Review article / Pregledni rad

DESIGN THINKING APPROACH IN BUSINESS EDUCATION

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ABSTRACT

The purpose of this paper is to explore recent literature in order to better understand the connection between design thinking approach and business education. Various scientific papers show that business education on higher education level is often ineffective and without satisfactory results. In the last decade, there have been ongoing discussions about new and innovative teaching methods that can transform business education, from a traditional model, which is focused on the adoption of theoretical knowledge, towards an experiential model, which is based on practical learning. While design thinking as a problem-based learning approach is becoming increasingly attractive for business educa-tion, it has not yet been sufficiently recognized and discussed in the field of management. The literature review conducted in this paper shows that researchers have a strong bias towards employing qualitative research methods such as case study, while rigorous quantitative research is lacking. In order to contribute to the body of knowledge in the field of business education, we propose a conceptual model as a framework for future impact studies based on design thinking approach. Furthermore, different organizational models on a higher education level for providing design thinking content are identified and structured into three different concepts.

Keywords: *business education; design thinking; higher education; problem-based learning*

1. INTRODUCTION

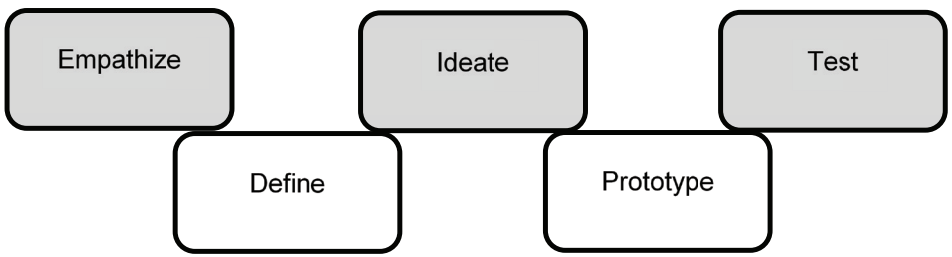
In the last 10 years, design thinking methodology has become one of the most influential "buzzwords" in the business school classrooms and meeting rooms of Fortune 100 companies. Examples of some well-known international firms such as Airbnb, Procter & Gamble, Apple, Intuit, Nike, Braun, PepsiCo and Uber show that design thinking has moved from product and process design towards strategy design. While design thinking has been rapidly expanding in the business sector and Google search engine finds 1.250.000.000 results for the term "design thinking", it is hard to believe that there is not a unified definition of the term.

Some researchers (Brown, 2008) define design thinking as a discipline that uses the designer's sensibility and methods to match people's needs with what is technologically feasible and what a viable business strategy can convert into customer value and market opportunity, while others (Plattner et al., 2009) define it in a more general aspect as a human-centric methodology for innovation which incorporates human, technological and business elements in formulating, designing and solving a problem. While there is no common agreement about the definition of design thinking, researchers agreed that, unlike traditional learning methodologies, design thinking follows a two-fold part being both a mindset (Carrol, 2014) and a dynamic non-linear process (Serrat, 2010).

The core parts of design thinking mindset are human-centeredness, empathy, mindfulness of process, a culture of prototyping, "show, do not tell", bias toward action and radical collaboration. It is evident that numerous variations of the design thinking process are used in practice, but the most common one is the model from Stanford d.school that can be broken down into five steps: (1) Empathize, (2) Define, (3) Ideate, (4) Prototype and (5) Test. The process is based on iterative logic and the whole idea is to learn from the failures in order not to miss opportunities and waste resources.

Furthermore, according to Dunne and Martin (2006), the design thinking process involves inductive reasoning or generalization from specific, deductive reasoning, based on logic, and abductive reasoning, founded on the process of establishing explanations which are of crucial importance in establishing new ideas. The design thinking process based on Stanford d.school model is shown in Figure 1.

Figure 1. Stanford d.school design thinking process



Source: Adopted from Design Thinking Bootleg (2018)

By analyzing various scientific literature in order to answer what impact design thinking has on business education, we learn that design thinking fosters teaching attractiveness (Blandul, 2015), serves as a means for effective problem solving and encourages prototyping and experimentation in testing potential solutions. Educators who have applied design thinking in education argued that it promotes innovation, problem-solving, creativity and collaboration (Anderson, 2012; Scheer et al., 2011; Watson, 2015; Caruso, 2011). Design thinking enables iteration and reflection on own actions (Dorst, 2011) while enabling higher order thinking (Luka, 2014; Wrigley and Straker; 2017).

2. LITERATURE REVIEW

The implication of the design thinking approach to business education is a heavily under-researched topic that has been popularized by Dunne and Martin (2006). In order to conduct a literature review, we researched databases and web sites such as ERIC, JSTOR, ScienceDirect and Google Scholar. The focus of the research was to access research articles using various terms or keywords such as *design thinking, design thinking education, design thinking business, design thinking management,* and *design thinking entrepreneur*. The research was not limited to a particular data range and it included criteria of topical relevancy of documents to the research question in this article (the impact of design thinking approach on business education).

Table 1 shows that the majority of research is qualitative and the strong focus on employing a case study method in the writing of research articles is evident. Case studies as a research method have traditionally been viewed as lacking rigor and objectivity when compared with other social research methods but on the other hand, case studies have often been viewed as a useful tool for new research areas or research areas for which existing theory seems inadequate (Eisenhardt, 1989).

Table 1. Review of research articles about design thinking in business education

Article title	Journal	Research methodology
Design Thinking and How It Will Change Management Education: An Interview and Discussion (Dunne, D., Martin, R., 2006)	Academy of Management Learning & Education	Qualitative research (one-on-one interview)
Creativity & Innovation in Business 2010 Teaching the Application of Design Thinking to Business (Davis, B.M., 2010)	Procedia - Social and Behavioral Sciences	Qualitative research (case study method)

Learning Design Thinking: International Design Business Management at Aalto University (Koria et al.,2011)	Review of Design, Innovation and Strategic Management	Qualitative research (case study method)
Embedding "Design Thinking" in Business School Curriculum (Eagen et al., 2011)	The International Journal of the Arts in Society	Qualitative research (case study method)
Combining critical reflection and design thinking to develop integrative learners (Welsh, M.A., Dehler, G.E., 2013)	Journal of Management Education	Qualitative research (case study method)
Potentials of Entrepreneurial Design Thinking® for Entrepreneurship Education (Von Kortzfleisch et al., 2013)	Procedia - Social and Behavioral Sciences	Conceptual research (authors propose new method for entrepreneurship education)
Design Thinking in Classroom: An Experience with Undergrad Students of a Business Course (Ching, H.Y., 2014)	Business and Management Research	Qualitative research (case study method)
The Need for Design Thinking in Business Schools (Glen et al., 2014)	Academy of Management Learning & Education	Qualitative research (review of literature from secondary sources and theoretical considerations)
Teaching design thinking in business schools (Glen et al., 2015)	The International Journal of Management Education	Qualitative research (case study method)
DesUni: university entrepreneurship education through design thinking (Nielsen, S.L., Stovang, P., 2015)	Education + Training	Conceptual research (authors propose new teaching model for entrepreneurship education)
Teaching Innovation Through Empathy: Design Thinking in the Undergraduate Business Classroom (Armstrong, C.E., 2016)	Management Teaching Review	Qualitative research (case study method)

Fostering an entrepreneurial mindset by using a design thinking approach in entrepreneurship education (Daniel, A.D., 2016)	Industry and Higher Education	Qualitative research (case study method)
Design and Design Thinking in Business and Management Higher Education (Matthews, J., Wrigley, C., 2017)	Journal of Learning Design	Qualitative research (presentation of findings from an initial exploratory investigation and identification of educational approaches)
Design Thinking: A New Road Map In Business Education (Ceviker-Cinar et al., 2017)	The Design Journal	Qualitative research (case study method)
A Design Thinking approach to introduce entrepreneurship education in European school curricula (Val et al., 2017)	The Design Journal	Qualitative research (review of literature from secondary sources and theoretical considerations)
All the world's a stage: transforming entrepreneurship education through design thinking (Huq, A., Gilbert, D., 2017)	Education + Training	Qualitative research (case study method)
The Curriculum Innovation Canvas: A Design Thinking Framework for the Engaged Educational Entrepreneur (Willness, C., Bruni-Bossio, V., 2017)	Journal of Higher Education Outreach and Engagement	Conceptual research (authors propose new method for curriculum development)
Using Design Thinking to Write and Publish Novel Teaching Cases: Tips from Experienced Case Authors (Sheehan et al., 2018)	Journal of Management Education	Qualitative research (case study method)
Preparing Managers for Turbulent Contexts: Teaching the Principles of Design Thinking (Schumacher, T., Mayer, S., 2018)	Journal of Management Education	Conceptual research with empirical illustrations

University entrepreneurship education: a design thinking approach to learning (Linton, G., Klinton, M., 2019)	Journal of Innovation and Entrepreneurship	Qualitative research (case study method)

Source: Authors work based on literature review

Taking into account that design thinking has been one of the most discussed topics in recent business literature and the positive trend of implementation of design thinking approach on undergraduate and graduate level of business education is evident on a global scale, it is quite interesting to notice that rigorous, quantitative research is lacking.

Quantitative research methods can provide evidence that design thinking-based business education, among other key outputs, has a positive impact on students' creativity, entrepreneurial self-efficacy, risk tolerance, propensity to act and entrepreneurial intention.

While there is common agreement among researchers and practitioners that design thinking represents an effective cognitive process facilitating adaptive reasoning and serves as a supplement to the analytic component of business education, there are not any quantitative research studies that can provide sufficient evidence for a positive impact of design thinking based education programs on students' entrepreneurial mindset. Lorz et al. (2013). identified the main problems concerning the methodology used in the entrepreneurship education impact research papers such as focus on only ex-post studies, lack of control groups and the utilization of small sample sizes. In order to minimize future risk of methodological deficiencies connected to quantitative research, which can strongly limit the validity of the results, it is important to employ recommendations of Lorz et al. (2013).

3. DESIGN THINKING APPROACH AS A SOLUTION TO CRISIS IN BUSINESS EDUCATION

Various researchers have criticized business school curricula and learning methods (Pfeffer and Fong, 2002; Glen et al., 2014; Torres, 2016; Ceviker-Cinar et al., 2017; Tschimmel and Santos, 2018). Instead of educating open-minded, creative change agents that can create financial value for their company and at the same time produce positive externalities for society (social and environmental value), business schools are fostering a culture of short-termism and greed. A new wave of criticism of the educational approaches of business schools is focused on two main areas: 1. the ideology behind their pedagogical framework and curricula contents; and 2. their "outdated" teaching and learning methods.

Major changes in economic and social environments, advances in technology and orientation towards more sustainable business models that combine financial, social

and ecological perspective, have left a large number of business schools with old-fashioned perspectives and curricula that cannot meet these postmodern wicked challenges.

Ceviker-Cinar et al. (2017) argued that the most striking problems of business school education are connected to lack of multidisciplinary integration, experiential learning and soft-skill development. Multidisciplinary integration requires the education to be carried out together in two or more disciplines, subdisciplines or professions, by bringing together and to some extent synthesizing their perspectives (Davis, 1995). In the modern business environment, learning from and building on ideas of others is regarded as the "right" strategy for success. Kolb (1984) defined experiential learning as a "process whereby knowledge is created through the transformation of experience". Business schools have started including such a holistic model of the learning process into their curricula through various forms, some of which are community service, fieldwork and workshops.

Experiential learning is based on a hands-on approach in learning, and although some of the above-mentioned forms are now common in many business schools, the efficiency of these in generating a real hands-on-experience is questionable (Kirschner et al., 2006). Finally, the curriculum of business schools has a strong technical and analytical orientation which is not adequate for the 21st-century business environment. Business schools are not paying enough attention to fit up students with soft skills such as creativity, critical thinking, teamwork, communication and problem-solving.

While business schools have been educating system followers instead of change agents that can, by thinking outside of the box, radically transform business systems, they admit that more focus is needed on what they neglected, but designers have embraced (Glen et al., 2014). Integrating design thinking into the business school curriculum may provide an effective educational strategy for solving the most striking problems of business school education.

Furthermore, integrating design thinking into business education can enable the transition from dominant rational-analytic approach to more experiential based approach that may guide professors and students both for managing innovation and problem solving, by cultivating a culture of creative confidence (Kelley and Kelley, 2013). Table 2 shows a comparison of rational-analytic and design thinking approaches.

Table 2 Comparison of rational-analytic and design thinking approaches

	Rational analytic	Design thinking
Problem formulation	Well-defined goal and constraints.	Goals and constraints uncovered during the design thinking process.
Criteria	Objective definition of criteria, established before generation of alternatives.	Both objective and subjective criteria used to define design objectives, since the end user is the ultimate judge of efficacy.
Method	Planning and analysis – thought precedes action. Sequential process.	Iterative exploration of the design "space", where thinking and doing are intertwined.
Information-processing emphasis	Preference for objective formulations, especially verbal and quantitative.	Preference for visual and spatial representations, which evoke both objective and subjective insights.
Solution process	Ideally based on conscious, rational-logical reasoning process, which, over time, becomes formalized into a set of rules.	Solutions evolve as the result of interaction with users and the ongoing creation and refinement of possible solutions. Incorporates experience-based insights, judgment and intuition.
Rationale	"Get it right." Reduce chances of failure though careful prior analysis.	Use rapid experimentation and prototyping to learn from early, inexpensive "failures".
Outcome	Solution optimizes predefined criteria to arrive at "best" answer.	Obtain "better" answer. Process may expose additional problems and solutions.

Source: Adopted from Glen, Suciu and Baughn (2014)

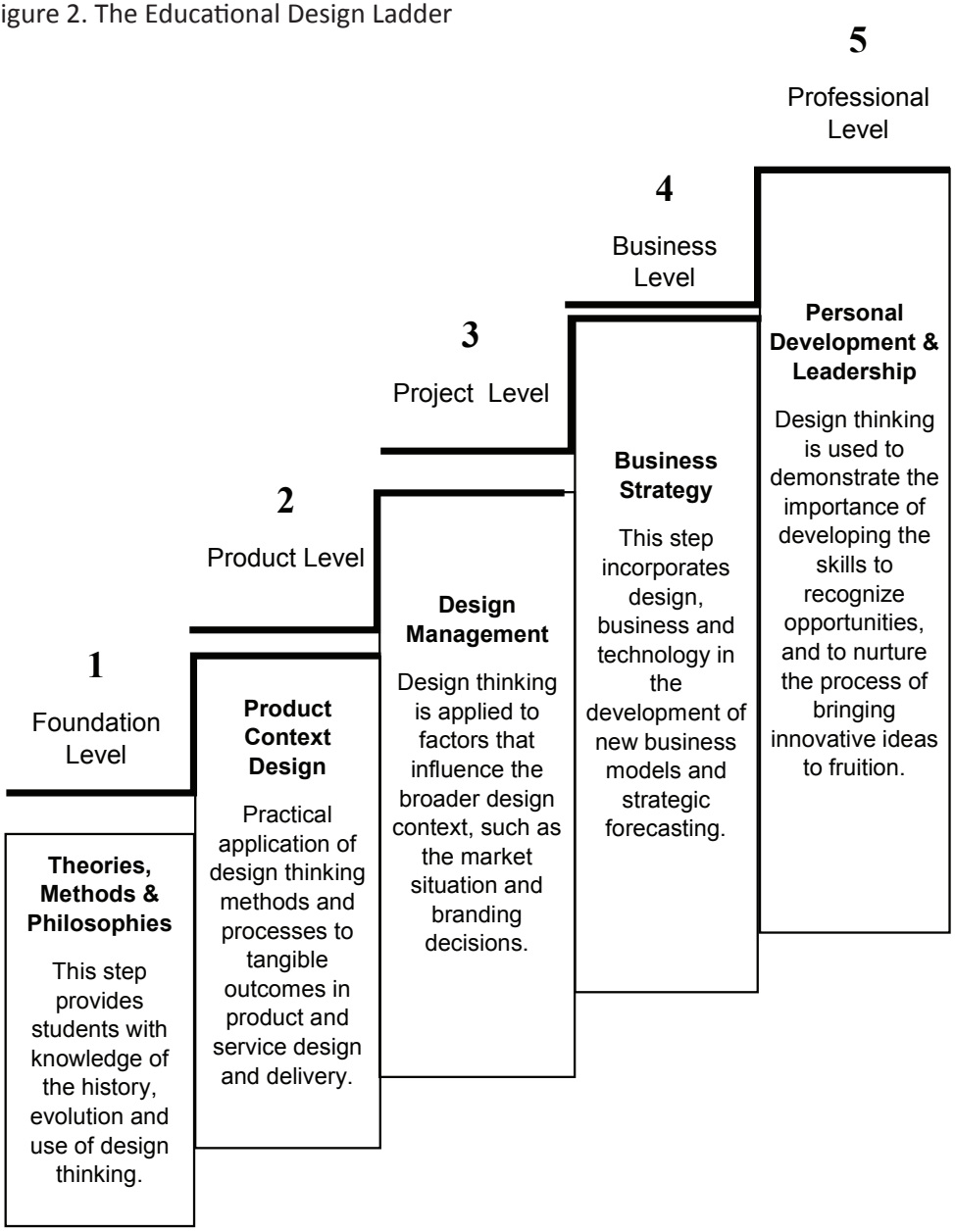
Hassi and Laakso (2011) describe design thinking under three main constitutive components: "Practices", "Cognitive approaches" and "Mindset". Such a framework is based on an extensive literature review and interviews with industry experts. The Practices category are related to instrumental competences by which students learn

the ways of multidisciplinary collaboration and develop their cognitive approaches. Human-centered approach, thinking by doing, visualizing, a combination of divergent and convergent approaches and multidisciplinary collaboration are the main parts of the Practices category. Experimental methods used in the Practices category lead to the rejection of both inductive and deductive reasoning as the epistemological and ontological foundation of design thinking. The Cognitive approaches category is based on elements such as abductive reasoning, reflective framing, holistic view and integrative thinking. The "right" mindset is the main condition for the successful implementation of design thinking in practice. Design thinker must have a bias toward experimentation and exploration, tolerance for ambiguity, optimistic attitude and orientation towards the future.

Wrigley and Straker (2017) conducted extensive research on 51 design thinking courses that have been taught across 28 international institutions in order to propose an approach for design thinking curriculum development and delivery on a university level. The Danish Design Ladder model, developed by the Danish Design Centre (Kretzschmar, 2003) was used as a framework for Wrigley and Straker (2017) Educational Design Ladder (Figure 2). While the Danish Design Ladder is a four-step model used to measure the level of design activity in Danish businesses in order to demonstrate the extent to which design can enhance creativity, innovation and competitiveness, the Educational Design Ladder is a five-step model that has been developed to illustrate the pedagogical stages in the development of design thinking. The Educational Design Ladder can be used to transform business school education from traditional, professor-centric, towards experiential, action-based, which has a strong focus on students' needs.

Among other things, the Educational Design Ladder model suggests that: knowledge is acquired through actions and practice, rather than traditional instructional learning; assessment should be based around the willingness to take risks and try new things; an action learning coach or facilitator must be involved in the design thinking process and projects to inspire, motivate and act as confidante; project work should take a problem-based and studio-based approach; studio learning should immerse students in an environment of reflective creative practice, with the guidance of an educator; cross-disciplinary project work is necessary for developing and sharing skillsets and design thinking challenges must be based on real-world problems defined by real clients.

Figure 2. The Educational Design Ladder

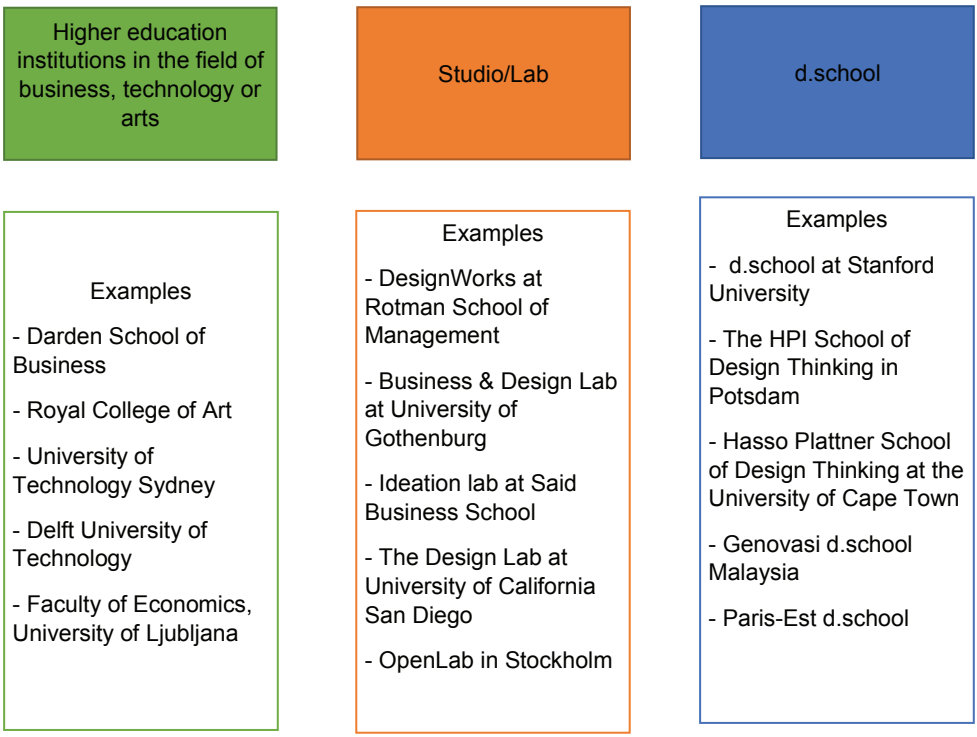


Source: Adopted from Wrigley and Straker (2017)

Various researchers (Ceviker-Cinar et al., 2017; Matthews and Wrigley, 2017; Kurokawa, 2013) have compiled a list of higher educational institutions that have implemented design thinking education.

It is evident that design thinking is globally recognized as an effective, action-based model that has real potential for the transformation of business school teaching and learning. While researching popular examples of design thinking educational programs across a selection of universities it is possible to identify different patterns or organizational models (Figure 3).

Figure 3. Different organizational models on a higher education level for providing design thinking educational content



Source: Authors work

Considering the highly experimental nature of design thinking approach and positive impact of multidisciplinary teamwork on design thinking output, the most efficient organizational models for providing design thinking educational content are studio/lab and d.school.

While undergraduate and graduate design thinking courses provided by higher education institutions in the field of business, technology and arts are suited for learning the fundamentals of design thinking approach (process, methods and tools), they have some serious flaws in contrast to studio/lab and d.school model. In order to design a truly creative and innovative learning environment where students can work on real business problems with partners from the private sector,

it is important to establish independent design thinking unit or institution inside traditional Faculty or University organizational structures.

4. PROPOSED CONCEPTUAL MODEL FOR FUTURE RESEARCH STUDIES

Taking into consideration the research limitations mentioned in this article, it is important to consider quantitative research methodology as an alternative approach for conducting design thinking research. A strong bias toward employing qualitative methodology, which can be seen in design thinking research, is insufficient for testing the impact of design thinking approach on business education main outputs such as entrepreneurial self-efficacy and entrepreneurial intention. Taking into account methodological deficiencies connected to business education research based on quantitative methods (Lorz et al., 2013), we propose the research model that can be used in future design thinking studies (Table 3).

Table 3. Proposed quantitative research model for future impact studies based on design thinking approach

Group	Before the workshop or course (t1)	Procedure	After the workshop or course (t2)
Experimental group	Measuring entrepreneurial self-efficacy and entrepreneurial intention of students by self-report survey	Workshop or course based on design thinking approach to entrepreneurship education	Measuring entrepreneurial self-efficacy and entrepreneurial intention of students by self-report survey
Control group	Measuring entrepreneurial self-efficacy and entrepreneurial intention of students by self-report survey	Workshop or course based on classical approach to entrepreneurship education	Measuring entrepreneurial self-efficacy and entrepreneurial intention of students by self-report survey

Source: Authors work

The main research question we aim to answer by conducting such research is as follows:

“What is the impact of the design thinking-based entrepreneurship education

approach on students' entrepreneurial self-efficacy and entrepreneurial intention in comparison to the impact of the classical entrepreneurship education approach?"

In the proposed quantitative research model, we used entrepreneurial self-efficacy and entrepreneurial intention as main entrepreneurship education constructs. There is a growing number of researches that have presented evidence for a positive correlation between entrepreneurial education programs and entrepreneurial self-efficacy of students (Nowinski et al., 2019; Gielnik et al., 2017; Karlsson and Moberg 2013; Byabashaija and Katano 2011; Wilson at al., 2007). Various researchers have found a significant positive link between entrepreneurial self-efficacy and the entrepreneurial intentions of students (Zhang and Cain, 2017; Austin and Nauta, 2016; Geenen et al., 2016; Hallam et al., 2016; Douglas 2013; Douglas and Fitzsimmons 2013).

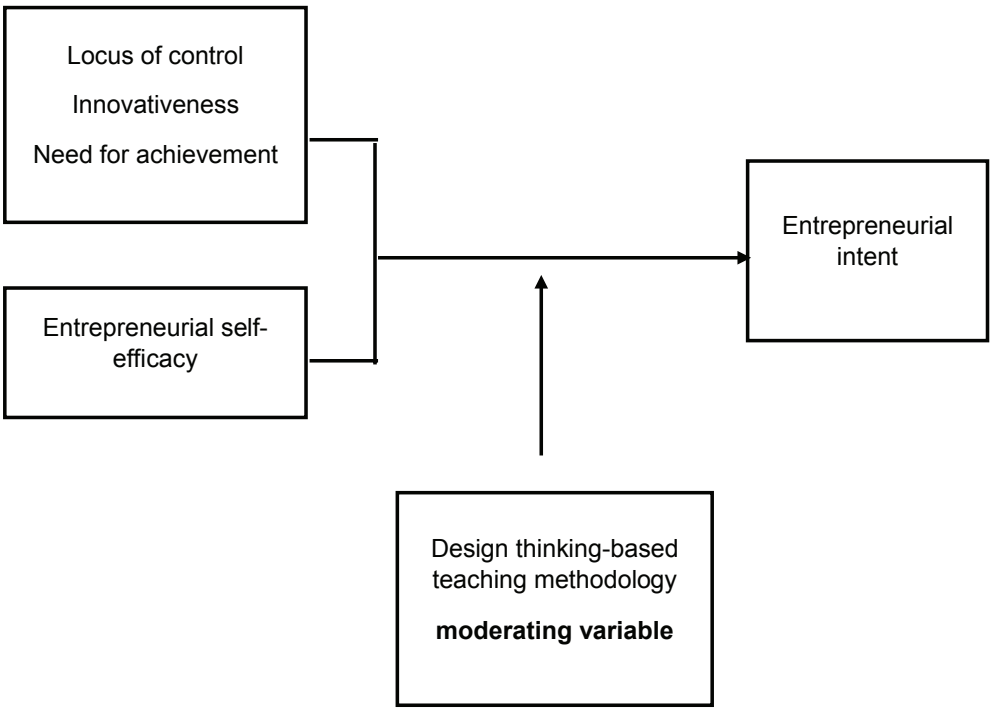
The conceptual model of antecedents of entrepreneurial intent (Drost and McGuire, 2011) represents entrepreneurship education as one of the key factors that have a positive influence on entrepreneurial self-efficacy and entrepreneurial intent. Furthermore, Souitiaris et al. (2007) argued that one major benefit of entrepreneurship education programs could be so-called trigger-events, which are defined as moments, experiences or events during an entrepreneurship program that trigger an increase or decrease in entrepreneurship intentions. This argumentation is rooted in a so-called "displacement event" described in Shapero and Sokol's Entrepreneurial Event Model (1982).

While various studies have been conducted utilizing design thinking as a teaching and learning approach in business and entrepreneurship field (Mumford et al., 2016; Dunne and Martin 2006; Nielsen and Stovang 2015), the implication of design thinking-based entrepreneurship education on students' entrepreneurial mindset is heavily under-researched. Bruton (2010) recommended conducting more research in describing in more detail what happens when students learn the design thinking way and how learning actually takes place. Drost and McGuire (2011) argue that future research should focus on the pedagogical aspects of entrepreneurship education that cultivate entrepreneurial self-efficacy. For instance, how significant are mastery of skills, creative thinking exercises, business plan competitions and others in increasing entrepreneurial self-efficacy?

The proposed research model can be seen as a starting point of design thinking-based business education impact studies that employ empirical research methodology. After it is proven that design thinking pedagogic approach has a significant positive implication on entrepreneurial self-efficacy and entrepreneurial intention, it is important to conduct in-depth analysis to prove that it has a similar impact on other business education constructs such as creativity, propensity to act and risk tolerance. Furthermore, future studies can be oriented towards multidisciplinary topics that research the relationship between personality traits and entrepreneurial intention by using design thinking-based teaching methodology as a moderator variable (Table 4). Behaviors and attitudes towards entrepreneurship can be explained through personality traits, which have been frequently discussed in recent years (Karabulut, 2016). The proposed research model included a certain number of personality traits such as locus of control, innovativeness and the need

for achievement, since these personality traits are known to have strong effects on entrepreneurial intentions of individuals (Krueger and Carsrud, 1993; Thomas and Mueller, 2000). In their study of entrepreneurial intention literature, Bae et al. (2014) suggested using teacher profiles and teaching methodologies to be used as moderators in order to better understand the entrepreneurial intention. It has been suggested that entrepreneurial intentions are influenced by the personality factors and are moderated by the situational factors such as teaching methodology (Jain and Ali, 2013; Bae et al., 2014). Based on the above discussion, we argued that teaching methodology moderates the relationship between tendencies and abilities of an individual and the development of entrepreneurial intentions. In other words, we presumed that design thinking teaching methodology strengthens the relationship between personality and entrepreneurial intentions.

Figure 4. Proposed conceptual model that defines design thinking-based teaching methodology as a moderating variable



Source: Authors work

Furthermore, it is possible to upgrade the above research model with the big five personality traits (Goldberg 1990). The big five model is a multidimensional approach towards defining personality, through measuring openness, conscientiousness, extraversion, agreeableness and neuroticism. The main research findings will help

entrepreneurship educators to design courses that are adjusted to specific needs of different personality types. By employing such a research approach, we will question if certain personality types are drawn to an entrepreneurial mindset.

5. CONCLUSION AND DISCUSSION

While several scientific articles, arguing for the use of design thinking in business education have been published (Benson and Dresdow 2013; Glen et al., 2014), there is not any empirical research that analyzes the impact of design thinking-based entrepreneurship education on entrepreneurial behavior and competencies of students.

Considering future research, it is important to move beyond purely quantitative measures in design thinking impact studies in order to find answers to important research questions such as whether entrepreneurial intentions of students' that participate in design thinking educational program ultimately turn into concrete action? Are ventures founded by owners that have completed a design thinking educational program more sustainable than ventures founded by owners that did not participate in the design thinking educational program? Do ventures created by design thinking educated owners create more economic, social and environmental value? Are graduates that have participated in the design thinking educational program more willing to become social entrepreneurs?

Moreover, there is a large, untapped space for research that combines design thinking-based teaching method with personality traits and business education constructs such as entrepreneurial self-efficacy, propensity to act, creativity and entrepreneurial intention. Future impact studies can use design thinking-based teaching methodology as a moderator variable. Furthermore, new research in the field of psychology that defines four personality types based on the big five personality traits (Gerlach et al., 2018) can be a very interesting topic for future multidisciplinary oriented design thinking research.

Furthermore, in this paper, we present three different organizational models on a higher education level for providing design thinking educational content. The main conclusion drawn from analyzing different organization models is that independent structures created on a higher organizational level (studio/lab model and d.school model) can provide a more adequate environment for multidisciplinary teamwork and an effective framework for building a stronger relationship with educational partners which provide real-world challenges.

PRISTUP BAZIRAN NA DIZAJNERSKOM PROMIŠLJANJU U POSLOVNOJ EDUKACIJI

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SAŽETAK

Cilj je ovog članka istražiti recentnu literaturu kako bi se mogla bolje razumjeti povezanost pristupa baziranog na dizajnerskom promišljanju i poslovne edukacije. Razni znanstveni članci ukazali su da je poslovna edukacija često na razini visokog obrazovanja neefikasna i da ne stvara zadovoljavajuće učinke. U prošlom desetljeću raspravljalo se o inovativnim metodama podučavanja koje mogu transformirati poslovnu edukaciju od tradicionalnog modela koji je usmjeren na usvajanje teoretskog znanja prema iskustvenom modelu baziranom na usvajanju praktičnog znanja. Dok je dizajnersko promišljanje kao pristup baziran na učenju rješavanjem problema postalo sve atraktivnije u poslovnoj edukaciji, još uvijek nije dovoljno prihvaćeno i raspravljeno u području menadžmenta. Pregled literature proveden u ovom članku ukazuje da znanstvenici imaju snažnu pristranost prema upotrebi kvalitativnih metoda istraživanja poput metode slučaja, dok su kvantitativne metode istraživanja nedovoljno iskorištene. Kako bismo ostvarili doprinos znanosti predlažemo konceptualni model koji se može upotrijebiti kao pred-ložak za buduće znanstvene studije koje istražuju utjecaj pristupa baziranog na dizajnerskom promišljanju na poslovnu edukaciju. Osim toga, različiti organizacijski oblici na razini visokog obrazovanja, usmjereni na pružanje sadržaja vezanog za dizajnersko promišljanje, identifici-rani su i strukturirani unutar tri različita koncepta.

Ključne riječi: *poslovna edukacija; dizajnersko promišljanje; visoko školstvo; problemsko učenje*

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