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A Design Thinking approach to introduce entrepreneurship education in European school curricula

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Abstract: Design Thinking is visualized as the central strategy to promote entrepreneurial skills in European schools. Europe needs future generations to be more entrepreneurial in their attitudes to achieve a strong position in the international economy. Entrepreneurial thinking needs to be fostered from an early age. With this aim, a review of current entrepreneurial teaching practices is undertaken and the key skills related to entrepreneurship are identified for school aged students. This paper argues that the basic principles of Design Thinking have the potential to promote entrepreneurial competencies in European school curricula.

Keywords: Design Thinking | Education | Entrepreneurship

1. Introduction

This paper presents the concept of Design Thinking as the central axis to introduce entrepreneurial attitudes in official school curricula, with the final aim of fostering entrepreneurship roots for adulthood.

As many industrialized countries have suffered from the economic downturn, several factors have contributed to the resurgence of interest in entrepreneurship. However, Europe lags behind other countries where entrepreneurship is more developed. For instance, entrepreneurs occupy a central position in the US economy (Shane, 2003). Bridging the entrepreneurship gap can help Europe to achieve a strong position in the international economy.

Entrepreneurship is deeply rooted in entrepreneurial attitudes such as taking significant risks. However, feeling comfortable to do so does not happen from one day to the next. As a consequence, entrepreneurial attitudes should be promoted from childhood. Children need freedom to test their limits and to overcome their fears. However, most European official school curricula do not encourage entrepreneurial attitudes in a specific way (Education, Audiovisual and Culture Executive Agency, 2012).

More than ever, we need youth to feel passionate about their future so that those passions evolve into successful and exciting careers. Society needs the next generation of workers not just to fill jobs, but also to create them.

If entrepreneurship is to be fostered in Europe from childhood, specific skills strongly related to it need to be identified and incorporated into official educational curricula. In this context, the Design Thinking approach is well positioned to address this issue.

This paper is structured as follows. First, we analyze entrepreneurship education in Europe, with a special focus on entrepreneurial skills. The second part provides a comprehensive overview of Design Thinking and its foundations. The third and final part focuses on how entrepreneurial skills can be promoted through the integration of Design Thinking at school age.

2. Entrepreneurship in European Schools

2.1 Concept and definition of entrepreneurship

The term entrepreneurship is widely used and often encompasses different concepts within various contexts. From a lexicographic perspective, entrepreneurship is derived from the French word entrepreneur (pioneer) and it is defined as the ability of a person to make an additional effort in order to achieve an objective or a goal. Additionally, it is also described as an individual who organizes or operates in any field of business. In Gartner (1990), the definition of entrepreneurship is associated with an individual setting up innovative organizations that have the potential to create value, which may refer to a profit or other forms of value. Stevenson and Jarillo (1990) argue that entrepreneurship could be defined as “a process by which individuals - either on their own or inside organizations - pursue opportunities without regard to the resources they currently control”. Bruyat and Julien (2001) propose a constructivist artefact and their definition of entrepreneurship incorporates the entrepreneur, the newly created value, the environment, the entrepreneurial process itself and the links between these constructs over time. Shane and Venkataraman (2007) argue that entrepreneurship does not necessarily imply the creation of new organizations, it can also occur in existing ones.

Based on these definitions, the term could be used to denote two distinct levels of skills. First, we identify cognitive-related skills that include opportunity identification, assessing business ideas, business development, value creation, venture set up and strategy growth. Secondly, non-cognitive entrepreneurial skills include personal development, creativity, self-reliance, lateral thinking, and translating ideas into actions.

2.2 Entrepreneurship in school education

In recent years in which economical dysfunctionalities have considerably increased in developed and developing countries, entrepreneurship is primarily identified as a way to foster economic and employment growth. As a result, many countries have launched national initiatives for the development of entrepreneurship skills among young people. However, there does not appear to be any consistent approach to any such initiatives.

Entrepreneurship education and training is termed as “entrepreneurship education” in USA and “enterprise education” in UK. The variation in terminology also denotes different priorities in skills development (Erkkilä, 2000). Entrepreneurship education focuses more on the cognitive skills that are required for setting up a venture and becoming self-employed (QAA, 2012) whereas enterprise education encompasses broader aspects like personal development, mind-set, skills and abilities

(QAA, 2012), (Mahieu, 2006). Hannon (2005) proposes the inclusive term “enterprise and entrepreneurship education” and Erkkilä (2000) the term “entrepreneurial education” to denote a unified, integrated approach.

Sexton and Kasarda (1991) argue that the two goals of education programmes in entrepreneurship are to prepare people for career success and to increase their capacity for future learning. Consideration is also attributed to the personal fulfilment of the learner and their contribution to society.

From a formal educational perspective, all educational programmes aim to advance knowledge, skills and attitudes. Entrepreneurial training is possibly one of the few that exemplifies the integration and combination of all three. The following are the most commonly cited objectives of entrepreneurship education and training programmes:

- to acquire, apply and use knowledge pertinent to entrepreneurship;
- to develop and apply skills in the use of techniques, in the analysis of business situations, and in the synthesis of action plans;
- to identify and advance entrepreneurial drive, talent and skills;
- to overcome the risk-averse bias of many analytical techniques;
- to develop empathy and support for all unique aspects of entrepreneurship;
- to develop attitudes towards change;
- to design, devise and evaluate new start-ups and other entrepreneurial ventures.

The multiplicity and divergence in the cited objectives have influenced a variety of programmes. In an attempt to provide an overview of the approaches followed, we adopt the categorization proposed by a number of scholars (Heinonen & Hytti, 2010), (Johnson, 1988), (O'Connor, 2013) that identify three major categories, namely, education “about”, “for” and “through” entrepreneurship (see Figure 1).

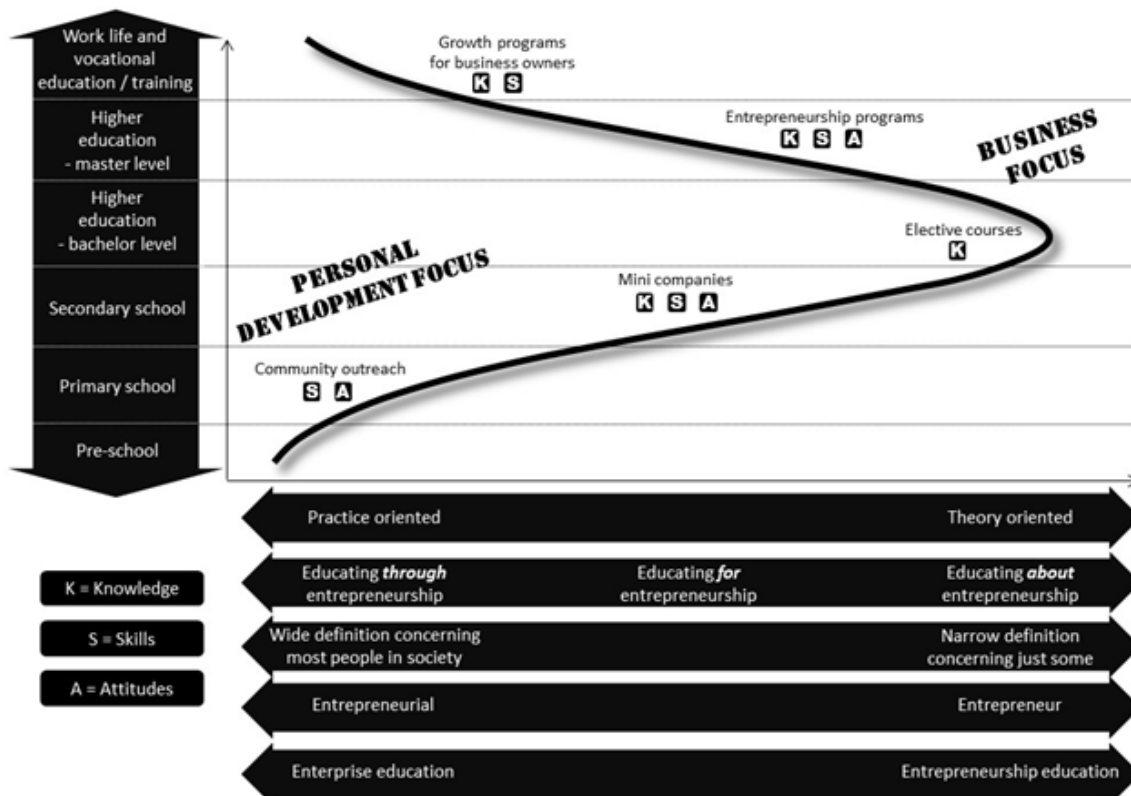


Figure 1. An overview of entrepreneurial educational approaches and their dynamics through different tiers of formal education and through curriculum development (Lackéus, 2015)

The first category examines the phenomenon from a scientific perspective and it usually addresses parts of undergraduate or (more commonly) postgraduate programmes (Mwasalwiba, 2010). The second, encompasses occupational-oriented activities that develop knowledge and skills and could be offered in secondary or tertiary educational settings. Finally, the educational activities set up an experiential learning process “through” which students acquire entrepreneurial cognitive or non-cognitive skills. Consequently, the third category can be relevant to all students and at all levels of education (Smith & Hannon, 2006), (Handscombe, Rodriguez-Falcon & Patterson, 2008).

However, when trying to integrate entrepreneurship into education as above, some important challenges such as resource and time constraints, resistance from teachers and other stakeholders, assessment challenges and cost implications have been identified (Smith & Hannon, 2006).

Although entrepreneurship education is explicitly recognised in the central level educational steering documents of European countries¹, in reality there is considerable diversity in how entrepreneurship education is being incorporated into national curricula. Entrepreneurship education is integrated into European general education in different ways: a crosscurricular approach can be taken, it can be integrated into existing subjects or it can be introduced as a separate curriculum subject (in some cases optional and in some cases compulsory).

Moreover, although most countries explicitly recognise entrepreneurship education at least to some degree in primary and secondary education, the overall pattern of provision changes significantly from one school level to another ((Education, Audiovisual and Culture Executive Agency, 2012).

2.3 Primary education

In primary education, about two thirds of countries (or regions within countries) explicitly recognise entrepreneurship education and the cross-curricular approach prevails. Under this approach, rather than being explicitly mentioned as part of a particular subject, entrepreneurship objectives are expressed as being transversal, horizontal or cross-curricular. They form part of the values and competences to be developed throughout all subjects and curriculum activities.

Where entrepreneurship education is integrated into other subjects, these are mostly subjects which form part of the compulsory curriculum. In most countries, entrepreneurship is taught as part of social sciences, which may include history, geography, government and civics education as well as other related areas such as community studies².

There are very few countries which focus specifically on entrepreneurship as a separate course during primary education: the Slovak Republic and Finland are two of them. The former, offers a subject called work education, which gives considerable attention to entrepreneurship education. In Finland, there is scope to develop specific entrepreneurship classes.

As a conclusion, European primary education, visualizes entrepreneurship mainly from a cross-curricular perspective within official school curricula.

¹ Official documents containing curricula, guidelines, obligations and/or recommendations.

² In Bulgaria and Latvia, entrepreneurship education is included in the subject 'home economics and technology'. In the Czech Republic, it is part of the optional subject 'ethics'. In Lithuania, entrepreneurship education is integrated within social sciences but also as part of natural sciences, In Poland it is integrated within social sciences as well as mathematics

2.4 Secondary Education

At secondary level, there is a significant increase in references to entrepreneurship education in the steering documents of European countries. The cross-curricular approach is still widespread as is the integration of entrepreneurship education into other subjects. In two thirds of these countries, these are compulsory subjects while in the remaining third they are optional.

In most countries, the cross-curricular approach is combined with the integration of entrepreneurship education into other subjects.

At lower secondary level, unlike in primary education, some countries teach entrepreneurship education as a separate subject³. At this level of education, the subjects areas most likely to incorporate entrepreneurship education are economics, business studies and careers education, with equal proportions of countries treating these subjects either as compulsory or as optional. Social science subjects are, however, still the focus of entrepreneurship education in many countries, with a majority offering it as a compulsory subject.

At upper secondary level, all countries recognise entrepreneurship education in their steering documents, even if the exact term 'entrepreneurship' is not always used. The cross-curricular approach is also widespread in upper secondary education, i.e. in around two thirds of European countries. What is most noticeable at this level of education, is the increase in the number of countries (more than two thirds of all European countries) integrating entrepreneurship education into optional subjects.

2.5 Entrepreneurial skills

It is generally understood that the term "skill" refers to an ability and capacity acquired through intentional, systematic and substantial effort to carry out activities and reach pre-specified results, often under certain constraints (i.e. time and/or effort). The term "entrepreneurial skills" is used in academia as well as in business extensively; however, it often refers to different sets of skills and conceptualizations.

Although entrepreneurship is conceptualized as "an individual's ability to turn ideas into action", it appears there is no consensus about the skills and mechanisms related to entrepreneurship. However, some skills have been cited repeatedly including creativity (Ahuja & Thatcher, 2005); (Woodman, Sawyer, & Griffin, 1993), problem-solving (Buttner & Gyskiewicz, 1993), risk-taking propensity (Brockhaus, 1980; Palich & Bagby, 1995), collaboration (Oosterbeek, Praag & Ijsselstein, 2010) (Boyles & College, 2012), goal orientation (Dweck & Reppucci, 1973), the influence of organizational factors such as management practices (Woodman, Sawyer, & Griffin, 1993; Amabile, 1988), work environment (Woodman, Sawyer, & Griffin, 1993; Gundry, Kickul, & Prather, 1994), innovation culture (Ekvall & Tangerberg-Anderson, 1986; Ekvall, 1997) and technological culture (Bijker, 2006); as well as the impact of the expectations about achieving an expected result (Vroom, 1964).

For the purposes of this paper, we focus our attention on the entrepreneurial skills that are relevant to the target age group of primary and secondary students. With the aim of translating these skills to the target age group, we conducted a number of informal interviews with interested stakeholders (entrepreneurship and IT educators, entrepreneurs and policy makers). The stakeholders validated

³ In Lithuania and Romania, entrepreneurship education is a compulsory subject. In Bulgaria, it is compulsory for students choosing the technology branch. In Denmark and Spain, it is an optional subject.

that the identified skills from the literature were appropriate. Moreover, they suggested focusing on four specific skills: creativity, risk-taking, problem-solving and collaboration.

Creativity has been described as developing new methods instead of using standard procedures (Born & Altink, 1996, p. 72). In the literature, a distinction can be made between four main components of creativity:

1. fluency, the ability to produce a large number of ideas (quantity);
2. originality, the ability to produce new and unusual ideas (quality);
3. flexibility, the ability to change between approaches; and
4. innovation, the ability to (re)define and perceive in an atypical manner.

Risk-taking refers to the acceptance of risk in undertaking an entrepreneurial initiative; in essence realizing the prospect of an unsuccessful outcome of an endeavour that is usually associated with some negative implications (Kourilsky, 1980); (Kirby, 2003).

Problem solving is defined as an individual's capacity to engage in cognitive processing to understand and resolve problem situations where a solution is not immediately obvious. It includes the willingness to engage with such situations in order to achieve one's potential as a constructive and a reflective citizen (OECD, 2010).

Collaboration refers to a situation in which two or more people work together to achieve the same thing. People engaged in collaboration capitalize on one another's resources and skills (asking one another for information, evaluating one another's ideas, monitoring one another's work, etc.) (Chiu, 2000, 2008; Boyles & College, 2012). Elements of collaboration emphasize the development of social skills to solve problems, innovate, and manage emotions and communicate (Boyles & College, 2012).

In this context, the authors have decided to focus on creativity, risk-taking, problem-solving and collaboration skills to effectively promote entrepreneurship in schools.

3. Design Thinking

3.1. Concept and definition of Design Thinking

Design Thinking is referred to as the cognitive process followed by designers while working on a project (Cross, Dorst & Roozenburg, 1992; Eastman, McCracken & Newstetter, 2001). In contrast with design methods employed in the field of engineering, Design Thinking takes a Human Centered approach to problem solving. Problems are visualized in a more holistic way; real world "wicked" problems are tackled with an "open" problem solving process (Rittel & Weber 1973).

The notion of Design Thinking as a "way of thinking" in the sciences can be traced back to 1969 (Simon, 1996). Peter Rowe's 1987 book *Design Thinking*, which described methods and approaches used by architects and urban planners, was a significant early usage of the term in design research literature and focused on Design Thinking as a method of creative action.

More recently, the concept of Design Thinking has been extended and has broken free from its domain limits. Two authors and their books have mainly contributed to the reconfiguration of Design Thinking: Tim Brown (2009) and Roger Martin (2009). These authors define and describe Design Thinking in different ways, however, they both highlighting the role and potential of Design Thinking in organizational change and innovation.

As a result, Design Thinking has been increasingly recognised as a promising asset for fields other than design. It has gained attraction in the business, leadership and management sectors, amongst

others, to cope with increasing complexity and to use as a driver of innovation and business success (Davis, 2010, Dorst, 2011, Fraser, 2007, Glen et al., 2014, Hassi and Laakso, 2011; Royalty et al., 2015).

Today, Design Thinking is understood as a complex thinking process of conceiving new realities and expressing the introduction of design culture and its methods into fields such as business and innovation.

3.2. Design Thinking Principles

The structure of the Design Thinking process has been defined by different researchers. While different articulations of the Design Thinking process may be described, the basic tenants remain essentially the same (Carroll et al., 2010, Curedale, 2013 and Glen et al., 2014).

Design Thinking is deeply anchored to the following principles (Figure 2):

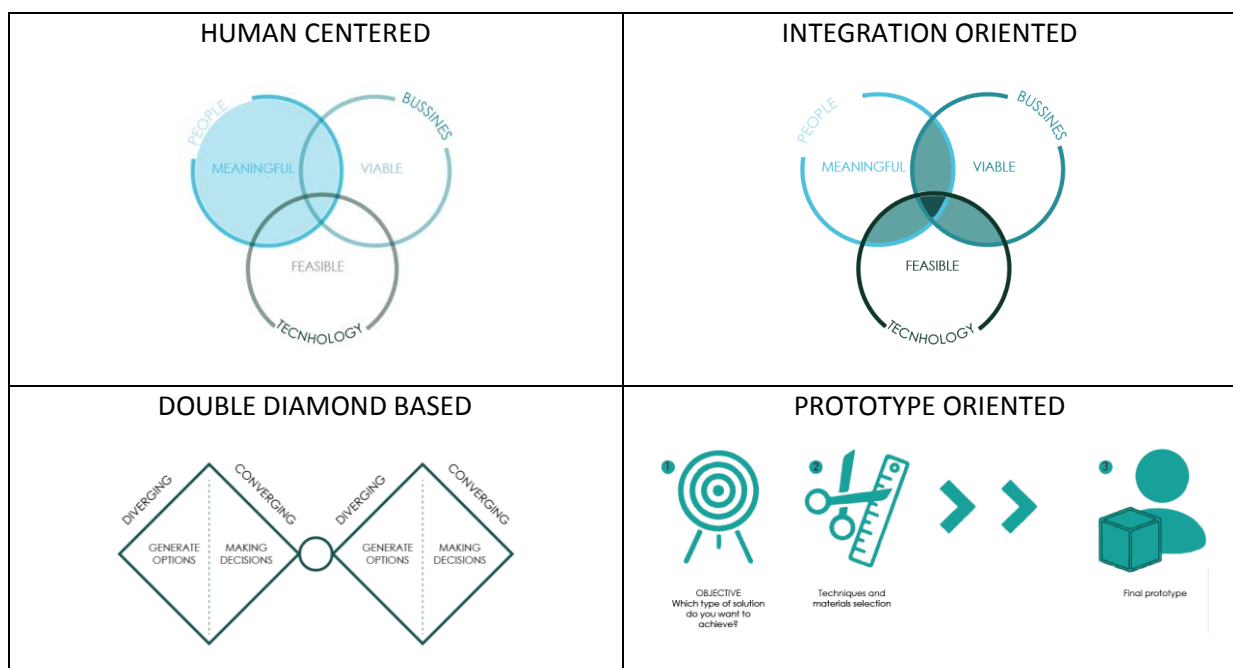


Figure 2. An overview of Design Thinking principles (elaborated by the authors)

3.3 Human Centered

Humans are placed at the center of Design Thinking (Glen et al., 2014). According to Don Norman (1988), design processes start with a good understanding of people and the needs that the design is intended to meet. At the root of this idea, Human Centered is fundamentally an affirmation of human dignity. It is an ongoing search for what can be done to support and strengthen the dignity of human beings as they act out their lives in varied social, economic, political, and cultural circumstances. Human Centered implies, therefore, a design and management framework that develops solutions to problems by involving the human perspective, human dignity and human rights in all steps of the problem-solving process.

3.4 Integration Oriented

Traditionally, Design Thinking relies on capacity of the designer to consider simultaneously (a) human needs and new visions of living well, (b) available material and technical resources, and (c) the constraints and opportunities of a project or business. The integration of these three factors requires

the designer to be analytical and emphatic, rational and emotional, methodical and intuitive, oriented by plans and constraints, but spontaneous (Pombo & Tschimmel, 2005). This kind of dualistic reasoning designers use is referred to as abductive thinking to differentiate it from the rational deductive and inductive reasoning (Martin, 2009). Abductive reasoning is a concept developed by the philosopher Charles Sander Pierce, who defended that no new idea could be produced by deduction or induction using past data (in Martin, 2009: 64). Thus, abductive thinking is using new and different perspectives and visualizing future possibilities, which do not fit into existing models. This empowers a way of thinking in which feelings and emotions are just as important as rationality.

3.5 Double Diamond based

Design Thinking employs divergent thinking as a way to ensure that many possible solutions are explored in the first instance, and then convergent thinking as a way to narrow these down to a final solution. Divergent thinking is the ability to offer different, unique or variant ideas adherent to one theme while convergent thinking is the ability to find the "correct" solution to the given problem. Design thinking encourages divergent thinking to ideate many solutions (possible or impossible) and then uses convergent thinking to identify and realize the best resolution. The Double Diamond model, developed by the Design Council in 2005, is a simple diagram highlighting the divergent and convergent stages characteristic of the design process (Tschimmel, 2012).

3.6 Prototype Oriented

Design Thinking is deeply rooted in prototyping. Creating and maintaining a culture of prototyping focuses on being highly experimental, building to think, and engaging people with artifacts. The Prototype Oriented mindset relies on eliciting and receiving feedback in ways that help solve design problems. Expressing ideas in a non-verbal way with increasing tangibility makes ideas more compelling, helps one see problems and opportunities that discussion may not reveal, and often leads to fruitful misunderstandings. Prototype Orientation is characterized by doing, trying, failing, iterating and constantly moving forward. It includes sketching and traditional prototyping, digital communication and storytelling, to foster a process that is highly action-oriented.

4. Design Thinking for Entrepreneurship

Entrepreneurship can benefit from the application of Design Thinking when moving through a creative process of problem solving, or when looking for new opportunities and challenges. This research paper is focused on fostering four specific skills as a central focus for enhancing entrepreneurship in European schools: creativity, risk-taking, problem solving and collaboration. With deeper insights into the dynamics and power of Design Thinking, school students can benefit from the integration of entrepreneurial skills in the curricula.

The Design Thinking approach has the strong potential to foster creativity in school students in Europe. Design Thinking is a creative process in itself. As explained in section 3.2., one of the founding principles of Design Thinking lies in its Double Diamond framework, which promotes divergent and convergent thinking. The activities executed in the Double Diamond establish a comprehensive framework of goal setting and seeking, gathering and orchestrating relevant information, synthesizing appropriate expressions, executing effective procedures, goal related evaluation, and the application of knowledge to improve a situation or satisfy an unfulfilled need.

Design Thinking also promotes risk-taking. The process of creating prototypes goes beyond trying something new to a more cyclical process, which fosters positive attitudes towards risk-taking. Inherently in a culture of experimentation there is ideation, iteration and when necessary, pivoting. Experimentation often depends on intuition, and balances risk-taking, creative thinking and critical thinking, which can lead to innovative and impactful ways of interpreting and engaging new solutions.

Design Thinking is a problem-solving framework. It goes beyond conventional problem solving strategies based on the equation “what” plus “how” leads to “value”. Design Thinking can help identifying failings in the equation. It questions whether the “what” could be changed, the “how” could be wrong, the “frame” that drives the implication could be faulty or even the “value” could have changed. This questioning provides a powerful strategy for problem solving.

Finally, the mindset of collaboration in Design Thinking is built upon the idea that radically diverse multidisciplinary teams will stimulate greater innovation than unidisciplinary teams. This idea is inherent in the Integration Oriented principle of Design Thinking: meaningful for people, viable for business and technologically feasible. Combining different profiles leads to successful collaboration. The emphasis is on accessibility and relevance for creative, innovative, and potentially strategic problem solving across various disciplines.

5. Further research

Design Thinking is a powerful model for promoting entrepreneurial skills. Further research focused on how to effectively harness this power in schools is underway. The authors and other consortium partners are working on the YESict “Young Entrepreneurial Skills by ICT” European project (Erasmus+) with this aim.

The YESict project is developing a pedagogical methodology rooted in Design Thinking strategies and focused on fostering entrepreneurial skills, together with the corresponding toolkit, pedagogical material and resources for further experimentation in real classrooms. The results from pilot testing will be available by the end of 2018 and will evaluate the effectiveness of the undertaken Design Thinking based approach.

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