The Design Journal

An International Journal for All Aspects of Design

ISSN: 1460-6925 (Print) 1756-3062 (Online) Journal homepage: https://www.tandfonline.com/loi/rfdj20

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To cite this article: Ester Val, Itsaso Gonzalez, Nagore Lauroba & Amaia Beitia (2019) How can Design Thinking promote entrepreneurship in young people?, The Design Journal, 22:sup1, 111-121, DOI: 10.1080/14606925.2019.1595853

To link to this article: https://doi.org/10.1080/14606925.2019.1595853

Published online: 31 May 2019.

EAD 2019

Running with Scissors, 13th International Conference of the EAD, University of Dundee, 10-12 April 2019

How can Design Thinking promote entrepreneurship in young people?

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Abstract: Design Thinking has the potential to promote entrepreneurial competencies in European schools. This paper presents an Educational Programme based on Design Thinking and its empirical application in the curricula in four European countries. Targeting 10-15 year old students, the programme demonstrates an impact on entrepreneurial attitudes. Over 300 participants in Cyprus, Denmark, France and Spain responded positively to the initiative and reported a better understanding of entrepreneurship. Qualitative and quantitative results also showed that Design Thinking based strategies are effective to foster entrepreneurial skills such as creativity, problem solving and self-confidence. Interestingly however, experimentation results reported a negative impact on collaboration related skills.

Keywords: Design Thinking, Entrepreneurship, Problem Solving, Education

1. Introduction

Europe needs young entrepreneurs, as there is evidence that European countries lag behind others where entrepreneurship is more intrinsically a part of the culture (Shane, 2003). If Europe is to maintain a strong position in the international economy, entrepreneurs will be key to achieve this. This is because European society needs the next generation of workers not just to fill jobs, but also to create them.

Entrepreneurship education and training is termed as entrepreneurship education. Although entrepreneurship education is explicitly recognised in the central level educational steering documents of European countries[1], in reality there is considerable diversity in how it is being incorporated into national curricula. 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 recognize 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 (European Commission, 2016).

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

Targeting 10-15 year old students, entrepreneurial education is integrated in school curriculum through different practical entrepreneurial experiences [2] across the Europe. Figure 1 shows different experiences to include entrepreneurial education within the school curriculum, ranging from project-based work to micro-financing students initiatives. It can clearly be seen that less than half of European countries provide only optional practical entrepreneurial experiences in their curriculum for the targeted age (10-15 years old).

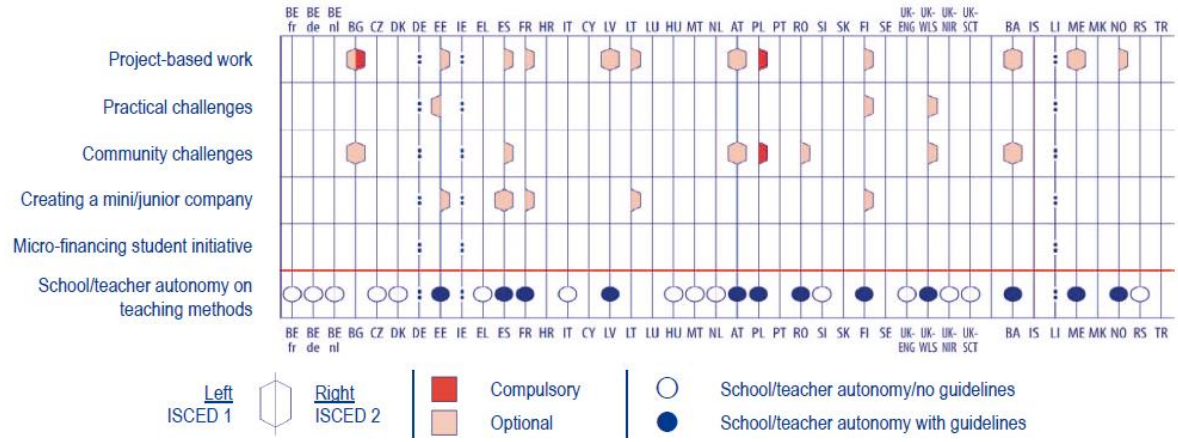

Figure 1. Practical entrepreneurial experiences in the curriculum in primary and lower secondary education (European Commission, 2016)[3]

It is important to note however, that the attitudes and skills linked to entrepreneurship (such as self confidence or creativity) are not encouraged or supported in most official European school curricula in any structured way (European Commission, 2016). Indeed, it could be argued that such attitudes and skills should be the main focus of entrepreneurial education in this age range.

In this context, Design Thinking has proved to be well positioned to address this issue as it is understood as a complex thinking process of conceiving new realities (Val, et al., 2017). Entrepreneurial skills, such as, creativity, problem-solving, self-confidence and collaboration are deeply rooted in the Design Thinking discipline. With deeper insights into the dynamics and power of Design Thinking, school students can benefit from the integration of entrepreneurial skills in the curricula. For this reason, this paper presents our research on fostering entrepreneurial skills such as creativity, problem-solving, self-confidence and collaboration, through a Design Thinking approach.

This paper is structured as follows. First, we present a pedagogical methodology based on Design Thinking to foster entrepreneurship education in Europe. The second part provides a comprehensive framework and definition of the Educational Programme. In the third part we set out the results from piloting the Programme with more than 300 students in Cyprus, Denmark, France and Spain.

[2] A **practical entrepreneurial experience** is understood to be an educational experience where the learner has the opportunity to come up with ideas, identify a good idea and turn that idea into action. It should be a student-led initiative either individually or as part of a small team, involving learning-by-doing and should produce a tangible outcome (European Commission, 2016).

[3] The International Standard Classification of Education (**ISCED**) has been developed to facilitate comparisons of education statistics and indicators across countries on the basis of uniform and internationally agreed definitions. ISCED 1 refers to primary education, and ISCED 2 refers to lower secondary education.

2. The pedagogical methodology

In the 21st century, education is moving from traditional teaching and learning models towards student-centred learning. With technological advancements, students have direct access to massive amounts of information (online social networks), while becoming content generators and publishers themselves. It is essential for educators to target beyond context learning, and develop pedagogically effective learning environments in order to enhance the quality of education and expose their students to a better understanding of the content. Design Thinking offers an interesting approach to address these new challenges in the classrooms of the future (Val, et al. 2017).

The next generation of entrepreneurs will need to cope with increasingly complex scenarios, juggling the competing needs of stakeholders, and integrating different fields of knowledge to formulate solutions to problems. For this reason, Design Thinking has crossed over from the world of design into the business, leadership, management and entrepreneurship sectors (Davis, 2010, Dorst, 2011, Fraser, 2007, Glen et al., 2014, Hassi and Laakso, 2011; Royalty et al., 2015).

Design Thinking can be described as the way designers approach a design problem (Cross, Dorst and Roozenburg, 1992; Eastman, McCracken and Newstetter, 2001). It takes a human centred approach, problems are visualized in a more holistic way and are tackled with an “open” problem solving process (Rittel and Weber 1973). In other words, "thinking outside the box".

In essence, Design Thinking is a departure from traditional problem solving methods, in that it is a collaborative solution-focused approach. The investigative and integrative character of the process promotes the development of observation, interdisciplinary group collaboration, enjoyable-fast learning, idea visualization, fast prototype development and learning through trial and error.

In the education sector, Design Thinking offers a flexible learning framework with students being responsible for their own learning and fostering entrepreneurial skills such as creativity, problem-solving, self-confidence and collaboration (Val, et al, 2017). Thus, using a Design Thinking approach, students identify a variety of possible solutions to solve the problem, and finally, select a justifying solution to be presented to the identified community of interest (Briggs, 2013). This develops their confidence and critical thinking, and trains them to be creative (Sorensen & Davidsen, 2017). In other words, Design Thinking demonstrates great potential to develop entrepreneurial attitudes in the professionals of the future.

3. The Educational Programme

This section describes how we incorporated Design Thinking into an Educational Programme to promote entrepreneurial skills in young people. To this end, programme stages and related activities for application in the classroom were created.

The programme begins with the setting of a problem or a challenge. The programme integrates explorative guiding questions, collaborative activities and a combination of digital and non-digital resources to articulate and implement solutions. Importantly, it also incorporates activities such as reflection, assessment, and documentation. The programme was designed in such a way that students could work at their own pace, be creative and responsible for their own learning. Students are encouraged to determine the direction of their research and come up with appropriate solutions for further communication to the community of interest. In this context, the educator plays the role of the facilitator, resource provider, project manager and mentor.

The Educational Programme is divided into the following 7 stages (see Figure 2) and the students are required to complete all of them:

1. Introduction / Motivation
2. Challenge Identification
3. Team Creation
4. Exploration
5. Ideation
6. Prototyping
7. Communication

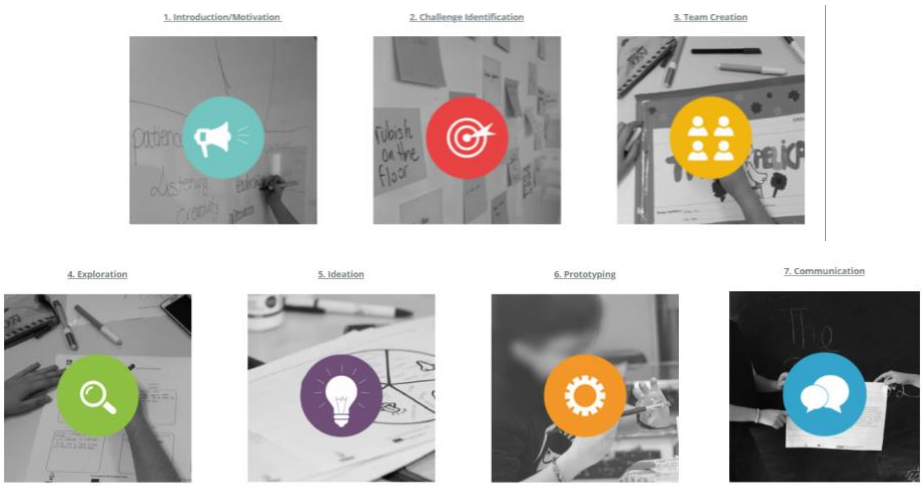

Figure 2. Educational Programme stages

The introduction and motivation stage (1) creates an entrepreneurial context in which 10-15 year old students can visualize themselves as active actors for problem solving. The challenge or problem identification stage (2) is related to defining and understanding the problem students are encouraged to solve. Team creation activities (3) establish the basics of team dynamics, sense of belonging and collaboration within the team. For teamwork activities, a cooperative learning[4] approach was implemented. The exploration stage (4) suggests different paths for further research and better understanding of the problem. Ideation (5) refers to seeking solutions that solve the problem and visualizing scenarios where these solutions are implemented. Prototyping (6) makes the selected solutions tangible, both through digital technologies and/or handcraft activities. Finally, the communication stage (7) presents both the problem and solutions and the process followed to the different communities of interest involved.

Each stage provides the students with a set of activities and resources that guides them through the execution of the programme. The detail of the specific activities suggested for each stage is shown in Figure 3.

[4] Cooperative learning can be achieved through small mixed ability groups, so that students work together to maximize their own and each other's learning. In a cooperative learning environment, members of each group will be assigned with different roles for teamwork.

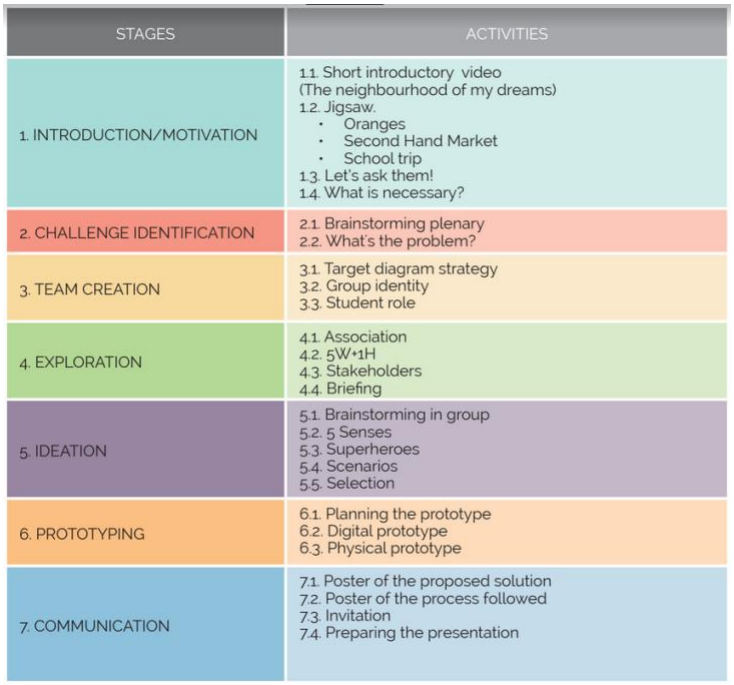

Figure 3. Educational Programme activities

4. Experimentation and results of the Educational Programme

The Educational Programme described in the previous section was piloted in Cyprus, Denmark, France and Spain in Spring 2018, allowing a final evaluation of the impact of the programme. The experimentation campaign in real conditions allowed us to:

- Assess the relevance and appropriateness of the method and tools for both teachers and students;
- Measure the effectiveness of the Educational Programme on entrepreneurial skills;
- Evaluate the perception of entrepreneurship among participants.

In the end, 316 students, aged from 11 to 15 years old, and 23 teachers were involved in the experimentation, in 7 schools in Cyprus, Denmark Spain and France (Table 1).

Table 1. Participants' description

	Cyprus	Spain	Denmark	France	TOTAL
Schools	2	1	1	3	7
Teachers involved	6	6	4	7	23
Participating classes	2	3	2	7	14
Students involved	44	57	46	169	316
Age of students	11-12 years 13-15 years	12-13 years	12-13 years	11-12 years 14-15 years	

Students, teachers and families were asked to take part in the research by answering some questions in online questionnaires and forms and providing further feedback trough face-to-face interviews and focus groups. By using quantitative and qualitative research methodologies, the authors analysed the data and assessed the effectiveness of the Educational Programme.

4.1. Perception of the Educational Programme

Overall, participating students and teachers agreed that the programme was easy to understand.

The students highlighted the physical and digital prototyping phase and presenting their ideas as the most enjoyable stages. They liked the creative exercises such as designing their own logo, or the prototyping more than those that involved simply listening or writing. Creating something with their hands enabled them to make their ideas tangible, even if they had difficulties at the beginning of the activity.

The students appreciated working in groups with predefined roles. In this sense, they thought the roles defined in the programme helped with internal organization, but they agreed in some cases it was difficult to maintain them. They admitted, however, having problems when organizing and managing the group and found the most difficult thing to be working with students who were not their friends.

The students also emphasized the freedom they experienced during the experimentations. By participating in this project, they felt that they were being listened to and valued, both of which are directly linked with self-confidence. Some of them even said the experience had made them more autonomous, more mature and it has allowed them to evolve and to learn more about themselves.

Like the students, the teachers were impressed with the engagement potential of prototyping and creative activities:

> “I liked the prototyping phase best.
>
> "The superheroes. It’s a concept that I’ll use in my class.

Interestingly, and in contrast to the students, the teachers identified the exploration and conceptualization stages and activities as the most difficult for the students.

> "The students were frustrated because they found it hard to concentrate on the phases and wanted to start problem-solving.
>
> "The students were a bit worn out by this activity.

4.2. Entrepreneurial Skills

From a qualitative perspective, all the participants involved in the experimentations agreed the Educational Programme helped to develop or improve students’ entrepreneurial skills (creativity, problem-solving, self-confidence and collaboration). The students identified and described these four abilities when they were asked about what they had learnt from the programme. Teachers interviewed at the end of the pilot also agreed that the programme completely addressed this challenge.

Regarding quantitative results, we assessed the four entrepreneurial skills (creativity, problem-solving, self-confidence and collaboration) on a 1-5 Likert scale. The results were calculated as the difference between answers given before and after participating in the programme. Measurement items and results (after vs before) are shown in Table 2.

Table 2. Entrepreneurial skills measures and results

Skill	Measure	Result
Creativity	I am curious about new things	0.18%
	I can explore new ways of using existing resources	9.84%
		6.41%

	I can experiment with my abilities and skills in situations that are new for me	8.76%
	I can search for new solutions depending on my needs	10.86%
	I can develop innovative ideas and test them	6.05%
	I can transfer knowledge, ideas and solutions in different fields	
Problem-solving	I tackle problems with curiosity	7.33%
	I can generate multiple solutions for a problem	6.37%
	I see opportunities where others see problems	9.79%
	I can encourage others to tackle problems creatively	11.79%
	I can take the initiative and tackle the problems that affect my community	5.59%
Self-awareness / Self confidence	I know my strengths and weaknesses	3.79%
	I can accomplish tasks successfully	11.14%
	I can create value by using my skills	11.68%
	I can influence people and situations for the better	12.03%
	I can help others identify their strengths and weaknesses	11.14%
	I can carry out what I imagined and planned, despite the obstacles	6.53%
Collaboration	I can show empathy towards others	-2.65%
	I can express my ideas confidently	1.91%
	I am capable of taking an active part in teamwork	-3.79%
	I am capable of making compromises when necessary	-8.75%
	I am capable of helping others do their best within a team	-4.58%
	I am capable of managing conflict within a group	-0.32%
	I can contribute constructively to making decisions in the group	-0.53%

From these quantitative measures, the programme had a positive overall impact on students entrepreneurial skills. Creativity, problem-solving and self-confidence increased. Interestingly, collaboration skills suffered a decrease. It would seem therefore that the programme is best for improving the first three skills while the skills related to team spirit are under questioned.

The programme had a positive impact on all creative skills, ranging from curiosity to experimentation skills, including innovation and knowledge transfer. Curiosity received the lowest score, whilst the ability to develop new ideas and take tests received the highest score.

The ability to solve problems was positive overall, showing the second highest increase. The capacity to encourage others to tackle problems creatively was the best score. The last question had the lowest score, maybe due to the topic selected. Some students worked with community challenges, while others worked on repurposing a public space within their school.

The highest ranking skill was self-confidence. The ability to accomplish tasks, create value and influence people positively was the best score. Knowledge of individual strengths and weaknesses was the lowest.

Collaboration is the only skill that recorded a negative result. All the “can do” statements were negative, with the exception of expressing their own ideas. This result could be related to some insights we obtained from the qualitative evaluation of the programme.

Overall, the programme improved student skills, particularly:

- Influencing people and situations positively;
- Encouraging creativity;
- Creating value with their own skills; and
- Completing tasks.

4.3. Perception of entrepreneurship

Almost all the interviewed participants confirmed that after being involved in the programme they had a better understanding of entrepreneurship. Some of their statements are a clear example of this:

> "The language of the project is well-suited for us, because sometimes it is difficult to understand the adults' world; but with this project, we have completely understood how an enterprise works. (French student)
>
> "After following the programme, I have changed my mind about what entrepreneurship/entrepreneurial mind-set is. It was initially about what to do to earn money. In the end, the challenges the students came up with were to the benefit of the society. (Teacher in Cyprus)
>
> "I feel positive about entrepreneurs. Particularly during the recession, I got a better understanding of their role for the country. (Parent in Cyprus)

Thanks to the experimentation, the students appreciated having the opportunity to imagine themselves in the future and to understand better what they will be asked to do when they start working. Some of them defined the experience as a mini-training on entrepreneurship, which may be a good starting point for those interested in becoming entrepreneurs.

5. Discussion of results

The piloting of the Educational Programme provided interesting insights on how and to what extent Design Thinking promotes entrepreneurial attitudes. Overall, qualitative results highlighted that the Educational Programme provided engagement for both teachers and students. It offers an enjoyable format that facilitates a better and more realistic understanding of entrepreneurship.

As expected, creativity, problem-solving and self-confidence related issues increased with the application of the Educational Programme, according to the quantitative results. Interestingly, however, we reported a negative impact on collaboration after its application.

Positive impacts on creativity, problem-solving and self-confidence would seem to support our hypothesis about the potential of Design Thinking to foster entrepreneurial attitudes in school students. The reasoning behind this proposition is three-fold.

First, Design Thinking is a creative process in itself. One of the foundational elements of Design Thinking is its Double Diamond framework (Design Council, 2015), which promotes divergent and convergent thinking, and was taken as a basis for the Educational Programme. Its stages and activities (see Figures 2 and 3) follow the Double Diamond approach and 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. The implementation of divergent and convergent thinking activities fostered, as expected, creativity among school students.

As a second point, Design Thinking also promotes self-confidence. The process of creating solutions to identified challenges or problems, goes beyond trying something new to a more cyclical process. This cyclical process fosters positive attitudes towards risk-taking, which in turn enhances self-confidence. Moreover, inherent in a culture of creation, there is ideation, prototyping, iteration and when necessary, pivoting. This creation process 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 with new solutions. When this happens, self-confidence is enhanced.

Finally, Design Thinking is by nature 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 or 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.

The negative effect on collaboration reported in the results, however, needs further reflection. Initially, the mind set of collaboration in Design Thinking was built upon the idea that radically diverse multidisciplinary teams would stimulate greater innovation than unidisciplinary teams. That is to say, combining different profiles would lead to successful collaboration. For that reason, cooperative learning strategies were implemented for team creation in our Educational Programme. However, it would seem that the results from experimentation do not support this reasoning. Additional insights obtained from qualitative results might explain this fact.

Firstly, some students highlighted that it was difficult for them to work with people that were not their friends. In this respect, differences in mind sets and personalities of team members could have provided extra difficulties for collaboration.

Secondly, different attitudes towards the challenge could also contribute to the negative results. Teammates who were not interested in the problem or challenge to be solved may well have had an impact on collaboration. Teamwork needs every member to be important, face the challenge and be determined to reach the goal. In its essence, teamwork effectiveness depends on members freedom to work. In this sense, the team creation guidelines in the Educational Programme provided strategies for teachers about creating mixed abilities groups. However, no guidance was provided, in practice, about issues such as personal affinities, different personalities or differences in motivation towards the challenge.

6. Conclusions and recommendations

The Educational Programme described in this paper is based on Design Thinking and appears to be a powerful approach for promoting entrepreneurial skills within European school curricula. Design Thinking helps young students and their educators understand entrepreneurship in their own words by changing their mind-set about what entrepreneurship is. This overriding conclusion can be analyzed from three perspectives.

First, Design Thinking related strategies, when implemented in the classroom, strongly promote entrepreneurial skills such as creativity, problem solving and self-confidence. Collaborative issues, however, need to be further explored with more innovative team creation strategies that take into account different issues such as differences in mindsets, personalities or attitudes towards the challenge.

Second, Design Thinking provides an enjoyable Educational Programme that facilitates student engagement. Students reported great satisfaction about the impression of freedom and being valued and listened to. The programme gave the students autonomy and opportunities to take the initiative, for reflection and production. Design Thinking represents a framework that fosters above all the ability to change things in our surroundings. The Design Thinking approach adds a new creative framework combining thinking and doing, with a high level of engagement among participants.

Third, Design Thinking opens the door to new teacher/learner relationships. Traditionally teachers are used to being in control, but entrepreneurship cannot be taught as a conventional academic topic where students are passive receivers of knowledge. Teachers can benefit from a designerly approach where all the variables in the "what" + "how"= "value" equation can be questioned. Design Thinking by its very nature visualizes problems in a more holistic way and can guide both teachers and students when "thinking outside the box".

References

Briggs, S. (2013). *45 Design Thinking Resources for Educators*. [online] informED. Available at: http://www.opencolleges.edu.au/informed/features/45-design-thinking-resources-for-educators/#ixzz2bnMyQLfC (accessed 13.02.2016).

Cross, N., Dorst, K., & Roozenburg, N. (1992). *Research in design thinking*. Delft University Press, Delft, The Netherlands.

Davis, M. (2010). Creativity & Innovation in Business Teaching the Application of Design Thinking to Business. Procedia - Social and Behavioral Sciences, Vol. 2 No.4. doi: 10.1016/j.sbspro.2010.04.062

Design Council. (n.d.). The Design Process: What is the Double Diamond? Retrieved November 2018, from https://www.designcouncil.org.uk/news-opinion/design-process-what-double-diamond/

Dorst, K. (2011).The core of 'design thinking'and its application. *Design Studies*, Vol. 32 No. 6, pp. 521-532. doi: 10.1016/j.destud.2011.07.006

Eastman, C., Newstetter, W. and McCracken, M. (2001). *Design knowing and learning: cognition in design education*. Elsevier, Oxford, UK. doi: 10.1016/b978-0-08-043868-9.x5000-1

European Commission/EACEA/Eurydice. (2016). *Entrepreneurship Education at School in Europe.* Euryrdice Report. Luxembourg: Publication Office of the European Union.

Fraser, H. M. a. (2007). The practice of breakthrough strategies by design. *Journal of Business Strategy*, Vol. 28 No. 4, pp. 66-74. doi: 10.1108/02756660710760962

Glen, R., Suciu, C. and Baughn, C. (2014). The need for design thinking in business schools. *Academy of Management Learning & Education*, Vol. 13 No. 4, pp. 653. doi: 10.5465/amle.2012.0308

Hassi, L. and Laakso, M. (2011). Making sense of design thinking. In: T-M. Karjalainen, M. Koria and M. Salimäki (Eds), *IDBM papers 1,* IDBM Program ,Aalto University, Helsinki.

Rittel. H. and Webber, M. (1973). Dilemmas in a general theory of planning. *Policy Sciences*, Vol. 4, pp. 155-169. doi: 10.5040/9781474282932.0015

Royalty, A. and Roth, B. (2015). Developing Design Thinking Metrics as a Driver of Creative Innovation. In: H. Plattner, C. Meinel and L. Leifer (Eds.), *Design Thinking Research: Making Design Thinking Foundation*, Springer International Publishing, Heidelberg, pp. 171-186. doi: 10.1007/978-3-319-19641-1_12

Shane, S. A. (2003). *A general theory of entrepreneurship: The individual-opportunity nexus*. Edward Elgar Pub, Northampton, MA. doi: 10.1007/0-387-24519-7_8

Sorensen, K.B., & Davidsen, H.M. (2017). A Holistic Design Perspective on Entrepreneurship Education. *Universal Journal of Educational Research*, 5(10), 1818.1826.

Val, E., Gonzalez, I., Iriarte, I., Beitia, A., Lasa, G. and Elkoro, M., (2017). A Design Thinking approach to introduce entrepreneurship education in European school curricula. *Proceedings of the 12th European Academy of Design Conference, Sapienza University of Rome, 12-14 April 2017*, Loredana Di Lucchio, Lorenzo Imbesi, Paul Atkinson, ISBN 978-1-138-09023-1, pp. S754-S766. doi: 10.1080/14606925.2017.1353022

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Acknowledgements: The authors thank the participating schools, for piloting the Educational Programme.The authors also thank both the Erasmus + Agency and the Diputación Foral de Gipuzkoa (Departamento de Promoción Económica, Medio Rural y Equilibrio Territorial) for supporting this work.bodies.