Entrepreneurship Education and Design Thinking: A Conceptual Threshold for Their Integration in Indonesian Higher Education

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Abstract

Many ongoing discussions in design thinking show similarities to the current entrepreneurship education debate on integrating both disciplines in the context of higher education. In that case, some articles, mainly from the developed countries, have addressed this issue, though fragmentedly. In contrast, this integration-educational type is rarely found in developing countries, particularly Indonesia. Additionally, very few studies have broadened the discussion to include the teaching entrepreneurship-design thinking process cycle and the conceptual threshold to support the integrated teaching process. This paper uses the narrative literature review and in-depth qualitative case-study discussion as the methodology. It aims to establish a conceptual link and threshold between these two areas and provide conceptual strategies for integrating and teaching them in Indonesian higher education. In doing so, this paper has critically summarized and synthesized parts of both the entrepreneurship education and design thinking literature. The details and significance of the conceptual threshold have also been reviewed. The findings of this study are the five primary entrepreneurship-design thinking process cycles (i.e., understanding the problem comprehensively, generating ideas, experimenting iteratively, testing the solutions, and implementing solutions). The process strongly incorporates the "empathy-reflect-visualize" cycle and the integrated *conceptual threshold* as a teaching support tool. This conceptual study provides new pathways for enriching current teaching and research practices of entrepreneurship education and design thinking.

Keywords: design thinking, entrepreneurship in higher education, conceptual threshold, pedagogy, Indonesia.

1. Introduction

Existing discussions in design thinking show many studies continue to debate how to integrate it with entrepreneurship education (see, e.g., Brown, 2009; Dunne and Martin, 2006; Liedtka & Mintzberg, 2006; Liedtka & Ogilvie, 2012). One of the primary rationales is that business schools and higher education institutions (HEIs) worldwide have received much critics. They have sent voluminous ill-equipped graduates into an increasingly turbulent business environment (Bennis & O'Toole, 2005; Glen, Suciu, & Baughn, 2014; Glen et al., 2015). That claim has emerged because many HEIs may have been relied "too much" on analytical ability imparted in the entrepreneurship education curriculum. From the current economic-global perspective, the quality of graduates' outcomes is insufficient. Therefore, there come many suggestions to incorporate several learning perspectives related to more contemporary and applicable entrepreneurial skills, such as problem-based (Tan & Ng, 2006), experimental-based (Kassean et al., 2015), and design-based learning (Dunne and Martin, 2006). The latter perspective appears in the literature as *design thinking*, which nowadays refers to a thinking methodology that can tackle complex business problems, complementing today's young graduates (Simon, 1969; Wang & Wang, 2011; Johansson-Sköldberg et al., 2013).

The widespread design thinking as a creative problem-solving process suggests that HEIs can consider a significant change in entrepreneurship education's teaching and learning process. Design thinking is an engaging way for students to learn about user empathy, multidisciplinary team projects, problem-solving, creativity, divergent and convergent modes of thinking, iteration process, not-afraid of failure, persistence, and resilience, and a solid motivation to change "a better world" (Huber et al., 2016). It enables entrepreneurship educators to integrate many essential design thinking concepts with the related entrepreneurship courses. Thus, it allows students to develop their creative confidence and improve their entrepreneurship perceptions as a rewarding future career. However, studies that have incorporated both disciplines are most likely from developed countries (see, e.g., Nielsen & Stovang (2015) in Denmark; Glen et al. (2015) in the US). Additionally, they have not yet covered a clear picture concerning what elements should be included in integrating entrepreneurship education and design thinking within the higher education context, particularly with the related objectives, activities, tools, and intended results (Schallmo, Williams, and Lang, 2018).

Furthermore, concerning Indonesia, both entrepreneurship education and design thinking are relatively recent in the Indonesian case. There are still very few Indonesian HEIs and textual case studies in the literature that offer both courses and their integrated teachings (Amalia and Von Korflesch, 2020). One of the very few exceptions is the School of Business Management, Bandung Institute of Technology (SBM-ITB) (Larso and Saphiranti, 2016; Larso, Saphiranti, and Wulansari, 2012).

Those circumstances above become paramount for this study to address a research need, i.e., propose a *conceptual integration threshold* of entrepreneurship education and design thinking implemented in HEIs in developing countries. The need to create a conceptual threshold is significant because it could be used as a *proposition* or *starting point* for further

research and investigation to examine whether entrepreneurship education and design thinking can be either wholly or partly integrated, especially in Indonesia.

The following is the methodology employed in this study, followed by the narrative literature review of entrepreneurship education and design thinking. The result and discussion will then continue to address how to conceptually integrate both disciplines and adjust to the Indonesian higher education context. Finally, this study will explain the conclusion, limitation, and further research implications at the end.

2. Methodology

The present study employed a narrative literature review (Green, Johnson, and Adams, 2006) and qualitative case-study textual discussion (Baumeister and Leary, 1997; Yin, 1987).

Some primary reasons are the following. First, there are still unconnected theories on entrepreneurship education and design thinking (Nielsen and Stovang, 2015; Von Korflesch et al., 2013). Second, various studies may have conceptualized the existing ideas within diverse research areas (Wong et al., 2013). For example, Glen et al. (2015) incorporate design thinking in the business curriculum for the business field and engineering and informatics ones. The option of systematic literature methodology (e.g., Thorpe et al., 2005) is prominent, but it might be less straightforward. Therefore, this study uses narrative literature to pull many pieces of knowledge together in a broad perspective and describe a topic's extensive process (Green, Johnson, and Adams, 2006).

Studies have shown that the narrative literature method is valuable, as it represents a wide range of published scientific articles in some fields (Byrne, 2016), for instance, medicine and health (e.g., Seah and Tan, 2015; Ferrari, 2015) and education sciences (Ward, House, and Hammer, 2009). However, some other studies have also criticized the method for limitedly employing peer-reviewed methodologies (Dijkers, 2009). Despite the above differences, the narrative reviews continue to remain solid in the methodological literature. It offers extensiveness of the literature exploration and flexibility to deal with progressing theory and knowledge (Byrne, 2016).

Concerning the qualitative case-study discussion, this study is intended to serve as a starting point and open a new gate for the relatively new research field of entrepreneurship education and design thinking at the Indonesian higher education level. Thus, we intentionally selected the "textual" case from the existing literature. In particular, the School of Business Management, Bandung Institute of Technology (SBM-ITB), Indonesia) (Larso and Saphiranti, 2016; Larso, Saphiranti, and Wulansari, 2012). The main reason is that the institution itself offers design thinking courses in its entrepreneurial pedagogy. The respective textual articles are available in the existing literature, although the number is still limited.

Finally, the main aims of the study are to establish a threshold between these two areas and provide *conceptual* strategies for integrating and teaching entrepreneurship education and design thinking in Indonesian higher education despite the limited time and resources available. Therefore, we believe that the narrative review and qualitative case-study discussion are valuable in this study. Some potential contributions by employing the narrative literature review are an extensive summary of the progress of entrepreneurship education and

the primary characteristics and process stages of design thinking extracted and integrated from the note-taking process. We then combined the resulting narrative literature with some qualitative analysis from the textual case study (i.e., SBM ITB, Indonesia) to offer a conceptual threshold of integrating entrepreneurship education and design thinking for the case of Indonesian higher education. The resulting threshold could enrich the theoretical knowledge of both disciplines and expose a new gate for further research on the applicability and adaptability of entrepreneurship education and design thinking, especially in developing countries – in this case, Indonesia.

3. Literature Review

4.1 Evolutions of Entrepreneurship Education

In the past, research in entrepreneurship education concentrated on overcoming the misconception that entrepreneurs are born, not made (Kuratko, 2005). The controversy centered around an attribute-based versus a competency-based approach. The former process argues that entrepreneurs are born with unique, innate traits, so entrepreneurship is not learnable (Farhangmehr, Gonçalves, & Sarmento, 2016). In support of the trait-based process, some studies found differences in entrepreneurs personality traits compared to managers, as an example, risk propensity (Stewart & Roth, 2001); achievement motivation (Collins, Hanges, & Locke, 2004; Stewart & Roth, 2007); and primary five personality features (Zhao & Seibert, 2006). In contrast, the competency-based approach argues that entrepreneurship is being developed and learned (Kyndt & Baert, 2015). Furthermore, those inherent qualities of entrepreneurs arguably do not fully explain entrepreneurial activity and success (Peschl, Deng, and Larson, 2020). As such, factors aside from personality could highly contribute to entrepreneurial activity and enhance entrepreneurial success. For instance, individuals do not simply know how to write a business plan and spot opportunities. Instead, they learn and improve these skills through education (Kyndt & Baert, 2015; Man, Lau, & Chan, 2002). Therefore, the research question has shifted from whether we can teach entrepreneurship to how we teach entrepreneurship (Peschl, Deng, and Larson, 2020).

Concerning “how to teach entrepreneurship,” traditional pedagogical and teaching methods in entrepreneurship and business education in higher education institutions (HEIs) are mostly lectures and targeted nascent entrepreneurs (Hägg & Gabrielsson, 2019). Those old-fashion methods underscore a behaviorist approach that focuses on transferring and reproducing knowledge, encouraging passivity in student learning (Nabi et al., 2017). In this case, business schools and HEIs have received many critics for many years to send their voluminous ill-equipped graduates into an increasingly turbulent business environment (Bennis & O’Toole, 2005; Glen, Suciu, & Baughn, 2014). This situation suggests that the exclusive reliance on analytical ability (i.e., behavioristic paradigm) imparted in the entrepreneurship education of HEIs’ system is no longer adequate in the current globalization perspective, thereby encouraging the plan to move forward passive to active teaching methods.

Accordingly, contemporary business educators suggest incorporating several more perspectives into the current business and entrepreneurship education curriculum. This movement from passive methods is paramount because it signifies greater recognition that

entrepreneurs learn from actual business experience (Rae & Carswell, 2000), whether positive or negative (Cope, 2011; Politis & Gabrielsson, 2009). As such, more hands-on learning emerged as more educators and researchers began to teach about real-world opportunities and skills as efficient pedagogics (Hägg & Gabrielsson, 2020). Some examples are problem-based learning (Tan & Ng, 2012), student business start-ups, live cases, and business simulations (Kassean et al., 2015). Those methods above encourage active learning through solving real-life problems, which enable knowledge and learning to be more readily transferable to the practical business world (Nabi et al., 2017).

Furthermore, those 'active' teaching methods introduced an experimental feature that traditional ones lack. Experimentation is crucial because it allows a learner to check and validate different assumptions then learn from those experiments' results (Neck, Greene, & Brush, 2015). By implementing them, the students' role becomes increasingly attached to greater use of hands-on learning, while the educators' role becomes more of a facilitator within the student's learning process (Neck & Corbett, 2018).

The contemporary teaching methods mentioned above exhibit both a constructivist and experiential learning process to teaching and learning (Hägg & Gabrielsson, 2020; Nabi et al., 2017). First, the constructivist view suggests that the learning process should involve "active participation" for getting the latest understanding (Nabi et al., 2017, p. 280). Then, the experiential learning view suggests learning as "the process whereby knowledge accumulates through the transformation of experience" (Kolb & Kolb, 2005, p. 194). According to Kolb (2015), experiential learning means a holistic, comprehensive, and integrative perspective that combines students' learning experience, perception, thinking, and behavior. Students, in this learning type, could gain concrete experiences that enable reflective observation of the case. This reflection follows the empathetic-thinking stage and abstract conceptualization, which pushes students to the active experimentation stage. Therefore, this cycle of "empathy-reflect-visualize" for the entrepreneurial teaching method and students' learning process is beneficial. It emphasizes the learner's central role to be life participants in their learning experiences (Peschl, Deng, and Larson, 2020). Such methods facilitate "deep learning whereby students develop a non-public understanding of the fabric instead of simply retention of knowledge" (Phillips & Trainor, 2014, p. 106).

Lastly, another perspective that most likely relates with applicable skills of constructivist and experiential learning approach is "design" (Dunne and Martin, 2006). This design perspective appears in the literature as *design thinking*. It refers to a thinking methodology that can tackle complex business problems, complementing today's young graduates (Simon, 1969; Wang & Wang, 2011; Johansson-Sköldberg et al., 2013). The widespread of design thinking as a process of creative problem solving around the world suggests that business schools and HEIs should consider design thinking as a profound approach to give significant changes in the entrepreneurial teaching methods, objectives, activities, and intended results. The following highlights the fundamental concepts of design thinking: definitions, characteristics, and processes.

4.2 Understanding Design Thinking: Definitions

The discourse of design thinking is not new. The term was first acknowledged in 1987 by Rowe when he published a book titled "Design Thinking" (Rowe, 1987), describing the systematic use of problem-solving procedures in architecture within the realm of design cognition (Lawson, 2005). However, Simon (1969) has analyzed the nature of design already eighteen earlier and acknowledged 'design' to encompass all conscious activities to create artifacts and distinguished it from natural science, social science, and humanities. Engineering sciences were also used to develop and apply design thinking as their methodologies and were initially associated with the way designers think (Johansson and Woodilla, 2009). Today, design thinking is a course set in which students work on real-world design challenges given to them as corporate partners. This concept of teaching is now available in several academic institutions and design schools around the world. They often use a particular term, "design-based learning," which refers to a model for enhancing creativity, endurance, engagement, and innovation (Dym et al., 2006).

Conceptually, the categorization for the roots of design thinking has five sub-discourses: (1) design thinking as the creation of artifacts; (2) design-thinking as a reflexive practice; (3) design thinking as a problem-solving activity; (4) design thinking as a way of reasoning or making sense of things; and (5) design thinking as the creation of meaning (Johansson-Sköldberg et al., 2013). This categorization is also applicable to the past literature that has revealed various ways to define, interpret, and conceptualize design thinking. The identified articles[1] are presented chronologically in Appendix A.

In this regard, several definitions, concepts, and interpretations exist in the literature about design thinking. Within the realm of design, design thinking refers to designers' cognitive processes (Cross, 2011 as cited in Evans, 2012; Lawson, 2005; Rowe, 1987). The term has been developed even more widely and has also become a part of the management realm. It generally associates with a mindset for solving complex-wicked problems in diverse contexts beyond design and encouraging innovations (Yilmaz, Paepcke-Hjeltness, and Dhadphale, 2016). It also brings principles, a methodology, and a collection of tools to realize how both emotional and rational aspirations come into play in innovative problem-solving (Liedtka and Ogilvie, 2011). However, some commentators argue that the existing definitions of design thinking may be too vague because of the dichotomy between scientific rigor and the relevance for professional practice (e.g., Clark and Smith, 2010; Dolak, Uebernickel, and Brenner, 2013; Kimbell, 2011; Lindberg, Meinel, and Wagner, 2010). So, they suggest three design thinking domains, i.e., as a cognitive style, as an embedded principle in professional practice, and as a method to guide the process of designing. Considering the scope of this study is in the entrepreneurship education realm, the first stance of design thinking, which is as a thinking methodology ('cognitive style') in the problem-solving process, will be used.

[1] There are 31 articles that this study has identified to extract the roots and definitions of design thinking (see Appendix A for more details).

4.3 Characteristics of Design Thinking

Many attributes define design thinking characteristics. Previous literature that explores design thinking often articulates a mix of elements and approaches required to see design thinking realized in individuals as *design thinkers* and how they practice design thinking "ideal" attributes within the organizations (Sobel and Groger, 2013). However, design thinking is not a set of fixed features; instead, situated and contextual (Yilmaz, Paepcke-Hjeltness, and Dhadphale, 2016). Thus, it is possible to find an overlapping space between different studies (Oh and Nah 2014), especially between design thinking and design thinkers' characteristics, as the latter perform the former (Waloszek, 2012). It is also not easy to refine the precise understanding of the design thinking characteristics and attributes. Many studies often describe their elements based on circumstantial evidence rather than empirical research (Schweitzer, Groeger, and Sobel, 2015).

Nonetheless, design thinking has primary characteristics in common, and thereby, it is essential to categorize them to create a more meaningful purpose. Efeogli et al. (2013) group the features into procedural and people perspectives. The procedural perspective refers to the rules, structure, and threshold (such as human-centeredness, collaboration, and experimentation). Whereas the human perspective refers to personal characteristics, attitudes, and contributions (for example, being versatile, having broad-spectrum thinking, and a strong personality). Similarly, Rosenberg and Hovland (1960) have separated several design attributes into cognitive (consideration) and behavioral (doing), and affective (feeling) components of a mindset. Grouping design thinking attributes could establish a threshold for anyone to deal with and manage innovation operationally and strategically, from business to education.

While such a perspective could help understand the nature of design thinking, it is impossible to separate the reflection from doing the design practice (i.e., behavioral attributes) and from the individuals' thought (i.e., designer's cognitive elements or, in this case as 'design thinkers') (Kimbell, 2011). Therefore, presenting the main characteristics of design thinking and then followed by the related attributes of design thinkers, both in cognitive and behavioral components within each characteristic's theme, could be one alternative. Figure 1 below provides a list of design thinking five main elements and their mental and behavior attributes (see Appendix B for its details of literature sources).

***Table 1**: Design Thinking Five-Main Characteristics and The Cognitive and Behavior Attributes Extracted from Literature (see the details of the sources in Appendix B).*

Design Thinking Characteristics	**The Related Cognitive and Behavior Attributes**
Human-centered and empathetic	Empathy focuses on human values, seeing and understanding customers' value and needs; observational and curious; and environment-centered concern.
Collaboration and communicative teamwork	Multi-disciplinary collaboration and embracing diversity; the ability for teamwork; cross-disciplinary pollination; interdisciplinary teams; ability to visualize ideas and communicate; and tolerance (deferring judgment).
Experimentation and iterative	The Experimental, pragmatic and explorative mentality; ideation and time-framing experimentation; thinking by doing; experiential intelligence; and action-oriented behavior.
Versatile and broad-spectrum thinking styles	Situated and systemic thinking; critically questioning; integrative (divergent and convergent) thinking; holistic thinking; abductive reasoning; reframing the problem or situation; and think and work systematically.
Firm mentality and personality	Curious and open to learning; being mindful; accept uncertainty, ambiguity, and risk; strong motivation to make a difference; being a model behavior; optimistic; future-oriented; creative; inventive; and generalist.

Overall, the essential characteristic of design thinking is firstly human-centered and empathetic. The application of design thinking as a practice-based method starts by approaching a problem from a human perspective (Dolak, Uebernickel, and Brenner, 2013). Then, design thinking is about creating a better environment with radical collaboration as it enables "breakthrough enlightment and solutions to emerge from the diversity" (Stanford d.school, 2010). The third characteristic is the attitudes of experimentation. As the design thinking process is non-sequential, individuals may undergo feedback loops, so practicing this attribute could be experimental, pragmatic, and explorative and have the out-of-the-box imagination. Moreover, when experiencing design thinking, individuals should practice versatile and broad-spectrum thinking to question critically; use integrative-holistic thinking, abductive reasoning, and reflective reframing; and think systematically to create novel solutions. Lastly, the strong mentality and personality reflect curiosity, openness, mindfulness, and a solid motivation to improve.

4.4 Process Cycle of Design Thinking

Initial design thinking approaches were circular and brought by Simon (1969), consisting of several stages: define, ideate, prototype, choose, implement, and learn. Within this so-

called "prototypical" design thinking process, a designer understands a problem, creates ideas, and generates the best solution (Waloszek, 2012). Moreover, Brown (2008) introduced IDEO's design thinking approach in his seminal article in the Harvard Business Review. He outlined examples and sketched the design thinking circular process of inspiration, ideation, and implementation (Brown, 2008, 2009).

Several other emerging design thinking approaches also prefer sequential approaches for didactical reasons. The commonality of sequential and circular processes is in the iterate circle. For example, Plattner, Meinel, and Wenberg's (2009) sequential approach (i.e., understand, observe, point of view, ideate, prototype, and test) has outlined vital advancements in the design thinking field. Similarly, both the Hasso Plattner Institute in Germany and Stanford University in the USA have used this academic institution method. Liedtka and Ogilvie's (2011) approach in the business education and entrepreneurial areas consists of four sequential phases, and the techniques were developed based on their practical teaching and consulting experiences. The phases are:

- what is? (explores current reality, assesses problems, and identifies opportunities);
- what if? (envisions the future by developing hypotheses from the current trends);
- what wows? (generates manageable solutions from various possibilities);
- and what works? (evaluates the answers and takes them into the marketplace).

Today, design thinking has emerged as a practical problem-solving methodology in other non-design fields, such as business and education. There are numerous approaches for design thinking within the literature (Brown, 2008; Stanford d.school, 2010; Liedtka and Ogilvie, 2011; Plattner et al., 2009) that address design thinking structured way. The design thinking process consists of several stages from the earlier models and can be linear or circular. As such, it may return to the starting pitch and begin a new iteration. It may also include various feedback loops between stages and may even have several locations taking place in parallel. In this matter, identifying the most common elements of design thinking entails a juxtaposition of different approaches. Therefore, this study argues that it could be more beneficial to view the process stages as "a cycle model" instead of sequential steps (Stanford d.school, 2009). Figure 2 below illustrates the five major stages of the design thinking process 'cycle' that this study has extracted from the literature[1] (see Appendix C). The primary phases: understand the problem comprehensively, generating ideas; experimenting iteratively; testing the solutions; and implementing solutions.

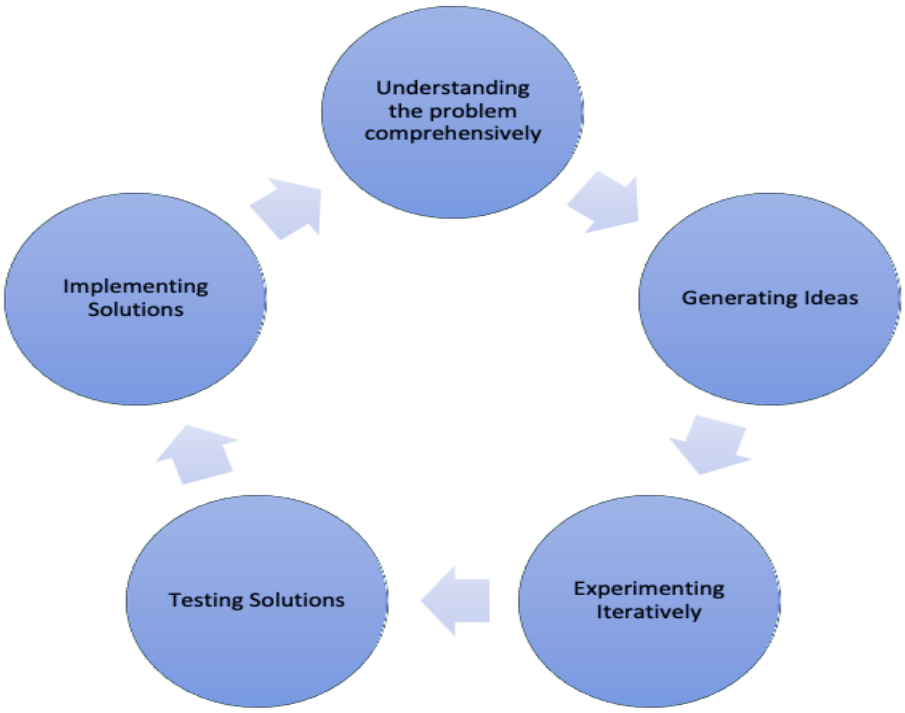

Figure 1*: The Five-Primary Stages of Design Thinking Process Extracted from the Literature see the details of the sources in Appendix C).*

In conclusion, this study believes that most definitions of design thinking in the literature contain some primary aspects. The goal is to develop a new solution for existing or future problems; orientation is users, the process is iterative, and the participants are multidisciplinary teams. In other words, the approach could help understand the problem context from the users' point of view, creativity to generate ideas and insights, rationality, and to analyze and find innovative solutions from the users' feedback. The expansion of design thinking, especially to entrepreneurship education, offers an exciting new paradigm but requires further explorations of definitions, threshold, toolboxes, and suggested practices for integration to support its implementations and effectiveness possibly.

The following is the discussion on how this study connects and integrates the two disciplines of entrepreneurship education and design thinking and acknowledges some literature that has incorporated them in the academic curricula but at the same time reveals a gap that this study finds to be a research need.

4. Result: Connecting and Integrating Entrepreneurship Education and Design Thinking

4.1 The "Entrepreneurship-Design Thinking" Process Cycle

Design thinking has been well-known as an efficient approach for tackling highly ambiguous situations and unveiling unanticipated problems in many research areas (Fixson and Rao, 2014). Notably in the educational field of management (Garbuio et al., 2018) in **entrepreneurship** (Garbuio et al., 2018; Nielsen and Stovang, 2015), and social entrepreneurship (Kickul et al., 2018). It provides a way to introduce students to elaborate, ill-defined entrepreneurial problems with unclear means-end relationships, preparing them for what they will meet as graduates (Garbuio et al., 2018). Therefore, design thinking can be highly relevant for entrepreneurship education (Penaluna and Penaluna, 2009) as it further provides vast opportunities for non-traditional engagement with industry partners (Ranger and Mantzavinou, 2018).

However, entrepreneurship education and design thinking can be seen as very distinct disciplines and thematically far away. O'Grady (2012) has revealed a 'culture clash' between social sciences and design when he compares management and design students' different cultures. Although there are interfaces between those disciplines, like in organizational design (Romme, 2003), comparability is too narrow due to different research attitudes. Whereas most researchers in the design realm exclude estimation as a modus operandi and embraces individuals' instincts, feelings, and experiments, social sciences (including entrepreneurship) rely on prediction as to their source of knowledge (Dunnbar and Starbuck, 2006). Even while design thinking is one of five future entrepreneurial minds (Duening, 2010), it is limited to the fields of 'organizing' and 'operating.'

Despite the difference above of both disciplines in researching approaches and allocations, Von Korflesch et al. (2013) have uncovered several similarities between the two areas: entrepreneurship and design thinking. The similarities that connect both disciplines are:

- The *main actors*: both professions or actors similarly create artifacts. Designers design artifacts, and for the entrepreneurs, it can be new ventures, markets, or organizations (see, e.g., Boland et al., 2008; Dunne and Martin, 2006; Foo et al., 2005; Sarasvathy et al., 2008).
- The *working environment*: both professions deal in similar working environments that are wicked, uncertain, and predictable. In this regard, that wicked situation they face is the triggering factor that drives both entrepreneurs and designers to solve problems (see, e.g., Buchanan, 1992; Sarasvathy, 2004; Sarasvathy et al., 2008).
- The *key characteristics*: both professions similarly need to have and use "empathetic" characters and skills to grasp users' perspectives and then address their implicit and explicit needs (see, e.g., Brown, 2008; Chiles et al., 2010: Dunne and Martin, 2006).
- The *creative tools*: both professions use creativity as one of the core tools to imagine new things and create them together (for designers), and to identify entrepreneurial opportunities that may lead to the creation of new ventures (for entrepreneurs) (Ko and Butler, 2007; Li, 2002; Matthews, 2010).

From those "corresponding linkages" of entrepreneurship and design thinking explained above, this study believes that there is a significant need to integrate entrepreneurship education with design thinking. It is also paramount because the practice of teaching entrepreneurship in business schools and HEIs is arguably still based on a conventional (*rational*) approach. Schön (1983) criticizes that this type of thinking cannot be effective means to solve contemporary global problems. Employing only the sensible approach to teach university students is more relevant where the worlds are stable (Glen et al., 2014), which does not apply in today's business environment. Several studies have even urged the importance of skill development in acquiring tacit knowledge and self-reflection to balance the "craft" feature of entrepreneurship, i.e., creative thinking and iterative learning (see, e.g., Schön, 1983; Mintzberg, 2004). Table 2 below summarizes the differences between teaching entrepreneurship with an analytical approach and a design thinking approach.

Table 2: *The Differences of Teaching Entrepreneurship Education with the Conventional/ Rational Approach and Design Thinking (the authors).*

	Conventional/ Rational Approach	**Design Thinking Approach**
Mindset	Problems are determined up-front, the future is predictable, and the solutions are rational and clearly defined.	Problems are wicked, messy, and ill-defined, the future is unfamiliar, and the solutions are unknown.
Constraints and Obstacles	Unwanted and need to be eradicated.	Positive and challenging.
Reasoning Activity	Overemphasis on careful prior analysis.	Emphasis more on rapid experimentation and inexpensive prototyping.
Solution Process	Rely on rational-analytical logic, often excluding actual practice.	Much prefer to do a lot of practice (co-creation process), go through an iterative process, do observation and exploration.
Results	Students are encouraged to get the "best" answer and may produce low tangible products.	Students are encouraged to obtain "better" answers and produce high tangible products.
Learning-Teaching Style	Passive; students rely much on textbooks.	Active; students incorporate experience-based learning and are encouraged to reflect on their action and learning process.

As Table 2 has illustrated, students can complement rational and creative thinking to solve messy business problems by incorporating entrepreneurship education with design thinking. It also enables them to acquire "entrepreneurial thinking" skills, such as being entrepreneurial alert to discover opportunities (Von Korflesch et al., 2013); then emphasizing empathy, visualized experimentation, and reflection (Glen et al., 2015), which will lead to the iterative-learning of entrepreneurship and design thinking.

Additionally, this study has previously generated the five-primary design thinking process cycle (see Figure 1). The stages are problem understanding, idea generation, experimentation, testing, and implementation. By extracting the sequential phases of design thinking, developed by several studies (see Appendix C), and following the entrepreneurial process circle of "act-sense-think" (Glen et al., 2015), this study subsequently expands one integrated process cycle of entrepreneurship and design thinking as shown in Figure 2 below.

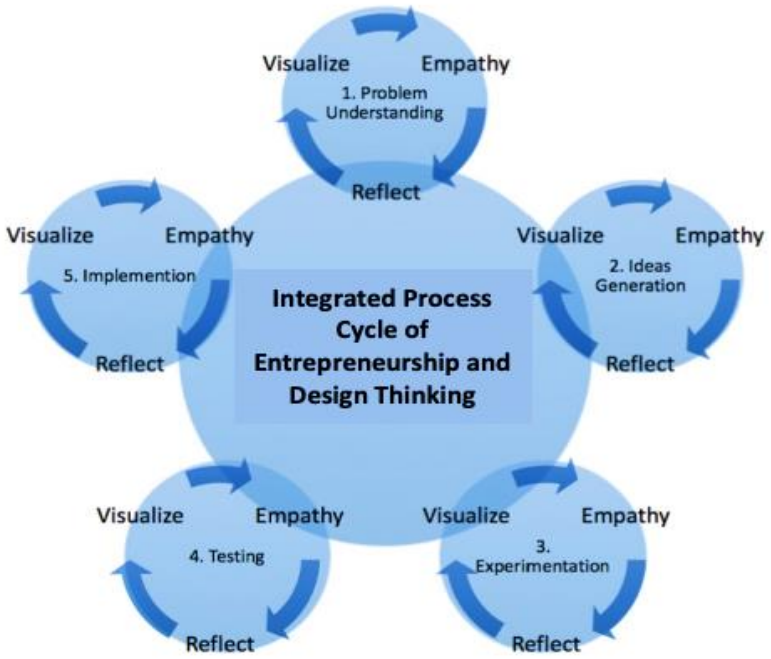

***Figure 2**: The Proposed Design Thinking Process Cycle – the authors.*

This study's integrated process cycle of entrepreneurship and design thinking is not conceptually exceptional to the other existing models in the literature. However, the proposed model presents a non-linear movement between each stage and the whole process because the problems in design thinking and the method to solve them are not linear. This cycling process can go back and forth from one stage to another, allowing iterative and learning mechanisms during the entrepreneurship-design thinking process (Von Korflesch et al., 2013). Furthermore, each of the five steps strongly incorporates customers' empathy in discovering entrepreneurial opportunity, self-and team reflection, and visualization, strongly emphasized in the entrepreneurial process (Glen et al., 2015). That means the approach of "people-centered" through observation and interaction with users, sense-making and theory integration, prototyping, and storytelling with the team members are emphasized continuously in each stage within this cycle process. Students can learn step by step throughout the process and proceeds to the next project after completion.

Some studies have acknowledged and incorporated the design thinking approach in the management and innovation courses (Melles et al., 2012); business (Glen et al., 2015); and entrepreneurship in higher education (Nielsen and Stovang, 2015; Von Korflesch et al., 2013), as presented in Table 3 below.

Table 3: Summary of some studies in the literature that integrates entrepreneurship education and design thinking (Amalia and Von Korflesch, 2021).

	Design thinking course	**Design Thinking Scaffold**	**DesUni Model**	**Entrepreneurial Design Thinking**
Source	Melles, Howard, Thompson-Whiteside (2012)	Glen, Suciu, Baughn, and Anson (2015)	Nielsen and Stovang (2015)	Von Kortzfleisch, Zerwas, and Mokanis (2013)
For whom and where?	Undergraduate student, Australia	Undergraduate and graduate (MBA) students, USA	Undergraduate and graduate students, Denmark	Graduate students, Germany
Process/ Framework	Following D.School Bootcamp Manual (HPI Stanford University): empathy-define-ideate-prototype-test phase.	The scaffold consists of problem finding, observation, visualization and sense-making, ideation, prototyping and testing, and viability testing. Each of the six phases is associated with critical activities in an "act-sense-think" loop.	The DesUni model consists of inner circle components (imagination, action, and mindset) and outer components (knowledge, design methods, facilitated teaching, habitat and culture, and assessment). Learning process DesUni model: Discover the present; Envision the future; Sense future potential; Interact with others; Go to theory; and Novel artifacts.	The six-stage process: consciousness (opportunity recognition), comprehension (problem understanding), consideration (idea development), creation (solution development), check (solution testing), and carry out (business plan and pitch)
How to do it?	Lectures, tutorials, guest lectures, team projects, blog writing, literature review, and final proposal presentation. Projects are undertaken in on-campus locations, e.g., library, health service, bookshop, where a combination of human, space, and product innovation is required.	Using "design challenge": to create a new product or service creation or problems from the greater community. E.g., For the MBA level, the design challenges have been presented by local companies' clients. For UG classes, the students' team may be asked to develop a business plan to address consumers whose needs are not fully met by mainstream products or services.	User journey mapping, personas, visualization, co-creation, prototyping, brainstorming, cultural popes, business model canvas, board games, storytelling, sense-making, and academic assignment writing.	Introductory projects for team building. After the groups work on more enhanced projects, the team members will rotate to get new team members. They will prepare entrepreneurial business models for the final projects, including marketing, investment, and finance. During the project, students will be accompanied by mentors.
What are the challenges?	Students often think of a "narrow-minded" solution, an 'intellectual' problem for students to read scientific articles, write a literature review, and test time constraints.	Students may face an increasing sense of ambiguity as they move from one phase to another.	Compared to traditional education, the implementation of the model involves a radical change in curriculum, teaching methods, style, teacher-student relations, teaching space, and assessment.	To have ideally multiple advisors (mentors) with different specialization to accompany students during the project.

From the discussion above, the integration of entrepreneurship in higher education and design thinking can be a highly preferable alternative. It supports pro-active learning (Glen et al., 2015), emphasizes experience-based learning (Melles et al., 2012), and promotes reflective action (Schön, 1983) for preparing young graduates to gain the necessary skills. However, many identified articles above are addressing this issue in developed countries. The

examples from developing countries, such as Indonesia, are still limited and probably rarely studied.

4.2 Textual Case Study: MBA CCE – SBM ITB, Indonesia

The incorporation and integration of design thinking in entrepreneurship education, particularly in Indonesian HEIs, are rare. One of the HEIs is the School of Business and Management, Bandung Institute of Technology (SBM-ITB)[2]. The ITB has been formed in 1920 and is the first and prominent technology-based HEI in Indonesia. The institute began to create the MBA program in 2011, primarily in creative and cultural entrepreneurship (MBA-CCE). This MBA program concentrates on the current theory and actual practice of Indonesian arts, local design and culture, entrepreneurial leadership, and contextual business management for national and global growth and sustainability (Larso and Saphiranti, 2016). Also, they employ an entrepreneurial pedagogy in its curriculum system by enabling its students to undergo the entrepreneurial process of opportunity identification, planning, start-up creation, and growth cycle. See Figure 3 for the program structure of the MBA-CCE.

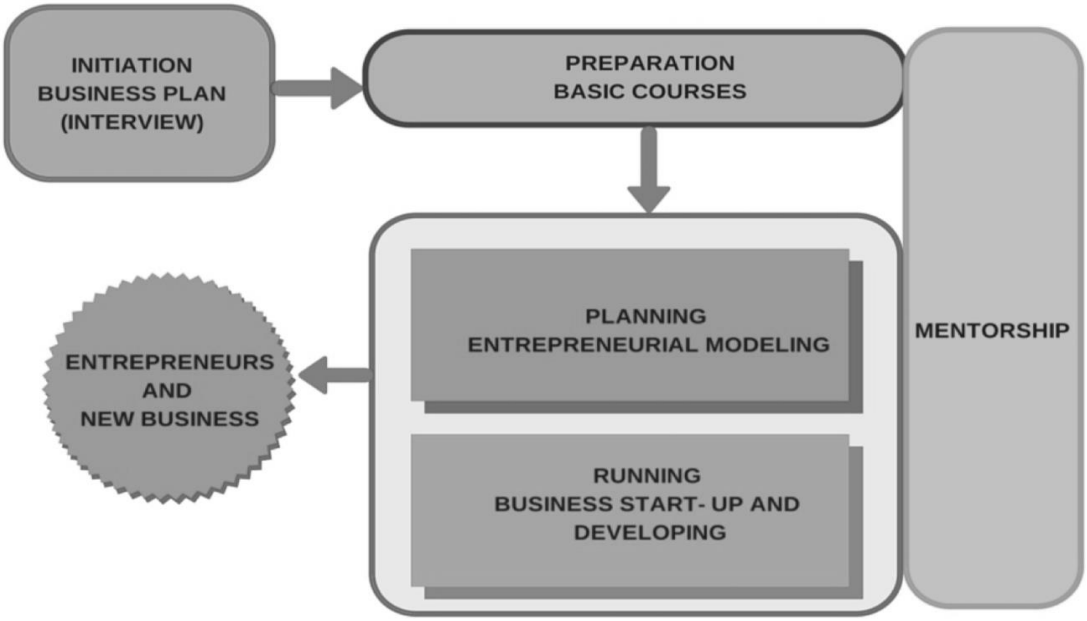

***Figure 3**: The Entrepreneurship Education Program Structured of MBA-CCE, SBM ITB, Indonesia (source: MBA SBM ITB Booklet, 2017).*

By collaborating with the internal ITB's School of Arts and Design, this program aims to enable students to gain entrepreneurial skills and knowledge and nurture future entrepreneurs

[2] The official website: https://www.sbm.itb.ac.id. SBM ITB is primarily located in Bandung Province, Indonesia. However, it recently opens a new branch in Jakarta to offer a corporate master-degree program, especially for professionals and business specialists.

to be creative and capable entrepreneurs in the future. Some current MBA courses include in the program, such as marketing management, operations management, leadership, and financial management, as well as three specialized modules: design thinking, contextual nature of creativity, and design-art-culture. See Table 4 for the curriculum details of MBA-CCE, SBM ITB.

***Table 4**: The Curriculum of MBA-CCE SBM ITB (source: Larso and Saphiranti, 2016)*

First semester	
Course	**Credit Hour**[3]
Marketing Management	3
Operation Management	3
Leadership	3
Design Thinking	3
Second semester	
Financial Management	3
Business Strategy	3
Design Art and Culture	3
Contextual Creativity	3
Third semester	
Entrepreneurial Modeling	3
Business Initiation	3
Fourth semester	
New Venture Management	3
Business Growth Management	3
Total Credit Hour	36

This program has also been supported by business practitioners and real entrepreneurs in various national creative industries. Some of them are in the fashion industry, music, advertising, local arts, and culture. In this case, the MBA CCE employs those practitioners and entrepreneurs as mentors who "accompany" students in the mentoring sessions and as a part of the entrepreneurship education curriculum. The mentors would give a group of students' advices and share their business experience. Students are also be accompanied by mentors during the incubation process to prepare and probably launch their business. Besides some entrepreneurs and practitioners, the MBA-CCE is also supported by banks and other financial institutions that provide soft loans to students. This cooperation will strengthen the ecosystem of entrepreneurship education within the program, particularly to offer accessible funding. Other than that, entrepreneurs ITB'S club and alumni association are parts of the entrepreneurial ecosystem to provide wide networking for students. Additionally, this MBA program cooperates with some local governments and entrepreneurs' associations in the West Java Province, where ITB is located (Larso et al., 2012).

The design thinking course offered by the MBA-CCE intends to form students' mindset in terms of identifying opportunities, developing products and services, processes, strategies,

[3] There are numerous online "ECTS calculator" online, but generally, 1 SKS (credit hour) in Indonesian is equal to 36 hours studying in one semester (12 sessions, each last for 3 hours). While for 1 ECTS in Europe is equivalent to 25 hours studying, each last for 2.5 hours) (source: Erasmus Mundus Indonesia, 2012).

and executing business models. The course is in the first semester as one of the primary subjects. Every student enrolled in this MBA-CCE must submit their initial business plan; the design thinking course would help them review, rethink, re-identify, or even re-create their business. The teaching method combines theoretical (i.e., *lectures, guest lectures, and case studies*) and practical activities (i.e., *team discussion, on-site business visit, group presentation*). The course contents include "*ideas visualization, think big, design process systematization, developing product and business ideas, and connecting design and market*" (Larso and Saphiranti, 2016, p. 226). The topic and materials *are the introduction of design thinking, idea generation, brainstorming, exercise innovation, principles of aesthetic, creative process and experience, creativity and design strategy, philosophy of design, company visit, group discussions, business plan presentation, and discussions* (Larso et al., 2012, p.883).

The design thinking course focuses on understanding the process of the occurrence of an idea. Provides an understanding of creative design thinking to be applied at the scale of community operations. Stimulating aesthetic sensitivity is essential to understand how to creatively solve a technical problem in the innovation process because these principles can be formed logically and have a built-in structure. Creativity is a skill that must continue to be developed, related to the human mind's cognitive factors and analytical abilities related to awareness of and understanding of ideas and objects. An idea that identifies with certainty an order, structural and conceptual. Creativity is closely related to context, related to situations where someone catches a problem and carries out the work process. At the end of the course and program, students present their final reports concerning their businesses and entrepreneurial understanding. In this way, students are encouraged to optimize their time for their study and entrepreneurial endeavors (Larso and Saphiranti, 2016).

In summary, the integration of entrepreneurship education and design thinking within Indonesian HEIs seems to follow some current design thinking phases. However, both the curriculum and the learning-teaching process shown in the literature seem to be not clearly described, and consequently, may lead to partial implementation of the integration process. This situation, however, provides a research opportunity to offer a conceptual learning-process cycle and integration threshold of entrepreneurship education and design thinking within the context of Indonesian higher education, particularly adapting from the case of MBA-CCE SBM ITB. The following is the discussion of the conceptual threshold proposed by this study.

5. Discussion: Proposing A Conceptual Threshold of Integration Entrepreneurship and Design Thinking in Indonesian Higher Education

The widespread design thinking has been shown by an increasing number of HEIs that offer the integration of entrepreneurship education and design thinking as innovation. As presented in Table 3 earlier, studies that have to incorporate both disciplines are most likely from developed countries (Australia, Europe, and the USA). The examples from developing countries are rather rudimentary.

Even though Indonesia seems to have a positive outlook of its current circumstances, the integration of entrepreneurship education and design thinking within its higher education context (i.e., the MBA CCE SBM ITB) seems to be partially implemented. The stages of design thinking and how the whole 'teaching-learning implementation process (i.e., its entrepreneurship-design thinking teaching stages and threshold) are not clearly described in the available literature. Another reason is that existing studies arguably have not to cover yet a clear picture concerning what elements should be included in the integration design thinking and entrepreneurship education within the higher education context, particularly with the related objectives, activities, tools, and results (Schallmo, Williams, and Lang, 2018). Therefore, generating a conceptual threshold of integrating entrepreneurship and design thinking, mainly Indonesian higher education, becomes necessary to address those research gaps.

This study suggests a conceptual process cycle and threshold for their integration. It was done by this study thoroughly discussing the conceptual understandings of entrepreneurship education and design thinking in the previous sections and explaining the general state of entrepreneurship education that incorporates design thinking courses MBA-CCE SBM ITB.

This study has incorporated the previous design thinking process cycle (see Figure 2). From the process cycle, we extended and adjusted the cycle to the contextual situation and curriculum system of MBA-CCE SBM ITB from the available literature (see, e.g., Larso et al., 2012; Larso and Saphiranti, 2016) to reflect and accommodate the research need. The first result is the following Figure 4.

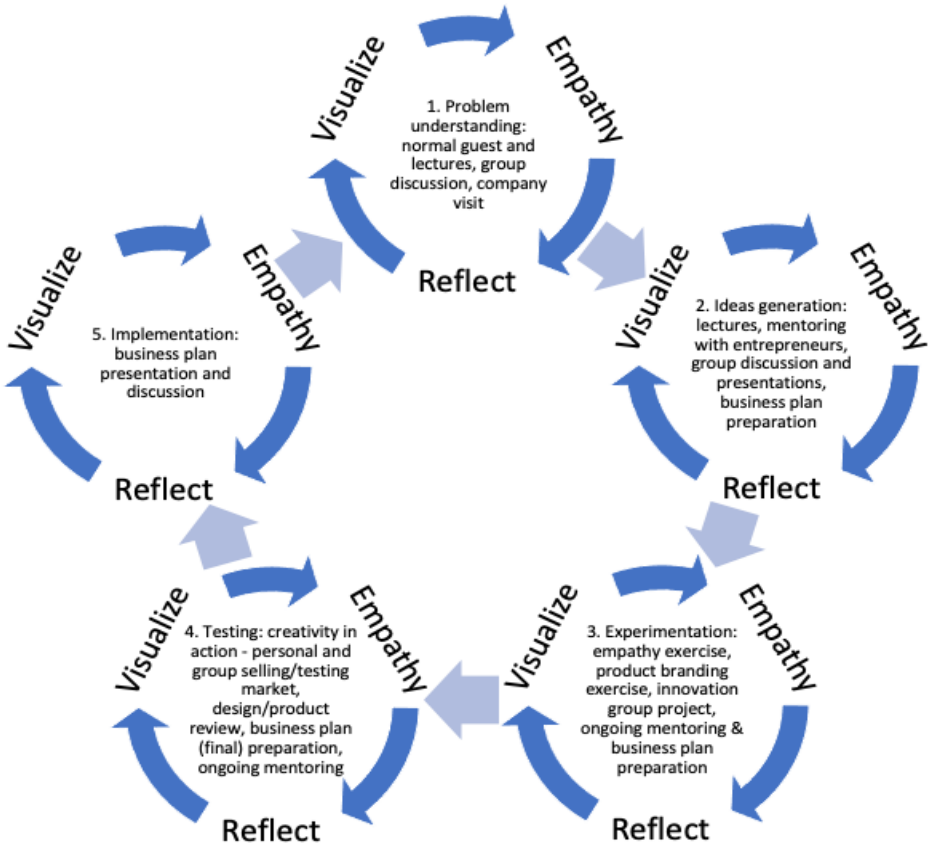

***Figure 4**: The Proposed Process Cycle of Design Thinking and Entrepreneurship Education in the Indonesian HEIs.*

For the latter objective, this study has consolidated the process stages of design thinking with integrated entrepreneurship-design thinking teaching and learning stages, learning objectives, activities, tools, and results based on the contextual case of MBA-CCE SBM ITB (see Table 5 below).

***Table 5**: The Conceptual Threshold of Integrating Design Thinking and Entrepreneurship Education in Indonesian Higher Education.*

Teaching-Learning Stages	**Learning Objectives**	**Activities**	**Tools**	**Intended Results**
Understanding the problem comprehensively and being empathetic	To define, discover, interpret issues through the users' perspectives/ point of view.	Research and problem definition; interpreting and re-framing the problem and users by empathy and observing users; reflecting users' perspective.	Design and market research; users' interview and observation; environment visit	A comprehensive understanding of users' current situation, frustration (things they said and not said).
Generating ideas	To question "What if, what might be?", meaning imagining and visualizing the future possibilities.	Gathering insights from users' observation; brainstorming activities by abductive thinking; actively looking for new data; grasping external knowledge; specifying ideas, pooling and then synthesizing them; conceptualizing ideas and action plans.	Persona, Brainstorming; Journey Mapping; Value Chain Analysis	A complete ideas conceptualization describes in detail users' problems to assess the new ideas and uncover gaps, win arguments and derive future developments, and group and describe thoughts for the next phase.
Experimenting iteratively	Data and information visualization	Rapid and cheap prototypes; synthesizing early users' needs and feedbacks; predicting future consequences by deductive thinking; making ideas and concepts tangible; Checking "what wow?" of the prototypes, and do active collaboration.	Prototyping, storytelling, role-playing, physical and computer modeling,	Collecting all possible alternative ideas for solution testing
Testing the solutions	Gathering users' feedback from the iterative experimentation	Integrating all the feedbacks: users, team members, all stakeholders; Going to the theory and see "what works?"; and inferring possible "new world."	Market (users and partners) test both online and offline; users' interaction; knowledge pooling system integrated with the users; team learning and open communication	Finding the most promising concepts/ ideas.
Implementing the solutions	Finalizing the solution and preparing the product/service/system launch to the market	Integrating theory, learning and testing the viability, thinking the results generally (inductive thinking); solving the problems; selecting and preparing the final action plans, and continuing to the following projects	Marketing tools (advertising online and offline); developing the marketplace by acquiring accessible funding, planning the market introductions either for the improved prototypes or the final solutions, learning and improvement.	Proposed/ improved products, services, or even system innovations meet users' needs and solve their problems environmentally sustainable.

The conceptual process cycle (Figure 4) and threshold of design thinking and entrepreneurship education (Table 5) have five primary elements.

a) *Understanding the problem comprehensively* (and being empathetic). The process begins with understanding the situation thoroughly, in which students start researching, defining, interpreting, and (re)framing the issue. The tools can use interviews and observation. In the context of MBA-CCE SBM ITB, students could start with typical and guest lectures, 'in-class' group discussion, and the initial company or industrial

visits to reach complete explicit (theoretical knowledge) and implicit understandings of users' needs and wants.

b) *Generating ideas*. In the second stage, students generate numerous ideas by raising "what if," "what might be," and "how might we" questions, do brainstorming with teams, and gathering insights. Students can use a persona, users' journey mapping to conceptualize ideas and derive a complete picture. In the context of SBM ITB, the MBA CCE students could start the mentoring sessions with their entrepreneurial mentors and prepare their business plans while still having usual lectures and frequent team discussions.

c) *Experimenting iteratively*. In the third stage, students do experimentation by creating rapid artifacts and synthesizing users' needs to come up with novel solutions. This stage aims to collect all possible alternative ideas by prototyping and synthesizing early users' feedbacks. The MBA-CCE students could practice this stage by doing empathy exercises, "product branding" analysis and presentation, and continuing the mentoring sessions with their respective mentors to prepare their business plan.

d) *Testing the solutions*. In the fourth stage, one tests and checks the proposed solutions iteratively by integrating users' feedback until one comes up with the final product or service. The testing stage can be online and offline market or users' testing, creating a knowledge pooling integrated system to find the most promising operational problems. Students of SBM ITB could undergo their selling activity to test the market about their corresponding business ideas or products, then use the information to review and communicate their improvements for the final business plan.

e) *Implementing the solutions*. The final stage is the solution implementation. In this stage, one could create a business plan to acquire external funding for the tested solution's mass production or sell direct over the internet. The latter option has become the fastest channel to launch a new or improved product or service (Liedtka and Ogilvie, 2011). This final stage is improved products, services, or system innovations that meet users' needs, solve the problems and be sustainable with the environment (Owen, 2007). The MBA-CCE students eventually present their business plan and may (or not) execute it in actual practice.

6. Conclusion, Limitation, and Further Research Implications

Overall, this study contributes to the richness of both entrepreneurship education and design thinking research areas by outlining the depth of the literature for both disciplines. The following are some of the highlights that have been thoroughly discussed in this study.

The primary features of design thinking, extracted from the existing literature, are human-centered and empathetic, collaboration and communicative threshold, experimentation and iterative, versatile and broad-spectrum thinking style, and strong mentality and personality. Additionally, this study has generated a five-primary entrepreneurship-design thinking process cycle consisting of problem understanding, ideas generation, experimentation, testing, and implementation phases. Each of the five steps strongly incorporates the "empathy-reflect-visualize" entrepreneurial process cycle that could help students to learn gradually throughout

the learning process. This study has also proposed the *conceptual* process cycle and threshold of integrating the teaching of entrepreneurship and design thinking in the context of Indonesian HEIs, in this case by using the *textual* example of the MBA-CCE entrepreneurship education program in the SBM-ITB Indonesia. This study and its suggested threshold were helpful. It enriches the lack of literature and opens the door for new research fields concerning the integration of entrepreneurship and design thinking from the developing-country cases.

Despite its significance, this study has a limitation. As it is a conceptual research, the interpretations of the findings should be *contextual*, not general. The findings open valuable future research works, such as to test this study's conceptual process cycle and threshold of whether this type of educational integration is possible in higher education or other academic contexts. Another research possibility is to examine some cross-cultural adaptation strategies in which design thinking could support entrepreneurship education, especially in developing countries.

References

Amalia, R. T., & Korflesch, H. F. O. Von. (2020). Practical Teaching of Entrepreneurship in Higher Education with The Design Thinking Approach: The Case of Indonesia Ria Tristya Amalia, Harald F. O. Von Korflesch. *The 24th Annual Interdisciplinary Conference on Entrepreneurship, Innovation, and SMEs (G-Forum), Virtual Edition.*

Bennis, W., & O'Toole, J. (2005). How business schools lost their way. *Harvard Business Review*, *83*(10), 148. https://hbr.org/2005/05/how-business-schools-lost-their-way

Boland, R. J., Collopy, F., Lyytinen, K., & Yoo, Y. (2008). Managing as designing: Lessons for organization leaders from the design practice of Frank O. Gehry. *Design Issues*, *24*(1), 10–25. https://doi.org/10.1162/desi.2008.24.1.10

Brown, T. (2009). *The making of a design thinker*. Metropolis. https://www.metropolismag.com/ideas/the-making-of-a-design-thinker/

Brown, T. (2008). Design Thinking. *Harvard Business Review*, *April*, 14–17. https://hbr.org/2008/06/design-thinking

Buchanan, R. (1992). in Design Thinking Wicked Problems. *Design Issues*, *8*(2), 5–21. https://doi.org/10.1017/dsj.2015.1

Chiles, T. H., Tuggle, C. S., McMullen, J. S., Bierman, L., & Greening, D. W. (2010). Dynamic creation: Extending the radical austrian approach to entrepreneurship. *Organization Studies*, *31*(1), 7–46. https://doi.org/10.1177/0170840609346923

Clark, K., & Smith, R. (2010). Unleashing the Power of Design Thinking. *Design Management Review*, *19*(3), 8–15. https://doi.org/10.1111/j.1948-7169.2008.tb00123.x

Collins, Christopher J.; Hanges, Paul J.; Locke, E. A. (2004). The Influence of Team Monitoring on Team Processes and Performance. *Human Performance*, *17*(1), 25–41. https://doi.org/10.1207/S15327043HUP1701

Cope, J. (2011). Entrepreneurial learning from failure: An interpretative phenomenological analysis. *Journal of Business Venturing*, *26*(6), 604–623. https://doi.org/10.1016/j.jbusvent.2010.06.002

Cross, N. (n.d.). From a Design Science to a Design Discipline: Understanding Designerly Ways of Knowing and Thinking. *Design Research Now*, 41–54. https://doi.org/10.1007/978-3-7643-8472-2_3

Der Foo, M., Kam Wong, P., & Ong, A. (2005). Do others think you have a viable business idea? Team diversity and judges' evaluation of ideas in a business plan competition.

Journal of Business Venturing, *20*(3), 385–402. https://doi.org/10.1016/j.jbusvent.2004.04.001

Dolak, F., Uebernickel, F., & Brenner, W. (2013). Design Thinking and Design Science Research. *DESRIST 2013, Eighth International Conference on Design Science Research in Information Systems and Technology, 11.-12.6.2013, Helsinki, Finland*, 1–11. https://www.alexandria.unisg.ch/Publikationen/223547

Duening, T. N. (2010). Five minds for the entrepreneurial future: Cognitive skills as the intellectual foundation for next generation entrepreneurship curricula. *Journal of Entrepreneurship*, *19*(1), 1–22. https://doi.org/10.1177/097135570901900101

Dunbar, R. L. M., & Starbuck, W. H. (2006). Learning to design organizations and learning from designing them. *Organization Science*, *17*(2), 171–178. https://doi.org/10.1287/orsc.1060.0181

Dunne, D., & Martin, R. (2006). Design Thinking and How It Will Change Management Education: An Interview and Discussion. *Academy of Management Learning and Education*, *5*(4), 512–523. https://doi.org/10.5465/AMLE.2006.23473212

Dym, C. L., Agogino, A. M., Eris, O., Frey, D. D., & Leifer, L. J. (2006). Engineering design thinking, teaching, and learning. *IEEE Engineering Management Review*, *34*(1), 65–90. https://doi.org/10.1109/emr.2006.1679078

Efeoglu, A., Møller, C., Sérié, M., & Boer, H. (2013). Design thinking: characteristics and promises. *14th International CINet Conference on Business Development and Co-Creation, September*, 241–256. https://doi.org/10.13140/2.1.4737.6640

Evans, M. (2012). Design Thinking: Understanding How Designers Think and Work by Nigel Cross . *The Design Journal*, *15*(1), 141–143. https://doi.org/10.2752/175630612x13192035508741

Farhangmehr, M., Gonçalves, P., & Sarmento, M. (2016). Predicting entrepreneurial motivation among university students. *Education & Training*, *58*(7/8), 861–881. https://doi.org/http://dx.doi.org/10.1108/ET-01-2016-0019

Fixson, S. K.; Rao, J. (2014). Learning Emergent Strategies Through Design Thinking. *Design Management Review*, *25*, 46–54. https://doi.org/10.1111/drev.10271

Garbuio, Massimo; Dong, Andy; Lin, Nidthida; Tschang, Ted; and Lovallo, D. (2018). Demystifying the genius of entrepreneurship: How design cognition can help create the next generation of entrepreneurs. *Academy of Management Learning and Education*, *17*(1), 41–61. https://doi.org/10.5465/amle.2016.0040

Glen, R., Suciu, C., Baughn, C. C., & Anson, R. (2015). Teaching design thinking in business schools. *International Journal of Management Education*, *13*(2), 182–192. https://doi.org/10.1016/j.ijme.2015.05.001

Glen, R., Suciu, C., & Baughn, C. (2014). The Need for Design Thinking. *Academy of Management Learning & Education*, *13*(4), 653–667. https://doi.org/10.5465/amle.2012.0308

Hägg, G., & Gabrielsson, J. (2019). A systematic literature review of the evolution of pedagogy in entrepreneurial education research. *International Journal of Entrepreneurial Behaviour and Research*, *26*(5), 829–861. https://doi.org/10.1108/IJEBR-04-2018-0272

Huber, F., Peisl, T., Gedeon, S., Brodie, J., & Sailer, K. (2016). Design Thinking-Based entrepreneurship education : How to incorporate Design Thinking principles into an entrepreneurship course. *4th 3E Conference – ECSB Entrepreneurship Education Conference, May*, 1–17.

Johansson-Sköldberg, U., Woodilla, J., & Çetinkaya, M. (2013). Design thinking: Past, present and possible futures. *Creativity and Innovation Management*, *22*(2), 121–146. https://doi.org/10.1111/caim.12023

Johansson, U.; Woodilla, J. (2009). Towards An Epistemological Merger of Design Thinking, Strategy, and Innovation. *8th European Academy Of Design Conference - 1st, 2nd & 3rd April 2009, The Robert Gordon University, Aberdeen, Scotland*, 1–5. https://doi.org/10.1016/0167-5087(84)90542-8

Kassean, H., Vanevenhoven, J., Liguori, E., & Winkel, D. E. (2015). Entrepreneurship education: a need for reflection, real-world experience and action. *International Journal of Entrepreneurial Behavior & Research*, *21*(5), 690–708. https://doi.org/10.1108/IJEBR-07-2014-0123

Kickul, J., Gundry, L., Mitra, P., & Berçot, L. (2018). Designing With Purpose: Advocating Innovation, Impact, Sustainability, and Scale in Social Entrepreneurship Education. *Entrepreneurship Education and Pedagogy*, *1*(2), 205–221. https://doi.org/10.1177/2515127418772177

Kimbell, L. (2011). Rethinking Design Thinking: Part I. *Design and Culture*, *3*(3), 285–306. https://doi.org/10.2752/175470811x13071166525216

Ko, S., & Butler, J. E. (2007). Creativity: A key link to entrepreneurial behavior. *Business Horizons*, *50*(5), 365–372. https://doi.org/10.1016/j.bushor.2007.03.002

Kolb, Alice Y.; Kolb, D. A. (2005). Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education Author(s): *Academy of Management Learning & Education*, *4*(2), 193–212. https://doi.org/10.5465/AMLE.2005.17268566

Kolb, D. A. (2015). Experiential Learning: Experience as the Source of Learning and Development Second Edition. In *Pearson Education, Inc. Upper Saddle River*. https://doi.org/10.1002/job.4030080408

Kuratko, D. F. (2005). The Emergence of Entrepreneurship Education: Development, Trends, and Challenges. *Entrepreneurship Theory and Practice*, *29*(5), 577–597. https://doi.org/10.1111/j.1540-6520.2005.00099.x

Kyndt, E., & Baert, H. (2015). Entrepreneurial competencies: Assessment and predictive value for entrepreneurship. *Journal of Vocational Behavior*, *90*, 13–25. https://doi.org/10.1016/j.jvb.2015.07.002

Larso, D., & Saphiranti, D. (2016). The role of creative courses in entrepreneurship education: A case study in Indonesia. *International Journal of Business*, *21*(3), 216–225.

Larso, D., Saphiranti, D., & Wulansari, A. (2012). Educating technology-based entrepreneurs: The development of an MBA Program in Creative and Cultural Entrepreneurship. *2012 Proceedings of Portland International Center for Management of Engineering and Technology: Technology Management for Emerging Technologies, PICMET'12*, 879–884.

Lawson, B. (2005). How Designers Think The Design Process Demystified. In *Architectural Press Elsevier*. https://doi.org/10.4324/9780080454979-12

Li, M. (2002). Fostering design culture through cultivating the user-designers' design thinking and systems thinking. *Systemic Practice and Action Research*, *15*(5), 385–410. https://doi.org/10.1023/A:1019933410857

Liedtka, J., & Ogilvie, T. (2012). Helping Business Managers Discover Their Appetite for Design Thinking. *The Design Management Institute*, 6–13. https://doi.org/10.1111/j.1948-7169.2012.00165.x

Lindberg, Tilmann; Gumienny, Raja; Jobst, Birgit; Meinel, C. (2010). Is there a Need for a Design Thinking Process? *Interpreting Design Thinking*, *8*(October), 243–254.

Lindberg, Tilmann; Meinel, Christoph; Wagner, R. (2011). Design Thinking: A Fruitful Concept for IT Development? In *In Plattner, Meinerl, and Leifer (Eds.) Design Thinking: Understand, Improve, Apply* (pp. 219–236). https://doi.org/10.1007/978-3-642-13757-0_13

Man, T. W. Y., Lau, T., & Chan, K. F. (2002). The competitiveness of small and medium enterprises: A conceptualization with focus on entrepreneurial competencies. *Journal of Business Venturing*, *17*(2), 123–142. https://doi.org/10.1016/S0883-9026(00)00058-6

Martin, R. (2009). The Design of Business: Why Design Thinking is the Next Competitive Advantage. In *Harvard Business School Press*. https://doi.org/10.1093/benz/9780199773787.article.b00154692

Matthews, J. H. (2010). Investigating design, creativity and entrepreneurial processes. *In: Annual Meeting of the Academy of Management - Dare to Care: Passion and Compassion in Management Practice & Research, 6–10 August 2010, Montreal, Canada., August*, 6–10.

Melles, G., Howard, Z., & Thompson-Whitesidec, S. (2012). Teaching design thinking: Expanding horizons in design education. *Procedia - Social and Behavioral Sciences*, *31*(2011), 162–166. https://doi.org/10.1016/j.sbspro.2011.12.035

Mintzberg, H. (2004). The Role of Entrepreneurial Organizational Design in Maximizing The Contribution of Employee Environment Information Harvesting. In *Berrett-Koehler Publishers*. Berrett-Koehler Publishers.

Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education: A systematic review and research agenda. *Academy of Management Learning and Education*, *16*(2), 277–299. https://doi.org/10.5465/amle.2015.0026

Neck, H. M., & Corbett, A. C. (2018). The Scholarship of Teaching and Learning Entrepreneurship. *Entrepreneurship Education and Pedagogy*, *1*(1), 8–41. https://doi.org/10.1177/2515127417737286

Neck, H., Greene, P., & Brush, C. (2014). Teaching Entrepreneurship. In *Teaching Entrepreneurship*. https://doi.org/10.4337/9781782540564

Nielsen, S. L., & Stovang, P. (2015). DesUni: university entrepreneurship education through design thinking. *Education + Training*, *57*(8–9), 977–991. https://doi.org/10.1108/ET-09-2014-0121

O'Grady, J. K. (2012). Design Is Entrepreneurship Is Design Is…. *Design Management Review*, *23*(4), 82–88. https://doi.org/10.1111/j.1948-7169.2012.00215.x

Oh, Eun Kyong; Nah, K. (2014). Design Thinking Process Model and its Application to Social Innovation. *Journal of Korea Design Knowledge*, *null*(32), 31–44. https://doi.org/10.17246/jkdk.2014..32.004

Owen, C. (2007). Design Thinking: Notes on Its Nature and Use. *Design Research Quarterly*, *1*(2), 16–27. https://doi.org/10.1017/S1359135500002712

Penaluna, A., & Penaluna, K. (2009). Assessing creativity: drawing from the experience of the UK's creative design educators. *Education + Training*, *51*(8/9), 718–732. https://doi.org/http://dx.doi.org/10.1108/00400910911005262

Peschl, H., Deng, C., & Larson, N. (2020). Entrepreneurial thinking: A signature pedagogy for an uncertain 21st century. *International Journal of Management Education*, *xxxx*, 100427. https://doi.org/10.1016/j.ijme.2020.100427

Phillips, C., & Trainor, J. (2014). Millennial students and the flipped classroom. *Journal of Business and Educational Leadership*, *5*(1), 102.

Plattner, H., Meinerl, C., & Weinberg, U. (2009). Design Thinking – Innovation lernen, Ideenwelten öffnen. In *München: mi-Wirtschaftsverlag.*

Politis, D., & Gabrielsson, J. (2009). Entrepreneurs' attitudes towards failure: An experiential learning approach. *International Journal of Entrepreneurial Behaviour and Research*, *15*(4), 364–383. https://doi.org/10.1108/13552550910967921

Rae, D., & Carswell, M. (2000). Using a life-story approach in researching entrepreneurial learning: The development of a conceptual model and its implications in the design of learning experiences. *Education + Training*, *42*(4–5), 220–228. https://doi.org/10.1108/00400910010373660

Ranger, B. J., & Mantzavinou, A. (2018). Design thinking in development engineering education: A case study on creating prosthetic and assistive technologies for the developing world. *Development Engineering*, *3*(March), 166–174. https://doi.org/10.1016/j.deveng.2018.06.001

Romme, A. G. L. (2003). Making a Difference: Organization as Design. *Organization Science*, *14*(5), 558–573. https://doi.org/10.1287/orsc.14.5.558.16769

Rosenberg, M., & Hovland, C. (1960). Cognitive, Affective, and Behavioral Components of Attidudes. In *In M. Rosenberg, C. Hovland, W. McGuire, R. Abelson, & J. Brehm (Eds.), Attitude Organization and Change: An Analysis of Consistency among Attitude Components*. https://doi.org/10.4324/9781410612823.ch3

Rowe, P. G. (1987). *Design Thinking*. The MIT Press: The Massachusetts Institute of Technology.

Sarasvathy, S. D. (2004). Making it happen: Beyond theories of the firm to theories of firm design. *Entrepreneurship: Theory and Practice*, *28*(6), 519–531. https://doi.org/10.1111/j.1540-6520.2004.00062.x

Sarasvathy, S. D., Dew, N., Read, S., & Wiltbank, R. (2008). Designing organizations that design environments: Lessons from entrepreneurial expertise. *Organization Studies*, *29*(3), 331–350. https://doi.org/10.1177/0170840607088017

Schallmo, D., Williams, C. A., & Lang, K. (2018). An Integrated Design Thinking Approach – Literature Review, Basic Principles and Roadmap for Design Thinking - ProQuest. *Innovation, The Name of Game, ISPIM Conference Proceedings, Stockhom, Sweden, 17-20 June 2018*, *June*, 1–18. https://www.proquest.com/docview/2186801880?accountid=38977

Schön, D. (1983). The Reflective Practitioner: How Professionals Think in Action. In *Cambridge, MA.* Basic Books, Inc.

School of Business Management Institute of Technology Bandung, S. I. (2017). *Booklet Master of Business Administration Institut Teknologi Bandung* (Issue 1).

Schweitzer, J., Groeger, L., & Sobel, L. (2016). The Design Thinking Mindset: An Assessment of What We Know and What We See in Practice. *Journal of Design, Business & Society*, *2*(1), 71–94. https://doi.org/10.1386/dbs.2.1.71_1

Simon, H. A. (1969). The sciences of the artificial, (third edition). In *MIT Press: Vol. 3rd Editio*. https://doi.org/10.1016/S0898-1221(97)82941-0

Sobel, L., & Groeger, L. (2013). Management Summary - Design Thinking: Exploring Opportunities for the Design Industry and Business in Australia. *SSRN Electronic Journal*, *61*(0). https://doi.org/10.2139/ssrn.2233083

Stanford, H. P. I. of D. at. (2010). *The D.School Bootcamp Bootleg*.

Stewart, W. H., & Roth, P. L. (2007). A meta-analysis of achievement motivation differences between entrepreneurs and managers. *Journal of Small Business Management*, *45*(4), 401–421. https://doi.org/10.1111/j.1540-627X.2007.00220.x

Tan, S. S., & Ng, C. K. F. (2006). A problem-based learning approach to entrepreneurship education. *Education & Training*, *48*(6), 416–428. https://doi.org/http://dx.doi.org/10.1108/00400910610692606

Thorpe, Richard, Robin Holt, Allan Macpherson, and Luke Pittaway. (2005). Using Knowledge within Small and Medium-Sized Firms: A Systematic Review of the Evidence. *International Journal of Management Reviews* 7(4):257–81. doi: 10.1111/j.1468-2370.2005.00116.x.

Von Kortzfleisch, H. F. O., Zerwas, D., & Mokanis, I. (2013). Potentials of Entrepreneurial Design Thinking® for Entrepreneurship Education. *Procedia - Social and Behavioral Sciences*, *106*, 2080–2092. https://doi.org/10.1016/j.sbspro.2013.12.237

Waloszek, G. (2012). *Introduction to Design Thinking*. SAP User Experience Community. https://experience.sap.com/skillup/introduction-to-design-thinking

Wang, S., & Wang, H. (2011). Teaching Design Thinking Through Case Analysis: Joint Analytical Process. *Decision Sciences Journal of Innovative Education*, *9*(1), 113–118. https://doi.org/10.1111/j.1540-4609.2010.00295.x

Yilmaz, S., Paepcke-hjeltness, V., & Dhadphale, T. (2011). The Nature of Design Thinking in Academia and Industry. *2016 Design Research Society 50th Anniversary Conference*, *27-30 June 2016, Brighton, UK*, 1–7.

Zhao, H., & Seibert, S. E. (2006). The big five personality dimensions and entrepreneurial status: A meta-analytical review. *Journal of Applied Psychology*, *91*(2), 259–271. https://doi.org/10.1037/0021-9010.91.2.259