,26	2,48	1,98	2,02	1,96
N.	55	55	54	54	55	55	55
Overall	1,64	2,47	2,38	3,15	1,81	2,36	2,11
N.	65	65	64	64	65	65	65

Figure 1. Evaluation of pilot study: effectiveness in generating awareness of transversal entrepreneurial competencies (Likert scale ranging from 1 = very much to 5 = very low).

As regards the perceived usefulness of the pilot studies in activating transversal entrepreneurial competencies, the results are displayed in Figure 2. Like the findings on its effectiveness in raising awareness of the selected competencies, the pilot studies were more

[3] The questionnaire included the following validated scales: Interpersonal Communication Competence Scale (Rubin & Martin, 1994); Making Decisions scale (Rogers, Chamberlin, Ellison & Crean, 1997); Student competency scale (opportunity recognition scale + conveying a vision/seeing the future scale + opportunity assessment scale + risk management scale + creative problem-solving scale + innovativeness scale + decision-making scale) (Morris et al., 2013); Entrepreneurial Competence Scale (Kyndt & Baert, 2015); Interpersonal Communication Competence Scale (Rubin & Martin, 1994).

useful in activating communication and teamwork competencies but less useful with regard to risk assessment, creativity, problem-solving, and critical thinking.

	Teamwork	Critical Thinking	Problem Solving	Risk Assessment	Communic.	Creativity	Positive Attitude
Teachers	1,44	2,56	2,56	4,14	1,94	2,69	2,50
N.	10	10	10	9	10	10	10
Students	2,00	2,22	2,27	2,59	1,91	2,20	2,06
N.	55	55	55	54	55	55	53
Overall	1,72	2,39	2,42	3,37	1,93	2,45	2,28
N.	65	65	65	63	65	65	63

Figure 2. Evaluation of pilot study: perceived usefulness in activating transversal entrepreneurial competencies (Likert scale ranging from 1 = very much to 5 = very low).

As shown in Figure 3, the pilot study workloads were evaluated as being in line with the estimations, both by students and teachers. The pilot studies were interesting and challenging for both students and teachers. The international collaboration was perceived as adding value to the pilot test, whereas the value added by the virtual platform was positive but could be further improved.

	Teacher workload	Students workload	Challenge to teacher	Challenge to students	Interesting to teacher	Interesting to students	Value added by internet. collaboration	Value added by virtual platform
Teachers	3,06	2,56	2,19	2,00	1,19	1,69	1,56	3,38
N.	10	10	10	10	10	10	10	10
Students	n/a	2,37	n/a	2,38	n/a	2,00	1,93	2,37
N.	n/a	54	n/a	55	n/a	55	55	54
Overall	3,06	2,47	2,19	2,19	1,19	1,85	1,75	2,88
N.	10	64	10	65	10	65	65	64

Figure 3. Evaluation of pilot study: workload, challenge, and relevance (Likert scale ranging from 1 = very much to 5 = very low).

The pilot study was effective overall in raising awareness of transversal entrepreneurial competencies among both students and teachers, especially with regard to communication and teamwork, while it was less effective in generating awareness of risk assessment, creativity, and problem-solving. Both teachers and students highlighted that the project more effectively raised awareness on teamwork competencies for students with little experience of working in team-based projects. In the same vein, the project was more effective in raising awareness on communication competencies for students already experienced in projects involving teamwork and class presentations. Students appreciated the international dimension of the project, which allowed them to develop awareness of communication in an international context.

Overall, both pilot studies engendered high levels of enjoyment for both teachers and students. Furthermore, teachers would highly recommend this method to other colleagues.

Based on these findings, Figure 4 proposed a SWOT analysis to offer a synthesis of the assessment of the two pilot tests.

Strengths	Weaknesses
Activating and capturing teamwork and communication competencies. Attracting students with an interest in improving their skills. International collaboration, especially valuable for students with a low exposition to international environment during ordinary university-level courses. Working in a cross disciplinary manner and appreciating other professions' perspectives and requirements.	Potentially unable to capture risk assessment competencies. Technically *simple* business challenges potentially not leading to a focus on problem-solving and creativity; technically *complex* business challenges potentially negatively exacerbating differences in students' disciplinary backgrounds. Short timeframe of exposure to the assigned activities is not *realistic* and might negatively impact quality of outputs. International virtual interaction does not work automatically, it needs to be planned in great detail, allowing students to get introduced and guided through a clear pattern of solution to the business challenge.
Opportunities	**Threats**
Enhancing the practical impact of international aspect on transversal entrepreneurial competencies. Virtual collaboration can be an advantage if allowing for multiple types of interactions and planning *compulsory* regular interaction sessions. Longer test timeframe to allow interim feedback to monitor activities and improve the work carried out by students and guidance by teachers. The methodology can be replicated also in a non-international and non-virtual environment. Enabling activities in a virtual environment offering possibilities for interaction (e.g., webinars) also through additional interaction tools integrated with other media/social media.	Students losing interest towards the content of the project or the collaboration with other students (both locally and internationally) over time. Exposure to pilot studies might not be particularly valuable for students with previous experience in teamwork and international environments.

Figure 4. SWOT analysis of the pilot tests.

The timing of the pilot study was raised as an important issue, linked to the extent of collaboration between the international teams.

The pilot study was highly interesting and challenging for both students and teachers. In particular, this study presented the opportunity to set up an international collaboration with students belonging to different disciplines, thus simulating collaboration in the *real* world which was deemed extremely interesting and valuable, both in the eyes of the students and the teachers. With regard to this, one student underlined that this aspect also requires a lot of careful management and organization.

One teacher underlined that although the aspect of international collaboration and the virtual environment were a peculiarity and a strength in the pilot study, working on the business case could also be possible in national-level, non-virtual settings.

With regard to the virtual platform, the students encountered problems in the delivery and direct upload of assignments via the online platform. This meant sending their assignments to teachers via e-mail. Although the students were invited to interact by using any virtual means outside Fair Share (e.g., Skype, Facebook, WhatsApp) they did not make use of these technologies. Interaction therefore remained limited to exchanges of PowerPoint presentations through the platform.

2. Refinement of the tools and the set of guidelines and recommendations that the teachers can use to evaluate training programmes.

During this stage of the project, a careful refinement and choice of non-redundant, testable competencies and skills was made in order to offer a shorter version of the assessment framework. For example, it was noted that the specific competencies pertaining to the areas of teamwork and collaboration consisted of more granular basic competencies linked to interpersonal communication. The elaboration of a shorter version of the assessment framework also represented a first step towards the definition of a EuroComPass proposal.

As a result, both the baseline study, as well as the pilot studies proved that the combination of the two functions in competence-based education, namely, *formative assessment* and *summative assessment*, is crucial for both the learning and assessment processes. A formative assessment steers the learning process to an important degree, since it provides students with important information about their competence development. Students can make mistakes without being penalized. Formative assessment can take different forms such as feedback or diagnostic testing. Summative assessment is one which indicates that the student is competent at a certain level and, as a result, earns credits. Both functions were used to some extent in the pilot studies and thus assisted further elaboration of the assessment tool set.

Apart from the assessment functions, three general characteristics of competence-based assessment were taken into consideration while refining the tools and guidelines:

- development-oriented assessment of competencies;
- multiform assessment. A competence consists of many facets, and this requires several methods and angles, a method mix;
- repeated assessment. A single measurement cannot determine whether a level of competence has been achieved.

Every competence consists of invisible layers such as personal characteristics, knowledge and skills, motivation and views. Students' competencies will not be visible until they display their behaviour in an authentic professional context. It has been observed in practice (also as an outcome of the pilot studies) that assessment needs to focus on behaviour, acting satisfactorily in an occupational situation with the body of knowledge needed for it, and reflecting on one's own actions and views and accounting for them.

In competence-based, project-based, and learning-by-growth scenarios, educational assessment focuses on the knowledge, skills and attitude that form the foundation of a competence and on the development of competencies as a whole. In the pilot studies a distinction was made between:

- subject-specific knowledge and the skills students should have after a certain period;
- generic skills which are developed in the course of the study programme during various study components; these skills are not linked to a particular period or a specific study component;
- acting professionally in occupational situations (simulated or not);
- development of competencies: the way in which the student acts competently in situations and contexts that are characteristic of and critical for his/her profession.

As far as the first two points are concerned, the various building blocks of a competence or several competencies are the subject of the fine-tuning process. The real level of the student will be measured against this final level. Acting professionally will be assessed within a specific context and a specific problem (for example, within projects). When assessing the development of competencies as a whole, the assessor must adopt a much broader viewpoint: he or she must be persuaded by the individual students that they are acting competently in all relevant situations.

6. Conclusions

Entrepreneurial competence and the sense of initiative have been acknowledged as key for individual development and fulfilment, active citizenship, social inclusion and employability in a knowledge society (European Parliament and Council, 2006).

Our study highlights that the assessment of entrepreneurial competencies needs to be based on an integration of different epistemological approaches to education, and adopt mixed-, multi-source, and real-life methods, not merely aimed at summative but also formative purposes. We would therefore like our findings to inspire new directions for research and practice aimed at introducing a game-changing approach to learning, teaching, and assessing entrepreneurship as a set of transferable competencies.

Our review and study suggest that student performance in entrepreneurial competencies can be assessed in different ways and contexts, without taking into account specific outcomes but rather a holistic view of these competencies. Our study highlights that teaching and assessing transversal competencies requires attention to the social context of learning (i.e. the *learning environment*) and the definition of contents and expected performance (i.e. the *learning outcomes*).

Looking at learning environments, a commonly noted approach to teaching transversal competencies is to provide interactive learning environments that facilitate active learning (e.g. games and real-life problems to be solved through debate, experimentation, exploration, and creativity) (Kirriemuir & McFarlane, 2004), while at the same time supporting students through *scaffolding* teaching activities and explicit instructions where relevant. We thus suggest that learning environments need to reflect real world contexts and present complex problems with multiple solutions. The assessment of entrepreneurial competencies depends on the specification of the learning objectives adopted by teachers. Competence-based education should be “more than an effort to describe or list educational and behavioural objectives” (European Commission, 2012, p. 13). In fact, when learning outcomes are over-specified, holistic competencies are reduced to atomized tasks (for example, described by long checklists of actions and behaviour). Moreover, transversal competencies need to be assessed as relevant to complex contexts, including occupational contexts and social contexts generally. Assessors must therefore be able to exercise their

judgement in any given set of circumstances (Cedefop, 2010) and operate with a complex, internalised and holistic model (and not a simple list of performance indicators). Likewise, the learning outcomes for summative assessment of a qualification will be more tightly specified than the learning outcomes for formative assessment within the university curriculum. In this regard, it is important to keep in mind that students gear their learning behaviour (e.g. what and how students learn) to the assessment method used. Therefore, learning objectives in competence-based education will only be achieved if the assessment and teaching are adjusted to it. Using a mix of assessment methods seems essential to compensate for strengths and weaknesses in the validity, reliability and generalisability of different methods. In conclusion, our study suggests that the assessment of entrepreneurial competencies needs to be based on the integration of different epistemological approaches to education, adopting mixed-, multi-source and real-life methods, with summative as well as formative goals.

The rise of entrepreneurship programmes in the last few decades has been fuelled by unprecedented student demand as students look for a style of business education that will provide them with the transversal skills (Cooper, Bottomley & Gordon, 2004) needed to succeed in an increasingly divergent business environment. In this study we underline that adopting a competence-based approach to teaching and assessing entrepreneurial competencies has relevant implications in terms of teacher training. For example, training must tackle the re-orientation of initial teacher training frameworks; the development of a common understanding of outcome specification and teacher judgement; knowledge of active learning, gamification, technology-based teaching techniques; and continuous learning and peer-to-peer support.

Finally, we hope that this work will stimulate new directions for research and practice aimed at introducing a game-changing approach to learning, teaching, and assessing entrepreneurship as a set of transversal competencies.

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