Teaching and assessing transferable competences:
The case of entrepreneurial competences.

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ABSTRACT

The critical importance of transferable competences in future employment is widely recognized and education reforms in many countries have taken steps towards including them into new or existing curricula. The transferable competences, as well as other generic skills like creativity or problem solving, relate to more than one subject area and are more difficult to assess with traditional instruments. In this context, the concept of assessment of competences has received increasing attention and needs to be aligned with an active, development-oriented teaching and learning approach. In spite of growing interest in entrepreneurship education, research about the entrepreneurial competencies that should be developed through education and training and the assessment of students' learning output is still scarce. Building on and extending previous literature on entrepreneurial competences, this study develops a framework for the methodical assessment for entrepreneurial transferable competences. The paper therefore highlights what forms of assessment instruments are available for instructors and policy makers to assess student progress in these specific competences, providing food for thought for defining and analysing innovative ways of teaching and assessing transferable competences in the context of higher education.

Keywords: Transferable competences; Assessment; Entrepreneurial competencies

1. INTRODUCTION

During the last decade, the educational policy debate has significantly focused on how to improve the match between the European education and training systems and the needs of our global, knowledge-based economy. Because students today will likely have several careers in their lifetime, they must develop not only technical competences but also transferable[1] competences – such as critical thinking and interpersonal communication skills - in order to be successful on the job market. Key aspect of education efforts in the 21st century appears therefore to be "knowing how to learn".

Education reforms in many countries have taken steps towards responding to these new trends. For example, reforms reshaped curricula on the basis of new concepts such as 'key competences' and 'learning outcomes', and some have introduced achievement scales. In many countries, a subject-based curricular organization (i.e., focusing on subject content) has given way to a more complex curricular architecture built on practical skills and cross-curricular approaches. In addition, new curriculum areas have been either introduced or given a higher profile in many European curricula, notably in the case of entrepreneurship, information and communication technology (ICT), and citizenship education. In this context, the concept of assessment of competences has received increasing attention and need to be aligned with an active, development-oriented teaching and learning approach.

Even though often ignored, also business and entrepreneurship are fields where practice is required for learning just and a shift should be made from passive, formative learning towards experiential learning (Higgins & Elliot, 2011; Pfeffer & Fong, 2002). Despite the growing interest in entrepreneurship education in the last decades, research about the entrepreneurial competencies that should be developed through education and training and the assessment of students' learning output is still scarce (Edwards-Schachter et al., 2015).

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[1] In this paper, we use the term transferable competences as a synonym for transversal competences (Rychen & Salganik, 2003).

In this paper we aim at filling this gap by discussing how to assess transferable competences, and specifically focusing on the case of transferable competences in entrepreneurship. The rise of entrepreneurship programmes has also been fuelled by unprecedented student demand as students look for a style of business education that will provide them with the transferable skills (Cooper et al., 2004) needed to succeed in an increasingly divergent business environment. Therefore, this paper is relevant because it addresses the topic of developing curricula based on transversal competencies - such as entrepreneurial ones - and assessing them: an important issue which is still lagging behind (Eurydice, 2012). This paper therefore builds on and extend previous literature on entrepreneurial skills and competences (e.g., Chell, 2013, Markman, 2007; Mitchelmore and Rowley, 2010), proposing an assessment framework for entrepreneurial competences. This has important practical implications for increasing what are entrepreneurial competences and how to effectively assess them, with the outcome of providing a support to educators and policy-makers in designing new teaching and assessment methods.

2. TRANSFERABLE COMPETENCES

The concept of "key competence" is difficult to define and to organize since competences refer to broad, multi-functional areas of human ability, thus differing from subject knowledge. A number of international bodies such as the OECD, the World Bank, UNESCO, the European Commission, and several non-governmental organizations have undertaken research leading to the recognition of the importance of key competences and created frameworks intended as clarification and guidance for policy makers and educational professionals (Terzieva, Luppi, & Traina, 2015).

In Europe, the concept of key competences originated with the adoption of the Lisbon Strategy in 2000 and resulted in the European Reference Framework. Key competences are those that all individuals need for personal fulfillment and development, active citizenship,

social inclusion and employment[2] and that therefore can be transferred from one job to another (Rychen & Salganik, 2003). One can learn these skills within the educational or social context and then transfer them to a career. The development of key competences should include both subject-based and transferable competences that motivate and equip students for further learning. The transferable competences are the following: (1) communication in the mother tongue; (2) communication in foreign languages; (3) mathematical competence and basic competences in science and technology; (4) digital competence; (5) social and civic competences; (6) sense of initiative and entrepreneurship; (7) learning to learn; and (8) cultural awareness and expression.

In education, while skills are considered as human capital or potential, the competence approach focuses on what the people can do rather than what they know. Competences are described as "behavioural manifestations of talent" (Boyatzis, 2008: 8) or observable aspects of performance in specific circumstances (Spencer & Spencer, 1993). Competences are not personal constructs or traits but rather dispositions that can be attributed to individuals, teams and organisations. They are latent attributes identified and defined in a community of practice (Spencer & Spencer, 1993). The goal should be to teach learners to develop using their skills and knowledge in successful ways, in creating competences (McKinney & Denton, 2005).

3. HOW TO TEACH TRANSFERABLE COMPETENCES

There are three main ways in which the transferable competences may be integrated into the curriculum in higher education. First, they may have cross-curricular status, when related learning objectives or outcomes are incorporated into the parts of the curriculum that are not subject-bound. Second, transferable competences may be integrated into existing curriculum subjects, with learning objectives or outcomes feature within the specific curricula for these subjects. Third, transferable competences can be introduced as separate curriculum subjects.

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[2] European Framework for Key Competences for Lifelong Learning, ANC 2006/962/EC

In Europe, it is generally recognised that the majority of transferable competences are not tied to any particular subject and are needed alongside all areas of study. Therefore, EU member states that have explicitly addressed the teaching of transferable competences have done so by developing cross-curricular frameworks.

The implementation of transferable competences requires attention to the social context of learning, and consideration of all the influences upon a learner's ability to both acquire and transfer what they learn in school or at university. To this regard, the learning environment reflects the learning perspectives used. Building on existing literature, we can identify three main perspectives on learning. First, a reproduction learning perspective, which consists in supplying the necessary information referring to organization of content, vocabulary, and knowledge of the investigative tools of the various knowledge sectors. Second, a construction learning perspective, which is addressed to the personal construction of knowledge, using instruments of direct investigation (attitudes, methods, techniques), formalization and troubleshooting (e.g., through observation, hypothesis, experimentation, verification) aimed at generalization and transferability of knowledge products. Third, a creativity learning perspective, which entails the construction of original comprehension/revision of knowledge, thus ensuring discovery, creation of new cultural objects or approaches, enhancing subjectivity.

Recent literature suggests that a creativity learning perspective, entailing a constructivist epistemology, encorauges a knowledge arising through a process of active construction (Mascolo & Fischer, 2005). Several authors have highlighted that active learning experiences are more likely to have significant positive gains for learners, such as the production of in-depth, longer-lasting knowledge, than passive learning experiences (e.g., Higgins & Elliot 2011; McGowan & Knapper, 2002; Wilson-Medhusrt, 2008).

As suggested by constructivist learning theories, learners can develop key competences, and therefore transfer their knowledge, if they learn through authentic activity, rather than

solely through instruction. In terms of learning environment, this is achieved through the provision of interactive learning environments that reflect real world contexts (e.g., making use of learning games, simulations, learning by doing, or cooperative and participatory approaches) (e.g., de Jong and van Joolingen, 1998; Garris et al., 2002; Lepper and Henderlong, 2000; McFarlane & Sakellariou, 2002; McLoughlin & Luca, 2002). While interactive learning environments encourage learners to be active and autonomous, they also require collaboration between learners, developing social and communicative competences. A learning environment does not have to be classroom based; virtual worlds can also represent interactive learning environments and tools like mobile technology can connect learners' lives inside and outside school (Sharples et al., 2009). In addition, placement, intern, and study trip programmes are potential sites for transferable competence development. These often have an applied focus and should be a site of experimentation and innovation, a place where educators catch up with the changing culture and teach new subjects that expand children's understanding of the world (Jenkins et al., 2009). They may also enhance student engagement and promote collaborative learning (Denis & Hubert, 2001). Learners' responses to real world problems may be conceived of in terms of a longer term, cumulative activity that may take place individually or in groups, and usually requires a final practical outcome. This project-based learning is typically cross-curricular rather than subject-specific; projects may address several subjects and also several key competences and transferable competences simultaneously.

Besides providing interactive learning environments, students need support to develop their ability to learn independently. Educational institutions need to consider learners' social and emotional wellbeing and allow learning to be more self-directed. Teachers need to be supported to develop these new methods, both through the re-orientation of initial teacher training frameworks, and through continuous learning and peer-to-peer support. Knowledge of ICT and familiarity with assessment methods are particular areas for development.

The interaction of teachers in a peer networking environment is also of great importance. Many of the activities, in spite of being enabled by technology, are highly teacher-dependent, particularly those that promote interdisciplinary and transversal competences. Teachers can expand their knowledge of both teaching and assessment by sharing information and resources among teacher learning communities. These offer a non-threatening forum in which to share key examples, and develop their teaching and assessment practices.

4. HOW TO ASSESS TRANFERABLE COMPETENCES

4.1. Perspectives on assessment

Assessment in education is defined as a process of gathering evidence, making judgments and drawing inferences about student's achievements and performances (Curtis, 2010). In this paper, we refer to the definition of assessment by Pellegrino, Chudowsky and Glaser (2001: 42), i.e., "a tool designed to observe students' behaviour and produce data that can be used to draw reasonable inferences about what students know". In fact, this definition contains three elements that are common to any assessments practice, known as "the assessment triangle": observation, data collection, and interpretation and learners' cognition (Ketchagias, 2011). Moreover, the combination of these three dimensions leads to the question of the purpose of assessment in education.

A review of the literature highlights the existence of three main approaches to assessment (Terzieva et al., 2015). First, the so called classical test theory, which is characterized by an overall approach focused on positivism or empiricism, the use of statistic models and methodological procedures, and the influence of psychological behaviourism. According to this approach, assessment can be reliable if only limited to measurable facts, performances, and events. Therefore, qualitative phenomena need to be transformed in quantitative variables by defining measurable indicators. In this approach, tests are preferred

rather than others forms of assessment, where an educational achievement test is "a device or procedure for assigning numerals (measures) to the individual in a given group, indicative to a various degree to which an educational objective or set of objectives has been realised by those individuals" (Lindquist, 1951: 142). The main issue is whether assessments are reliable and valid. Following a behaviourist psychological approach, *knowledge* is an organised accumulation of associations and skills, and *learning* is the process that allows acquiring associations and skills (Skinner, 1958, 1968). In this view learning can be demonstrated by tests measuring behavioural skills in discrete tasks, while the process of learning can be showed by monitoring changes in behaviour or performances, according to regular task practice and reinforcement (Bloom, 1971).

A second stream of theory regards the cognitive theory on learning, according to which the individual is not passive but active when acquiring knowledge and doesn't only react to stimuli but selects and processes it. Cognition is intentional when using abilities or mental operations such as tools in processing information. (Neisser, 1976). According to this perspective, knowledge deals with learning strategies; and knowledge on knowledge itself is the highest self-reflexive consciousness concerning what we know, what we need to learn and what we have to do, in order to acquire the requested knowledge. This consciousness on mind strategies and potential is due to metacognitive experiences and self-questioning (Sternberg & Smith 1988, Carrol, 1981). Sternberg defined three components in mind's activity: the metacomponents, the performance components, and the knowledge-acquisition components (Sternberg, 1985). These three components, when applied to different contexts and tasks, create three functions of intelligence, and respectively the analytical intelligence (that is considered as componential), the creative intelligence (that is mostly experiential), and the practical intelligence (that is contextual) (Sternberg, 1985, 1997; Sternberg et al., 2001). In this perspective when assessing learning goals one must deal with complex abilities and

competences such as selection, synthesis, analysis, planning, evaluation, decision making, problem solving, etc.

The third theoretical perspective that can be applied to learning assessment is social constructivism. In this perspective, learning is seen as an active and continuous process where knowledge is constructed and reconstructed, influenced by prior knowledge and experience. Knowledge is build upon individual constructions, which don't necessary match to the reality itself or to other people' constructions (Handley et al., 2004). Following this view, learning is a process for searching meaning and can be promoted starting from the significant issues of student's experience (Woolfolk, 1998). Learning processes based on the principles of constructivism work on mental models that students use to represent a situation or understand a topic, in order to improve these models. At the same time teachers helps students becoming aware of their convictions and implicit theories by giving them tools to self-question, reflect and move further narrowed views. The purpose of learning for a student is to become able to build up his/her own meaning. This doesn't mean to learn the right answer, that would mean acquiring one's other meaning, but to find a personal way to make knowledge a significant part of life. Transmissive learning is refused: students cannot only register information, they must become creators of their personal knowledge structures (Herman, 1997). A constructivist learning environment is characterized by personal relevance of experience to students, uncertainty, critical voice, shared control, and student negotiation (Taylor et al., 1999). According to this perspective, assessment must focus on learners' processes of experiential reflection, which can be represented by mind maps, self-questioning, self-explanations and search for meaning (Fenwick, 2000; Chia, 2003).

Assessment is increasingly considered as part of the knowledge building process (Koretz, 2005; Segers et al., 2003; Stobart, 2008). As Wiggins (1998: 7) stated: *the aim of assessment is primarily to educate and improve student performance, not merely to audit it*. According to the most recent perspectives on education, teaching is more and more a

scaffolding activity aimed at supporting students to operate at the edge of their competences. In this perspective, assessment should provide feedback on where students are and how they could be supported to progress further, in order to promote meaningful learning. This occurs when learners are actively involved and have the opportunity to take control of their own learning process. Under this perspective the main role of assessment consist in providing feedback to learners, emphasising metacognition, self-assessment and the transferability of knowledge and competences acquired within other settings (Packer & Goicoechea, 2000). Assessment should be as much contextualised as possible, in order to allow learners to show their deep understanding of concepts and the related frameworks. During assessment procedures a student should be asked to make explicit their own learning processes and the feedback of assessment should not only give information about what students already know but also on what they could do to improve their competences (Bransford et al., 2000).

The debate regarding assessment of learning processes is pointing to several key changes with regard to the aims, practices, and tools of assessment (e.g., Kulieke et al., 1990; Segers et al., 2003). A key shift in the notion of assessment regards its authenticity. Authentic assessment is the one that integrates multiple types of knowledge and skills, relies on multiple sources of evidence collected over time and in different contexts, and follows codified professional standards (Darling-Hammond, 2000). While authenticity was previously seen as decontextualised and atomistic, there is a shift towards looking at contextualized forms of assessment. This entails a set of new directions in the number of measures used to assess learning processes (e.g., from single to multiple measures), the level of assessment of comprehension (e.g., from low to high), the dimensions of intelligence assessed (e.g., from few to many), the relation to the learning process (e.g., from an isolated assessment to an integrated assessment), and the responsibility of the assessment (e.g., from the teacher to the student) (see Figure 1).

Taking this view of assessment, students play the role of active participants, sharing purposes, goals, criteria, instruments in order to be able to reflect on their own learning path, improving their competences, using feedbacks to adjust their cognitive strategies, skills and behaviours. This synergy of assessment, learning strategies, and teaching practices is linked to another key concept of the debate on assessment in education, i.e., the notion of formative assessment as opposed to the notion of summative assessment. The first definition of formative assessment was proposed by Scriven (1967) as a type of assessment that provides information to assess the effectiveness of a curriculum and guide educational further choices. Following this, Bloom (1968) defined formative assessment as a tool for improving the teaching-learning process for students. The debate on formative assessment moved from these complementary visions: the first with a view to the evaluation of learning environments and curricula and the second to teaching and learning processes. In both cases formative assessment leads to educational decisions, actions and awareness. In the current debate formative assessment is considered in its potential to enhance learning and performance (Ketchagias, 2011). Formative assessment takes into account the progress of each learner, does not refer to fixed criteria and, moreover, provide diagnostic information. Students play a central role in this function of assessment: they are requested to be active in order to understand their strengths and weaknesses and to decide how to improve and progress in learning path. Feedback is a key aspect of formative assessment because it clarifies the expected performance (Huhta, 2010) and helps students becoming aware of their learning efforts. This educational attitude also lead to motivate students and develop their self-assessment competences (Nicol & Macfarlane-Dick, 2005).

4.2. Assessment of transferable competences

In Europe, Eurydice (2009) found that only communication in the mother tongue, communication in foreign languages, and mathematical and basic competences in science and

technology are the most commonly transferable competences assessed in national tests. By contrast, in many European countries the other key competences, which usually relate to more than one subject, are not at present generally assessed in national tests. While these competences may be implicitly or explicitly assessed through other methods and tests that were not surveyed by Eurydice, the assessment gap in the national testing systems is significant, since these tests reflect the priorities of education systems at the national level.

Transferable competences represent a valuable but complex view of learning. Assessing transferable competences is characterized by the risk that if only a few competences are assessed, assessment will distort the curriculum, leading to the neglect of other competences. In addition, distortions could arise if assessment regards only a limited number of aspects of these competences. For example, an assessment system aimed at testing the level of knowledge will not be able to track the development of skills and attitudes.

Assessment of transferable competences can be either summative or formative. Summative assessment indicates to which extent the student is competent at a certain level and how many credits is allowed to earn. Formative assessments provides students with information about their competence development, either in form of feedback or diagnostic testing. Whereas both types of summative assessment can be used, they have different learning assumptions and outcomes. In fact, because students gear their leaning behavior to the assessment method used, the way in which tests are carried out will direct what and how students learn (Terzieva et al., 2015). The potential of assessment is that it allows to assess not what is learnt, but also how it is learnt by students. In other words, assessing learners' transferable competence not only documents the acquisition of competences, but is also essential to the development of learners' transferable competences.

In this paper we therefore suggest that teaching of transversal competences should privilege formative assessment, since this type of assessment is oriented to developing competences without attaching a mark and credits, although it is important to have a "score"

realised. Formative assessment can be set up in various ways, for example, peer feedback, diagnostic testing, interim feedback given by experts, self-assessment, or use of learning tasks. Engaging in this type of assessment requires the adoption of a development-oriented approach to learning and testing, where there is a continuous feedback between learning and assessment: assessment supports learning, and learning supports assessment (Terzieva et al., 2015). In practice, this has two implications for the assessment methods and tools adopted. First, it implies the use of repeated assessment during time. Second, it implies the adoption of a multiform assessment, i.e., the use of several methods to assess the different facets of competences and to compensate for strengths and weaknesses of tests in terms of reliability and validity (OECD, 2001). For example, this entails the adoption of both assessment methods based on classroom and workplace observation, and of questionnaires and tests based on self- and etero-assessment. In sum, because competence-based education should be more than an effort to describe or list educational and behavioural objectives (Council on Education for Public Health, 2011), the assessment of transferable competences need to be referred to complex contexts, including occupational contexts and social contexts more generally (Cedefop, 2010).

5. ASSESSING TRANSVERSAL ENTREPRENEURIAL COMPETENCES

Entrepreneurial competence and sense of initiative has been acknowledged as a key competence for individuals towards personal development and fulfillment, active citizenship, social inclusion and employability in a knowledge society[3]. To this regard, entrepreneurial competencies can be viewed as transferable ones, i.e., competencies that can be transferred from one job to another. For this reason, it could be recommended entrepreneurial competences to be taught not only in business schools and universities, but at any level of education.

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[3] European Framework for Key Competences for Lifelong Learning, ANC 2006/962/EC.

The concept of entrepreneurial competencies is complex. It comprises components that are deeply rooted in a person's background (traits, personality, attitudes, social role and self-image) as well as those that can be acquired at work or through training and education (skills, knowledge, and experience) (Man et al., 2002). In the field of entrepreneurship, it has been recognized that entrepreneurial competencies are key to entrepreneurial success (Morris et al 2013). While there is consensus that entrepreneurship can be taught (e.g. Gibb, 2002; Matlay & Mitra, 2002; Adcroft et al., 2004) the relevant question is what should be taught and how should it be done (Kuratko, 2005). Because entrepreneurial competences directly correlate with entrepreneurial performance and can be improved with education and training, how they are taught and assessed are fundamental questions for instructors.

In this paper we specifically focus on how to assess entrepreneurial competences. In fact, entrepreneurial competencies can only be demonstrated by a person's behavior and actions, which correspond to the dynamism characteristic of competitiveness (Man et al., 2002). Therefore, students' entrepreneurial competences will not be visible until they display their behaviour in an authentic professional context. This requires a completely new and at the same time complementary approach towards understanding, teaching and assessing transferable entrepreneurial competences.

We build on an extensive literature review on the topic of entrepreneurial skills (e.g., Chell, 2013) and competences (e.g., Markman, 2007; Mitchelmore & Rowley, 2010; Morris et al., 2013) to define what are transversal entrepreneurial competences. Because entrepreneurial education can be viewed broadly in terms of the skills that can be taught and the characteristics that can be engendered in individuals that will enable them to develop new and innovative plans, we can identify both technical skills (e.g., marketing, management, financial control) and transversal skills as fundamental to entrepreneurship (e.g., Chen et al., 1998; Markman, 2007). We identify five areas of competence which are transversal to

entrepreneurial endeavours, i.e., team-work and collaboration, critical and analytical thinking or problem solving, communication, creativity and innovation, positive attitude and initiative.

Because entrepreneurial competences are multifaceted, their measurement and assessment is inherently ambiguous. Compounding the problem is that entrepreneurship does not happen in a vacuum, but entrepreneurial competences involve dealing with material and social environment. For each of these competences, we therefore propose a mixed-method set of validated assessment tools, responding to the needs of an active, development-oriented assessment, as shown in Table 1.

6. CONCLUSION

Both academics and policy makers have recognized that education, especially at the post-secondary level, should increasingly be aimed at preparing students to develop appropriate competences for working life and to face the challenges of real-life situations. This vision has been translated, in Europe, in the concept of key competences, originated with the adoption of the Lisbon Strategy in 2000. Key competences in the European Reference Framework are those that "all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment". As most of the European educational policies state, the development of key competences should include both subject-based and transversal competences that will motivate and equip students for further learning.

The concept of transferable competences is complex, including a set invisible layers such as personal characteristics, knowledge and skills, motivation and views. Students' transferable competences will not be visible until they display their behaviour in an authentic professional context. This requires a different and the same time complementary approach towards understanding, teaching, and assessing transferable competences than those used in subject-based curricula. First, the question of "how" has moved aside the question of "why" and the complexity it entails unfolds new possibilities for coping with change, translating it

into educational innovation and new enterprise logic. Second, teaching and learning are called to be based on active, development-oriented methods and tools. In line with this, assessment needs to be refocused on a formative rather than summative function, based on repeated and mixed methods and tools.

Transferable competences which are generally taught in Europe, as a part of other subjects and national curricula, mainly cover communication in the mother tongue, communication in foreign languages, and mathematical and basic competences in science and technology. Even though often ignored, also business and entrepreneurship are fields where practice is required for learning just and a shift should be made from passive, formative learning towards experiential learning (Higgins & Elliot, 2011; Pfeffer & Fong, 2002). But it is challenging to move towards the inclusion of these competences in education. For example, with regard to entrepreneurship, nine European countries (Germany, the Netherlands, Italy, Greece, Romania, Ireland, Denmark, Belgium Flemish community, and Croatia) do not explicitly cover entrepreneurship competencies education (Terzieva et al., 2015).

In this paper, based on a review of the existing approaches to teaching and assessing transferable competences, we have proposed an assessment framework aimed at assessing transferable entrepreneurial competences. Our framework is based on five areas of competence which are transversal to entrepreneurial endeavours, i.e., team-work and collaboration, critical and analytical thinking or problem solving, communication, creativity and innovation, positive attitude and initiative. For each of these competences, we propose a mixed-method set of validated assessment tools, responding to the needs of an active, development-oriented assessment.

The adoption of such an assessment framework has implications in terms of teaching and learning approach, with several challenges to be faced by instructors. First, most European states tend to train teachers in single subjects, and school timetables tend to be based around single subject lessons. This raises concerns about where and how cross-

curricular competences will fit into the educational set-up of the day. Second, this approach requires the development of an assessment system based on different sources of assessment (e.g., the self, peers, teachers, external experts), and the implementation of real-life simulations. Therefore, higher education institutions will be required to think about adapting their learning environments to these requirements and establishing partnerships with employers and external stakeholders. We therefore wish that the proposed framework will stimulate new directions of research and practice aimed at introducing a game-changing approach to learning, teaching, and assessing transferable competences.

EXHIBITS

Figure 1 – New directions in assessment
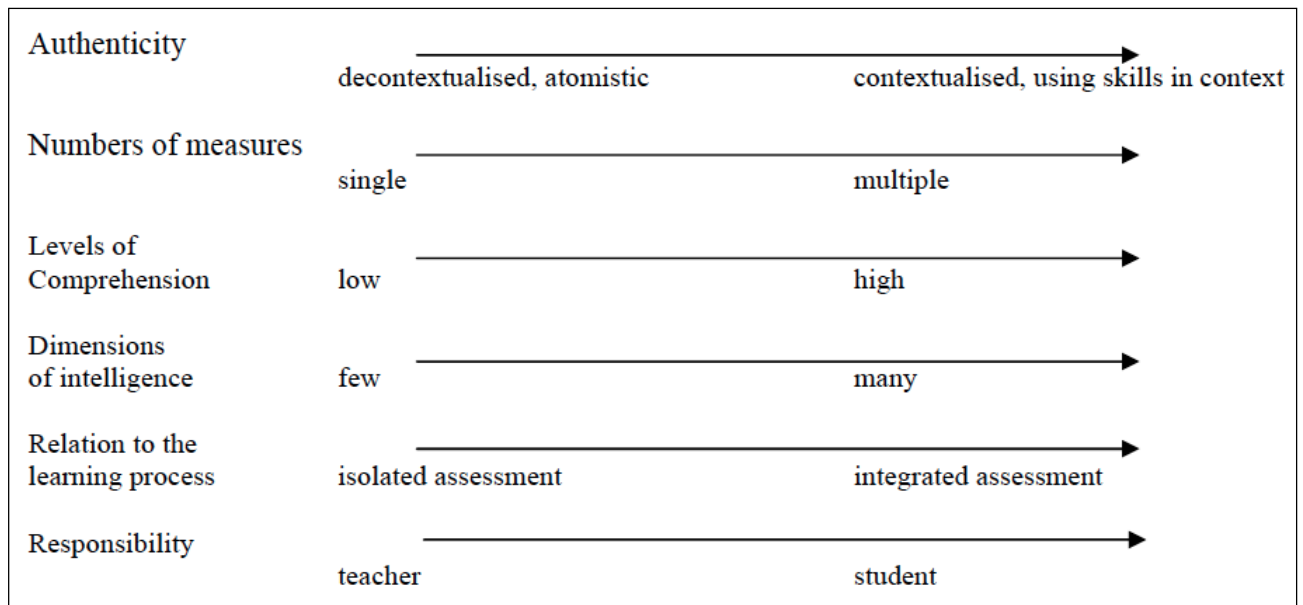
Source: Segers et al. (2003)

Table 1 – Assessment framework for assessing transferable competences

Competences related to Positive attitude and initiative (in the literature: Personal Empowerment)			
Transversal competence	**Skills**	**Description (high level)**	**Assessment tool**
Positive attitude and initiative	**Self assessment**	Being aware of own strength and or weaknesses and being able to find improvement strategies.	• Empowerment Scale (Rogers et al., 1997) • Making Decision Scale (to be used 360°) (Rogers et al., 1997) • Questionnaire for qualitative transversal competence self assessment
	Growth mindset	Believing that intelligence is dynamic, applying for improvement, seeing effort as a path to mastery, embracing challenges, learning from criticism, feeling inspired by the success of others.	Mindset Scale (Dweck, 2006)
	Emotional intelligence	Recognising, giving value and managing emotions and their impact on the self and on others.	Brief Emotional Intelligence Scale (Davies et al., 1998)

	Perseverance	Finishing an assigment even if tired of; keeping on working in a concentrated way even if there is distraction; continuing with the task even after a setback or failure; working with clear goals.	Perseverance Scale (in Entrepreneurial Competences Scale, Kyndt & Baert, 2015)
	Coping Strategy	Looking for creative ways to alter difficult situations; believing that positive growth is possible when dealing with difficult situations; being able to control reactions; asking for help when needed.	Coping strategy scale (Sinclair & Wallston, 2004)

Competences related to Communication. Group work and Team management
(in the literature: Social Empowerment)

Transversal competence	Skills	High level	Assessment tool
Communication	**General Communication**	Being aware about the components of communication (verbal, non verbal and paravaerbal); listening and correctly understanding messages someone is sending; always sending clear, concise messages to others.	• Interpersonal Communication Competence Scale (self assessment) (Rubin & Martin, 1994) • Communicative Competence Scale (external assessment) (Wiemann, 1977)
	Interaction	Being able to present ideas articulately and in a complex discussion; using sophisticated arguing and turn-taking strategies; having no difficulty in understanding idiomatic language use or different registers.	Interpersonal Communication Competence Scale (self assessment) (Rubin & Martin, 1994)
	Presentation	Being thoroughly familiar with the topic and respond confidently and spontaneously to complex questions; producing well-structured presentations; using transitional elements, following the conventions of the field; maintaining good eye contact, no reading from a paper; maintaining an appropriate level for the intended audience.	In-basket simulations

		Engaging in a range of approaches to generate solutions; seeking expert inputs and advice to inform negotiating strategy; using sound arguments, strong evidence, and expert opinion to influence outcomes; determining and communicating the organisation's position and bargaining strategy; representing the organisation in critical negotiations, including those that are cross jurisdictional; achieving effective solutions in challenging relationships, ambiguous and conflicting positions; pre-empting and avoiding conflict across organisations and with senior internal and external stakeholders; identifying contentious issues, direct discussion and debate, and steer parties towards an effective resolution	Resource leveraging scale (Morris et al., 2013)
	Negotiation		
Team-work and collaboration	**Group work and team management**	Being able to work interdependently and to contribute in a variety of work teams; promoting cooperation; giving value to diversity in a group; respecting ideas and contributions of others; sharing information assists in mentoring others.	Questionnaire for qualitative transversal competence self-assessment
	Collaboration towards achieving a common goal	Supporting the components of the team to develop has an extensive project management plan that outlines the tasks to be accomplished, resources that are needed, and due dates; assigning tasks to various members and anticipating future needs; planning and carrying out regular follow-up activities to monitor progress and provide feedback to team members.	In-basket simulations
	Team decision making	Mobilizing personal strengths to set forth own ideas and to negotiate a fit between personal ideas and ideas of others, using contrasts to spark and sustain knowledge advancement of the entire team, acknowledging that each member has a significant role to play and personal responsibility in decision making.	In-basket simulations

	Conflict resolution	Using assertiveness in initiating difficult conversations; listening in an objective, empathic way; avoiding the blame game; being focused on the outcome; not taking comments as personal attacks; being able to negotiate and promoting win-win outcomes.	Questionnaire for qualitative transversal competence self-assessment

Competences related to Critical and Analytical Thinking or Problem Solving, including Risk Assessment
(in the literature: Problem solving Attitude)

Transversal competence	Competences/ skills	High level	Assessment tool
Critical and analytical thinking or problem solving	Problem solving attitude	Identifying and appropriately analysing problems; distinguishing relevant from irrelevant information; quickly searching for best solutions involving others; making clear, consistent, transparent decisions; acting with integrity in all decision making.	Making Decisions scale (Rogers et al., 1997)
	Recognizing and assessing opportunities	Being able to perceive changed conditions or overlooked possibilities in the environment that represent potential sources of profit or return to a venture/organization; being able to evaluate the content structure of opportunities to accurate determine their relative attractiveness and feasibility.	Opportunity recognition and opportunity assessment scales (Morris et al, 2013)

Competences related to Creativity and Innovation
(the literature: Creativity and Lateral thinking)

Creativity and Innovation	Creativity and lateral thinking	Considering different approaches, disciplines and points of view when generating solutions; using resources creatively; originating alternatives to conventional thinking; producing imaginative or unique responses to a problem.	Creative problem solving scale (Morris et al., 2013)
	Adaptability	Instigating and leading programmes of change, working in close collaboration with team mates/ colleagues; identifying resource implications of strategic developments and managing them accordingly.	Career Adapt-Abilities Inventory (Savickas & Portfeli, 2012)

		Developing and implementing new concepts, models, approaches to practice and products that have a significant impact on the longer term success of the team/organization/company; driving strategic thinking.	Entrepreneurial orientation scale (Covin & Slevin, 1989).
	Innovation		

REFERENCES

Adcroft, A., Willis, R., & Dhaliwal, S. (2004). Missing the point? Management education and entrepreneurship. *Management Decision*, *42*(3/4), 512-521.

Bloom, B. S. (1968). Learning for mastery. Los Angeles, USA: University of California press.

Boyatzis, R. E. (2008). Competencies in the 21st century. *Journal of Management Development*, *27*(1), 5-12.

Bransford, J., Brown, A.L., Cocking, R.R., Donovan, M.S., & Pellegrino, J.W. (2000). How People Learn, Brain, Mind, Experience, and School. Expanded Edition, National Research Council, National Academy Press, Washington.

Carroll J. B. (1981). Ability and task difficulty in cognitive psychology. *Educational Researcher*, 10(1), 11-21.

Cedefop (2010). Learning outcomes approaches in VET curricula: A comparative analysis of nine European countries. Luxembourg: Publications Office of the European Union. http://www.cedefop.europa.eu/EN/Files/5506_en.pdf.

Chell, E. (2013). Review of skill and the entrepreneurial process. *International Journal of Entrepreneurial Behavior & Research*, 19(1), 6-31.

Chia, R. (2003). From knowledge-creation to the perfecting of action: Tao, Basho and pure experience as the ultimate ground of knowing. *Human Relations*, *56*(8), 953-981.

Cooper, S., Bottomley, C., & Gordon, J. (2004). Stepping out of the classroom and up the ladder of learning: an experiential learning approach to entrepreneurship education. *Industry and Higher Education*, 18(1), 11-22.

Council on Education for Public Health (2011). *Competences and Learning Objectives*. Washington.

Covin, J. G., & Slevin, D. P. (1989). Strategic management of small firms in hostile and benign environments. *Strategic Management Journal*, 10(1), 75-87.

Curtis, D. (2010). Defining, Assessing and Measuring Generic Competences. University of South Australia.

Darling-Hammond, L. (2000). Authentic assessment of teaching in context. *Teaching and Teacher Education*, *16*, 523-545.

Davies, M., Stankov, L., & Roberts, R. D. (1998). Emotional intelligence: in search of an elusive construct. *Journal of personality and social psychology*, *75*(4), 989-1015.

De Jong, T., & Van Joolingen, W. R. (1998). Scientific discovery learning with computer simulations of conceptual domains. *Review of Educational Research*, *68*(2), 179-201.

Denis, B., & Hubert, S. (2001). Collaborative learning in an educational robotics environment. *Computers in Human Behaviour*, *17*, 465-480.

Dweck, C. (2006). *Mindset: The new psychology of success*. Random House.

Edwards-Schachter, M., García-Granero, A., Sánchez-Barrioluengo, M., Quesada-Pineda, H., & Amara, N. (2015). Disentangling competences: Interrelationships on creativity, innovation and entrepreneurship. *Thinking Skills and Creativity*, *16*, 27-39.

Eurydice (2009). National Testing of Pupils in Europe: Objectives, Organisation and Use of Results. Brussels: European Commission.

Fenwick, T. (2000). Expanding conceptions of experiential learning. *Adult Education Quarterly*, August 2000.

Garris, R., Ahlers, R., & Driskell, J. E. (2002). Games, motivation, and learning: A research and practice model. *Simulation & Gaming*, *33*(4), 441-467.

Gibb, A. (2002). In pursuit of a new 'enterprise' and 'entrepreneurship'paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge. *International Journal of Management Reviews*, *4*(3), 233-269.

Handley, K., Clark, T., Fincham, R., & Sturdy, A. (2004). Knowing how to know: an inquiry into methods of studying knowledge and learning. Paper presented at the 5th Conference on Organizational Knowledge, Learning and Capabilities, Innsbruck, April.

Herman J. L. (1997). Large-Scale Assessment in Support of School Reform: Lessons in the Search for Alternative Measures. *International Journal of Educational Research*, *27*(5), 397.

Higgins, D., & Elliott, C. (2011). Learning to make sense: what works in entrepreneurial education?. *Journal of European Industrial Training*, *35*(4), 345-367.

Huhta. A. (2010). Diagnostic and Formative Assessment. In Spolsky, Bernard and Hult, Francis M. (Eds.), *The Handbook of Educational Linguistics*. Oxford, UK: Blackwell (pp.469–482).

Ketchagias, K. (2011). Teaching and Assessing Soft Skills, Measuring and Assessing Soft Skills Report (MASS) project, Thessaloniki.

Koretz, D. (2005). Alignment, high stakes, and the inflation of test scores. In J. L. Herman & E. H. Haertel (Eds.), Uses and misuses of data in accountability testing. Yearbook of the National Society for the Study of Education (Vol. 104, Part I). Boston, MA: Blackwell Publishing (pp. 99-118).

Kulieke, M., Bakker, J., Collins, C., Fennimore, T., Fine, C., Herman, J., Jones, B.F., Raack, L., & Tinzmann, M.B. (1990). Why Should Assessment Be Based on a Vision of Learning?. North Central Regional Educational Laboratory.

Kuratko, D. F. (2005). The emergence of entrepreneurship education: Development, trends, and challenges. *Entrepreneurship Theory and Practice*, *29*(5), 577-598.

Kyndt, E., & Baert, H. (2015). Entrepreneurial competencies: Assessment and predictive value for entrepreneurship. *Journal of Vocational Behavior*, *90*, 13-25.

Jenkins, H., Purushotma, R., Weigel, M., Clinton, K., & Robison, A. J. (2009). *Confronting the challenges of participatory culture: Media education for the 21st century.* Mit Press.

Lepper, M. R., & Henderlong, J. (2000). Turning "play" into "work" and "work" into "play": 25 years of research on intrinsic versus extrinsic motivation. In Sansone, C. & Harackiewicz, J. (Eds.), *Intrinsic and Extrinsic Motivation: the Search for Optimal Motivation and Performance*. San Diego: Academic Press.

Lindquist E. F. (1951). Preliminary Considerations in Objective Test Construction. In E. F. Linquist (Ed.), *Educational Measurement*. American Council on Education, Washington DC (p. 142).

Man, T. W., Lau, T., & Chan, K. F. (2002). The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. *Journal of Business Venturing*, *17*(2), 123-142.

Markman, G. D. (2007). Entrepreneurs' competencies. *The psychology of entrepreneurship*, 67-92.

Mascolo M.F., & Fischer K.W. (2005). Constructivist theories. Cambridge Encyclopedia of Child Eevelopment.

Matlay, H., & Mitra, J. (2002). Entrepreneurship and learning: the double act in the triple helix. *The International Journal of Entrepreneurship and Innovation*, *3*(1), 7-16.

McCowan, J. D., & Knapper, C. K. (2002). An integrated and comprehensive approach to engineering curricula, Part One: Objectives and General Approach. *International Journal of Engineering Education*, *18*(6), 633637

McFarlane, A., & Sakellariou, S. (2002). The role of ICT in science education. *Cambridge Journal of Education*, *32*(2), 219-232.

McKinney, D., & Denton, L. F. (2005). Affective assessment of team skills in agile CS1 labs: the good, the bad, and the ugly. *ACM SIGCSE Bulletin*, *37*(1), 465-469.

McLoughlin, C., & Luca, J. (2002). A learner–centred approach to developing team skills through web–based learning and assessment. *British Journal of Educational Technology*, *33*(5), 571-582.

Mitchelmore, S., & Rowley, J. (2010). Entrepreneurial competencies: a literature review and development agenda. *International Journal of Entrepreneurial Behavior & Research*, *16*(2), 92-111.

Morris, M. H., Webb, J. W., Fu, J., & Singhal, S. (2013). A Competency-Based Perspective on Entrepreneurship Education: Conceptual and Empirical Insights. *Journal of Small Business Management*, *51*(3), 352-369.

Nicol, D., & Macfarlane-Dick, D. (2005). Rethinking Formative Assessment in HE: a theoretical model and seven principles of good feedback practice. *Quality Assurance Agency for Higher Education*.

Neisser U. (1976). Cognitive Psychology. Appleton-Century-Crofts: New York.

OECD (2009). Creating Effective Teaching and learning environments first results from TALIS. Paris: OECD.

Packer, M.J., & Goicoechea, J. (2000). Sociocultural and constructivist theories of learning: ontology not just epistemology. *Educational Psychologist*, *35*(4), 227-242.

Pellegrino, J. W., Chudowsky, N., & Glaser, R. (2001). Knowing what students know: the science and design of educational assessment. National Academies Press.

Pfeffer, J., & Fong, C. T. (2002). The end of business schools? Less success than meets the eye. *Academy of Management Learning & Education*, *1*(1), 78-95.

Rogers, E. S., Chamberlin, J., Ellison, M. L., & Crean, T. (1997). A consumer-constructed scale to measure empowerment among users of mental health services. *Psychiatric Services*, *48*, 1042–1047.

Rychen, D. S., & Salganik, L. H. (2003). Definition and Selection of Competences: Theoretical and Conceptual Foundations (DeSeCo). *Summary of the final report: Key Competences for a Successful Life and a Well-Functioning Society*. Paris: OECD.

Rubin, R. B., & Martin, M. M. (1994). Development of a measure of interpersonal communication competence. *Communication Research Reports*, *11*(1), 33–44.

Savickas, M. L., and Porfeli, E. J. (2012). Career Adapt-Abilities Scale: Construction, reliability, and measurement equivalence across 13 countries. *Journal of Vocational Behavior*, *80*(3), 661-673.

Scriven, M. (1967). The methodology of evaluation. In Stake, R. E. *Curriculum evaluation*. Chicago: Rand McNally. American Educational Research Association (Monograph Series on Evaluation, *1*).

Segers, M., Dochy, F., & Cascallar, E. (2003). Optimising New Modes of Assessment: In Search of Qualities and Standards. Kluwer Academic Publishers: Dordrecht.

Sharples, M., Arnedillo-Sánchez, I., Milrad, M., & Vavoula, G. (2009). *Mobile learning*. Springer Netherlands (pp. 233-249).

Sinclair, V. G., & Wallston, K. A. (2004). The development and psychometric evaluation of the Brief Resilient Coping Scale. *Assessment*, *11*(1), 94-101.

Skinner, B. F. (1958). Teaching machines. *Science*, 128, 969-977.

Skinner, B. F. (1968). The technology of teaching. East Norwalk, CT, US: Appleton-Century-Crofts.

Spencer, L. M. Jr., & Spencer, S. M. (1993). Competence at work: Models for superior performance. New York: John Wiley & Sons.

Sternberg, R. J. (1985). Beyond IQ: A Triarchic Theory of Intelligence. Cambridge: Cambridge University Press.

Sternberg R. J., & Smith E. E. (1988), The psychology of human thought, Cambridge University Press, Cambridge.

Sternberg, R. J. (1997). A Triarchic View of Giftedness: Theory and Practice. In N. Coleangelo & G. A. Davis (Eds.), *Handbook of Gifted Education*. Boston, MA: Allyn and Bacon (pp. 43–53).

Sternberg, R.J., Nokes, C., Geissler, W., Prince, P., Okatcha, F., Bundy, D.A., & Grigorenke, E.L. (2001). The relationship between academic and practical intelligence: a case study in Kenya. *Intelligence*, *29*, 401-418.

Stobart, G. (2008). *Testing times: The uses and abuses of assessment*. Routledge.

Taylor P. C., Fraser B. J., & Fisher D. L. (1999). Monitoring Constructivist Classroom Learning Environments. *International Journal of Educational Research*, *27*(4), 293-302.

Terzieva, L., Luppi, E., & Traina, I. (2015). Teaching and assessing transferable/transversal competences. The case of SOCCESS. *Journal of Science and Research*, *8*, 1-22

Wiemann, J. M. (1977). Explication and test of a model of communicative competence. *Human Communication Research*, *3*(3), 195-213.

Wiggins, G. (1998). Educative Assessment: Designing Assessments to Inform and Improve Student Performance. Jossey-Bass.

Wilson-Medhurst, S. (2008). Towards Sustainable Activity-led Learning Innovations in Teaching, Learning and Assessment. *Innovation, Good Practice and Research in Engineering Education, The Higher Education Academy Engineering Subject Centre. Loughborough: Loughborough University*.

Woolfolk, A. E. (1998). Educational psychology. Boston: Allyn & Bacon.