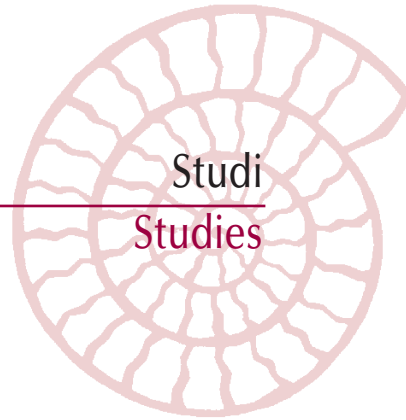

Studi
Studies

The entrepreneurial laboratory for teacher training in enterprise education

Il laboratorio imprenditoriale per la formazione insegnanti all'imprenditività

Daniele Morselli
University of Helsinki
daniele.morselli@helsinki.fi

ABSTRACT

This paper examines a current European Marie Curie project on in service teacher training in enterprise education. It begins with an overview of the current debate in Europe on entrepreneurship education. It presents expansive learning as suitable learning theory to underpin entrepreneurship education through the entrepreneurial laboratory workshops, a variation of the change laboratory for enterprise education. The paper introduces the empirical component of the research which is to be carried out in a technical institute in Italy. The major challenge facing the upper secondary vocational schools in Italy is the implementation of 400 hours' work experience, and this challenge will be employed in the entrepreneurial laboratory workshops with teachers. It is argued that by participating in the workshops the teachers will gain agency and become entrepreneurial in the way they implement enterprise education with their students. Moreover, in order to trigger deep transformation of school and work interactions and enterprise education with consequent in-class pedagogies, the entrepreneurial laboratory will have to make use of special second stimuli, such as the work-to-school relationship, and the model of connective pedagogy. The paper concludes by describing how learning outcomes will be measured in students. Enterprise education should be based on pedagogies aimed at connecting school with industry, as well as on teachers who teach around principles and open questions.

Il contributo illustra un progetto europeo Marie Curie in corso riguardante la formazione continua degli insegnanti all'imprenditività. Si inizia con il dibattito contemporaneo sull'educazione all'imprenditorialità in Europa. La teoria dell'apprendimento espansivo caratterizza l'educazione all'imprenditorialità attraverso una variazione del Change Laboratory specifica per l'insegnamento dell'imprenditivitá. Nell'articolo si mostra la progettazione della parte empirica che si svolgerà presso un istituto tecnico tecnologico mantovano. Una delle sfide che le scuole secondarie superiori, in particolare gli istituti tecnici e professionali, è l'implementazione di 400 ore di alternanza scuola lavoro; sarà proprio questa sfida ad animare la discussione durante i laboratori imprenditoriali con insegnanti e parti sociali. L'ipotesi è che partecipando agli incontri gli insegnanti qualifichino l'agency e diventino imprenditivi nel modo stesso in cui implementano l'imprenditività, sia durante l'insegnamento in classe che durante l'alternanza scuola lavoro. Per portare trasformazioni più incisive nelle interazioni tra scuola e lavoro, il laboratorio imprenditoriale potrà utilizzare secondi stimoli specifici con diagrammi quali la relazione tra scuola e lavoro o il modello di pedagogia connettiva. Si conclude sottolineando come l'imprenditività dal punto di vista pedagogico si dovrebbe basare sulla connessione tra scuola e mondo del lavoro, e insegnanti che insegnano per principi e domande aperte.

KEYWORDS

Entrepreneurship Education, Vocational Education, Capability Approach, Expansive Learning, Change Laboratory.
Educazione all'imprenditorialità, Formazione Tecnica e Professionale, Approccio delle Capacitazioni, Apprendimento Espansivo, Change Laboratory.

Formazione & Insegnamento XIV – 3 – 2016
ISSN 1973-4778 print – 2279-7505 on line
doi: 107346/-fei-XIV-03-16_06

Introduction

In order to promote productivity and growth, Europe needs creative and innovative entrepreneurs, and a resilient and flexible workforce equipped with the necessary skills and key competences (European Commission, 2015). Within Europe 2020 for smart, sustainable and inclusive growth, entrepreneurship is considered relevant for three out of the seven flagship initiatives (OECD & European Commission, 2013): the Agenda for New Skills and Jobs, which supports the removal of measures that discourage self-employment; Youth on the Move, which will support youth entrepreneurship; and The European Platform against Poverty and Social Exclusion, which will promote the role of entrepreneurship in order to boost social inclusion. Entrepreneurship education can help young people to be more entrepreneurial, and the challenge is to develop a set of competences applicable in every vocation and aspect of life, not only to learn how to start a new enterprise. Enterprise education aims to foster entrepreneurial spirit, with or without commercial aim.

As globalization is confronting European citizens with new challenges, individuals need to be equipped with the key competences for lifelong learning to master transformations in a more and more interconnected world. In this scenario education can play a prominent role in guaranteeing that each citizen owns the right key competences for lifelong learning, «those which all individuals need for personal fulfilment and development, active citizenship, social inclusion and employment» (European Commission, 2007, p. 3). The European key competence for lifelong learning of the sense of initiative and entrepreneurship focuses on how to turn ideas into action (European Commission, 2007). Like the other key competences, it is a combination of knowledge, skills and habits appropriate to the context:

> «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 being aware of the context of their work and being able to seize opportunities, and is a foundation for more specific skills and knowledge needed by those establishing or contributing to social or commercial activity. This should include awareness of ethical values and promote good governance». (p. 11)

In this context, in formal education teachers play an essential role, as they promote learning and multiply ideas, define learning processes and help students reach their desired learning outcomes (European Commission, 2014). Although there are diverse pedagogies to promote entrepreneurship, it seems that there is a gap between the pedagogies usually employed by teachers and the ones reckoned most effective; teachers are not always aware of the right way to teach entrepreneurship and sometimes feel they are not fully prepared (European Commission, 2009).

Amartya Sen, an economist studying human development, insisted on the importance of capabilities, what people are really able to make and be (Sen, 2001). Central to this approach is the concept of agency freedom, a key ingredient of positive social change: individuals can act to carry out changes valued as important for them**.** When managing issues in vocational education, it is important to involve all the stakeholders in order to incorporate the values of individuals and their communities through democratic processes of public involvement. Instead of providing people with ready-made answers, shared solutions are offered (Costa, 2012). The capability approach is also important for entrepreneurship education, which can be defined as the individuation and exploitation of positive

opportunities, and the creation of value for the individual and the entire community (Gries & Naudé, 2011). Entrepreneurs are ideas people seeking opportunities to generate value and wellbeing in society**,** providing unmatched need with new products or services, or carrying out an existing activity in new or more effective ways (Bahri & Haftendorn, 2006).

Entrepreneurship education and enterprise education are two different terms. Enterprise education is defined by the UK Quality Assurance Agency (QAA, 2012) as the type of education which provides students with an «enhanced capacity to generate ideas and to make them happen» (p. 2), while entrepreneurship education gives graduates «the additional knowledge, attributes and capabilities required to apply these abilities in the context of setting up a new venture or business» (p.2). According to QAA (2012) both enterprise and entrepreneurship count towards the entrepreneurial capability to work with effectiveness as an entrepreneur or in an entrepreneurial capacity.

As a term, entrepreneurship education is employed in two different ways: the first is general (Mwasalwiba, 2010), and incorporates other similar educational processes (entrepreneurial learning, enterprise education, etcetera); while the second use of entrepreneurship education is specific (Jones & Iredale, 2014), and refers to business creation. When contrasting enterprise with entrepreneurship Jones and Iredale (2010) utilize entrepreneurship as a specific term. As a specific subject, entrepreneurship is taught in tertiary business studies. By way of contrast, enterprise education is more appropriate in other contexts – such as primary and secondary education and vocational education. Enterprise education concerns the development of the enterprising person in the widest sense, with knowledge, skills and habits useful in diverse contexts throughout the life course. It deploys creative and innovative approaches; the teacher, for example, guides the students in the learning process acting as facilitator, and develops teaching styles that promote learning by doing, experiencing, taking calculated risks and learning from mistakes, problem solving and interacting with the outside world, thereby encouraging interaction and independent thinking. In so doing, enterprise education is considered a pedagogy, helping to connect school with industry and society, and preparing students to master changes and thrive in a globalized world. It is maintained that enterprise education sets the stage for entrepreneurship education, and both promote the creation of opportunities, a 'go-getting' society and 'can-do' attitude (Jones & Iredale, 2010, 2014). In Italy, enterprise education has been translated with the term *imprenditività* (Baschiera & Tessaro, 2015) to emphasize its education value and to break away from economic models characterizing entrepreneurship. Table 1 summarizes the differences between enterprise education and entrepreneurship education as business creation.

Education	**Entrepreneurship**	**Enterprise**
Primary focus	Enterprise creation, development, planning, including the start-up process	Competences useful in diverse contexts and to thrive in a fast changing market economy.
Context	Economic	Educational
Didactics	Standard, for example lectures	Active didactics centred on experience
Orientation	On the result	On the process
Underlying values	Libertarian	Liberal
Target	Corporations	SMEs and self-employment
Type of educational institutions involved	Tertiary faculties of management	Primary and secondary education
Inclination	Theory	Practice

Table 1. Comparison between entrepreneurship and enterprise education

The first difference is the primary focus: entrepreneurship education targets how to start, grow and manage a business, whilst enterprise education seeks to foster the acquisition and development of personal competences that can be utilized in diverse environments throughout a person's lifespan, and help them to thrive in quickly changing economies. Enterprise education promotes freedom through active participation, and establishes the right to open a business; it also encourages community responsibility and democratic citizenship. The second disparity stems from the context in which the terms are used: whilst enterprise education is utilized in educational contexts, entrepreneurship is used in an economic context. Another differentiation between the terms can be found in the different didactics methods used. Entrepreneurship education makes use of traditional teaching methods such as lectures, whereas enterprise education favours active teaching methods centred on the learner, for example group work, project work and learning from experience. The fourth element of comparison is the different emphasis of each term: entrepreneurship is centred on the result, for example preparing a business plan for a start-up, whilst enterprise focuses on the learning process to infuse an enterprising attitude. The fifth distinction stems from the underlying values. As entrepreneurship education advocates for business start-up, the underlying principle is libertarian, meaning that individuals and the private sector are best placed to create wealth. By way of contrast, enterprise education argues for liberal educational principles, and personal liberty and freedom are at a premium. Libertarian ideas also deal with freedom, but the focus is on personal rights and entitlements. The sixth contrast deals with the target: while entrepreneurship focuses on corporation and business management, enterprise concentrates on self-employment and SMEs. These are the types of work and companies which characterize an entrepreneurial society, as opposed to a managed society, which is characterized by large firms (OECD, 2010). The seventh point of divergence is the type of educational institution where these forms of entrepreneurial education are taught. Entrepreneurship is taught in specific tertiary courses, for example at the faculty of business and management. Enterprise concerns all other forms of education: from primary schools, for example, in terms of creativity and personal initiative; in secondary schools, especially vocational contexts where working is more immediate and self-employment could be an important resource, with employability skills and autonomy; up to non-business tertiary courses, to increase the graduates' employability. The last difference concerns the inclination: entrepreneurship is theoretical, whereas enterprise is practical. In making these separations, enterprise education is freed from economic and managerial features; it is better understood by educators in schools, who often do not understand why it is important to train their students to become entrepreneurs or to teach them how to make a business plan (Testa & Frascheri, 2015). For Italian teachers, for example, entrepreneurship has an economic and productivistic component which is at odds with the current practice of educating at school. Although misunderstood, it is important to differentiate between the terms entrepreneurial and enterprising, the latter being a personal attitude and behaviour and a constantly adapting competence in innovative thinking and the ability to turn ideas into action (Baschiera & Tessaro, 2015).

When examining entrepreneurship education as a wider term, scholars have considered the learning mechanisms underpinning entrepreneurial conduct. As learning is an important element of the entrepreneurial process, a theory of entrepreneurship calls for a theory of learning (Minniti & Bygrave, 2001). Since an entrepreneurial process is considered as intrinsically experiential, many scholars modify existing theories of adult learning with the aim of breaking away from static approaches such as lectures. Only a few learning theories have been used in research to underpin entrepreneurship education (Wang & Chugh, 2014).

There are Mezirov's (2009) theory of transformative learning, Lave and Wenger's (1991) situated learning, Wenger's communities of practice, and Kolb's (1984) theory of experiential learning. The latter is the most used theory, and this is because entrepreneurial learning is considered experiential in nature (Wang & Chung, 2014). In any case, many authors are dissatisfied with the existing learning theories as they do not provide an adequate explanatory conceptual framework for entrepreneurship. This is confirmed by a document of the World Bank (Valerio, Parton, & Robb, 2014), as little is known about the effective teaching approaches and corresponding learning actions in entrepreneurship education. A new learning theory and methodology to underpin entrepreneurship education is called for.

1. Methodology

Within the Cultural Historical Activity theory framework, the Change Laboratory is a type of formative intervention for the transformation of practices and innovation through collective involvement and participation (Virkkunen & Newnham, 2013). The goal is to trigger cycles of expansive learning. While Kolb's experiential learning is centred on the individual, expansive learning enlarges the focus on the interacting organizations and puts the primacy on communities as learners, on transformation and creation of culture, on horizontal movement and hybridization, and on the formation of theoretical concepts. Starting from a major change that the organization is facing, the learners construct a new object and concept for their collective activity, and implement this new object and concept in practice (Engestrom & Sannino, 2010). Expansive learning entails innovation and social change. Expansive learning is a cyclic process composed of the following learning actions:

1. Questioning, criticizing parts of the present practice;
2. Analysing the problem to find the explanatory mechanisms;
3. Modelling the new explanatory relationship in a visible form;
4. Examining the model. The new model is then challenged;
5. Implementing the model in the practice with its applications and enhancements;
6. Reflecting on the model;
7. Stabilizing and extending the new practice.

After the cycle is completed, a new activity system qualitatively different from the previous and culturally more advanced is created.

The Change Laboratory is a type of formative intervention useful to promote cycles of expansive learning. The basic idea is that the practitioners of an activity system, generally a pilot unit, meet on a weekly basis in a highly mediated environment to deal with a major change the organization is facing. Helped by the researcher, the participants trigger the expansive learning actions: they start questioning and analyse the present practices to discover the basic contradiction characterizing all the present manifestations of problems. The group envisions a new model of activity, first as a basic idea, a germ-cell, then in more detail; the model is put into practice and reflected upon with the necessary adjustments. The new model of activity is consolidated when it reaches a new equilibrium with the neighbouring connected activity systems and becomes business as usual. In other words, the new practice is crystallized, and the germ-cell can be adapted and extended to the whole organization with the necessary improvements.

The basic equipment to arrange a Change Laboratory workshop is a 3x3 set of writing surfaces (for example flipcharts) on which to brainstorm on work activity, plus a video recording of the meetings for later analysis. Mirror materials are used to trigger discussion within the group. They are gathered by the researcher through participant observation in the field, and can be in the form of videos, interviews, documents or charts illustrating not only regular work activity, but also any issues such as ruptures and disturbances. The mirror materials are employed in the workshops, so that the participants can look at themselves 'in the mirror'; they see the problem from other points of view, discuss and reflect about the problems. Dialectics[1] is also brought to the fore by different roles of the participants, managers, employees, as well as by clients and providers, thus generating a clash of opinions. The writing surfaces are employed according to a horizontal and vertical direction (Virkkunen & Newnham, 2013). The horizontal direction represents the different degrees of abstraction; on one side the minimum level of abstraction represented by the mirror materials, and on the other side the maximum level of abstraction, the new model of activity. In the middle there is the intermediate level, with ideas and tools. The vertical direction is represented by the historical perspective, the present with the actual problem, ruptures and disturbances, the past from which to trace the roots of the problem and the basic contradiction; and the future to envision a new model of activity.

The Change Laboratory is founded on two epistemological principles, namely ascending from the abstract to the concrete and double stimulation (Engestrom & Sannino, 2010). In the process of ascending from the abstract to the concrete, a germ cell is created. A germ cell is a basic idea representing the new form of activity system. The basic idea is then expanded and modelled into a detailed, concrete form. Double stimulation is the process with which to re-mediate for the solution of a problem and was first used by Vygotsky (1987, in Engestrom, 2015): the first stimulus is the problem to be dealt with, while the second stimulus is a neutral artefact, which is progressively imbued with meaning and turned into a sign to help solve the problems. In the Change Laboratory, the first stimulus is the problem that the group of participants is facing. The researcher gathers materials (videos of activity, interviews, documents) concerning the challenges the activity system is facing, and selects the materials to be brought into the Change Laboratory according to the hypothesis he or she has made on the underlying contradictions. The second stimuli are the neutral artefacts that can be brought into the problem to be solved and turned into signs to solve it – on the surface they are idea, tools, models. It is important to note that there is not only one first stimulus and second stimulus throughout a change laboratory intervention, but rather a chain of first and second stimuli that promote the various phases of expansive learning.

During the phase of analysing, the goal of double stimulation is to go beyond everyday abstract-empirical and promote historical-genetic thinking. While abstract-empirical generalizations deal with classification and external features of the entities, historical-genetic classifications are based on deep features and relationships between entities, and become key to finding the main contradiction, and discover the new germ-cell characterizing the activity system. Double stimulation is also considered as the basic generator of human will or agency. In the Change Laboratory, double stimulation triggers transformative agency: through-

1 In philosophy, dialectics is a method of examining and discussing opposing ideas in order to find the truth.

out the workshops and cycles of expansive learning the participants progressively take lead of the transformation. Transformative agency is defined as the collective break away from a given frame of action and the search for new forms of productive activity (Virkkunen & Newnham, 2013). The sense of initiative and entrepreneurship of the participants is seen as directly connected to the transformative agency in the Change Laboratory, as the participants essentially turn ideas into action, and problems into opportunities, becoming triggers for change.

2. The *proprium* of the entrepreneurial laboratory, the second stimuli

A variation of the Change Laboratory, the entrepreneurial laboratory for entrepreneurship education, will be experimented in an Italian technical institute. In 2015, upper secondary vocational schools in Italy faced a major change represented by the implementation by law (Buona Scuola, n. 107/15) of an overall 400 hours' work experience for students in Grades III, IV, V. This will be the spark to start entrepreneurial laboratory workshops: a selected group of 15 teachers chosen from Grade III IV or V classes will participate in ten weekly two-hour meetings to discuss how to implement the 400 hours' work experience in their classes. Once the new model of work experience has been found, it could progressively be generalized to encompass the entire vocational school with the necessary integrations. In order to generate the dialectics necessary to consider an issue from multiple points of view, diverse stakeholders will be occasionally involved besides teachers: an alumni or young entrepreneur, a representative of industry-specific vocation, and the school principal.

It is maintained that the final result should not be a bureaucratic implementation of work experience, wherein school and work remain separate entities with no interaction. The goal of the entrepreneurial laboratory is to involve teachers in a change effort aimed to develop advanced forms of school-to-work integration. In so doing, it is argued that the in-class pedagogies (teaching and evaluation) will also have to change to embed enterprise education. It is evident that the tools used for collective reflection during the entrepreneurial laboratory will be crucial to promote a model of enterprise education. In the learning action of questioning, first stimuli will have to be prepared to investigate the problems that vocational alumni are facing nowadays in the transition from school to work and society. Mirror materials could consist of interviews with alumni looking for jobs and the problems they have encountered. This could be video recorded job interviews involving vocational alumni. After the job interview, interviewer and job seeker could be asked separately how they felt and how they think the interview went. Other first stimuli could concern employers, work tutors, or young entrepreneurs, and what they had to learn to start their endeavour. Another first stimulus could be the outcomes of a questionnaire administered on students and teachers on their entrepreneurial tendency.

In the learning action of analysing, first stimuli on the history of the specific teaching pedagogies and work experience in the school could be proposed. In the modelling and examining of learning actions, first stimuli would concentrate on successful in-class pedagogies and experience models, with interviews with the school director and entrepreneurs on the future of work experience. During the learning actions of implementing, reflecting and stabilizing, first stimuli could concentrate on the experiments made on the new model with the recording of the work activity and interviews with students, work tutors and teachers. It should be remembered, however, that all these first stimuli are just an idea, and that mirror materials must be gathered according to the way the entrepreneurial laboratory is progressing. Moreover, the materials should be well-de-

fined, and aimed at the appropriate classes and people targeted with the activity. Table 2 shows possible first stimuli. The starting point of the Entrepreneurial Laboratory is the need for the implementation of overall 400 hours' mandatory work experience for each student during grades III, IV and V.

Learning Action	First Stimuli Interviews, video recordings, videos of the work activity, documents, charts, etcetera.
Questioning	Need for implementation of mandatory work experience Issues that vocational alumni face nowadays in the transition from school to work and society (employers, work tutors, or young entrepreneurs to be consulted) Video recorded job interviews involving vocational alumni Outcomes of a questionnaire administered to students and teachers on their entrepreneurial tendency
Analysing	History of the specific teaching pedagogies and work experience in the school
Modelling Examining	Successful in-class pedagogies and experience models Interview with the school director and entrepreneurs on the future of work experience
Implementing, Reflecting Stabilizing	Experiments made on the new model with recordings of the work activity and interviews with students, work tutors and teachers.

Table 2. Possible first stimuli to be used during the entrepreneurial laboratory with teachers

Concerning the second stimuli, some schemas could be useful to promote integration between school and work and enterprise education in the modelling phase. Due to the aim of the entrepreneurial laboratory, two specific second stimuli useful to reflect on new models of school-to-work experience and enterprise education could be used. The first model could be the cycle of investigative learning by Engestrom (1994) shown in Illustration 1.

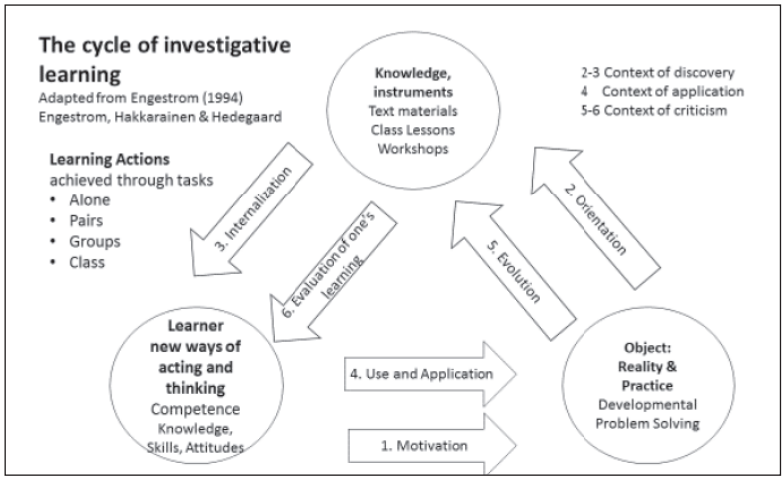

Illustration 1. The cycle of investigative learning

This model starts by acknowledging that textbooks are not enough to engage students and prepare them to be competent for working life. By way of contrast, the interaction of the student with a real problem situation arouses his or her

motivation (1). Phase (2) consists of the formation of a preliminary hypothesis in form of a model (a concept, structure, etcetera) that can solve the problem. In the internalization phase (3), the explanatory model explains and organizes the parts of the system; in so doing the model is interiorized. In externalization (4) the learner reconstructs his or her explanatory model with the help of speech, diagrams, plans, etcetera. In phase (5) the student challenges the model by performing tasks and explaining manifestations of the model under study. In phase (6) the student examines his or her own learning.

The other second stimulus is the model of integrative pedagogy by Tynjala (2008) shown in Illustration 2.

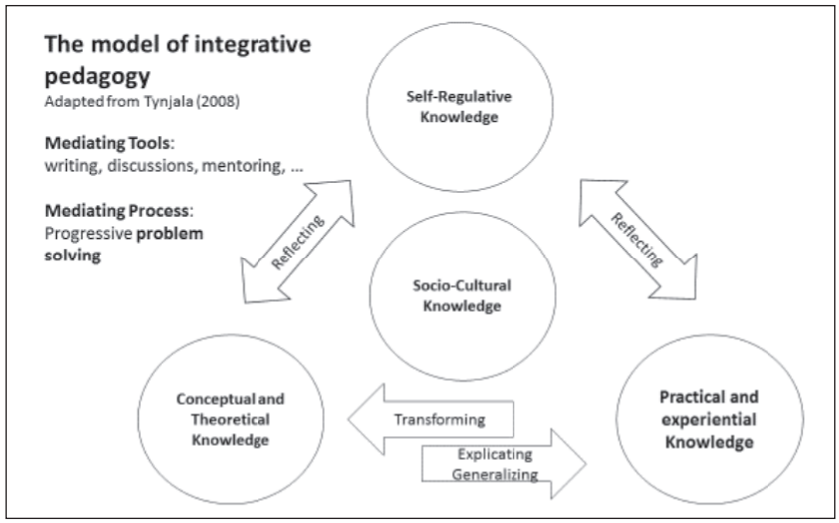

Illustration 2. The model of integrative pedagogy.

Tynjala (2008) suggests that professional expertise is composed of four different types of knowledge: practical, theoretical, reflective and sociocultural. Theoretical knowledge is explicit and is related to books and lectures. Practical knowledge is generally referred to as skills, and implies learning-by-doing and is mostly implicit. For students, it can be gained by means of work experience and workshops. Self-regulative knowledge deals with the reflection of the learner on the performed activities, and can be encouraged through self-diaries, but also through collective discussions. Sociocultural knowledge deals with the working patterns, norms and rules characterizing a specific workplace, therefore it can only be achieved with direct participation in the work activities. These four sources of knowledge are tightly interconnected together and are transformed into professional expertise by means of problem solving activities. Tynjala's (2008) model of expertise is based on connective pedagogies, aimed at making connections between diverse levels – between institutions, agents, between theory and practice – in order to promote transformation and the integration of systems and knowledge.

It must be recognized, however, that these second stimuli should not be imposed on the participants during the entrepreneurial laboratory, and employed only as possible examples. In order for the participants to take the lead in workshops and in being entrepreneurial, they should be left free to criticize and eventually discard them. These models only represent ideas and the initial second stimuli within a chain, not the final model. Sooner or later they should be abandoned by the group, who will build their own vision and model.

3. The Phases of the empirical research

The research starts by looking for an appropriate context, an upper secondary vocational school (either technical or vocational) that has to implement 400 hours' mandatory work experience for students. At the same time the school wants to develop advanced forms of enterprise education in terms of: work experience and interconnectedness between school and work, as well as in-class pedagogies. Once the school has been found, the ethics authorizations follow from the school director, and class council. The project is then presented to the teachers' board to raise interest and discussion about the possibility to experiment with it in the school. In the following phase, the researcher begins participant observation in the school and in the interconnected activities, for example companies where the students undertake work experience, in order to find out the tensions and the problems connected to work experience, in-class teachings, and school-to-work transitions. To do so, the researcher collects interviews with stakeholders: teachers, students, parents, employers, entrepreneurs, and stakeholders. In line with a capability approach, a phase of public debate and a negotiation of the intervention follows. To be determined are the classes and teachers to be involved, the number of meetings, and a timetable of the research. The project is introduced to the families and students with a launch event. The researcher collects the consent forms of the participants – both teachers and students – and sets a baseline of the students' sense of initiative and entrepreneurship in the classes involved. The entrepreneurial workshops then take place, and this phase is expanded on below. This is followed by data gathering in order to examine to what extent students display more sense of initiative and entrepreneurship. A final event concludes the research project: preliminary data are shared in order to foster reflection on how to crystallize and generalize this experience within the school and outside.

The project will be implemented during six months in four phases. The first phase deals with the formulation of a hypothesis on the contradictions which characterize the school-to-work transition, and is conducted during months 1 and 2. A hypothesis is developed in terms of a historical study on the relationship between school and workplaces. This phase is carried out through participant observation and interviews with key stakeholders. The second phase is the collection of the mirror materials to be used as first stimuli in the entrepreneurial laboratory: interviews, video clips of work activities, and documents. As different mirror materials concerning the present, past and future of the school are used according to the learning phase, this activity continues throughout the entire intervention (months 1 to 6). Phase three is characterized by the entrepreneurial workshops start during month three for roughly 4-6 weekly meetings during which the participants question the present practice, make an historical-genetic analysis to find out the basic contradiction, and start envisioning a new model. Phase four is represented by the advanced model of enterprise education and schoolwork interaction, which is progressively implemented both in school and workplaces (with students undertaking work experience) and turned into practice from month 4. During this phase, mirror materials on the experiments concerning the new model are collected and reported on to the follow-up monthly workshops. This allows further discussion, adjustment and development of the model while it is implemented in the practice. This part is crucial in stabilizing the new model: to do so, the researcher must continue following the group after the end of the intervention in order to check that the new model is becoming the new form of business as usual.

4. Measurement of the impact

Generally speaking, according to the evidence gathered by the European Commission (2015), entrepreneurship education definitely works. This means that the outcomes of entrepreneurship education, likewise the other forms of education, could and should be assessed. A theory of change implies that entrepreneurship education has an impact on individuals and on institutions, in turn causing a change in society and economy. The impact can be observed at the individual level, for example with an increase in career ambitions, more employability and improved entrepreneurial competence. An input, as could be the case with enterprise education, has immediate results, intermediate outcomes and global impact.

The impact of the research project will be measured in diverse ways by inspecting the learning outcomes in teachers and students. A first base line could be represented by the administration of a general questionnaire on enterprising tendency, and this could be used as mirror material in the questioning phase. However, a form of evaluation more in line with the expected outcomes of enterprise education would be necessary for the students. This could be represented by an assessment of the learning outcomes of enterprise education through problem-based learning. In this scenario, a new problem is given to the students to be solved in groups. This is assessed through the knowledge, skills and habits concerning the sense of initiative and entrepreneurship and the European Qualification Framework. This assessment could be carried out at the beginning and at the end of the experience. The first assessment could also be used as a formative assessment for the students, in order to encourage reflection, and as mirror material in the entrepreneurial workshops to show the issues of students when confronted with real life problems calling for professional competence.

However, according to Cultural Historical Activity Theory, a cycle of expansive learning, results entail changes in the object of the activity, as well as in the rules, division of labour, tools, community and instruments used for entrepreneurship education. Moreover, the implementation of the new model, its generalization and sustainability will be the ultimate proof that the transformation effort has been successful.

Conclusions

Illustration 3 represents the Zone of Proximal Development of the interaction between school and work in vocational education. It can be a useful model during the entrepreneurial laboratory workshops, specifically the phases of analysing and modelling the new solution.

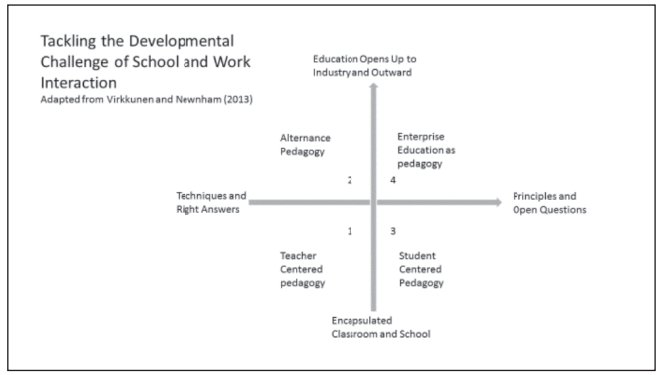

Illustration 3. The developmental challenge of school and work interaction.

The arrows represent conflicting tendencies in vocational education. The combination of the two directions determines four ideal types of pedagogies. The vertical arrow illustrates the dialectics between closure and openness of school as institution. School can be a self-sufficient entity isolated from society and in this case the activities are carried out within the school. By way of contrast school can be opened to society and industry, with work experience, visits, joint projects and networks. The horizontal arrows illustrate a tension between teaching styles. On the left side there is a style training for techniques and for right answers. On the right side there is educating for principles and open questions opening up. The teacher is a guide for the students and learns side by side with them.

In the teacher-centred pedagogy, teachers train for contents imposed by the Ministry of Education. The main teaching method is the lecture. Teachers meet together for bureaucratic issues, do not cooperate on cross disciplinary topics or key competences, and their main concern is to cover their syllabus. In the work experience pedagogy, a work component is offered to students, and teachers aim to teach for technical competences with lectures and workshops. However, experience is understood as the students leave the school for work and return again at the end of that work. Teachers then continue the syllabus from where it had been left off. There is no interaction between the knowledge learned in the classroom and the knowledge in the workplace, nor in the interactions between educators or institutions (teachers and work tutors, for example) or problem solving challenges.

The student-centred pedagogy is characterized by active pedagogies focusing on the students and their learning. Students' opinion and values are taken into account and are valued, according to a capability approach. Teachers solicit participation and interaction with teaching methods other than lectures such as group work, project work and problem solving. Teachers cooperate, and seek to find common topics to be taught as cross disciplinary subject in the curriculum such as generic competences, but the impact remains limited as it is yet to be incorporated into the reality of a schooling context.

In enterprise education as pedagogy there is a work component, but there are also structured forms of interactions between types of school and work knowledge and connectivity at diverse levels. Helped by teachers and work tutors, students challenge what they have learnt in the workplace with school learning and vice versa. Students reflect on their school and work experience through diaries, discussions, and workshops. There are connections between institutions, which share the common issue on how to educate vocational students for their future, with meetings, teachers visiting the workplaces, and entrepreneurs and work tutors visiting the school. In the classroom and in the workshops, students work in groups and by project. They also carry out the problem solving of real life problems, which becomes increasingly challenging at work as well as at school. They take part in the decision-making processes that are important for them, and they learn how to make choices. Their initiative and autonomy is solicited. Self-employment and working for small and medium enterprises is seen as a desirable option, and enterprise basics and ethics of enterprises are taught as cross disciplinary topic of the curriculum.

It is expected that the entrepreneurial laboratory will encourage expansive transformations to promote the teachers' agency. Teachers will learn about enterprise education by themselves becoming entrepreneurial by developing learning environments which promote a sense of initiative and entrepreneurship. To do so, it is argued that the entrepreneurial laboratory will have to implement the in-class pedagogies useful for enterprise education. These can be seen in terms of knowledge, skills and attitudes concerning the sense of initiative and entre-

preneurship. However, developing such lifelong learning competence related to the sense of initiative and entrepreneurship in students will not depend only on workplaces. A new alliance between school and workplace will be called for, and the importance of teachers and in-class pedagogies cannot be overestimated in order to promote this interaction and the overall enterprise education. From this point of view, the implementation of the 400 hours' mandatory work experience by law could represent a *Trojan horse* in which teachers are actively involved in the thinking and implementation of enterprise education at school and at work.

References

Bahri, S., & Haftendorn, K. (2006). *Towards an Entrepreneurial Culture for the Twenty-first Century: Stimulating Entrepreneurial Spirit through Entrepreneurship Education in Secondary School*. Paris: UNESCO Publishing.

Baschiera, B., & Tessaro, F. (2015). Lo spirito di iniziativa e l'imprenditorialità. La formazione di una competenza interculturale nei preadolescenti. *Formazione & Insegnamento European Journal of Research on Education and Teaching, XIII*(1), 297-317.

Costa, M. (2012). Agency formativa per il nuovo welfare. *Formazione & Insegnamento, X*(2), 83-107.

Engestrom, Y. (1994). *Training for change: New approach to instruction and learning in working life*: International Labour Office Geneva.

Engestrom, Y. (2015). *Learning by expanding*. Cambridge, UK: Cambridge University Press.

Engestrom, Y., & Sannino, A. (2010). Studies of expansive learning: Foundations, findings and future challenges. *Educational Research Review, 5*(1), 1-24.

European Commission. (2007). *European Competences for Lifelong Learning*. Luxemburg: Pubblication Office of the European Union.

European Commission. (2009). *Entrepreneurship in Vocational Education and Training*. Luxemburg: Pubblication Office of the European Union.

European Commission. (2014). *Policy Brief on Entrepreneurship for People with Disabilities*. Luxemburg: Publications Office of the European Union.

European Commission. (2015). *Entrepreneurship education: A road to success*. Luxemburg: Publication Office of the European Union.

Gries, T., & Naudé, W. (2011). Entrepreneurship and human development: A capability approach. *Journal of Public Economics, 95*(3), 216-224.

Jones, B., & Iredale, N. (2010). Enterprise Education as Pedagogy. *Education & Training, 52*(1), 7-19.

Jones, B., & Iredale, N. (2014). Enterprise and entrepreneurship education: towards a comparative analysis. *Journal of Enterprising Communities: People and Places in the Global Economy, 8*(1), 34-50.

Kolb, D. A. (1984). *Experiential learning: experience as the source of learning and development*. Englewood Cliffs, N.J.: Prentice-Hall

Lave, J., & Wenger, E. (1991). *Situated learning: legitimate peripheral participation*. New York: Cambridge University Press.

Mezirov, J. (2009). An overview on transformative learning In K. Illeris (Ed.), *Contemporary theories of learning* (pp. 90-105). New York: Routledge.

Minniti, M., & Bygrave, W. (2001). A dynamic model of entrepreneurial learning. *Entrepreneurship Theory and Practice, 25*(3), 5-16.

Mwasalwiba, E. S. (2010). Entrepreneurship Education: A Review of Its Objectives, Teaching Methods, and Impact Indicators. *Education & Training, 52*(1), 20-47.

OECD, & European Commission (2013). *The missing entrepreneurs: policies for inclusive entrepreneurship in Europe*. Paris: OECD.

QAA. (2012). *Enterprise and entrepreneurship education: Guidance for UK higher education providers*. Available at: http://www.qaa.ac.uk/en/Publications/Documents/enterprise-entrepreneurship-guidance.pdf (accessed 10 October 2016).

Sen, A. (2001). *Development as freedom*: Oxford Paperbacks.

Tynjala, P. (2008). Perspectives into learning at the workplace. *Educational Research Review, 3*(2), 130-154.

Valerio, A., Parton, B., & Robb, A. (2014). *Entrepreneurship education and training programs*

around the world: dimensions for success. Washington: World Bank.
Virkkunen, J., & Newnham, D. S. (2013). *The Change Laboratory. A tool for Collaborative Development of Work and Education*. Rotterdam: Sense.
Wang, C. L., & Chugh, H. (2014). Entrepreneurial Learning: Past Research and Future Challenges. *International Journal of Management Reviews*, *16*(1), 24-61.