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**Design Thinking and Managerial Education,  
from theory through practice.**

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# Introduction

Throughout this final dissertation thesis, we will address the Design Thinking subject from different perspectives, with the final aim of determining its role with regard to the managerial educational context. To this extent we will start first by analysing the subject, providing briefly its theoretical and historical background, focusing mainly on the managerial sphere. We will then proceed through chapter by analysis the principal schools providing Design Thinking stages and implementing models through which is possible to work on real-life projects.

In the second chapter instead, the Design Thinking tools, necessary to lead the design thinker through the complicated action of thinking conveniently and divergently are analysed in much detail. The instruments will be explored individually, addressing both their linkage with the process execution and the motivations behind their efficacy. Here we will also deep into some criticises and the debates rose on the Design Thinking efficacy, as well as the professional tension created between Designers and managers.

In the third chapter will collocate the subject purely into the organisational area. Here the main aim would be to demonstrate which are the advantage — and disadvantage as well — of using the Design Thinking method in the firm's environment. To this extent, three main topics will be explored. First we will analyse how Design Thinking could be a potential in providing a competitive advantage, by fostering firm's innovation capabilities and lowering cognitive biases. Second, we will determine what precisely mean for a manager to embrace a design attitude while working, also by exploring the concrete consequences of the organisational and managerial practice as a whole. Third and last, we will also provide which are the barriers and difficulties that inhibit the Design Thinking application into the organisational environment.

Through the fourth chapter we will deep into the real objective of this thesis: how Design Thinking can be included and learned in business schools. Here Design Thinking will be finally merged with the managerial education, by establishing first the determinants and the necessities that have lead to the necessity of the inclusion, as long as the boundary conditions

that must be accepted for effectiveness. Also, the skills that will be acquired by the students through such a path will be explored. As a consequence, we will present which are the existent pedagogical models to teach Design Thinking in the academical courses.

Finally, we will provide a real application of Design Thinking in the educational environment, with the objective of determining problems and frictions that arise among participants when in front of an academical experience that merges masters' studies with a real business project.

# Chapter 1

## Design Thinking

# 1.1 The concept of Design Thinking

Throughout this chapter the origins of Design Thinking methodology will be first investigated, by providing the difference between the various concepts attached to the term. To this extent, the main differences between pure design, Designerly Thinking, and Design Thinking will be provided. Successively the focus will be shifted on the managerial practice of the method. Within this regard, the major streams composing the managerial Design Thinking literature will be analysed, along with the main approaches, principles and tools attached to the various methodologies. Finally some critiques regarding the Design Thinking validity will be explored, by providing different perspectives and opinions.

## 1.1.1 Origins and definitions

To fully understand Design Thinking in management and educational field — the central argument of this final dissertation thesis — it is essential to start by defining the concept by bringing some historical features.

The term “Design Thinking” is today very popular and largely spread in various environments, and for this reason, the term is simultaneously the object of many debates and confusions. Several misunderstandings arose because the term was first conceived in the architecture and design context, whereas in more recent years it has been attached also to the business and managerial environment. For this reason still we do not have a unique definition for Design Thinking (Liedtka, 2015) and, at the same time, many terms and authors turn around it.

Each author that get involved in Design Thinking literature, in fact, gives his own definition of the concept, and it may be the case that even within the same author more than one definition is presented. Tim Brown, one of the major exponents of Design Thinking discipline, gives multiples definitions for the same term, even within the same piece: “*A set of principles that can be applied by diverse people to a wide range of problems.*” (Brown T. 2009) or “*A methodology that imbues the full spectrum of innovation activities with a human-centred design ethos.*” (Brown, 2008) or even “*A team-based approach to innovation.*” (Brown,

2008). Other two supporters of the method, Roger Martin and Jeanne Liedtka, defined Design Thinking as “*An abductive way of thinking*” (Martin, 2009) or as “*A systematic approach to problem solving*” (Ogilvie & Liedtka, 2011). As it has been just provided, a unique meaning for the term itself cannot be provided.

However, an interesting piece of work has been done to clarify this issue. Ulla Johansson Sköldberg, recognised Professor of Design Management at Gothenburg University (Sweden), published an exhaustive paper where the concepts concerning Design Thinking subject have been divided and catalogued in order to sort things (Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013).

Ulla Johansson Sköldberg within her work, sustains that in order to fully comprehend the Design Thinking term, the theoretical literature should be divided into two major streams:

1. “*Designerly Thinking*” that refers to the academic construction of the designer figure of the designer, in all its practical skills and competencies, and way of know.
2. “*Design Thinking*” which pertains to the concept emerged more recently within the managerial debate; here the design practice is used also outside the design context, by people, managers, without an academical background in design.

This publication revealed to be very useful to clarify the various concepts and actors attached to the term. As a matter of fact, the Design Thinking argument can become tangled and confused if not managed properly. For this reason it is necessary to start by cataloguing all the concepts pertaining to the argument. Once the concept has a clear theoretical base, we can proceed by analysing the term in the management and business area.

In the following paragraph we will examine the first stream of theories related to the Designerly Thinking stream: bounded rationality and wicked problems.

## 1.1.2 Designerly way of Thinking

Designerly Thinking is a concept that refers to the academical construction and the theoretical reflections on competences, typical of the designer practice (Johansson-Sköldberg, 2013). This matter, is deeply rooted in the academic field of design, and for this reason, far more older than Design Thinking. Even if the concepts treated from this subject are purely academics, they reveal to be important for a better understanding of the Design Thinking, term, which in many cases drawn from design literature.

As matter of fact, two of the most famous academics contributors to develop the Designerly Thinking concept had been identified to be Herbert Simon (Simon, 1996) and Richard Buchanan (Buchanan, 1992).

Herbert Simon had been the first person who talked about Designerly Thinking, in his book called “The creation of artefacts” publicised in 1969. Even thought, Simon never used the term “Design Thinking”. Simon’s research includes various subjects: Economy, Psychology, Sociology, Management, Philosophy and Computer Science. Only in recent years Simon had been interested in design matters. Simon also won the Nobel price in 1978 in Economics, for his contribution to the model of decision making, by adding the concept of *bounded rationality*.

Bounded rationality — term coined by Simon in 1950s — describes the following concept; individuals, when making decisions, only seek for satisfaction rather than optimisation. This situation occurs because our mind is limited for two simple reasons: first, by the fact that we cannot access to all the information needed for make this decision, and second, because even if we could access those information, our mind would not be able to process them properly and third we have limited time to make the decision.

Simon defined design as “*the transformation of existing conditions into preferred ones*” (Simon, 1996) since he sustained that the design discipline deals with creation, whereas other sciences are concerned only with what already exists. These ideas, originated by Simon, are considered the building base of Design Thinking, and are seen as a reference point

especially for all the academical research. Simon, in fact, is considered the father of design research as Taylor was for management (Johansson-Sköldberg, 2013).

The second person who had been very influencing in the sphere of design was Richard Buchanan<sup>1</sup>. He interpreted the designer's way of thinking as a continuous interaction with *wicked problems*. A problem can be defined as wicked when is hill formulated and without a single solution. In this kind of problems, information is confusing, since that there are many stakeholders with conflicting values and exigencies. The concept of wicked problem dates back to 1972, when Horst Rittel<sup>2</sup> defined it along with their specific properties:

1. Wicked problems have No definitive formulation
2. Wicked problems have No stopping rules
3. Solution to wicked problems cannot by true or false, only good or bad
4. In solving wicked problems there is No exhaustive list of admissible operations
5. For every wicked problem there is always more than one possible explanation
6. Every wicked problem is a symptom of another, higher level problem
7. No formulation and solution of a wicked problem has a definitive test
8. Solving a wicked problem in a one shoot operation, with No room for trial and error
9. Every wicked problem is unique
10. The wicked problem solver has No right to be wrong, they are fully responsible for they action.

The approach taken by Buchanan was considered the first attempt to deal with the Designerly Thinking perspective starting, in fact, from Rittel's wicked problem definition as an alternative from the usual and accepted linear model used in design processes: problem definition, followed by a problem solution.

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<sup>1</sup> Richard Buchanan, professor of design and Innovation, is known especially for extending the application of design into new areas of theory and practice. He argues that interaction design does not stop at the flatland of the computer screen but extends into the personal and social life of human beings and into the emerging area of service design, as well as into organizational and management design. For further information, visit <https://weatherhead.case.edu/faculty/george-buchanan>

<sup>2</sup> Hostel Rittel, design Theorist and University Professor, was mostly known for the coin of the term "Wicked problem".

Buchanan introduced the concept of “placement” to describe the designer reasoning to solve indeterminate problems. Designers in fact have to apply a very intricate logic while designing. A designer imagines both the product, since that it usually does not exist yet, and simultaneously, the context of placement. The concept of placement is intended as the most important features that must be enhanced by a designer, but at the same time it should be balanced in the designed object. Many mind exercises with fast changing of context has to be done while designing, and it turns out that this kind of reasoning could be very useful also for non-design related disciplines, as management.

### **1.1.3 Design Thinking: a managerial perspective**

The concept of Design Thinking, is far younger than design itself but has grown very rapidly in recent years, especially in the organisational and managerial environment. Design Thinking has less robust academical roots with respect to Designerly Thinking, since it is often interpreted as a way for managers to understand design (Johansson-Sköldberg, 2013). Design Thinking started to be considered an academical subject only during the seventies, when designers began to take courses to management scholars.

Business researches become increasingly interested in the design subject, to understand how its logics and reasonings could have been adapted to the chaotic complex management environment. In this context, in fact, Design Thinking does not refer to the classic design discipline but rather it considered a human-centred approach to problem-solving, creativity and innovation (Brown, 2008).

Also in this case, a multiplicity of actors can be connected to the same discourse, however the major exponents in an organisational perspective are:

1. The IDEO design company, which sustains Design Thinking as a necessary tool for tackling with innovation.
2. Dunne, along with Martin, whose sustain Design Thinking as a way to approach indeterminate organisational problems, and as a consequence, a key skill for management.

3. Boland with Collopy which sustain Design Thinking as a fundamental part of management theory.

Originator	Audience	Discourse Character	Academic Connections	Relation to Practice
IDEO design company (Tom Kelley & Tim Brown)	Company managers (potential customers)	IDEO success cases (written for managers)	Grounded in experience rather than research Connections to innovation research	Kelley: How 'we' (IDEO) do design thinking Brown: how anyone can use design thinking
Roger Martin	Educators (academics & consultants) Company managers	Success cases from production companies used to illustrate theory development (managerial thinking)	Grounded in cognitive science & management science Builds on planning theories ('wicked problems')	How successful production companies do design thinking How 'any' company (manager/individual) can do design thinking
Richard Boland & Fred Collopy	Academic researchers & educators	Short essays where established (management) scholars apply their theoretical perspective to the design area	Grounded in individual researchers' own theoretical perspectives Inspired by Gehry's architectural practice or contact with design	Design thinking as analogy & alternative

Table 1: Comparison of the three management discourses of Design Thinking,  
(Johansson-Sköldberg, 2013)

In table 1 above, the three approaches that today are attributed to Design Thinking can be observed, along with their main audience and epistemology. It can be immediately and easily grasped that the main audience is composed by managers and educators. The materials on which this theory is based are represented largely by real cases and applications. Successful cases in fact are often used as the main reference by authors to illustrate the theory development and managerial implications. A completely different approach with respect to Designerly Thinking.

### 1.1.3.1 Design Thinking and innovation

The first discourse regarding Design Thinking is the one generated by Tim Brown, along with IDEO company. IDEO is a global design firm who takes a human-centred, design-based approach to help organizations in both public and private sectors to innovate and grow<sup>3</sup>. It has been founded in 1991 in Palo Alto, California from David Kelley, Bill Moggridge, and Mike Nuttall. Kelley is the founder of IDEO and professor at Hasso Plattner Institute of Design at Stanford University, formally known as d.school<sup>4</sup>. The d.school is considered a focal point for the Design Thinking methodology and, as a matter of fact, its major role is to provide learning experiences to help people at unlocking their creativeness potential and transpose it to the

<sup>3</sup> From [IDEO.com/about](http://IDEO.com/about)

<sup>4</sup> Information from d.school official website: <https://dschool.stanford.edu/about/>

most varied kind of problems. However, even if Kelley is the officially founder of the IDEO company, the CEO Tim Brown is often considered as the real supporter of Design Thinking methodology.

Brown defined Design Thinking as a methodology that imbues the full spectrum of innovation activities, with a human-centred design ethos (Brown, 2008). According to Brown, in fact, every delivered solution to be consistent has to be powered by a deep understanding of the human being. To this extent, he sustains that Design Thinking has basically nothing in common with what we are used to associate with “design” such as the action of drawing or the Product Development phase. Brown in fact links ironically the work of the pure designer — drawing — as the action of rendering an object desirable to the consumers, by “putting a beautiful wrapper around the idea” (Brown, 2008). Today in fact the design intended as a strategy, as Brown suggests, is becoming so crucial that giant companies are hiring designers, or even acquiring design firms in order to perform better for their clients, managing digital transformation and innovations using Design Thinking as catalyst.

### **1.1.3.2 Design Thinking for business problems and necessary skill for management**

The second discourse concerning the Design Thinking concept (Table 1) has been raised by Roger Martin, dean of Stanford’s d.school, and one of the first supporter of Design Thinking as part of the cognitive process of successful executives. According to Martin, this methodology can unlock a particular reasoning that enhances the ability to innovate, using the logic of the “Knowledge Funnel”. Martin describes indeed Design Thinking as a “*dynamic interplay that balance analytical mastery and intuitive originality, that enable leaders to innovate, along with the path of the knowledge funnel*” (Martin, 2010). The Knowledge funnel is a model that — following Martin — illustrates the way in which the most brilliant minds work while solving wicked challenges and creating ambitious innovations. In order to sustain his thought, Martin brings to our attention the two examples of successful ideas: the McDonald’s business and Newton’s discovery. These two cases, according to Martin, even if very in contexts, have a common creation path structure.

As it was already said, Design Thinking is not academically rooted as design is. For this reason, all its supporters use renown successful cases to endorse their theories, since first they demonstrate how the theory is applicable in a real situation, and second they facilitate the concept transmission, by providing readers with existing subjects. Also Martin as Brown did used this epistemological structure while explaining his theory. Brown used Edison's discovery of the light bulb to approach Design Thinking explanation (Brown, 2008), while Martin cited McDonald's history to describe the logics behind the knowledge funnel (Martin, 2010).

As a matter of fact, McDonald's history provides the perfect metaphor for the Knowledge Funnel functioning. The whole McDonald's history rotate around the creation of the "Speedee Service System", which is the name attached to procedure used first by McDonald's brothers in preparing the meals, which can be approximated to the principles of the production line manufacturing, applied to restoration. The origins of the Speedee Service System<sup>5</sup>, the ancestor of the fast-food restaurant, can be brought back to 1940, when McDonald's brothers established a small drive-in stand in California, with the attempt to exploit a new market opportunity: the new American eating habits, changed through the post war mobility. Then, after a decade of practice, they had been able to identify which was the right offer for that specific market opportunity: bring Americans with a quick, convenient and tasty meal. Later, in 1955, Ray Kroc, American businessman, astonished by McDonald's management efficiency, decided to acquire the business. Kroc taken advantage of the Speedee Service System, by taking it down to an exact science: every hamburger had to weigh 1.6 ounces (about 45 grams) and cook for exactly 38 seconds so that to remove every possibility of error in every phase of the operation. This mechanisation or "algorithm" using Martin's worlds, perfect by Kroc, made possible the creation of the McDonald's colossal.

What can be "taken away" from McDonald's history, is that the steps that shape the creation of a brilliant innovation, following the model, are basically three:

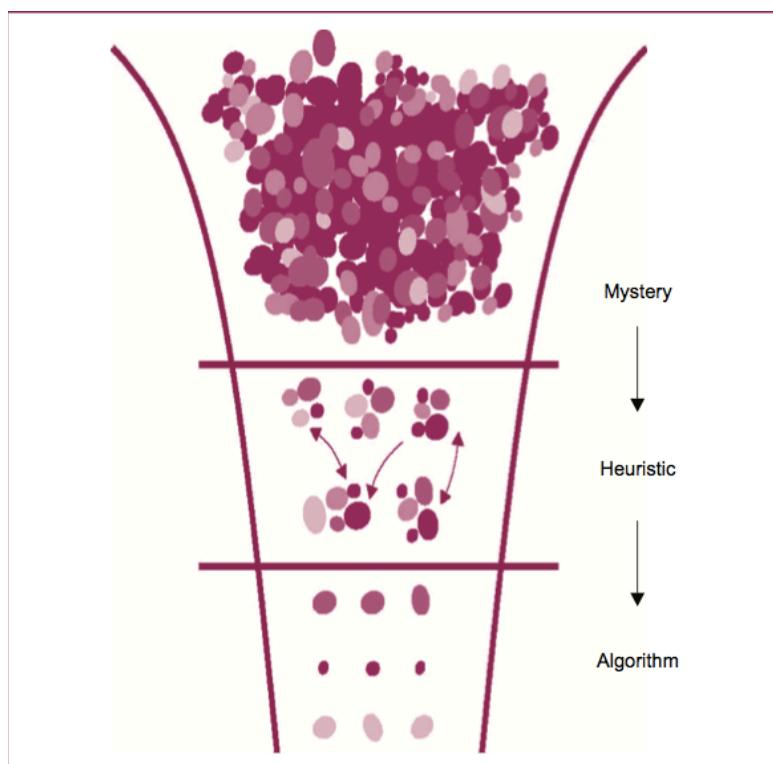
1. Identify a specific problem, or "*mystery*" that need to be solved,

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<sup>5</sup> Richard James McDonald's and Maurice James McDonald, aka Dick & Mac McDonald, pioneers of McDonald's fast food chain restaurants.

2. Establish an initial *heuristic* (rule of thumb) that could approximate the solution.
3. Convert the heuristic into a specific and simplified *algorithm*.

This sequence of steps can be indeed approximated to a funnel (Figure 1) where the entrance is fulfilled with a bundle of disordered ideas (*Mystery*) that become, as we gradually descend, more ordinated (Heuristics) until final solution (Algorithm).



**Figure 1:** The Knowledge Funnel (Martin, 2010)

What is more important to study, are not the steps themselves, but rather the reasonings and the actions actuated around this process of innovation. Martin would in fact transmit that the knowledge, according to his model, is originated from the action of reasoning over an initial question. This question, following Martin reasoning, can be solved only with an extended period of contemplation, experimentation and observation of the facts, until the construction of an initial rule (second step of the funnel). Once a heuristic (or a rule) can be established, the individual can move to the exploration of all the possibilities present in the environment, to construct a final algorithm. Martin continues by underlining that in order to pursue this kind

of path we need surely to engage in the cognitive logic of abduction, triggered thanks to the application of Design Thinking.

The logical inference — the concept from which the logic of abduction derives — can be described as a cognitive action that allows us to use the knowledge to draw conclusions. This cognitive action, the logical inference, is based on three main way of think: **deduction**, **induction** and **abduction**.

- *Deduction*, or deductive logic is applied when we move from a generic rule into a specific application. In this case, a conclusion is always guaranteed, since that if the original assertion is stated to be true, also the conclusion, must also be true. A good example can be drawn from Math: if A is equal to B and B is equal to C then we can deduce that A must be equal to C.
- *Induction*, or inductive reasoning instead moves from a specific observation limited to a specific environment, to a generalised conclusion. In this case, the solution is not guaranteed, or better is not assured to be true, since that it is not possible to sort all the possible evidences in every single to validate the conclusion. Even if induction cannot assure certain solution, it does not mean that the reasoning behind is to be considered wrong. The logic that moves induction can be defined to be additional, since it can increase the human knowledge making inferences about not yet observed phenomena.
- *Abduction*, or Abductive logic, finally is considered as the logic of “what could be” since it is characterised by incompleteness in evidence, incompleteness of explanation or even both. Citing the McDonald’s case: the brothers were not sure about the success of the Speedee Service System, they did not know it would have worked, they simply followed their instinctive reasoning (Martin, 2010) without having any evidences that this kind of business would be profitable.

Reasoning with an abductive logic means also to involve a creative imagination and visualisation other than observation and evidences, exactly what distinguishes people using Design Thinking from the other kind of thinkers.

Martin linked Design Thinking to the organisational environment, by sustaining that if an organisation want to be successful, it needs to apply Design Thinking process with an abductive logic and engage in continuous exploration. Following Martin in fact it is not enough to discover something new and exploiting the knowledge generated by the new discovery, but rather, we need to look continuously for new challenges to be solved, over and over. This attitude is unfortunately very tough to be applied for a typical organisation. Inside organisations actually people are used to reason along the line of analytical thinking, that is: looking at the past to find confirmations for present decisions. Design Thinking is a perfect instrument to escape this logic, since that it forces managers to unlock creativity by reasoning on what it could be rather than what it was.

As it will be presented in the next paragraphs, Martin is not the sole in perpetuating this kind of discourse, since that other two academics retain that Design Thinking is central for the management practice.

### **1.1.3.3 Design Thinking as part of management theory**

The last discourse attached to the Design Thinking argument (Table 1) has been raised by Richard Boland and Fred Collopy (Boland & Collopy, 2008) both professors of design and Innovation at Case Western Reserve University, Ohio. They sustain Simon's belief of design centrality for the management practice, either as cognitive logic (similar to Martin) and as organisational practice. This discourse raised by Boland & Collopy reveals to be the most significant for the scope of this thesis, since that it bridges the world of Design Thinking with the one of business education, by coining the word "Managing as Designing".

Within this terminology, the two academics want to contrast the actual paradigm of management practice and education: the methodology of teaching management with a decisional aptitude. The decisional aptitude is mostly concerned with methods and techniques apt to making choices based however on the assumption that an adequate set of options is already present.

A design aptitude, according to with the two scholars (Boland & Collopy, 2008) is needed for managers whose want to be able to have the possibility to realise innovational projects and organisational betterment. The design aptitude is in fact intended to be a strategy for managers to shift away from the usual focus on goals, and in contrast, opt for a mindset directed to seek human betterment. This kind of aptitude energises organisational members and fosters individuals to chase expectations behind stated missions, and to achieve better results for a future to be proud of.

Boland and Collopy, sustain indeed the need for a design attitude in both the university and the business environment. Crediting Simon's notion: "*Engineering, medicine, business, architecture and painting are concerned not with the necessary, but with the contingent: not how things are, but how they might be; in short, with design.*" (Simon, 1996)

The two authors clarify in fact that an enduring problem of today's scholars is that they still fail to recognise the need for a new curriculum for management education that valorise the manager role as designer. The cause of this oversight, according to them, has to be brought back to a wrong perception of design. Design — intended as a noun — is in fact overmuch attached to the world of style and fashion, negatively obscuring design as a verb. This misperception, in the long run, had caused the association of design to finished products and established procedures to perform activities rather than, more properly, as a way to define problems and projects, and as a to act in order to seek amelioration in the world. Boland and Collopy are indeed convinced in pursuing the path of unearthing the importance of design in the field of management, since that, according to them "*If managers accept such a design attitude, the world of business would be different and better*" (Boland & Collopy, 2008). This last discourse raised by the two scholars is very similar to the one sustained by Brown, since as we already saw, also him sustains that Design Thinking must be detached from the usual concept of design intended as a noun.

Still, even after having analysed the various discourses regarding Design Thinking, still it is not feasible to give a comprehensive definition of the term since Design Thinking can be compared to Music: every musician has his style, and in the same way also Design Thinking has more than one authors and shades (Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013).

However, what is more important, is that Design Thinking has been considered at first indispensable to organisational innovativeness but also as a method to unlock a peculiar kind of reasoning, essential to solve indeterminate problems. Also for these reasons, Design Thinking is today considered a necessary and essential skill for managers (Martin, 2007b; Brown, 2008; Liedtka, 2000, Boland & Collopy, 2008). As a consequence Design Thinking should be a required component of management education, starting with the assumption that it can be learned — with the opportune stimulation — through experiences and ad hoc workshops, even without having an artistic attitude (Brown, 2008).

## 1.2 Different approaches and shared views

After having reasoned around the origins and the various definition of the Design Thinking term, and understood which are the main concepts attached to it, it is now possible to present the methodology in more practical terms, exposing its implementation phases.

As for the Design Thinking origins, also the implementation models are subdivided in different school of thoughts attached in turn to different authors. Through this section we will analyse all the main streams, to show major differences and similarities.

The various Design Thinking models, even if derived from different sources, are all characterised by three principal steps (Liedtka, 2014):

1. An initial phase dedicated to the understanding of final user needs, through Data Gathering, to understand the problem deeply.
2. A second stage marked by the actual idea generation along with the members of the team.
3. A third devoted to prototype and test the solution along with final users.

Even if at first sight those stages seem to be a dummy procedure, ready to be used, we will understand that things go differently. The key lies in fact in the ability of the individual who using the tools, since he must have the right skills, acquired through training. Furthermore, in order to have the expected success, the steps need to be applied along with some precaution in term of team composition, environment times and schedules.

Today, given the fact that Design Thinking had been introduced from a substantial time span, many are the shades in which we can find it. Still, there are practices describing Design Thinking that can be considered as the building block of the method itself. According to Jeanne Liedtka, a very known strategic professor, the state of the art is represented by five main approaches: two have been developed by consulting firms whereas the other three are more academical rooted since that they have been generated by design schools like Stanford Design School, Rotman and Darden Business School.

We will now enter the details of every specific process, in order to understand on first instance, what Design Thinking actually is, and on second instance, to grasp the principles and tools attached to its practice.

### **1.2.1 The Human Centred Design Process**

Design Thinking process, even if it comes in many forms, it has always been attributed to be a creation of the IDEO Design firm. IDEO, as we already said, was born as a design company. They started in 1991 and they worked on developing innovative products of every type, starting from the Apple's first mouse, the mechanical whale in Free Willy and even medical equipment. Later on, they recognise that there were asked to solve other issues not related to physical PD problems, such as organisation reconstruction, or the rearranging of the learning environment. They applied to non-physical issues the same process used to approached innovation with physical products, and it worked. They have been started to call this new method of doing consultancy, "design with small d" to distinguish from the usual way of work. Then time later, Brown, the CEO, along with David Kelley, the founder, reasoned over the fact that every time they work with design tools, they always associate the word "thinking" and in this way, they decided to nominate the "design with small d" way of consultancy, Design Thinking.

Design Thinking within the IDEO model is said to be created so that teams and individuals can become able to manage innovation and generate breakthrough ideas. According to the IDEO model, it is possible to generate breakthrough ideas by merging designers' skills with the constraints presented from businesses. Businesses, following the IDEO model, are increasingly interest in the design world since today we are experiencing a desperate need for innovation. Innovation is becoming, in fact, a survival strategy not attached to physical products, but rather to human-centred activities such as processes, services and way of communication. This is why design is too important to be left to designers (Brown, 2009).

However, why Brown emphasise exactly "designers" skills?

According to Brown, the figure of the designer has the role of matching human needs with what is technologically feasible and economically affordable in order to create the products that we all enjoy today. The real novelty delivered by IDEO's methodology is that it brings those design skills into the hands of non-designers, giving to them the possibility to apply those instruments over a multitude of problems, also different from the classic activities, often attached to the design term.

### **1.2.1.1 Three overlapping spaces:**

Nevertheless, Design Thinking should not be considered the new model of scientific management, since that it is not an exact science, nor an easy recipe to be followed to success with every undertaken process. It is in fact, by nature, an unpredictable and non-linear process, designed for exploring, and uncovering new opportunities. For this reason, Brown defined Design Thinking as a system of overlapping spaces, rather than a step of orderly steps, with "*useful starting points and helpful landmarks along the way*".

Those three overlapping spaces can be seen as questions to be answered, that paired with some handy tools enhance the continuum of innovation. The metaphorical spaces are indeed three:

1. *Inspiration* — the problem, or opportunity that motivates in the search for solutions.
2. *Ideation* — the process followed in order to generate develop and test ideas that could be approximated to possible solutions.
3. *Implementation* — the path that lead from the project room to the market.

A project following Brown pass through these imaginary spaces more than once, as new insights are individuated. The iterative nature of Design Thinking can be seen both as a strength and as a weakness while applied to a project, since being it an iterative process it can fosters the opportunities for exploring new fields but, at the same time, it also extends the time to get the initial idea to the market.

Another way in which we can visualise the just cited overlapping spaces of innovations is through the embracing of constraints. Brown admits «*without constraints design cannot happen*» since according to him, every time we run a project, surely we will need to face with

some limitations. Limitations could be, for example monetary, since we do not dispose of infinite resources, or differently, technological, since there are limits of what is technologically feasible at a specific time. The just cited constraints are not taken in place to limit the designer mind, but rather to guide the Design Thinker in constructing harmonious and successful ideas.

The three criteria that should be embraced by a Design Thinker, according to IDEO, are basically three: *feasibility* — what will be functionally possible within the short term future, *viability* — what will be so good to become part of a sustainable business model, and *desirability* — what really makes sense to people but especially for people (Brown, 2009). A capable Design Thinker is capable to work by balancing these constraints by weighting them according to the specific type of organisation involved and according to the specific environment the project is facing. In fact, the limitations need to be weighted within the specific sector, since all the constraints are not equally important in each project. One project could, for example, put more emphasis on budget, whereas another could be more devoted to the discovery of a new technology, and hence less stuck to budget constraints.

The only constraint that should be clear and unchanged in each project is the focus on the fundamental human needs, because it is the core drivers of the Design Thinking mindset, and also what pushes for the detachment from the status quo. The IDEO's approach in fact suggests to start with "humans", by uncovering first what is desirable, and once suitable solution are individuated, decide what is technically feasible to be constructed, and only finally determine what is economically viable.

### **1.2.1.2 Correlation with the notion of project**

The position taken by IDEO on Design Thinking methodology is strictly correlated with the notion of "project". The IDEO's methodology sustains in fact that only by treating wicked problems as projects to be completed is possible to leverage them optimally and creatively with the imposed constraints. However, this occurs because of the proper characteristics of the project itself. The association with the concept of project has been designed from IDEO and Brown as a means to carrying an abstract idea to reality since that it has the appropriate construction, composed by a finite time span: "a beginning, a middle and an end". This finite

time limit obliges indeed to stay grounded and stuck to the schedule imposed by the project structure, avoiding to crumble in an infinite loop of continue exploration.

### **1.2.1.3 Multidisciplinary team and shared spaces**

In order to undertake a Design Thinking project, according to IDEO, two are the basics element needed: a team and shared spaces. A good shaped team can make an immense difference in how a project is tackled. The principal requisite of a proper team of Design Thinkers, following IDEO, is the interdisciplinary. A team of Design Thinkers, can be defined interdisciplinary when it is composed of the so called “T-shaped persons”, individuals whose competencies are strong along the vertical axis, and broad along the horizontal axis. This because individuals need to be interested and capable of managing more than one subject, collaborating across different disciplines since that, various projects deal with multiple issues pertaining to several sectors. The capacity of the “T-shaped” individuals is also said to be one of the prerequisites of a competent consultant, and often valued from recruiters in the sector. A team, beyond interdisciplinary, must also give to its components the possibility of expressing proper opinions, in order to avoid the so called “groupthink” effect.

#### **Avoiding Groupthinking phenomena**

Groupthink is a psychological phenomena first individuated and published by William Whyte on Fortune magazine (Whyte, 1952). This phenomena explain the tendency of individuals, when gathered together in groups, to reach a sort of conformity, by agreeing on a unique solution, suppressing dissenting opinions. This event produces non optimal, or dysfunctional decisions as outcome since it prevents the analysis of alternatives and suppresses the individuals creativity. Design Thinking overcomes the groupthink phenomena, with more than one strategy. It encourages both individual and collective thinking, through the appliance of a dual way of thinking: *convergent* and *divergent*. Thinking in a divergence way allows to multiply options in order to create choices, stimulating individuals to free their individual thoughts and ideas. Convergence thinking instead helps to eliminate options, in order to make choices. The second ingredient to remove groupthinking, is by working with small times in favour of large times, especially during the inspiration phase, and guiding team-members to conduct individual Brainstorming session before sharing ideas with others.

Nevertheless, also the *environment* plays a crucial role in the field of Design Thinking. As a matter of fact, a project, in order to be run with Design Thinking approach needs to be equipped, other than with an interdisciplinary team of t-shaped persons, also with the proper physical spaces. This need to be done to favour creativity, and to allow team members to collaborate together. Rooms should, in fact, be large enough to fit the accumulated materials, prototypes, boards and tools, in order to allow the immediate consultation of materials, physically available in the room, following the IDEO approach.

Once the basic necessities of a Design Thinking project have been settled, also the three spaces (Inspiration — Ideation — Implementation) and constraints (desirability — feasibility —viability) have to be managed in order to create the perfect solution to the posed client desires. IDEO is the Design Thinking sustainers who offer the widest set of materials regarding the argument. Resources are freely available on their websites (IDEO.com and designkit.org) and can be downloaded and consulted in order to be guided through the process. The Design Kit website itself is constructed to provide ready to use books and guides to introduce people to the use of Design Thinking in order to solve problems and innovate. The principal instrument, that illustrates the functioning of Design Thinking is called “The Field Guide to Human-Centred Design”. Through the guide we can find both mindsets and operative passages that give the possibility to deal with the three overlapping spaces in concrete terms.

#### **1.2.1.4 The right mindsets**

Having the preposed mindset, or be able to “think like a designer” is very important while conduced this kind of project, since it helps participants to enter in symbiosis with the method, in order to fully exploit its possibilities. Mindsets described and suggested by Design Thinking guide predict uncomfortable situations in which the Design Thinking’s user might find themselves.

According with IDEO, the primary mindset to embrace is convincing themselves that **any** individual can be creative, even without being able to draw. This is called “*creative confidence*” and is simply a way to understand the world, following intuitions and creating

solutions to solve big challenges. Creative confidence has to be built along the way, step by step, working with projects which embed human-centred approach.

**“Make it”** is the second mindset that has to be embraced. Prototyping, in fact, is the building base of the method since it allows an immediate understand what works in reality not only in abstract terms. The action of making stimulates also the creativity and helps to think, and share what would, otherwise, be trapped in our mind. Moreover, discovering what cannot work, is also a way to anticipate a later and potentially dangerous failure. What is important to understand is that failures are inevitable, especially using this approach that is aimed to solve problems and situations that seem to have no solution. Getting right at the first attempt is not the goal, but rather it should be to **“learn from failures”** in order to ask ourselves what could work, indeed. The action of fail is just a way to try what will not have worked practically, and, sooner or later, we will find what will work.

Still, the answer to our challenges is enclosed into people’s lives, since we are designing for them. Understanding the need of different people, and the obstacles they are facing during their daily activities become an indispensable tool for creating new possibilities and innovate. **“Empathy”** is, in fact, the noun that better explains the ability to imagine how it would be to be in the person’s shoes, and it is exactly what a good Design Thinker need to have, in order to be able to extract users’ necessities.

As we just said, while playing Design Thinking we are trying to solve very wicked problems, and consequently we have to accept that every time we embrace a new challenge, the answer is unknown. How would it be possible to innovate if something is already determined? It is exactly ambiguity that leads us to explore in the search for answers that we could not even imagine. **“Embracing ambiguity”**, and trusting the method even if difficult to apply, are the mindset which enables for great discoveries.

Never less, we need to **stay optimistic**, during the whole process, even if we find lost. We must trust in the process and be convinced that every problem is solvable.

All these capabilities seem at the same time nonsense and difficult to acquire, but they can be learned through practice, and experience, with the help of professionals, who are already used to the environment.

### **1.2.1.5 The five stages**

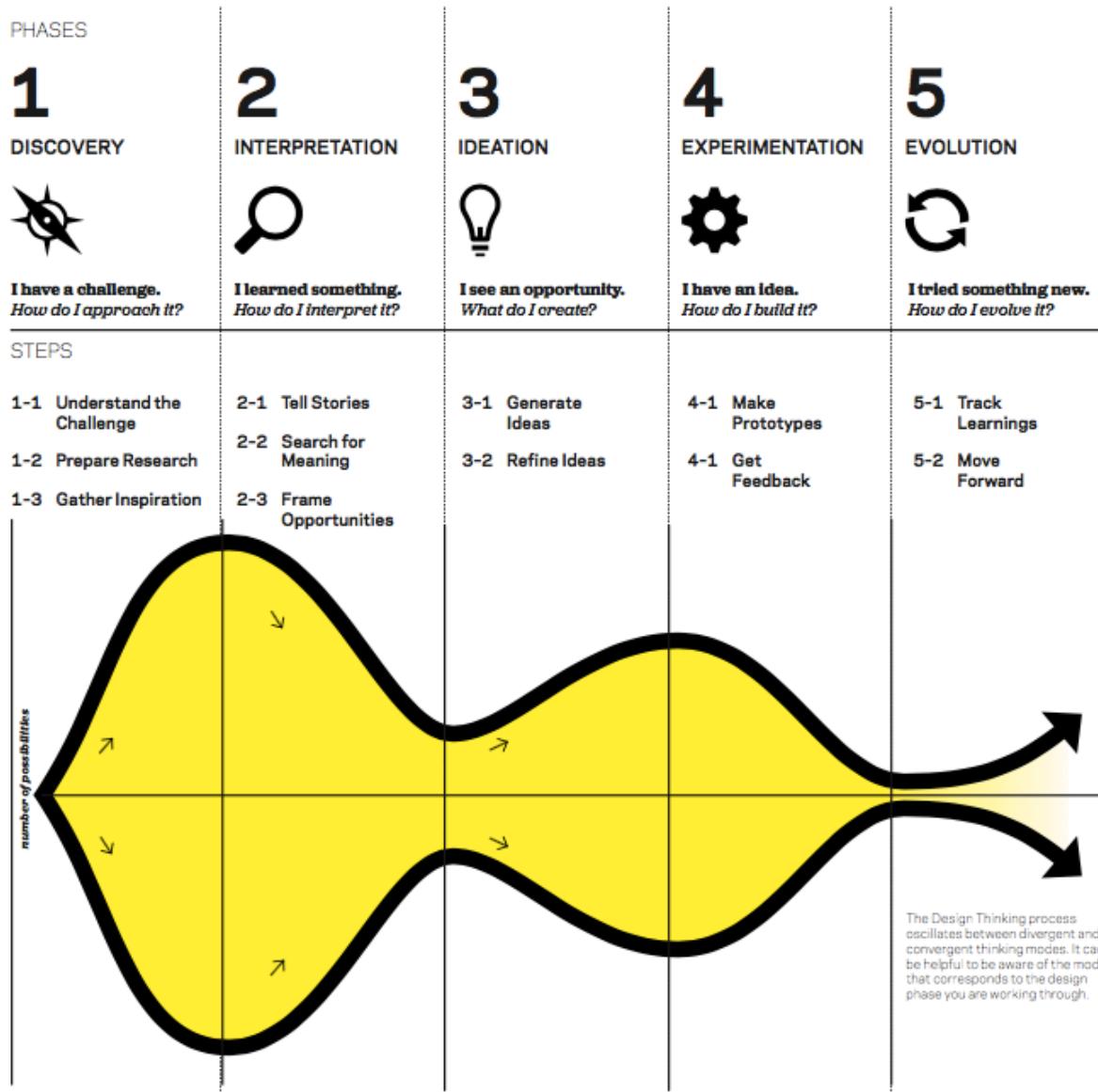
Once analysed the theoretical background and ideology of IDEO's Design Thinking method, it is interesting to know how the Design Process is carried in practical terms. The Design Process is, in fact, the method which takes Design Thinking in action through a structured process. A structured process is needed so that we can be guided from the action of identifying a specific challenge to the creation of a suitable solution.

The Design Process taken into action is composed of five principal phases, with three stages each, as we can grasp from the figure below (see figure 2).

The five phases are identified as:

1. Discovery
2. Interpretation
3. Ideation
4. Experimentation
5. Evolution

Along the entire process, the Design Thinker will encounter various situations of floating between convergent and divergent thinking, which is represented, through the diagram, by the number of available possibilities (see figure 2). Possible solutions, in fact, follow an increasing pattern during the first two phases, since that are characterised by a more uncertain environment, with respect to the following ones. The number of possible solutions decreases (converge) at the end of the second phase, to increase again (diverge) during the third and fourth phases, even if with a lower variance with respect to the previous two. The number of possible solutions will decrease then (converge) definitively, only at phase five, when an opportune solution will be chosen.



**Figure 2:** The Design Process, along with the flux of convergent and divergent number of possibilities.

From “Design Thinking for Educators 2nd Edition”, IDEO.

Those five stages are only an approximative guideline to bring Design Thinking to life. Actually, the various phases have not to be considered as fixed, but rather as a malleable tool that can be re-shaped and arranged in non-sequential ways, to suit with each particular need. Even IDEO itself encourages the use of the Design Process in a creative way, by annotating, cutting and reconstructing the various sheets contained in the toolkit, in order to shape new methodologies and theories to develop ideas.

## **Discovery**

As we already discussed, the Design Process is divided into 5 phases, with a maximum of three step each. The First phase is called “**Discovery**” and is it focused around the starting point of each Design Thinking project: the challenge. This phase is really important, since that it guides the whole project, since that it represents the problem or in other terms the goal that needs to be achieved through the Design Process. The challenge is even more important in the case of a consultancy, since, in this case, represents a specific client’s request, or desire. In this case the challenge needs to be studied even deeply, in order to set the entire process, in function of it. We must also underline that the challenge can be re-framed or changed during the process, if any further request or element is uncovered. Understanding the Challenge is, as a matter of fact, the first steps. Also in this case we must remark that the challenge could be given, in the case of a consultancy, as we just said, or can be also self-made. In the first case the problem is already defined, hence the team purpose is to understand, which is the exact meaning of the given challenge. A challenge is not always clear, because in some cases it could appear very generic, imprecise, or even over-ambitious.

Once the challenge has to be framed or understood, the project needs to be planned with respect to the required phases to undertake, and the available time frame. As a matter of fact, a team can be fully devoted to the project, or it may have to fit with other ongoing projects and schedules, especially in the case of a professional services firm. For these reasons, it would be useful to set a real agenda with the various phases, arranged throughout the available days, or weeks. A project may be taken only with a single week, or even a unique day, but in other cases, a projects can be so complex and articulated that it requires weeks or months to be completed. For last specific case, the planning became a key issue for obvious reasons of time and resources involved.

The first phase of the Design Process is called “discovery” also because a substantial amount of time need to be spent on the field, in touch with the final users: people. People represent the real source of inspiration, fundamental for the project’s success. The first step is to individuate who represent the final audience of the project, and once individuated, some key questions have to be formulated in order to stimulate and encourage people in the act of sharing their experiences and insights. Beyond users, also experts of the specific topic can be very

important, especially if the team is not experienced with a particular sector or specific matter. Essentially the discovery phase regards the exploration of the topic addressed by the initial challenge, through field experiences, experts help and the analysis analogous settings. All those different contexts help the team in visualising the complexities of the challenge, and the users' necessities as well.

### **Interpretation**

Once the team has gathered enough information, it can move to the second phase of the IDEO's Design Thinking process: "Interpretation".

During this second phase the main aim of the team members is to interpret the data gathered on the field. Here interviews, field visits, pictures, conversations and experiences have to be transformed into insights, useful for the challenge resolution. To achieve this, it is important to share the lived experiences along with all the team members, in order to generate a common knowledge of the addressed argument. Insights should be captured with concise sentences into notes, thought post-it notes for example, and attached on a visible surface, as a wide paper poster or a white board.

Once the storytelling session is ended, we need to make sense of all those information and inspirations, gathered into small notes. Notes and insights generated are usually various, hence it would not be easy to manage all together. One technique that can be used in order to make sense of all collected information is to cluster notes into different themes. Having information divided into various themes in fact will simplify the managing of findings, and at the same time recognise which are the insights more proper, or more relevant to the specific challenge.

Throughout this phase, the previous fixed assumptions might change, due to the new information gathered during the research. This situation, even if appears misleading, it is part of the design process, and for this reason, participants need to be prepared to change their mind and let go old ideas in favour of new insights. It is very important to do not fall in love with one own idea, since that it is not productive for the process, but rather it creates useless frictions between team members. Each individual should work for the sake of the project,

rather than for its own glory, sustaining the opportunity that seems more viable for solving the posed challenge.

## **Ideation**

The third phase is about generating ideas, that could fit with a challenge's solution. Ideas should be always inspired by the insights originated during phase two. Ideas should be the most bizarre and wild, since it is often from those bizarre ideas that visionary solutions arise. A very conscious way to stimulate creativity is through a facilitated brainstorming. Brainstorming need to be organised so that all individuals feel free to express their own idea, and, at the same time, defer to judge others opinion. Team members have in fact to build on other's ideas, rather than demolish them; in this way, anyone feels comfortable to express himself. It is important to have a moderator that supervise the Brainstorming session, so that members do not get out of topic, or dominating behaviours. Also, in this case, the ideas need to be written down in a visual way through simple sketches and figures. During this phase is preferred quantity rather than quality, in term of ideas, since that creativity has to be fostered. In fact, after the Brainstorming session, some time need to be spent in a sort of "reality check" where ideas generated are sorted and weighted, in order to decide which are feasible, but also viable, with the resource at disposal. In this situation, ideas that feel not exciting, or too difficult to create, have to be dropped, in favour of more promising ones. Selected ideas must be a reasonable number, since that, in the next step, they will be made real.

## **Experimentation**

Experimentation is the theme of the fourth phase; here ideas come to life, through rough prototypes, made with cheap and reparable materials. Even though very rudimentary, prototypes represent the means through which the users can visualise the team's solution for the given challenge, and as a consequence, give an early feedback. It is important that the prototype, even if ugly, results functional, so that the user can be observed and guided while interacting with it, with the goal of learning how it can be further improved.

A prototype will not be perfect at the fist try, but it will surely need various iteration to get in a definitive shape. The really important think is that at each new version includes improvements, based on users' feedbacks.

## **Evolution**

The fifth and last phase of the IDEO's Design Process is called evolution, since it is intended as a guide for the planning of future developments and achievements of the ideated concept. In fact, once the idea has been transformed into a tangible concept, the next steps have to be planned in order to bring the concept to life.

The new solution, in order to be known, must be seen from the final audience: users. This can be done by organising story telling sessions, the so called "pitch" where the team try to transmit the value of the created solution to final users.

Now we proceed by introducing a second structured methodology — constructed by another consultancy firm — to operate using Design Thinking.

### **1.2.2 Design Brain**

Continuum is considered, along with IDEO, one of the leading company in the field of product and service innovation design consultancy. The history of the firm began with Gianfranco Zaccari, an entrepreneur born in Trieste, in 1947 and grew up in Brescia, until the age of nine, when he moved with his family in Syracuse, New York. Zaccari likes to compare himself with the figure of the innovative entrepreneur, similar to the one devised from the First Schumpeter, who argued that innovation and technological change come from entrepreneurs. Continuum, as we will understand, has an organisational structure completely detached from one of the sole inventors, but on the contrary, based on collaboration.

Continuum has been founded in 1983 in Boston and is now established also in Milan, Seoul and Shanghai. The firm's culture is characterised by a mixture of talent, visions, and working together with a unique scope: designing with people, for people. They are focused on bringing to their clients not only what they desire now, but rather, what clients imagine they would have in the future. To reach this attitude, it is necessary to understand context deeply, along with culture, habits, and people chooses, to be able to project beyond the current reality. Moreover, what is necessary to work in function of for this logic, is an attitude pointed toward

experimentation, forgetting indeed the fear to be wrong, as Zaccari says « *The secret for success is to make mistakes quicker than others* ».

What Continuum enhances is not the value of the design as an end in itself, but rather it is the whole set of logics that revolve around the management of the innovation process, to the point of being the choreographer of the interaction between the person and the novelty.

Continuum tackles innovation following a unique schema that allows to individuate and extract the competitive advantage derived from the emotional correlation between a solution and the consumer. To exploit the just mentioned correlation, and anticipate the future necessities, real needs and users aspirations have to be understood. Unfortunately, users are not able to tell which are they needs, since that most of the times those uncovered needs are considered irrelevant or even embarrassing. What Continuum does is, in fact, build an interdisciplinary team of people which study the consumers' needs, observing them from various perspective.

Differently from the other consulting firms Continuum does not provide us with a visual model that describes the way in which they use to apply Design Thinking while developing innovations. They present the method through case studies.

Continuum approach to Design Thinking is called “Design Brain” and it is described as a derivation of Martin’s concept of Design Thinking.

Design Brain approach consists of five main stages:

1. Alignment (Understanding the problem, or request)
2. Discovery (Discovering deep insights hidden in people habits)
3. Analysis (Analysing the gathered data)
4. Envisioning (Prototype a possible solution)
5. Deployment (Deliver the solution to the client)

Continuum uses two major case studies to describe their methodology: the first case is the one of Reebok Pump, and the second is the one of Swiffer, for P&G.

During the 90s Continuum was asked by Reebok to develop a new basketball shoe to compete with Nike, the actual leader in the market, who just launched the famous “Air Jordan” with a spring incorporated into the sole, for a major elevation during jumps. Continuum, in order to develop a product with the perfect characteristics, started by observing players during matches and after a while they recognise that basketball players have a common problem: ankle injuries due to the heavy solicitations during rapid actions, change of directions and jumps. This lead them to develop a pair of shoes called “Rebook Pump” since they have a sort of inflatable ankle guard, which works like a cushion around the ankle, helping to have more stabilisation of the articulation during the activity. The shoe model allowed Rebook to increase revenues of 1.2 M dollars, in one year. This creation was possible by first observing the final users, basketball players, and second by providing them with multiple prototypes to test.

The second case is presented by Continuum is the Swiffer’s case study. In 1994 Procter & Gamble contacted Zaccari with a particular request « *I need a new method to wipe the floor. The mop is like a coach; I want a car* ». To provide the client with a suitable solution, Continuum consultants started to examine dirty and dust and to observe people doing housework. What emerged was surprising: people hate to mop the floors, since it is dirty activity, due to the presence of dark water. Moreover, it was discovered that the water does not remove the dirt completely. To solve the problem Continuum created a cloth, the Swiffer, that attract the dust, electrostatically.

These two cases allow us to understand how Continuum can deliver an innovative solution by discovering deep insights, prototype and create following the customer needs.

Until now we have seen Design Thinking approaches strictly derived from the business world, and to the consultancy field. Now instead three academical views of Design Thinking paradigm will be presented.

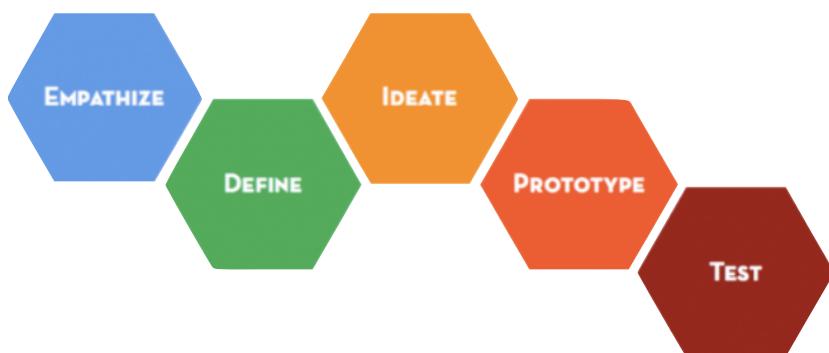
## 1.2.3 Emphasize, Define, Ideate, Prototype and Test

Two major academical approaches to Design Thinking had been developed by the renowned Stanford d.school and the HPI (Hasso Plattner Institute) School of Design Thinking in Potsdam, Germany. Stanford d.school has been founded in 2005 by David Kelley, Larry Leifer and Terry Winograd, supported by the SAP founder Hasso Plattner. Plattner has been able to recognise the Design Thinking potential, and for this reason in 2007, founded also the HPI School of Design Thinking in Potsdam.

The two design's schools are directly correlated each other, first through Hasso Plattner, backer of the two institutes, and second through the IDEO agency, due to the collaboration of David Kelley, IDEO's chairman and professor at Stanford. These relations clearly suggest that both methodologies have been influenced by IDEO Design Process, but still, we have two distinct models of application.

### 1.2.3.1 d.school

The d.school method is most spread with respect to the other developed by Postdam institute, and it is formed by five iterative stages, represented in a sequence of hexagons, namely: Emphasize, Define, Ideate, Prototype and Test.



**Figure 3:** The d.school Design Process, from [dschool.stanford.edu/](http://dschool.stanford.edu/)

#### Empathize

The first step is called **Empathize** and has as a first scope, the people understanding, in the context of the designed challenge. This kind of work is fundamental, according to the d.school's approach, since that every given problem a Design Thinker has to undertake is related to a particular group of people, with specific necessities; to provide to our clients the best solution, is important to observe them giving empathy. Empathy is lead the Design Thinker to see things with fresh eyes, by giving relevance to what people do and say; only in this way we can uncover insights from experiences, which in turn, will give directions for the creation of the best solution.

The action of empathising can be carried out by observing users, by listening to them and finally by engaging them. Observing users in their environment is fundamental for the fact that there are actions to which users are so accustomed to, that they even forget to mention. The Design Thinker has to observe and notice if there are discrepancies between how something should be, and how in fact is. Through the action of observing, it can be grasped which are the concrete user needs. Also, to observe they in action, the users need to be engaged by establishing a structured conversation, which leads them to share their stories and past experiences. Stories are full of uncovered insights, that can be individuated by listening carefully to people's stories.

## **Define**

The step that comes after Empathize is named “Define”. This second step is in fact structured to drawn conclusions, based on the information and material gathered in the first phase. The goal is to create a real and actable problem statement that will lead the team to the ideation of powerful ideas drawn from insights. The problem's statement should include all the needs of the particular user, drawn from the available information; for this particular reason, the definition phase also helps to display an overview of the state of the art.

Drawing conclusions from a wide set of information could be difficult since for sure all the gathered data appear to be relevant. One way to manage this complexity is to focus on: first, the users, since they are the subject of the design process, and second on users' needs.

The problem definition comes indeed from the analysis of users' specific needs and insights, which should be previously determined. Having the problem's statement defined, simplify the execution of the following part of the Design Process.

### **Ideate**

Getting the right idea is not the sole objective of the third phase, since the main goal is to generate the widest range of possible solution. "**Ideate**" is indeed the process of idea generation, whereas the pick and evaluation of the best solution will come right after. Ideation can occur through a huge fan of techniques, that comprehend: brainstorming, prototyping, Mind Mapping or sketching, the only fundamental principle to apply is to defeat judgements, since that they could harm people creativity.

### **Prototype**

The penultimate phase of the d.school process has a double purpose, stimulating the actions of thinking together with testing the achieved solution. Prototype in fact, helps to understand if users may enjoy the solution, by submitting them with raw prototypes, quick and cheap to make, but accurate enough to allow users and people outside the team to give feedbacks about the architected solution. Moreover while testing it is possible to explore multiple options for a unique solution, since that almost No resources are committed, differently from the standard product development process.

### **Test**

The final step of the d.school's design process is focused on the test of the invented solutions, even if partly they are usually tested during the prototyping phase. What is recommended through the d.school's design process is that testing should not be a mere yes or no decision, based on whether people like or dislike the presented solutions, but rather it should be taken as another opportunity to deep into customers everyday actions and behaviours. Still, even if the solutions are not appreciated, the Design Thinker should investigate for the reasons of this negative result, by demanding to the people involved in the experiment the hidden motivations of their dissatisfaction. This final phase has been made to function as a testing ground for improving ideas, and the scenario should be the as real as possible since that users should be observed rather than explained while interacting with the prototype. It can be useful

also allowing the selected users to compare various prototypes, to have a base for comparison, that can give, sometimes, the revelation of latent and unexpected needs.

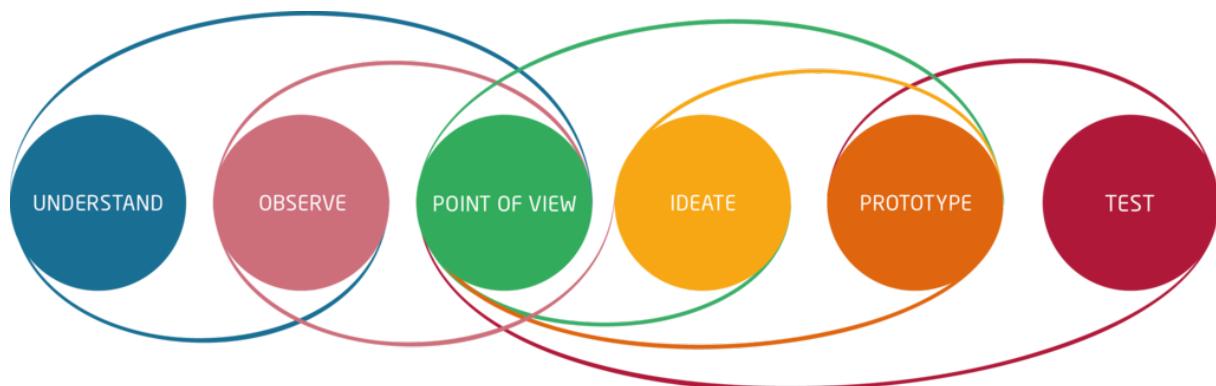
Moreover, an important clarification made by the Stanford d.school is that iteration should be taken as a fundamental factor for a good design approach. The process should indeed be repeated more than once, either completely or also within each single phase, to have the possibility of refining small details over time. The process has been articulated as a linear path, but it can be rearranged in a different sequence, even paired with other tools, more suited to each own work style.

### 1.2.3.2 Potsdam

As specified before, the Stanford d.school and the Hasso Plattner Institute of Design Thinking in Potsdam are very connected each other, but still they present two different model for the Design Process.

Never less, as we can grasp from the image below, the HPI design process is very similar to the one developed by the d.school, since it present almost the same phases, exception made for the first two steps that are expanded into three phases rather than two.

The phases “Empathize” is broken into “Understand” and “Observe” (see figure 4) and the “Define” phase is called from the HPI's model “Point of view”. This lead to have a model with six steps, rather than five, and also with more emphasis on iteration, that can be immediately grasped from the curves that link the various steps each other, which suggest that the various stages should be reiterated and faced in a nonlinear way.



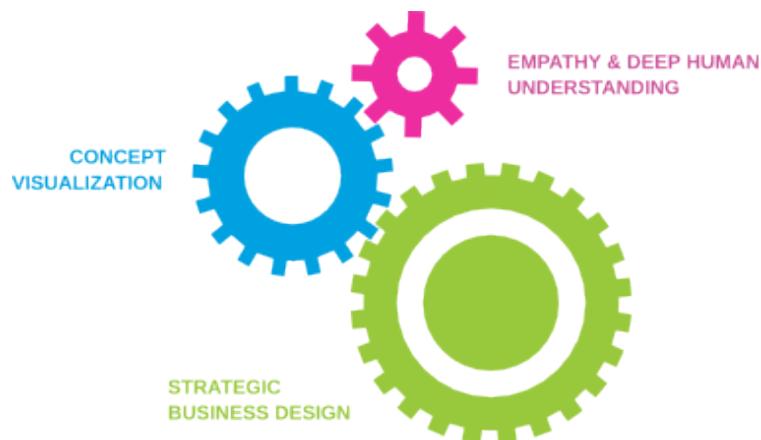
**Figure 4:** The HPI's Design Process form the Hasso Plattner Institute official website 41

### 1.2.3 DesignWorks

Another academical approach to Design Thinking is presented from the Rotman School of Management, at Toronto University, Canada. The Design Process model has been developed in the context of the Rotman's Business Design Studio, and it is called "DesignWorks". The DesignWorks process has been founded in 2005 by Roger Martin, former Dean, and Heather Fraser, adjunct professor and business strategist. Together Martin and Fraser established this Design School with the goal of transforming business education, by increasing the new managers' profiles with a complete toolkit, equipped with user-centred design instruments.

The DesignWorks' approach is called "The Three Gears of Design" (Figure 5), and it combines three basic principles:

1. Empathy, to discover customers' unmet needs;
2. Prototyping to understand how these needs can be met
3. Strategy, to create a competitive advantage.



**Figure 5:** The Three Gears of Design from University of Toronto official website

Above we can observe how the process is graphically represented. The approach has been built with the double aim of being both an educational and business tool. The influence from the business world had been clearly present since the stage of ideation of the model by the fact that it was made with the collaboration of figures from both the academic field — Martin and

David Kelly (IDEO) — and the business world — Heather Fraser — who had a 25 years experience at Procter & Gamble, prior to Rotman DesignWorks. The presence of those key individuals allowed the creation of a business design model, that combines business practice, along with design mindsets for driving innovation and growth with the appliance of Design Thinking. The DesignWorks model, as we already said, is metaphorically shaped as gears, which tighten together form a mechanism that permits both to gain a better understanding of uncovered human needs and to design winning strategies for the created solutions.

### **Empathy and Deep Human Understanding**

The Design Process starts from the smallest gear, Image 5, named Empathy and Deep Human Understanding. During this initial phase, the goal to identify which is the opportunity to innovate, and has to be found through the understanding of what matter most for final users. Here various ethnographical methods and stakeholders mapping can be useful to identify the right opportunity to be followed.

### **Concept Visualisation**

The second gear represents the Concept Visualisation and it incorporates all the processes aimed at the exploration and concretisation of new possibilities, aimed to solve the individuated human needs. Through prototyping and co-creation with final users, it is possible to see the designed solution physically, and eventually reframing the vision, based on the user feedbacks.

### **Strategic Business Strategy**

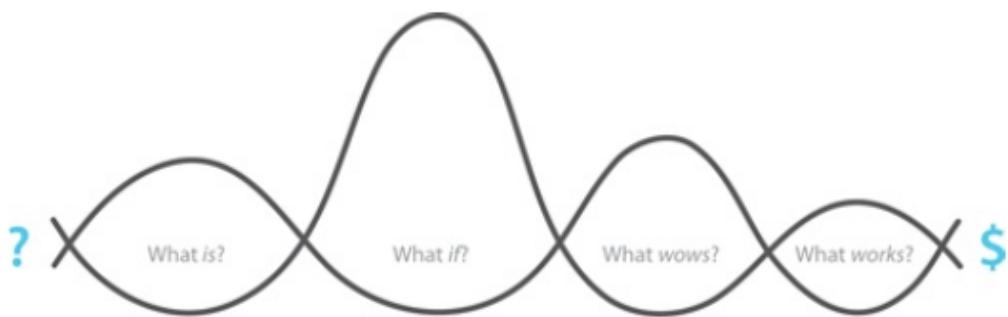
The third and last gear is the one that distinguish the DesignWorks method from the previous , since it is dedicated to the development of a Business Strategy. Even if the strategy is not usually intended to be part of the ideation process, it is essential to develop ideas which are relevant for the market but also bearable in economical and practical terms as well as viable in a long term period. This last step underline in fact that an analysis of the market viability and feasibility go the created solution.

Within the next paragraph we will present the third influencing Design Thinking approach derived from the academical context.

## 1.2.4 Design For Growth

The Darden Business School, approach to Design Thinking has been developed by Jeanne Liedtka and Tim Ogilvie, and it is called “Design For Growth” or D4G in their parlance. Liedtka, as already mentioned, is a strategic professor at Darden School of Business, but she has also been a consultant with BCG; she is very active in the field of strategic thinking and especially Design Thinking. He wrote two influential books: the first is “Designing for Growth: A design toolkit for managers” which describe thoroughly the Design Process, and the second is “Solving Problems with Design Thinking: Ten Stories of What Works” which explains along with two other authors, various organisational problems, outside growth, that can be solved using Design Thinking approach. Ogilvie has been a strategic consultant too and he is now CEO at Peer Insight, an innovation strategy consultancy company.

The D4G approach has been structured especially to stimulate divergent and convergent thinking, at each stage of the work. Divergent thinking, as already said, implies to expand the vision to absorb all the possible information present around us, bypassing the traps of our mental model. Convergent thinking, at the contrary, is used to narrow the options available to the most promising ones (Liedtka, 2013).



**Figure 6:** The Darden Business School Design Process (Liedtka, 2011)

Design Thinking in this specific model is said to be a method that help to foster creative problem solving, by guiding the manager through a systematic process that can be applied to a wide range of specifically organizational problematics, by using four basic questions:

1. *What is?*

2. *What if?*
3. *What wows?*
4. *What works?*

### **What is?**

The first question, “**What is?**” lead us to explore the status quo, or the current reality. This first step is said to be crucial for two basic reasons: the first because it forces us to reflect around the posed question, by brooding or reframing it, to understand which is the challenge we are asked to solve and second because introduce us to the analysis of the current reality , by helping the individual to uncover the latent user needs, cornerstone for the production of a useful and worthwhile solution. Moreover the what is step helps us in understanding what our client expect from us, reducing the risk of providing an unexpected solution. Citing Jeanne Liedtka, who has been one of the founders of this toolkit methodology, the “*What is?*” phase *specifies what a great solution will look like, without telling us the solution itself.*

### **What if?**

The second question, “**What if?**” has been studied to lead managers to analyse what had been collected and learned in the first phase, so that possible solutions can be imagined. As a matter of fact, once the collected data have been examined, ideas are envisioned using tools like Brainstorming and concept development that helps team members to think out of the boxes, starting from possibilities rather than from constraints. This is done by transforming the most compelling group of ideas, into concepts.

### **What wows?**

The third question, “**What wows?**” has been constructed to make choices about which concepts deserve time and resources, and which instead, deserve to be discontinued. This step need to be performed because the team will find in this phase with plenty of different concepts, too many to be continued, it will need to make them down into a more realistic number. To do this we need to make hypotheses and reasonings around each concepts, in order to find the ones that create the “wow” effect, or, more properly, concepts that will have a positive match with our stakeholders expectations. This third step is really crucial, since that the concept selected in this phase will be candidates for be experimented with final users.

## **What works?**

The fourth and last question is “**What works?**” and it deals with the implementation of “wow” ideas, selected in the phase three. During this phase the team should learn from the final users which is the concept that “works” and solves the proposed problem. This is done through the presentation of cheap and simple prototypes to final users, who should try to interact and give some feedback in response. Those prototypes that receive positive feedbacks, will have the chance to be refined and tested with even more users. This process shall continue until we get the perfect idea that suite client expectations.

What is interesting within this specific approach to Design Thinking, is that its authors, Jeanne Liedtka and Tim Ogilvie, admit that this kind of process is really flexible, since that, they analysing ten consultancies cases, solved with the asylum of the 4W model, can be used fully, in every step, or rather, the analysis can be started with any piece of the process.

Along the next section, we will provide a comparison among the presented approaches to Design Thinking

## 1.3 Principles and comparisons

In the previous section various approaches to Design Thinking have been analysed, and as we experienced, the methods are generated from two distinct sources: business environment, and academical environment.

However, all the analysed methods show a commonly shared view of what the Design Thinking method is, even if with the use of a different terminology and a variable number of steps. Each method can be seen, in fact, as the composition of three macro phases (Table 2): a first phase always dedicated to Data Gathering, for the understanding of users needs, and to problem definition (first row of table 2, Data Gathering). A second stage, instead, is always spent to idea generation (second row of table 2, Idea generation) followed by a third and last phase which is spent in prototyping and experimenting the ideated solutions, along with final users, to identify the best option (third row of table 2, Testing). Those three macro phases are then used and exploded into various sub-phases, that can be observed in each column of table 2, below each specific method.

Table 2: Comparison between Design Thinking methods

Method					
	IDEO	Continuum	d.school	Rotman	Darden
<b>Stage 1</b>	- Discovery	- Alignment	- Empathize	- Emphaty and	- What is?
<b>Data</b>	- Interpretation	- Discovery	- Define	deep human	
<b>Gathering</b>				undestanding	
<b>Stage 2</b>	- Ideation	- Analysis	- Ideate	- Concept	- What if?
<b>Idea</b>				visualisation	
<b>generation</b>					
	- Experimentation	- Envisioning	- Prototype	- Strategic	- What wows?
<b>Stage 3</b>	- Evolution	- Deployment	- Test	Business	- What works?
<b>Testing</b>				Design	

As a matter of fact, all the analysed methods, other than following the same macro phases, have some key common principles that are always presented and evidenced in each method, disregarding the specific field of conception.

The shared principles are basically five:

1. User centricity
2. Convergent - Divergent attitude
3. Prototyping
4. Optimism
5. Iteration

### **User centricity**

All the models are unambiguously designed around the concept of User and human centricity, the cornerstone of Design Thinking theory. Every method underlines with insistence the need for an active users observation, that, according to Brown, consists of «*watching what people don't do, listening to what they don't say*» (Brown, 2009; pp. 81).

Observing users with empathy is what allows to transform users experiences and stories into insights, which are transformed, in turn, into solutions aimed to improve people lives. This is the real mission of a Design Thinker: put people first.

### **Convergent - Divergent attitude**

Moreover, through all the analysed methods, a common scope of stimulating convergent and divergent thinking can be found. This convergent-divergent state of mind can be visualised in particular through the diagrams, which, in many cases, are drawn with a fluctuating line that waves upward in the phases that require a divergent attitude, while it waves downward in the event of a more focused and convergent mindset. The IDEO and Darden Business School Design Processes, figures 2 and 6 respectively, provide the exact drawing of what is intended with the convergent-divergent flow.

Observing figure 2, the one who depicts IDEO Design Process, it can be noted that in the first phase, discovery, we have an upward line, who suggest that the designer's mind has to freed

from previous assumptions, and fulfilled with discoveries gathered during the exploration along with users. In the second phase, interpretation, the line converge downward, for indicating the need for a more focused and selective attitude, since here the result of the field exploration need to be analysed and sorted to define the best solution. Then the Design Process line diverges again during the third phase, ideation, to converge during experimentation phase, which asks for a selective and critic approach. Almost the same pattern can be found in the Darden Business School Design Process (figure 7). The unique difference is that in the model the divergence peaks are placed during the second phase — ideation — rather than in the first phase — exploration — as IDEO does.

## **Prototyping**

Also prototyping is considered an important concept, and for this reason, included in every approach. Prototyping is, as a matter of fact, what allows to visualise ideas, and is essential to explore and test them, before being too committed. Over-investment of resources in a poor idea, can be costly in terms of physical and physiological resources. Through a prototype, instead, it is possible to understand if the idea actually works, by having it tested with final users, without spending neither time nor money. Since the prototyping process stimulate creativity, it can be used as a session for the generation of new ideas and suggestions. Obviously, prototyping is an action that needs to be reiterated, either test various solution, or to improve and refine a selected one, based on the customer's feedbacks.

## **Iteration**

The last concept that is underlined in all the methodologies, is iteration. Iteration is a concept that is not only linked to the action of prototyping, but rather to the entire duration of the process. Each process' phase can be reiterated if the Designers feels the need for a more intensive analysis, or also if some information is missing.

The reiteration act must not be considered as a project's weakness, but rather as an opportunity to improve and explore. Moreover, through the various reiteration attempts also a culture of experimentation and failure tolerance can be developed. Optimism, in fact, is one of the fundamental principles that lead Design Thinking, since it helps to recover from failures, which are more than probable when a team is dealing with future innovations. Design

Thinking is not an exact science, and it does not guarantee the success of each process undertaken, but rather it leaves the spaces also for an eventual failure, which it can, hopefully, be spotted in time through prototyping.

A clear variation that can be underlined between the various methodologies can be found in the last phase of the processes. This particular is evident especially when the methodologies originated from the business environment and the one originated by the educational sector are compared. The processes linked to the corporate sector, IDEO and Continuum, present in fact a common final phase, evolution and deployment, respectively, which is not mentioned in the processes inherent to the educational environment, except for Rotman business school's method which calls the last phase Strategic Business Design. This final step is expressly projected by consultancies to sustain the development of the designed solution, through, for example, the user's engagement, the organisation of pitches and the creation of communities.

The high resemblance that is present among the Design Thinking methodologies could be partly explained by the fact that the authors of the various processes are almost all entwined each other. Many of them, in fact, have been first entrepreneurs and then professors, or both simultaneously, as in the case of Kelley, who is chairman at IDEO and also professor and founder at the Stanford d.school. For obvious reasons the two models, the one created by IDEO and the one developed at Stanford have some common features, since the two institutions collaborate. The same occurs with the Stanford d.school and the Hasso Plattner Institute of Design Thinking, given that they have the same backer. Moreover, since Brown, along with IDEO has been the first to introduce Design Thinking in the organisational environment, IDEO Design Process has some way be taken as a reference model also for the development of other methods.

## Chapter 2

### Tools, Evolutions and Critiques

## 2.1 The Instruments

As it can be perceived in the second and third section of the previous chapter, the Design Processes themselves, even if very inspiring, are not enough to transform insights, into innovative solutions, since they do not give specific directions in how to concretise every phase. To this extent, some essential tools have been constructed to accompany the various steps of the Design Thinking process.

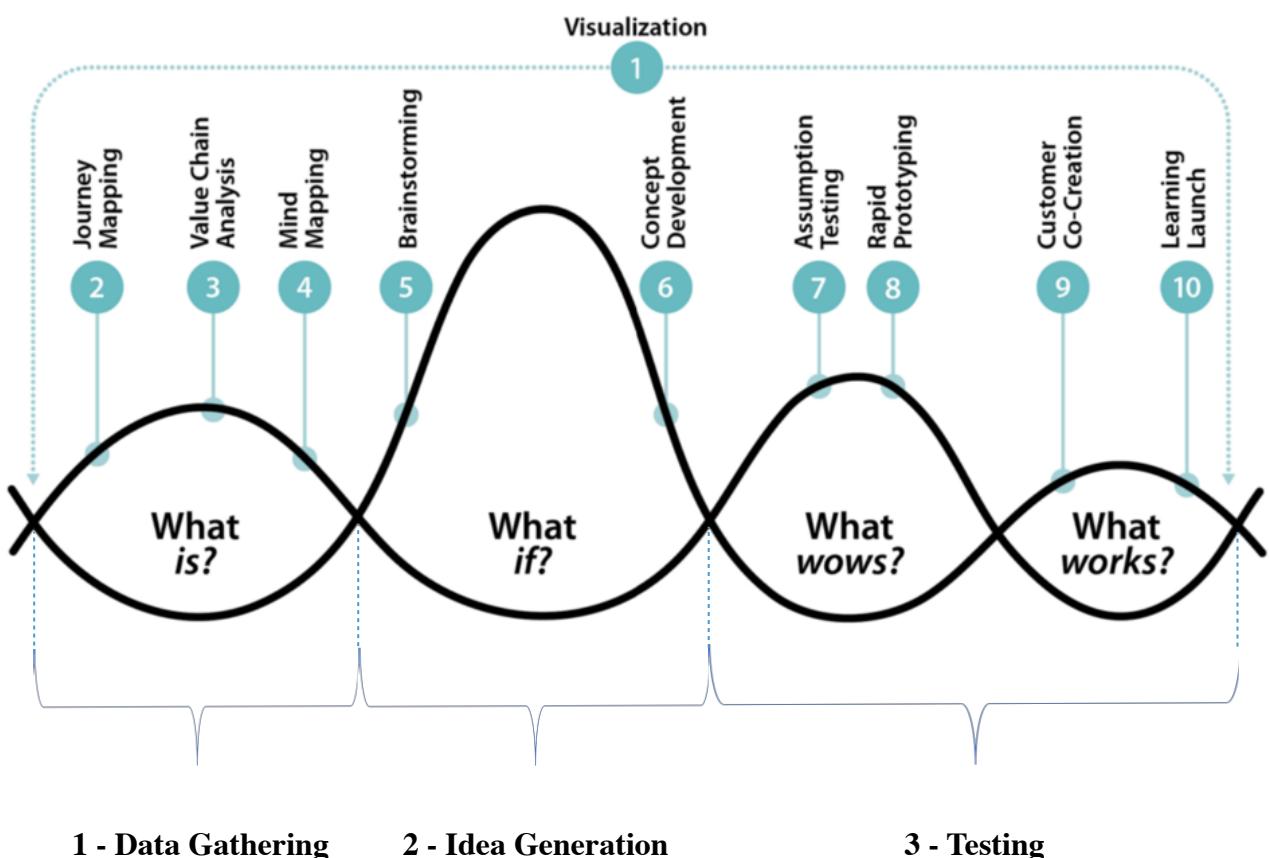
Design tools are necessary to guide the design thinker through the complicated pattern of convergent and divergent thinking, but they are also essential to reduce the risk of uncertainty while creating new possibilities. To facilitate managers in the understanding of resources and skills needed during the process implementation, some tools have been studied and collected from plenty of successful by professor Liedtka and Ogilvie, in their book.

As it was true for the Design Processes, also in the case of Design Tools, the manager shall not be required to use the entire set of tools while managing a problem. The tools can be utilised and re-shaped tailored by the single problem or project the manager is facing.

The essential tools for tackling a Design Process have been identified to be ten (Ogilvie & Liedtka, 2011) :

1. **Visualisation:** using imagery to envision possibilities and bring them to life
2. **Journey Mapping:** assessing the existing experience through the customer's eyes
3. **Value Chain Analysis:** assessing the current Value Chain that supports the customer's journey
4. **Mind Mapping:** generating insights from exploration activities and using those to create design criteria
5. **Brainstorming:** generating new possibilities and new alternative business models
6. **Concept Development:** assembling innovative elements into a coherent alternative solution that can be explored and evaluated

7. **Assumption Testing:** isolating and testing the key assumptions that will drive the success or failure of a concept
8. **Rapid Prototyping:** expressing a new concept in a tangible form for exploration, testing, and refinement
9. **Customer Co-Creation:** enrolling customers to participate in creating the solution that best meets their needs
10. **Learning Launch:** creating an affordable experiment that lets customers experience the new solution over an extended period of time, to test key assumptions with market data



**Figure 7:** The ten tools, inserted in the Design Thinking process, from Ogilvie, T., & Liedtka, J. (2011). Designing for growth : a Design Thinking toolkit for managers.

Some of the tools, such as brainstorming, rapid prototyping and customer co-creation have already been encountered during the processes analysis, whereas others are still to be explored.

The ten tools are graphically represented in Figure 7, applied to the Darden Business School 4W approach, but they can fit every kind of design process if intended as the three previous cited macro phases: Data Gathering, idea generation and testing.

The tools can be grouped into three mayor groups (see Figure 7) since they are linked to the three specific phases of the Design Thinking model:

### **1. Data Gathering**

- Visualization
- Journey Mapping
- Value Chain Analysis
- Mind Mapping

### **2. Idea Generation**

- Brainstorming
- Concept Development

### **3. Testing**

- Assumption Testing
- Rapid Prototyping
- Customer Co-Creation
- Learning Launch

Now we proceed first by exploring the various tools, indicating their functioning, and second by providing their utility and importance for management thinking and mindset inclination.

## **2.1.1 Data Gathering**

Data Gathering is the first generalised step of the Design Thinking method, and is carried through the help of three instruments: Visualisation, Journey Mapping, Value Chain Analysis

and Mind Mapping. In the following paragraphs, we will have the opportunity to explore the tools deeply.

### **2.1.1.1 Visualisation**

The first tool is named visualisation and can be seen as the main concept rather than a pure action to be performed since it is essential in each stage of the Design Process. Being the mother of all the design tools (Ogilvie & Liedtka, 2011) visualisation implies the transmission of information through visible images rather than words. Why? Because the use of visible data reduces the risks of misunderstanding, especially in the case of a multidisciplinary team, that uses a wide set of different languages. Pictures and stories left less space to interpretation, with respect to texts. Let us imagine a team formed by engineers, accountants and historians; they all have very different mindset approaches and ways of thinking since they are used to work with a diverse terminology, due to their different roles and backgrounds in organisations. The communication and information transmission could be complicated if everyone speaks its own “work parlance”.

### **Boundary objects**

The role of Design Thinking in information sharing between different multidisciplinary teams is best described by the sociological term “boundary object”. The term has been first coined by Susan Leigh Star and James R. Griesemer, two sociologists, in 1989. They described boundary objects as “Objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. (...) They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognisable, a means of translation.” The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds (Star, Griesemer, 1989).

Design Thinking through the visualisation principle, allows the creation of boundary objects, that are, the presentation of ideas by drawing a picture or telling a story. In this way cross - disciplinary collaboration is enhanced, by reducing the possibilities of unmatched mental models, making possible to represent diverse knowledge (Tarja, T., & Heli, A. I., 2013).

Using a visualisation approach also means to favour the use of our “right brain” where imagination, creativity and intuition reside, rather than our “left brain” the part of human’s brain more related to rigid thinking, logic and computation. Often our right brain is unconsciously excluded from business activities since they are intuitively connected to the left brain. Visualising ideas activate the so called “mirror neurones” which trigger the mapping of physical activity in our motor system, without even send a command to muscles. Hence observing can be a powerful enabler of empathy, a necessary character to understand users uncovered needs.

However, how can be the visualisation practised?

Once again, to sketch ideas, it is not needed to be artists: while projecting, in fact, draws has to be very simple, to allow the focus to be on ideas rather than on particulars. It needs only some very cheap tools like notes, charts, paper, whiteboards, markers or photographies and some of the instruments that we will present throughout this section.

### **2.1.1.2 Journey Mapping**

The second tool we are examining is the Journey Mapping. This tool is really essential since it allows, if done properly, to uncover also the most hidden necessity of the final user. Journey Mapping is the second tool attached to the Design Process, but it is actually, the first real instrument tightens to Data Gathering stage, first stage of the design process.

This tool allows the consultant to see the world with his client's eyes, by assessing the status quo of customer's experience. Journey Mapping can be defined as an ethnographic tool, but it is actually the graphic representation of how the customer (or stakeholder in general) interacts with the client company, in using its products or services: keys to the identification of valuable solutions.

The world “Customer Journey”, “Journey Mapping” or “customer experience” are widely used and spread nowadays. As it holds true for other buzzwords such as “design” or

“innovation” it is often difficult to attach a find definition for Journey Mapping, even if it is often considered as a strategic tool for companies.

As Adam Richardson explained in the article (Richardson, 2010) “Using Customer Journey Maps to Improve Customer Experience” — a *Customer Journey map* is a very simple idea: a diagram that illustrates the steps your customer go through while engaging with your company, whether it be a product, an online experience, retail experience, or a service, or any combination. The more touchpoints — critical moments when customers interact with the organisation and its offerings (Rawson, Duncan, Jones, 2013)— the more complicated, but also useful, such a map becomes.

However, focusing only on touchpoints can create a distorted picture of the reality, suggesting that the customers are happier with the company than they actually are (Rawson, Duncan, Jones, 2013). For this reason, it is better to consider not only critical touchpoints, but instead the whole picture representing the customer’s end-to-end experience.



**Figure 8:** The journey of a student from Darden Business School. Source: Ogilvie, T., & Liedtka, J.(2011).

In Figure 8 an example of Customer Journey is reported. This specific case depicts the experience of an MBA student during his academical path at Darden Business School. As it can be grasped, the map does not depict only the touchpoints regarding the interactions between the students and university experience, but also the actions that had been undertaken before during and after the academical experience. Looking at the map (Figure 8) we can observe that the first actions examined start in fact long before the decision of the undertaking of an academical path at Darden (Step 1, Decide on Figure 8). The operations undertaken include the evaluation of the various offerings, through web researches and on field visits, as well as the actions undertaken to prepare for the academic year (Step 2-3 Figure 8) which comprise the moving, the tests and the first social interactions in the campus.

The journey map is constructed by selecting particular customers whose experience could reveal useful insights to ameliorate the company's offering. Once the target customers have been identified, hypothetical visualisation of the user journey has to be drawn, ensuring to include all the performed steps, not only the ones concerned with the touchpoints.

The selected customers should be followed through their journey, so that they can be first observed and then interviewed with focused questions. While the subject proceeds during his journey, it is useful to look for some specific actions such as confusion, which suggest for a more intuitive experience, overexertion while doing activities, or unpleasant and annoying moments. Appropriation is also a significant action that has to be noted since it represents the use of a product for a different purpose.

Once the observations have been concluded, a new journey of each person has to be made, based on the gathered information. The constructed map should represent both the steps and the customer's feeling while performing each particular step, to visualise which are the points that need for intervention.

The Customer Journey is one of the key tool provided by Design Thinking, since that every company, in whichever sector, provides a customer experience, regardless of whether they do it consciously or not. Liedtka admits in fact "*If we could add only one design tool to manager's repertoire, it would be Journey Mapping*" (Ogilvie & Liedtka, 2011).

Journey Mapping allows for the creation of value for clients, by getting closer to customers' lives, understanding their problems and frustrations in their everyday context. It has been proven that companies which excel in the Customer Journey analysis have a higher competitive advantage with respect to those who do not invest in customer experience.

### **2.1.1.3 Value Chain Analysis**

Value Chain analysis is the second tool regarding the Data Gathering phase of Design Thinking process. This analysis is essentially the business side of the Customer Journey that we just saw. It includes, in fact, the study of organisation's interaction with partners to

produce, support, market and distribute its products and services, and it represents the business ecosystem in which the customer's journey occurs.

The Value Chain concept had been introduced in 1985 by Micheal Porter, Strategist Professor at Harvard and most cited author in business and economics. This concept is one of the most known and used strategic instruments in the business field, and for this reason it will be covered quickly compared to the other tools. The typical Value Chain, as depicted by Porter, represents the flux of strategic clusters of activities that contribute to creating value for the final customer.

However, delivering value to customers is not the unique goal of an organisation. To be sustainable and attractive an organisation should create value for itself (through profit) and for its partner firms as well. The Value Chain analysis allows, in fact, the firm to see the business with the eyes of partner companies and competitors, as the Customer Journey Mapping contribute to see the world through the eyes of the client (Ogilvie, Liedtka, 2011). Seeing the business through this perspective helps indeed to avoid the commitment to offerings that may create value for the customers, but not profit for the organisation itself.

To perform this kind of analysis, it is useful to start with the output provided to the final user and proceed backwards, along with the various activities. The final result of the analysis should be an ecosystem of clusters of activities. The typical Value Chain is formed by: Supply Activities — Manufacturing — Distribution — Sales — Customer Services — End User.

For each activity the various competitors, their market share and bargaining power should be identified, as long as the strategic capabilities that are needed to deliver value within each activity. Then having depicted the various activities, and determined the influence of other competitors, also the proper possibilities for improving power and profitability have to be identified, through the recognition of vulnerable points that can be a source of disadvantage.

The final goal is to individuate opportunities for improving power and profitabilities, as well as the vulnerable points that may put the organisation in disadvantage compared to others.

The results of Value Chain analysis together with those of Customer Journey mapping, give the possibility to recognise the attributes that the innovation should have.

#### **2.1.1.4 Mind Mapping**

The last tool associated with the Data Gathering phase is Mind Mapping, and it is what prepares the team to enter the second phase, Ideation.

Mind Mapping it is not the name of a particular kind of diagram, but rather the logic used in Design Thinking process to extract meaningful insights and relationships from the enormous amount of information collected during this first phase. It includes far more than a mere graphical representation of thoughts. Mind Maps are identified as an expression of a function of the human brain: the *radiant thinking* (Buzan and Buzan, 1996).

Tony Buzan<sup>6</sup>, English psychologist, brain expert, Mind Map inventor and one of the most influential leaders in the field of creative thinking, assess that this graphic technique can be considered “*a universal key to unlock the potential of brain*”. Following Buzan studies, representing ideas visually through a network of connected concepts, stimulates the entire brain thinking, by engaging the often inactive right brain hemisphere, having the possibility of reasoning in both creative and logical patterns.

Visual representations and idea visualisation in general, optimise human thinking and ideas combination as well (Davies, 2011), due to the particular psychology and functioning of our mind. The structure of our thought can be represented, according to Buzan, as giant biological super-computer where thinking radiates from one main node to an infinite number of data nodes, connected and associated each others. Every time a person enter a new bite of information it is represented in mind as a central image which radiates tens, hundreds, thousands and millions of hooks. Each hook represents an association and each association has its own infinite array of links and connections Buzan (1993).

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<sup>6</sup> For further information, please visit: <http://www.tonybuzan.com/about/>

Pieces of information are dislocated in our mind and reconnected each other through the Corpus Callosum, a complex of fibres that assures the communication between the two sides of our brain — the *left brain* and the *right brain* — where the information resides. Even if those two parts are constantly connected, in most people, while performing specific activities, one part of the brain dominates the other. Usually, the left brain is triggered with logic, words, reasoning, numbers, linearity, and analysis; the so-called academic activities. Right brain, instead, deals with rhythm, images and imagination, colour, daydreaming and face recognition (Buzan, 1989).

The concept of visualisation, addressed in the first paragraph of this chapter, anticipated that Design Thinking tools could trigger the usage of the right brain, usually excluded while performing business activities. Now it is evident how, through Mind Mapping, the Design Thinker can optimise his brain activity, using Mind Mapping while looking for insights among the materials available.

However, what about the concrete execution of Mind Mapping activity?

An essential prerequisite for a proper execution of a Mind Mapping process is to arrange the collected data in a way that everyone can see them. Usually, the materials can be hanged on posters in a hall or large room. During this phase, it is also fundamental to engage users as guests, by dividing them into teams and explaining what the various posters and data represents. Guests have to be encouraged in add relevant information or data which in their opinion is missing. They can add some posts to the posters and deliverables in a different colour so that their intervention could be recognised. External opinions can be essential for the identification of key insights, that, as we will see in the next section, will be the used for the Ideation phase.

## 2.1.2 Ideation

### 2.1.2.1 Brainstorming

Brainstorming is probably one of the most known instruments of the entire Design Thinking process. What happens in a typical brain storming session, is that members of a group attempt

to follow the just outlined rules while providing ideas about a topic until they either run out of ideas or use up the allotted time (Litchfield, 2008).

The technique is known to most managers but, sadly, is often applied ineffectually because of poor training. It is also too often thought as the synonymous for the whole Design Process since there is a shared wrong belief that Design Thinking is only dealing with wired ideas generation.

Brainstorming, instead, is a powerful technique for generating creative ideas and solving problems. The technique has been popularised during the 50s, by Alex Faickney Osborn, a creativity theorist. Osborn claimed that *a group of persons using Brainstorming could outperform* — in term of novel ideas and solution — *an individual working alone*. Osborn underlined that Brainstorming session is a supplement to individual ideation, rather than a replacement and that the technique, to be useful, must be executed following four basic rules (Osborn, 1963<sup>7</sup>) :

1. to generate as many ideas as possible,
2. to avoid criticising any of the ideas,
3. to attempt to combine and improve on previously articulated ideas, and
4. to encourage the generation of “wild” ideas.

Moreover, there are also other prerequisites, stated by the creator, for assuring a proper Brainstorming execution. Individuals who are going to attend the session have to be trained and oriented in advance, having the background explanation and oriented on the types of ideas desired by the problem owner. (Isaksen, 1998) Train participants is even more crucial if the components are outsiders of the project.

Osborn found that when these prerequisites were followed, a lot more qualitative ideas could be generated, since that defeating judgements and building on others' ideas, people's natural inhibitions can be reduced. Inhibitions, in fact, prevent people from sharing ideas that could

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<sup>7</sup> The original approach, depicted by Osborn, can be read in his book. “Osborn, A.F. (1963) Applied imagination: Principles and procedures of creative problem solving.”

be felt as wrong or stupid. Instead, silly ideas could benefit the sparking of more constructive ideas, since they changed the way people thought.

Brainstorming is much known as criticised. Right after its spend, during the 50s, heavy critiques regarding its productivity had been raised. The debate is still alive, and it build around the presumption that individuals working on their own would be more productive than those brainstorming in group (Isaksen, 1998). One of the most cited studies as evidence for Brainstorming inefficiency is the one carried on 1958 from Yale University (*“Does Group Participation When Using Brainstorming Facilitate or Inhibit Creative Thinking?”* Taylor, Berry & Block, 1958). The finding of the study evidenced in fact that individuals operating alone using the brainstorming procedure can indeed generate more ideas than group using the same procedure.

However a later study conduced in 1998 provided the incorrectness of the multiple studies executed for testing the non optimal outcome of Brainstorming procedure. The study has been conducted by Scott G. Isaksen, Professor of Leadership and Organizational Behaviour and founder of the Creative Problem Solving Group, professional services firm within the field of creativity and innovation. He proved that the studies evidencing that brainstorming does not work are actually biased. He analysed 50 empirical studies, finding that 34 over a total of 50 did not test the rules and prerequisites of the brainstorming process. Almost all the studies, focused in fact on individual versus group Brainstorming output, rather than testing the Brainstorming procedure.

After this discussion, we can assert that Brainstorming is indeed a powerful tool for generating creative ideas and solving problems, but at the same time, it must be carefully managed along with its prerequisites and rules.

In every project in fact there is the temptation to bring forward the Brainstorming, still at the very beginning of the project, pretending to start working on the plant of ideas on team member's minds. However, anticipating the Brainstorming could severely impact on the value of final ideas, since the solution would not be tailored to customers' real needs. For this reason Brainstorming has to be carried only after the Data Gathering phase — Visualisation, Journey

Mapping, Value Chain Analysis and Mind Mapping — so that ideas generated during the session are built upon customers real need and desires.

Once the Brainstorming session is complete, the team could proceed with the second tool associated with the Idea Generation phase: Concept Development.

### **2.1.2.2 Concept Development**

The second and last tool of the idea generation phase is the concept development. Here there is the possibility of choosing the most promising ideas raised from the Brainstorming session and transform them into valuable solutions, which embed the vision of both the customer and business. The goal of concept development is to draw from the Brainstorming results approximately ten ideas, that will be transformed in concepts, which, in turn, during the next phases, will be concretised through Prototyping.

Differently from Brainstorming, the Concept Development phase needs to be performed by a dedicated team, since outsiders would lack the precise project context, and consequently the capacity of judge ideas coherently. Having set the team, Brainstorming results need to be spread to be seen by everyone, as in the Mind Mapping session. Once the materials have been prepared, duplicates have to be removed, and similar ideas put one next to the other. After that, it will become simpler to identify what is missing and also which are the key ideas to be transformed into concepts.

The key is to pick and choose among elements to form a concept that will have both values for the customer and also a viable business model. From the chosen concepts, in turn, only three to five anchors — powerful solutions — need to be chosen and brought to the next stage: Testing.

### **2.1.3 Testing**

Testing is the final step of the whole Design Process, and it comprehend the tools that will help managers to transform concepts into deliverable solutions.

### **2.1.3.1 Assumption Testing**

The first stage of Testing is called indeed Assumption Testing. During this phase, previously determined assumptions have to be verified before proceeding with the Prototyping session.

Through the Design Thinking process new business concepts are developed, however business concepts are nothing more than hypothesis, best guesses on what customers will need and value.

Continuing with this reasoning, business concepts, like hypothesis, are built on some assumptions, characters that make new concepts attractive. An assumption can be for example: “Are our target customers willing to pay a premium price for the quality”. Hence ultimately, the assumptions have to be true in order for the business concept (or hypothesis) holds, and this occurs iff those assumptions turn out to be truthful. As for the just cited example, the customers must be really willing to pay a premium price for a qualitative solution, otherwise the hypothesis does not hold. The objective of this phase is therefore to investigate about the veracity of the imposed assumptions.

Unfortunately, assumptions will surely be many, since that concepts to be managed are still a substantial number at this point. Subsequently some time has to be spent with the identification of the most critical assumption, the one which determines the attractiveness of the concept. The identification of the key assumptions can be made through a sort of “stress-test”, first generic and then specific. If the concept passes both the tests, its assumptions deserve to be analysed.

The first test under which the concepts has to be subjected is a generic test. Here the concept must be analysed under four issues:

1. Is the concept valuable? Is the customers willing to buy it, and at a certain price?
2. Is the concept executable? Is the firm able to create and deliver it at a reasonable cost?
3. Is the concept scalable? Is the firm able to build a volume that worthwhile the investment?
4. Is the concept easily copyable? Are competitors able to copy the concept easily?

The four issues have to be treated sequentially since they are listed in order of importance. If a concept passes neither the first nor the second point, it means that the concept is unlikely to succeed.

The concepts which pass the generic tests, have to be subjected to a more accurate test, a business test, to see if they fit with the firm and its desired strategic goal. A concept cannot be too far located from a firm specific environment, otherwise, it will be hard to sustain the concept creation and viability. Once the assumptions lying behind concepts have been narrowed to a manageable number, there are two methods to test them, either gather new data in the field (usually very costly) or use the existing information to run a more detailed analysis.

Since that test hypothesis in the field can be expensive, another skimming of the information is usually recommended. The available data must be arranged, to understand what is known, what is impossible to know or what is not still known but could be known. However, with the available evidence, it is possible to verify some assumptions, whereas others need to be tested with data that is not available, but that could be found on field along with final customers through the use of a prototype, the subject of the next phase.

### **2.1.3.2 Rapid Prototyping**

Prototyping is probably the step which differentiates the Design Thinking process from the other business thinking methodologies, and it is central to the whole process effectiveness. To Prototype means creating quick and cheap visual expression of the selected concepts, to render their testable and understandable by others.

The word “Rapid Prototyping” must not be confused with the often associated concepts of 3D printing and other industrial technologies used during Product Development. Prototyping in this case indicate the action of producing anything tangible that can help to explore the selected ideas, emerged from the Design Thinking phases. It is important to keep the “things simple” and move quickly so that early mistakes or weaknesses can be rapidly spotted, without spending much time and resources. Focusing on details and mechanical and aesthetic

aspects can lead the team to lose the focus on people. Prototyping, in fact, must take only the resources — time, effort and materials — necessary to create useful feedbacks on the idea and move forward.

The motto is: “anything can be created from anything” from a business model to a customer experience, merely using some cardboards and stationery. As a matter of fact, early prototypes have to be fast rough and cheap. The first prototypes, indeed, have only the purpose to figure out what to built (if it has to be built) and have to be shown to possible customers accompanied by stories, videos, music and conversation. The more is the investment in the idea, the more increase team commitment on it. Hence, in the first prototyping phase, it is more important the surrounding environment than the prototype itself. Moreover, a prototype that is rough and unfinished will leave room for users interpretations and suggestions, the real aim of the prototyping session. This stage is expressly built to be reiterated, through various improvement of the chosen concepts.

Usually, a prototype is developed in three stages. The early prototype will be only a sketch to present the idea to the audience: it must take only a few minutes and dollars to be constructed, and it will be spiced with much storytelling. If the customers leave a good feedback on the concept, then it can be taken to the second evolution, a functional prototype.

A functional prototype will be more refines concerning the previous, since it will require more time to be constructed, in term of days, rather than minutes, and a few hundred dollars in materials to be built. The functional prototype will still look pretty ugly, but it will show all the expected functions, and it will provide to the customers the possibility to interact with it.

Only one idea will be taken to the final form, the market test prototype. The final prototype will be indeed fully functional, and it should reflect the actual aspect of the solution. It will take some months to be developed, and also several thousand dollars regarding time, and materials cost. The real aim of this step is to slow the team down, to speed it up. Pausing with prototyping prevents the team from becoming too involved, or too complex with a poor idea for too long.

The whole Prototyping session will involve the customers opinions and feedback on the created prototypes. The artefacts will be actually subjected to selected audience opinions, as we will explain in the next section. However one more thing should be underlined: the perfect prototype is not the one which work smoothly, but instead the one that teaches us something.

### **2.1.3.3 Customer Co-Creation**

Customer co-creation is described as the penultimate steps of the toolkit (Ogilvie & Liedtka, 2011), but it is essentially parallel to the previous — Prototyping — and it embeds the advices for the selection of a proper customers audience. A good prototype testing session, as Brainstorming, to be useful, must have the right components.

It goes without saying that customer co-creation reduce sensibly the risk of a failure, both in term of time and money. Co-creation will take only few weeks and the involvement of a pair of resources, whereas a full product or service launch involves the presence of many peoples and the investment of months. Co-creating with customers is not trivial, and it is an action that has to be structured properly. The customers involved must be trustable and hungry for a new solution, but, and at the same time, diverse in target. Having only target customers as audience, could lead to biases feedbacks opinions.

Customers should be encouraged to participate to co-creation sessions through the provision of documentation to attest their participation, that can be attached to their curriculums, and also through the of a little compensation. It is important also to provide customers with feedbacks on their inputs, so that they can feel tempted also to participate in future co-creation sessions.

### **2.1.3.4 Learning Launch**

The last session, or tool, for the testing phase, is the learning launch. Learning launch is not a real rollout, but neither an experiment: it should seem real for both team members and customers. Learning launch bridges co-creation with an actual commercial launch, and it is the last possibility to test the final assumptions of the chosen solution.

During the learning launch, a definitive and fully functioning prototype is needed, so that the selected customers and partners have the possibility to test the solution for real, and give a precise answer to the untested assumptions. The team needs to define which assumptions need to be tested and also a good metric to determine assumption confirm or disconfirm.

As it has been analysed, Design Thinking, after a deeper investigation, is not a simple list of nouns nor a short procedure. It involves the engagement of many actors and the disposal of time, space and especially certain mental precautions.

It is also important to evidence that there are clear overlaps between the various Design Thinking processes and toolkits, as well many similarities between Design Thinking and other management practices. The various phases exploited by the Design Thinking process can be found also in other business works of literature. The techniques of Data Gathering, for example, has been used for a long time in the marketing practice for individuating user needs. Similarly also Brainstorming sessions and hypothesis testing are not new in the concept of Lean Startup launched by Steve Blank around 2004.

## 2.2 Further evolutions and some critiques

Many aspects which have been found in Design Thinking practice in the previous sections can also be found elsewhere in management practice, and for this reason, it becomes very difficult to argue that Design Thinking is a unique business practice. Regardless, the real struggle about Design Thinking is not about its singularity, but rather about whether its practice is still to be considered a Competitive Advantage. Speaking quite, this method has been around for more than ten years — since 2008 — when it gained momentum thanks to Brown and Kelley whose stop calling IDEO's approach “design” and start branding it as “Design Thinking” (Vassallo, 2017).

Today, ten years later, we are in front of this interrogative: *is Design Thinking still valid or had it been just a management fad?*

In the next sections we will try to address some of the most heavy critique raised against Design Thinking, by Designers and Design Professors, to understand which is the public opinion regarding the practice.

### 2.2.1 Is Design Thinking A Failed Experiment?

Many opinions have been raised about Design Thinking validity, long before now. One of the most popular disapproval had been raised from Bruce Nussbaum, once an ardent fan of Design Thinking which defined it later as a “*failed experiment*”(Nussbaum, 2011). He sustains that Design Thinking is ossified since it has no more to give, neither to Design Thinkers, nor to the society as a whole, but that it is even arming.

Nussbaum sustains it thesis by providing that Design Thinking has brought far much more failures with respect to successes. He continued by arguing that Design Thinking cannot bring the promised innovation enhancement, but rather only some incremental innovations that guarantee temporary benefits.

The process in fact will not deliver assured success, and certainly it won't without a complete and deep involvement in the method. It is not enough to apply the phases.

Until now we provided many arguments about what Design Thinking is, but it seems proper to specify also what Design Thinking is not. *Design Thinking is not fairy dust*. Design Thinking is a tool to be used properly. It might help to illuminate an answer, but it is not the answer itself (Walters, 2011).

Still, Nussbaum recantation had been focused on two main arguments:

1. Design Thinking has given all the benefits it has to offer,
2. Corporations attempted to absorb the process as a linear, by-the-book methodology, like an efficiency bases approach.

The first argument can certainly be stated as wrong, since to these days, many giant organisation as Google, IBM, PwC and others are — in 2017— still investing and bet on Design Thinking.

The second recantation, sadly is partly accurate. The times of rule based Scientific Management which believed in precedents and best ways are long gone. We are headed to an entirely different situation, perfectly described by Grant McCracken<sup>8</sup>, anthropologist and author, as “*operating an aircraft carrier at night without the benefit of arc light or radar*”. We are living in a new business environment that needs a complete involvement of physical and psychical resources to be tackled. We cannot hope to find benefit from the mere application of a simple three-step procedure, nor we can hope Design Thinking will provide profits without fighting. The real problem of Design Thinking is its execution.

Since the Design Thinking revelation, too many managers tried to reshape the process, by stripping it from the side effects: internal conflicts, process reorganisations, looping circularity, organisational culture and other barriers, which, however, represent the insoluble

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<sup>8</sup> Is Design Thinking Dead? Hell No, Grant McCracken, July 2011 on [fastcodesign.com](http://fastcodesign.com)

parcel of the creative process. It is especially this, the rough reshaping of Design Thinking process, the real cause for its failure.

The presumption that Design Thinking could have been taken without side effects in the organisational structure and environment has lead then to the wrong assumption that Design Thinking is a failed experiment. But, after all, the companies that had been able to embrace Design Thinking, becoming masters of the art, like Apple and IBM, have found great successes in the method.

After all, Design Thinking is not dead but rather at the beginning. There is still a long way to go to see the true Competitive Advantages of Design Thinking in action. To develop the kind of mastery needed to gain a true Competitive Advantage from Design Thinking, it is necessary to build deep skills in the subject, and creative leaderships at all levels in the organisational structure.

Teaching a new managerial approach in business schools that provides students with the in depth knowledge of new mindset needed to approach the new it will be possible to merge Management with design, and extract real Competitive Advantage.

This last cited topic — Managing as Designing — is the central topic this final dissertation thesis, and therefore a whole chapter will be dedicated to the subject. It will include many aspects of Management, Education and design as well.

Even if Design Thinking methodology is widely praised and promising in management and business field, still many opponents exist, especially among professional Designers. Some Designers repudiate it even by labelling it as a nonsense or stupid procedure. This upsetting seems in part given by an unjustified concern that Design Thinking could take Designers scene.

## 2.2.2 What Designers say about Design Thinking

Nussbaum, after all, is nor the unique nor the last person that will criticise the Design Thinking process. As a matter of fact, many are the areas of concern with respect to the practice, and one of them rise straight from the design's community.

Just to bring some examples: Nigel Cross, emeritus design's Professor, described Design Thinking as “*ineffable*” due to the fact that there had been not unanimous decisions about a unique definition of the term itself, and Kimbell (2009) also sustains “*the term is confused, and the literature on which is based is contradictory*”. A similar claim has been raised by Kees Dorst, another design Professor who asses that Design Thinking literature combined “*many disparate, vaguely creative activities under the term Design Thinking*”.

Very recently — in August 2017 — Natasha Jen<sup>9</sup>, note figure in the design sector, raised heavy critiques about Design Thinking. During the last 99U conference in New York, Jen attacked Design Thinking methodology through a disapproving talk<sup>10</sup>, in the name of the whole Designers community.

Jen began her talk by underlining her concern about Design Thinking, for the fact that it is a troublesome buzzword for the Designers community. She clarified right from the beginning that Design Thinking, in her opinion, is a technique devoid of critiques on which all Designers count on before releasing a new creation out to the world. According to her, the rigour of experts critique and proof is completely missing in the Design Process. She continued her talk by taking joke of Design Thinking, declaring that it can be summarised into a unique tool, the so called “3M Post-it”.

Jen even provide her own definition of Design Thinking, defining it as an instrument that « *packages a designer's way of working for a non-designer audience by codifying their*

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<sup>9</sup> Natasha Jen is an award-winning designer and educator. In 2014 she was acclaimed by *Wired* magazine as one of nine ‘Designers Who Matter’.

*processes into a prescriptive, step-by-step approach to creative problem-solving — claiming that it can be applied by anyone to any problem ».*

With this definition, Jen is clearly pointing the finger at Brown's ideology, and simultaneously, backing Nussbaum presumption that Design Thinking has been reduced to a “*linear, by-the-book methodology*”.

Brown defines in fact Design Thinking as “*a set of principle that can be applied by diverse people to a wide range of problems*”. Hence, following Brown, Designers dotes are not “innate”, but rather accessible to a far greater range of people by practicing<sup>11</sup>.

Reading between the lines, it seems clear that Professionals Designers, as Natasha Jen, are upset and attacked by the momentum that Design Thinking is gaining nowadays. However, it goes without saying that the two critiques provided by Natasha Jen are unfounded. Googling “Design Thinking” on images, as Natasha Jen did, and taking the results as the proof that Design Thinking is only about Post-its notes is somehow hilarious. It is also hilarious to consider Design Thinking without “Crit”, by the fact that every step of the process embeds the ideology of “do not fall in love with your idea” and rely on users feedbacks.

Nevertheless, Designers should not fear Design Thinking at all. As a star chef recipe would not make an amateur cook be able to reproduce the same dish, in the same manner, Design Thinking does not make managers able to become a Designer. Design Thinking offers some useful “recipes”, of course, but it does not provide the experience, techniques and skills necessary to become a Designer. As Brian Gillespie — Digital Strategy Principal at Continuum — pointed out is that Designers should understand which are the limits of Design Thinking, since as he said: “*No matter how many design classes business students take, they are still business students receiving a business education*”. There will certainly be place for Designers, since Design Thinking does not “negate more replace Design in any way” (Walters, 2011).

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<sup>11</sup> “The designer’s skills can indeed be applied to a wide range of problems but also that these skills are not innate and are accessible to a far greater range of people than may be commonly supposed” — Brown, Tim. “Change by Design”.

Designers should take advantage of the opportunity offered by Design Thinking to collaborate with the business context and educate themselves on the business strategy aspects. Understand how design connect with business is essential to create successful innovations Designer's want to make. Moreover, since that Design Thinking ranges in various areas other than classical design, it provides an opportunity for designers to place their influence on field different from the traditional design profession. Hence, blending in with business, is only an advantage for Designers, and they should learn how to cooperate within the Business Environment rather than feeling harmed.

In the next chapter, we can understand how Design Thinking can bring Competitive Advantage to the Business world, by fostering creativity and Innovation.

# Chapter 3

## Design Thinking in Organisations

## 3.1 Design Thinking in the Business Environment

In the first and second chapter, a theoretical and descriptive approach to Design Thinking has been presented, in order to fully understand the Design Thinking subject. Through this third chapter instead, a purely organisational setting will be explored, to demonstrate the Design Thinking potential in an organisational environment, and prove whether the method could suit with such an environment, by uncovering possible limitations and difficulties concerning its application.

Three are the main topics will be exploded through the following chapter. First we will experience that Design Thinking could be a driver of competitive advantage, by fostering innovation capabilities, second we will analyse what means to “managing as designing” and third which are the limitations and difficulties encountered in the application to the Design Thinking in the organisational environment.

The principal question addressed in this chapter is: *why should firms invest Design Thinking?* We will see that, if applied properly, Design Thinking along with its mindsets can foster innovation, the actual driver of *competitive advantage*.

However, all that glitters is not gold, since that even if Design Thinking provide positive outcomes on performance, many limitations exist with its application, making difficult its implementation. In the second and third part of the chapter in fact, we will analyse what does it means practically to managing as designing, and which are the difficulties that can be encountered through the implementation.

As we already experience, Design Thinking entered the business environment through start-ups and software companies, but today many large organisations are embracing this mindset. Google, PepsiCo, SAP, IBM and many MBA curriculum as well have Design Thinking firmly on the agenda, since it offers enormous potential for innovation, and competitive advantage (Kanazawa, Wilson, Betigeri & Chen, 2011). Companies like Google and IBM even developed their own version of Design Thinking process.

Google call its model “Design Sprint<sup>12</sup>” a five-day process that has been built to tackle the most critical problems and test new ideas through Design Thinking. IBM is working very hard to pursue this strategy. As a matter of fact IBM is investing more than \$100-million in the effort of becoming a design-centred corporation (Stinson, 2016). Actually at IBM they have one designer every 20 employees, and they are working to continuously increase the number. Their model is called “The Loop” and is thought as a continuous cycle of observing, reflecting, and making<sup>13</sup>.

Also top management consultancies are trying to increase customer experience using design competencies, acquired even through the acquisition of design firms. One clear example of this phenomena is Ernst and Young, which in the biennial going from 2014 to 2015 acquired Bedrock and Seren, two British design consultancies. But EY is not alone in pursuing this strategy (Gianatasio, 2017); in 2014 also Deloitte acquired Flow, design agency specialised in design solutions. Price Waterhouse and Coopers (PwC) instead, is applying Design Thinking logic through a dedicated network of physical spaces or accelerators called “Experience Centres<sup>14</sup>”.

We need to underline the word “binomial” when we are dealing with Design Thinking in the organisational environment, since it expresses an important concept that has to be clarified: an organisation should not be totally converted into a project oriented, iterative and prototyping design shop to embrace Design Thinking. Some functions that are present in every organisation, such as sales, accounting, marketing or operations, will never be suited to be reorganised with respect to the Design Thinking logic, since that a certain level of efficiency and standardisation has to be guaranteed (Martin, 2009). An organisation, instead, has to introduce Design Thinking in support to certain activities and processes, especially those related directly with the final consumer.

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<sup>12</sup> To have more information in how Google Sprints work, please visit [gv.com/sprint/](http://gv.com/sprint/)

<sup>13</sup> IBM Design Thinking, The Loop [ibm.com/design/thinking/loop](http://ibm.com/design/thinking/loop)

<sup>14</sup> Experience Centres offer teams of creatives, strategists, technologists, designers, engineers, product managers and developers, as long as an environment (“Sandbox”), developed expressly to foster collaboration and *co-creation*, between participants.

What consultancies underline is that they use Design Thinking, through the innovative environment, **in addition** to the traditional consultancy methodology. They, in fact, approach the problem posed by the client with two weeks of data gathering and field research, two days of co-development of the solution, and two weeks of analysis and testing along with the final users. After those phases, the client is asked whether he want to proceed with the identified solution, or, on the contrary, if he desires to stop the project. In case of a positive answer, a traditional consultancy that includes impact assessment both from the technology and from the organisational perspective, a detailed business plan, the examination of legal and financial details and a whole plan of the project.

Hence, from this first analysis we can assert on first instance that Design Thinking is not the last management fad, since that many big firms and major consultancies are investing through this trend in recent years. On second instance we should underline that Design Thinking is not a receipt, but rather it has to be implemented with the right logic.

Still, some questions need to be immediately raised:

- *Why should firm invest in Design Thinking?*
- *Which are the concrete advantages that Design Thinking can brought through management?*
- *Why does Design Thinking should be a driver for competitive advantage?*

All those questions will be addressed through the next sessions of this chapter.

## **3.2 Design Thinking and Strategy**

### **3.2.1 Management Innovation**

In 2016 it has been released for the twelve consecutive years the study<sup>15</sup> aimed to understand the driving forces that are leading the world's largest listed companies by innovation and R&D spending. What is interesting is that from the last study it emerges that there is not correlation between innovation and R&D spending, since that — for the seventh straight year — the 10 most innovative firms have outperformed the top 10 R&D spenders. According to this study (Jaruzelski, Staack, Shinozaki, 2016) it seems that R&D spend does not ensure performance.

However, since R&D spending does not explain innovation performance, which is actually the driver of those top 10 innovators? Could it be possible that this superior performance is partly due to the innovation contribution of the Design Thinking methodology? Is it a coincidence that five<sup>16</sup> over ten top innovators declare to use Design Thinking inside their organisations?

Before continuing, it is opportune to define what is intended with innovation, otherwise the following assertions could be misunderstood.

Innovation, in the management field can be defined in general as the adoption of a new idea or behaviour (Jiménez-Jiménez & Sanz-Valle, 2011) and is often called “Management Innovation”. For the purposes of this final dissertation thesis, the term Management Innovation, coupled with Design Thinking, is intended as the introduction and implementation of a new management practice, process or structure intended to enhance firm performances (Birkinshaw & Mol, 2008; Mol & Birkinshaw, 2009). Nevertheless, a Managerial Innovation can also be distinct between Technical and Managerial.

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<sup>16</sup> Apple, Google, Amazon, Samsung and IBM declare use Design Thinking as a Strategic tool.

- Technical Innovations are those that occur in the technical system of an organisation, usually regarding the implementation of a new product or service, or the introduction of improvement in the production system.
- Management Innovations, instead, are those that occur in the social system of an organisation. The social system is represented by the organisational structure and the management of people, and it comprehends, indeed, relations between people, procedures, roles, structures and the way of accomplishing goal or tasks.

The origins of Technical Innovations tend to start from the bottom of the organisational structure, since they usually occur in R&D dept or Product Development area, where professionals, technicians and engineers reside. Managerial Innovations, instead, usually originate from the top of the hierarchy, where the administrative core resides.

Management Innovations are considered to be more complex to implement with respect to Technical Innovations, since that they encompass the whole organisation structure, and consequently impacting on the overall firm performance. Managerial innovations tend often to be more relevant, with respect to Technical Innovation, since they can prepare organisation in the adoption of technical changes. This last assertion does not imply that Technical Innovations are less important than managerial ones since to achieve high performance, a leveraged balance between the Technical system and the managerial system should be attained.

Design Thinking can foster both kind of innovations<sup>17</sup>, but, as we said in the first chapter, we are more interested in examining innovations pertaining to the managerial practice, rather than the technical improvement and product appearance.

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<sup>17</sup> Design Thinking is an approach to innovation that is powerful, effective, and broadly accessible, that can be integrated into all aspects of business and society, and that individuals and teams can use to generate breakthrough ideas that are implemented and that therefore have an impact. (...) Moreover, the principles of design thinking turn out to be applicable to a wide range of organizations, not just to companies in search of new product offerings. (Brown, 2009)

Clearly Management Innovation has been widely recognised to have a positive relation with organisation performances (Camisón, Villar-López, 2014; Jiménez-Jiménez, Sanz-Valle, 2011; Hana, 2013; Mol & Birkinshaw, 2009) but today is more important than ever to sustain innovation, and consequently competitiveness, due to the impressive rate of disruption that we are experiencing.

The impressive rate of change that we are going through today has been defined as “dromology” from the Greek *dromos* — to race (Mootee, 2013). The speed at which everything is continuously changing will create ecosystems that “*will not just be candy stores full or opportunities*” Trapp, R. (2017) to whom is not ready to move and reinvent continuously.

The actual environment is offering an unlimited range of possibilities for revolutionaries and innovators, but at the same time it is posing clear threats to business managers which are wedded to the status quo (Liedtka, 2011). This is why innovation and the ability to innovate has become crucial.

Still, even though the rate of change is impressive, many companies used to manage themselves following the old models based on hierarchies and procedures; putting profit before everything. Today the old model does not fit in anymore. Management has to adapt and innovate itself, and one way is through Design Thinking.

Organisational Innovation paired with Design Thinking is becoming indeed a survival strategy giving to the business environment and management the instruments for facing that turbulent environment.

### **3.2.2 Design Thinking as an innovation enhancer**

It would be interesting to know how it could be possible for Design Thinking to make managers more inclined to invent a different future.

Design Thinking can equip business people with out-of-the-box thinking and creativity, both essences for Innovation. The creative mental process activated through Design Thinking is believed to stimulate *lateral thinking* — a way to instil innovative thinking in organisational settings — contributing to a variety of innovations in business operations (Martin, 2009). Lateral thinking is, in fact, the mechanism triggered while solving problems through an indirect and creative approach, by viewing the issue from a different angle<sup>18</sup>.

According to Edward De Bono — the psychologist who promulgated the term lateral thinking — the human brain is used to work with the logic of vertical thinking. By nature, the human brain is designed to learn how to solve problems, and to lock resolutions into a subconscious process, to provide an automatic response to a future occurrence<sup>19</sup>. Hence, to reason creatively, the human mind must be “trained”. Design Thinking, as we will discover, offers a broad range of principles that can help individuals to switch reasoning from the vertical thinking to the more creative lateral thinking.

By relying on abduction, experimentation and visualisation, Design Thinking can bring to managers multiple alternatives and solutions to tackle the various tension present in environments with high uncertainty and ambiguity, helping to foster creation and innovation.

### 3.2.2.1 Cognitive biases

Many minds shortcoming, or biases, have been individuated to interfere with creative thinking and innovative problem solving, as we can observe from the table below.

The consequences of these biases could be severe for innovation, since as depicted in the third column of the table, they could even lead to the failure of novel or value-creating ideas and the undervaluation of more novel ideas.

The cognitive biases that can influence innovativeness and creativity in the organisational setting, are basically nine (Table 3) :

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<sup>18</sup> Definition from Oxford Dictionaries

<sup>19</sup> What Is Lateral Thinking? from Edward De Bono official website: <https://www.edwdebono.com/lateral-thinking>

Table 3: Flaws in Cognitive Processing and Their Consequences for Innovative Problem Solving (LIEDTKA, 2015)

#	Cognitive Bias	Description	Innovation Consequences
1	Projection bias	Projection of past into future	Failure to generate novel ideas
2	Egocentric empathy gap	Projection of own preferences onto others	Failure to generate value-creating ideas
3	Focusing illusion	Overemphasis on particular elements	Failure to generate a broad range of ideas
4	Hot/cold gap	Current state colors assessment of future state	Undervaluing or overvaluing ideas
5	Say/do gap	Inability to accurately describe own preferences	Inability to accurately articulate and assess future wants and needs
6	Planning fallacy	Overoptimism	Overcommitment to inferior ideas
7	Hypothesis confirmation bias	Look for confirmation of hypothesis	Disconfirming data missed
8	Endowment effect	Attachment to first solutions	Reduction in options considered
9	Availability bias	Preference for what can be easily imagined	Undervaluing of more novel ideas

1. **Projection Bias:** is the individual tendency to project the present into the future, impeding the development of novel ideas and the accurate assessment of their likelihood to success.
2. **Egocentric Empathy Gap:** is the presumption that everybody else value, think, feel, and believe like they do. Basically, an individual is so caught up in his own mind that he does not understand what the other party is thinking. This can result in the creation of ideas that seems valuable for the creator, but that are not as much valuable for the users.
3. **Hot/Cold Gap or Empathy Gap:** it represents the inability of one individual to assess the influence of actual visceral states (emotion-laden — hot state, or not emotion-laden — cold state) on their future behaviour or preferences. Indeed a decision maker's current enthusiasm for an idea can limit the accuracy of the prediction of how others (*potential users*) will react to that idea.

4. **Focusing Illusion or focusing effect:** it is an individual tendency occurring when people place too much importance on one specific factor, and its effects, causing errors in the accuracy of the prediction of a future outcome. This bias can impact on hypothesis generation and testing as well.
5. **Say/Do Gap:** it is the bias explaining the incapability of users to accurately describe their current purchasing behaviours. This results as an issue for innovators, since they cannot assess accurately future user needs and wants.
6. **The Planning Fallacy:** it is the tendency to overestimate the optimality of an idea, by imagining always a best case scenario. This lead to the overcommitment of poor ideas.
7. **Hypothesis Confirmation Bias:** it occurs when individuals search for explanations coinciding with their preference, leading to the disconfirmation of the unfavourable idea/hypothesis.
8. **The Endowment Effect:** it represents the unwillingness of a person to give up something that is already in his/her posses — in the business context it could refer to a process, an idea or a solution — causing the inability to value positively a new improved solution.
9. **The Availability Bias:** it is the individual presumption that an idea or option that is easily recalled in mind has to be more valuable than an option that is less easily recallable. This lead to the preference for incremental solution at the expenses of radical ideas.

Examining those biases, we can get even more clearly that while producing novel ideas many are the sources of complication, making the action of inventing and creating even more complicated.

### **3.2.2.2 Bias reduction through Design Thinking**

Nevertheless, many strategies exist to contrast and mitigate those unfavourable behaviours, and, among the remedies, there are many tools provided by Design Thinking process. As a matter of fact, Design Thinking if taken at the practice level, provides a series of mechanisms that are well suited to reduce negative outcomes produced by cognitive biases, improving the novelty and value of the generated ideas (LIEDTKA J., 2015). In order to explain in great

detail how Design Thinking can override those mental shortcuts, the biases have to be subdivided into three different categories:

1. Idea Generation Biases
2. Customer's Biases and
3. Testing Biases

Each category of biases can be then provided with the specific Design Thinking tools for mitigating the negative effects on innovation, as we can observe from Table 4.

Table 4: Biases, Remedies, and Design-thinking Process and Tools (LIEDTKA, 2015)

Biases	Remedies	Need Finding	Ideation	Experimentation
<b>Idea Generation Biases Reduction</b> Category 1 bias: (projection, egocentric empathy, focusing, and hot/cold gap)	1. Collect deep data on others  2. Improve ability to imagine experiences of others  3. Work in teams	Perspective-taking ethnography (journey mapping and job-to-be-done analysis)  Visualization (storytelling and metaphor)  Sense-making tools	Collaborative ideation tools	Disconfirming data focus
<b>Customer's Biases Reduction</b> Category 2 bias: (say/do gap)	1. Improve users' ability to identify and assess their own needs  2. Use methods that do not rely on users imagining their needs and solutions	Journey mapping Projective techniques  Participant observation		
<b>Testing Biases</b> Category 3 bias: (planning fallacy, confirmation, endowment, and availability)	1. Help decision-makers become better testers  2. Work with multiple options  3. Conduct reflection on results of real experiments	Perspective-taking ethnography  Creating multiple options		Assumption testing and prototyping to create "preeexperience"  Testing multiple options  Field experiments act as after-event review (AER)

## Idea Generation Biases Reduction

The first category of biases encompasses the tendency of decision makers to be controlled form their way of thinking, influencing the process of idea generation. The first category includes, in fact, the individual propensity of getting influenced from the past (projection bias), getting influenced by the current mood (hot/cold gap), favouring personal preferences (egocentric empathy gap) and getting stuck on their particular perspective (focusing illusion).

Design Thinking can mitigate the impact of the Idea Generation mental shortcuts through Data Gathering — the first step of Design Thinking Process — in three ways:

1. By putting effort on others' concerns and perspectives with perspective-taking skills
2. By helping decision makers to envision experiences outside of their own through storytelling
3. By focusing on multidisciplinary teamwork

Through Data Gathering, in fact, Design Thinking users can develop perspective-taking skills, which are, the understanding and adoption of others' perspective. Perspective skills, have been individuated by cognitive experts (Galinsky, Maddux, Gilin, White, 2008), to be a remedy for idea generation biases. With the term, “perspective-taking” is intended the whole process and instruments through which an individual can visualise a situation from another's point of view. A good proxy for perspective-taking has been identified to be *Ethnography*: the systematic study of people thought instruments as Mind-Mapping, Customer Journey Mapping and Customer observation. The Design Thinker, Using these tools, can develop a deep understanding of users' needs and create both valuable and useful solutions.

The second remedy for the first category biases is *Storytelling*. Using stories rather than mere representations of facts can enhance the imaginative capabilities, facilitating managers to visualise experience of other individuals. The use of stories has been discovered by researchers to be a good remedy for cognitive biases related to Idea Generation since stories enable the focusing on details that will be otherwise missed by presenting fact with data.

The third remedy to Idea Generation Biases is the use of *multidisciplinary teams*. Individual perspectives and preferences by collaborating can be contrasted and enhanced by colleagues,

improving the creativity of each (Madjar, Oldham, Pratt, 2002). Collaboration is, in fact, central and underlined throughout the entire Design Process.

Briefly, Design Thinking by emphasising *Ethnography*, *Storytelling* and *Multidisciplinary teams*, can indeed mitigate the effects of Projection Bias, Egocentricity, Focusing Illusion, providing managers with a wider and more valuable array of solutions.

### **Customer's Biases Reduction**

The second category of biases is originated from the customers rather than from the decision maker. This bias, named Say-Do Gap, describes the unconscious customer's inability to explain his preferences and needs. Design Thinking can contrast the effect of this bias either by using diagnostic methods as *Qualitative research* that do not rely on users' ability to predict preferences or by providing *Prototypes* of desired solutions.

*Qualitative research* is a method for inquiring customers about their preferences, by questioning them about their behaviours, rather than asking their preferences or desires directly. The technique of questioning customers about behaviours, has been demonstrated to be a good antidote for the Say-Do Bias (Mariampolski, 1999) since customers are more facilitated in recounting how they behave during experiences rather than share their preferences.

As a matter of fact, Design Thinking offers multiple tools to help customers to recount their behaviours. The first instrument is the Customer Journey Mapping, through which, as explained before, the customer can be followed during his typical journey and observed in order to individuate diseases and concerns in relevant situations.

The second family of instruments that can help managers to contrast the Say-Do Gap are Prototypes. Through Prototypes users can be provided with a vivid and tangible demonstration, allowing them to create a real expression of the future solution. Providing users with a tangible solution, in the form of prototypes, more solicit and accurate feedback can be extracted since users can create a real manifestation of the future.

Thus, by making ideas tangibles, either with Journey Mapping or Prototypes, Design Thinking helps to overcome the Say-Do Gap, helping users to describe more accurately their experiences. This, in turn, helps managers to uncover customers' latent needs.

### **Testing Biases Reduction**

The Third and last category of biases is composed by flaws related to the individual hypothesis testing ability. Basically, when a decision maker is influenced by Testing Biases, is not able to test properly the hypothesis that he or she has developed. This category includes:

- Planning Fallacy that leads to overoptimism,
- Hypothesis Confirmation Bias that impede individuals to see disconfirming evidences,
- Endowment Effect that lead to “fall in love with own ideas”,
- Availability Bias, that lead to the preference for easily recalling ideas.

All these prejudices result in the preclusion for decision maker to test novel ideas, since they unconsciously sustains the actual solution to be .

Design Thinking can prevent the occurrence of those counter-productive behaviours in three major ways:

1. Insisting with the creation of multiple prototypes, to spot unarticulated assumptions and disconfirming data,
2. Insisting with the management of multiple options at time,
3. Insisting on the consideration of marketplace experiments.

The action of producing different prototypes, facilitate the manager in figuring out the novel solution, helping indeed in assessing confirming or disconfirming data about the hypothetical solution, leading thus to the undertaking of a testing phase. By exploring different prototypes is possible for managers to think in detail at which are the expectations, and which data can support their assumed expectation, leading so to the weakening of planning fallacy, reducing overoptimism, and the hypothesis confirmation bias, by looking for source of disconfirming data.

Moreover, working with different options at time — as it occurs during the Design Thinking sessions — improve decision making process, since it has been demonstrated that considering a wider range of options the planning fallacy can be mitigated.

Last, considering on field experiments, Design Thinking can provide Design Thinker with vivid experiences, useful for the review of identifies assumptions.

Thus as it has been analysed, Design Thinking can bring innovation into the organisational environment by operating on managers subconscious, mitigating the negative effects of the just cited biases, freeing the mind, favouring both the generation and evaluation of unexplored ideas.

However if it would be that simple to embrace abductive reasoning and produce novel ideas, then everyone will be using Design Thinking. As a matter of fact, to have any of the cited advantage from Design Thinking, it is necessary to include it in strategic plans.

### **3.2.2 Design Thinking and Competitive Advantage**

Before we also said that Design Thinking could be considered a critical driver of competitive advantage, but actually how can it occur in practical terms?

It has been demonstrated throughout the previous sessions, that using Design Thinking can increase innovativeness score in firms (Wattanasupachoke, 2012) by enhancing lateral thinking and abductive reasoning through the reduction of cognitive biases. Unfortunately, there is not an equally direct relationship that links Design Thinking with firm performances. This occurs because of the intrinsic nature of Design Thinking, a form of logic that does not generate proofs, and based on the domain of “what might be” (Martin, 2009).

Performances can be increased through Design Thinking indirectly, through the improvement of various aspects of the business. Design Thinking can — among other things — put the user first, help to solve the same old problems differently, create boundary objects, defeat judgements, enhance innovation and eliminate the fear of failures, encouraging thus

maximum performances and inputs by individuals providing — as a consequence — an increase in firm performances. Even so, all these benefits pay in the long run, and with certain arrangements.

However, according to Roger Martin, it is far more risky to maintain an environment hostile to abductive logic than Design Thinking itself. After all, without the logic of “what might be” a company can only get stuck on the current algorithm — referring to the logic of the Knowledge Funnel — leaving the path clear for competitors that are willing to put some skill in the game, trying to solve mysteries embracing the Design logic.

Anyway, the competitive advantage derived from Design Thinking does not come for free. Solving wicked problems is a risky, expensive and time-consuming activity since it requires a considerable amount of time — from five to ten years — and resources to be involved in the changes of organisational norms and culture. As a matter of fact, the major benefits of Design Thinking, can be achieved when the method is paired with the Strategic plan and the operational model of the entire firm, and it is a process that require in deep involvement of resources.

Brown himself affirms that « *in order to create sustained competitive advantage, businesses must be not just practitioners, but masters of the art.* » intending that is not enough for firms to encourage managers to apply Design Thinking tools to see benefits coming, but rather a whole new structure has to be created to sustain and welcome this new Design attitude.

Design Thinking could help indeed the business people to leave the old paradigm of the 20 Th. century, and enter the new era while creating a sustainable opportunities, within some arrangements.

Within the next paragraph, we will explore what is intended for Design, detached from the usual concept product aesthetic. The practicalities of what means to insert Design in the managerial practice will be addressed, in order to understand which are the necessary changes in a hypothetical attitudinal change through Design Thinking.

## 3.3 Managing as Designing

Giving the fact that Design Thinking has been recognised to be crucial both as a mode of cognition, by lowering cognitive biases, and as an organisational practice, by stimulating innovative solutions, it would be interesting to explore how the managerial role must be reconsidered to respond to the current business environment exigencies.

The argument of managing as designing is very delicate since its consequences will impact both the organisational and the educational sphere of management. It has been already addressed the fact that managers are currently trained to be decision makers, in the sense that they are used to deal with a set of alternatives, or course of action, from which they must choose. Within the problem-solving attitude, it is easy to come up with many solutions, but, on the other side, it is hard to decide among alternatives, other than being influenced by many biases. The Education imparted to managers is in fact focused on developing excellent Decision-Making skills. However, a problem-solving attitude oriented towards decision making could have given advantages during the 50s, when the working environment was clearly defined and stable. A situation that unfortunately does not hold true anymore.

Through this paragraph indeed we are going to analyse concretely what does it mean for a manager to embrace a Design attitude, exploring the concrete consequences for the organisational and managerial practice as a whole.

Design can impact management practice, by influencing three main aspects: the first is by completely rethinking the daily practice of managers, second by creating a more appealing workspace for the retaining of new talents, and third by changing organisation structures, processes and cultural norms.

### 3.3.1 A Design Attitude

Embracing a Design attitude — or managing by designing — means to integrate Design principles into the complex organisational environment, to equip managers with new habits,

to help managers in switching from an old work style paradigm, to a new one, more suited with the today's environmental necessities.

The new challenge of incorporating Design principles in the firm's management is particularly crucial for organisations founded on a technical and rigid culture, with a working style neglecting the human dimension, essential however for innovational and successful solutions.

By embracing a Design attitude, the flow of work life of the traditional organisation is completely reversed. If in a typical organisation managers are used to working on ongoing tasks with well-defined roles, in a Design based organisation the flow of work life is defined by temporary projects, carried by teams of t-shaped individuals. Projects having defined terms, can be reiterated until a suitable solution is founded, avoiding the risk of getting stuck on a persistent task forever.

Managers and organisations should indeed embrace a more Design attitude to answer to the actual challenging environment, and Roger Martin defines this issue as "*Companies more like Design Shops*". Martin sustains indeed that the traditional organisations, have to become more like "design shops" in their attitude and work methods (Dunne & Martin, 2006). Traditional organisations — following Martin — should indeed change their attitude along five main dimensions: the flow of work life, the style of work, the mode of thinking, the source of status and the dominant attitude.

Traditional Firms and Design Shops		
Feature	From Traditional Firm ...	To "Design Shop"
Flow of Work Life	Ongoing tasks Permanent assignments	Projects Defined terms
Style of Work	Defined roles Wait until it is "right"	Collaborative Iterative
Mode of Thinking	Deductive Inductive	Deductive Inductive Abductive
Source of Status	Managing big budgets and large staffs	Solving "wicked problems"
Dominant Attitude	We can only do what we have budget to do Constraints are the enemy	Nothing can't be done Constraints increase the challenge and excitement

Table 5: Traditional firms vs Design Shops (Dunne & Martin, 2006).

The change along the five main dimensions, as claimed by Roger Martin, can be visualised more clearly in Table 5, initially displayed in the paper “*Design Thinking and how it will change management education: An interview and discussion.*” published in 2006 on the Journal of Academy of Management Learning & Education.

The main difficulties associated with the traditional firms’ approach are originated by the fact that the various tasks are organised in a bundle of ongoing assignments, causing the need for a considerable involvement of resources. The massive involvement of resource escalates indeed in the complex management of budgets that act as a constraint for managers. Big budgets are defined as a restriction by Martin since they act as a propellant for deductive logic, by creating the false conception that that only what is predetermined on the budget can be developed. Within this environment, managers are indeed encouraged to select among predetermined alternatives, since they are often rewarded for sticking to the budgets.

By working with the Design logic it becomes possible to solve wicked problems and to foster novel solutions through collaborative abductive thinking, favouring the approach of “what might be”. Treating each project individually as a challenge where constraints do not exist, it is possible to shift away from empty platitudes about goals, and budgets, as usually conceived by management, and achieve *human betterment*. Energising organisations members through managing as design, it will be possible for them to seek ideas laying behind a stated mission, since they are lead to ask themselves which is the real purpose of a problem, and create a really helpful solution, a solution of which they can be proud of.

However, treating the organisational environment with the attitude of a Design Shop, is not simple, nor only useful for innovation purposes. The predisposition of an organisation to managing as designing is useful also for creating a more appealing workspace experience.

### **3.3.2 A New Workspace Experience**

The actual environment, along with innovation, continuous improvement and change, demands even for a different experience in the work field, an experience where organisations offer flexible time schedules, flat hierarchies and the possibility to growth. Today, as a matter

of fact, several drivers make workers expect more from the innovative and digitally enabled workplaces.

The components of “Generation Y”<sup>20</sup> management workforce tend in fact to be well educated, well networked, multilingual and self-determined, increasingly look for workplaces where the just cited characteristics can be found (Gruber, De Leon, George & Thompson, 2015). This new demand creates indeed another issues in the management domain, the so called “New Workplace Experience”. The NWE is becoming crucial, since it seems to be one of the main drivers is the competition for talent. Young managers in fact are more willing to work in organisations designed to offer the right work experience, with the right physical and virtual environment, that includes, other than innovation also the related activities at support of the NWE, as the interaction between employees, a human resource program and many others factors that support the whole NWE.

Design Thinking when applied to the organisation environment, does not only pinpoint to the creation of innovative solutions for user but might also allow for the development of a new workplace experience.

### 3.3.3 Structure, Processes and Cultural norms

Managers can exploit the new insights offered by the Design environment to rethink also other aspects of the organisational system, to render it more appealing for a Millennial workforce.

An organisation to be considered a home for Design Thinking has to leverage changes in three main elements, familiar to every firm: the structure, the processes and the cultural norms (Martin,2009).

#### **A structure Project-oriented**

As we already anticipated, the structure of a Design oriented organisation needs to be project-oriented by forming ad-hoc teams with specific cross capabilities, defined goals and fix dates.

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<sup>20</sup> With the term “Generation Y” or “Millennials” it is intended the demographic cohort born from 1980s until 2000s.

Once each project is completed indeed, the team can be dispersed and recomposed in a different configuration for another task. Design consultancies are an excellent example of the team based job structure and are in fact often interpellate for helping organisations to manage the transformation from a traditional structure to a Design oriented one.

The traditional organisation processes, even if hidden in the infrastructure, need to be revised to promote an approach oriented toward validity. The two processes that foster validity in favour of reliability are especially the planning and the reward system.

### **The Planning process**

The process of planning, as set in the traditional organisation setting, influences the management behaviour toward reliability rather than the validity of solutions. The planning procedures are usually extremely past-sensitive since they rely on past data to predict future outcomes. The reliability based approach — as promoted by several planning techniques — can succeed only until the benefits of the current organisation heuristic — i.e. actual knowledge and solutions — last.

In the long run, when the benefits will be exhausted, an approach toward reliability will only harm organisations performances and moral. Pursuing a reliability oriented approach, the firm bears the risk to fall prey either of more innovative competitors who are ready to use the logic of “what might be”.

The fact that the planning process should favour validity, it does not imply that planning should be removed. For the sustaining of activities validity oriented, the planning activity should be formed by action-oriented toward validity: defined goals and spending limits. Defined goals help to the achievable breakthrough, and spending limits, in order to reflect which is the reality that the company can afford.

Even if something is appealing and good to persecute persons or workers in the specific case, have to be both allowed and spurred to persecute a good cause. The actual organisation environment is even discouraging the managing by designing attitude.

## **The Reward System**

The design attitude as everything else to be attractive has to be fuelled by some incentives. In the managerial environment, the fuel of actions are rewards. Nowadays many traditional companies, use to reward people on the base of their capability of producing revenues and capitals, not on their capability of solving problems and create a better future. People who want to play Design Thinking have to be free of relying upon imagination, insight and inspiration, without fearing the consequences in monetary terms.

In a Design oriented organisation, the reward strategy has an entire different conception: the best designer status is achieved according to the challenges faced, rather than the generated revenues (Martin, 2009). Rewards are indeed conferred according to the ability to solve wicked problems and to generate users' valuable solutions.

Therefore, a design-oriented organisation need to support first a flexible planning process and second a validity oriented reward system and third, as we are going to explore, also cultural norms and rules, with the aim of influencing people behaviour.

## **Cultural norms**

If the objective is to create a Design Thinking oriented organisation, and an environment suited for a Millennials management workforce, specific barriers have to be overcome even in the cultural field.

A first obstacle can be surely identified to be the provision of an analytical thinking training to managers, in order to stimulate abductive thinking, since, for the majority of them, only a deductive and inductive logic has been imparted in their post-secondary education path.

The second barrier to be overcome is in charge of Stakeholders, rather than management party. The validity orientation of the majority of key stakeholders represents a though stop. Stakeholders are in fact often more inclined to reward achievement in reliability and punish those minor shortfalls in validity solutions, obeying managers to reliability oriented provide solutions, with sure payoffs. Thus, even if the management is oriented toward validity and

abduction, still has to collide with the reliability orientation of Stakeholders party (Martin, 2009).

However applying Design Thinking to the organisational structure does not imply that every function has to be entirely shifted in a design-oriented one. Some functions such as sales, accounting or operations are not suited to be reorganised for the Design Thinking logic since a certain level of efficiency and standardisation need to be met. Moreover, as we will observe, in the next section, most of the today's' organisations are not even suited nor ready to accept a managing by designing culture.

## 3.4 Barriers to application

Even if Design Thinking has been proven to be a source of innovation and competitive advantage and to deliver the possibility for New Workspace Experiences in the business environment, still at present only few organisations are willing to embrace the logic of managing by design. The just cited fact play a very unfavourable role for the method itself, since it lead to the false conception that Design Thinking is a failed experiment, when, instead it only need to be understood.

Here we can bring an explanation — through Martin's words — for the fact that Design Thinking organisations remain still a minority in the corporate world.

*« For a middle manager forced to deal with flighty, exuberant creative types, who seem to regard prevailing wisdom as a mere trifle and deadlines as an inconvenience, the admonition to “be like a designer” is tantamount to saying. “Be less productive, less efficient, more subversive, and more flaky” — not an attractive proposition. »* (Martin, 2009; pp. 124).

Managers behaviour and mindset, as stated by Martin, are by nature not inclined to behave like a designer. This limitation in behavioural terms is due to: the occupational hazard evolved throughout the organisation setting and second from the education imparted to managers in business schools.

### 3.4.1 Organisation Traditions

According to a recent study (Carlgren, Elmquist & Rauth, 2016) it emerged that Design Thinking has a strong positive relation on innovation performances but on the other hand, it seems that using Design Thinking is a challenge itself. As a matter of fact, many difficulties encountered with the Design Thinking application are linked to the organisational traditions and habits, rooted in turn in the organisation culture.

On the first instance, Design Thinking results to get too big for organisational managers by the fact that it does not fit with the existing processes and structures. Design Thinking appears to

be very resource intensive concerning the usual way of working, and for this reason, difficultly prioritised over the usual line of work, especially in situations of high workload.

Design Thinking is often left out from usual managing practices also because it occurs that besides of being resource intensive, the resulting ideas and solutions often clash on existing scope and already projected firm plans. Existing organisational structures represent indeed an obstacle to the development of innovative concepts and solutions that fall outside the area of competence, even if those identified solutions are drawn on the bases of users real necessities, as the Design Thinking process allows.

As already mentioned, stakeholders in many realities asses much pressure for proofs and validations of the usefulness of the Design Thinking investments in the short term, assuming that those efforts could be evaluated based on the traditional methods (Carlgren, Elmquist & Rauth, 2016). As we analysed, the Design Thinking methodology is nor a usual nor a simple model, since it requires a considerable resource involvements, especially in terms of time. Design Thinking requires a long time frame for being inserted into the organisational setting (from five to 10 years), and it is also influenced by the size of the organisation itself; the larger the organisation, the less it is, in fact, likely that it will be receptive to Design Thinking. For this reason, it is impossible and inopportune to ask for proofs and validation in the short term.

Moreover, it goes without saying that the more the company has a risk-averse culture, the more it is difficult to persuade workers to rely on experimentation and iteration. This aversion is also reinforced by national cultures since that in many countries — especially the Asiatic ones — employees and managers are not supposed to have an opinion different from the superior. In these particular situations, it becomes even more difficult to encourage people of thinking abductively and to behave like Designers.

Another aspect that must not be under-evaluated as a challenge of Design Thinking usage is the fact that Design Thinking application threatens the existing power dynamics in the firms. Design Thinking can unbalance the existing power dynamics either by altering the decision-making process, moving many decisions to the team level and reducing thus managers authority or by invading the area of expertise of specific individuals.

Having fun, promoting flat hierarchies and working along with users is not contemplated by everyone. We have to admit that the cultural model required to adopt Design Thinking is proper only of the giant IT American firms like Google, Apple and IBM that manage to be also among the top organisations for innovation and performances.

Innovation along with Design Thinking is increasingly considered a critical competitive advantage in the organisational setting since as we have already analysed, it can help to solve challenges in innovative ways in all the business sectors, and for this reason companies, also the more conservatives, must adapt and change to keep up.

Nevertheless, organisational culture does not represent the single barrier against Design Thinking usage. The role of education, and specifically of Business management education, plays a crucial role in the acceptance of Design Thinking in the organisation environment.

### **3.4.2 Lack of Design concepts in the Business Education**

The introduction of Design concept in the educational path of business managers could be the key to the Design Thinking acceptance and practice, since that, after all, what has an implication for managers, ultimately will affect business school (Dunne & Martin, 2006).

Shortly it will verify the need for consultants that have a design attitude can help companies to render the world of business a better place. A place where each project is viewed as an opportunity to question the basic assumptions, ossified by years of organisational habits and where managers are idea generators rather than decision makers (Boland & Collopy, 2004).

What Martin claims is “*today's business people don't need to understand designers better, they need to become designers*”(Dunne & Martin, 2006: p. 513) and that one way to achieve this capability is through the lens of learning by doing.

Business schools can become a proper practicum setting if they would be designed to learn a practice, a subject that is missing in many business curriculums (Dunne & Martin, 2006; Brown, 2009).

In the next chapter we will analyse the status quo for the incorporation of Design Thinking in the business curriculum, to understand which are the methodologies used and also the challenges encountered in the path by students and instructors.

## Chapter 4

### Learning Design Thinking in Business Schools

## **4.1 Managerial Education asks for Design Thinking**

Throughout this chapter, we will analyse the Design Thinking subject in relation to the business education sector. To understand the correlation between the two subjects — Design Thinking and the Business Education environment — it would be interesting to analyse, on first instance, the status quo of the two subjects.

In analysing the status quo, we will start by identify which are the determinants that had lead to the need for the incorporation of Design Thinking in Business curriculums. Then, we will detect which are the available instruments and models — to this day — to implement and use the Design Thinking in the pedagogical environment. Subsequently, we will also determine which are the boundary conditions, or the assumptions that need to be fixed to achieve the expected results. Finally, we will go through the existing pedagogical model of Design Thinking in order to determine the state of art in the academical sector that is still new and yet unexplored.

### **4.1.1 Determinants**

The need for a new curriculum for management business education had been recognised since the late sixties when Simon called for the need of the inclusion of Design concepts. Simons assessed in fact that «Managers, like architects and engineers, are “form-givers”, shaping organisations and economic processes. They are concerned with “not how things are but how they might be, in short with design”» (Simon, 1966 p.55).

The discourse raised by Simon forty years ago has now regained interest thanks to the work of contemporary scholars (Boland & Collopy, 2004; Dunne & Martin 2006; Mootee, 2013) which still sustain the Design cause in business education.

As a matter of fact, in recent times, further critiques have been in fact raised regarding the need for reexamination of the traditional management education setting. One of the more

contested critiques is connected to Mintzberg (2004)<sup>21</sup>. Mintzberg accuses the actual business' school approach to being hill formulated, since it focuses almost only on the provisions of analytical knowledge, that is, however, suited only for analysing readily available data. The overemphasis on analytical techniques — according to Mintzberg — leads managers to divert the attention away from ill-defined but equally important considerations. Mintzberg continues by arguing that management, being a practice, asks for experiences in context, since that issues have to be faced in the full complexity of living (Gosling & Mintzberg, 2004).

Nevertheless, Mintzberg is not the only in sustaining the need for an academical business revolution. Martin claims for the need of a less abstract approach to teaching. Taking the options presented, analyse them and deduce the solution from past experiences is not the right approach according to Martin. He sustains in fact that the traditional logic of induction and abduction traditionally delivered to managers has to be integrated with the logic of abduction.

To deliver abductive logic to managers, following Martin, the traditional business education must be supplemented with aspects borrowed from the Design field, to «*approach managerial problems as designers approach design problems*» (Dunne & Martin 2006; pp. 512). With concepts like collaborative skills, visualisation, curiosity and experimentation future managers will be able to imagine entirely new solutions that can accommodate both the customer and the shareholder.

Even if more smoothly, also Brown betray a dissatisfaction regarding the actual managerial school system, accusing that the examples of institutions that are sustainably relying on Design Thinking can be count on one hand (BROWN, 2015). Brown sustains in fact that to create sustainable results from the application of Design Thinking business people must be «*not just practitioners, but master of the art* » (BROWN, 2015; pp. 2).

Nevertheless, acquiring the necessary mastery is a long-term process that can be realised solely through the educational path. Also Brown indeed demands a less analytical approach in business schools, since, following his reasoning, the dominant focus on analytical thinking

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<sup>21</sup> Henry mintzberg, professor of management studies at McGill University in Montreal, Canada

lead students to think that creativity is either unimportant or a privilege of few. The solution provided by Martin is the development of educational experiences that allow the natural inclination to experiment and create to be amplified, rather than suffocated.

One of the most prominent discourses exposing the determinants of Design Thinking introduction in Business courses is sustained by David Dunne along with Roger Martin (Dunne & Martin, 2006). Their article wrote in 2006, was a clear answer in sustaining the Mintzberg claims about the overemphasis on analytical techniques in Master Business Curriculums. What they sustain is that Design Thinking could be used to address many of the criticism that had been levered at Business programs.

What Dunne and Martin argue is in fact that what has implication for the management environment — Design Thinking — will surely affect business schools, and indeed, as managers are interested in Design methods, also business students will need to be prepared, to strength their Design mindset. Hence, what the scholars argue is, in first place, that Business education should be more like Design education by organising master courses in therm of projects where students are guided in solving wicked problems, using the abductive reasoning, in addition to deductive and inductive skills (Dunne & Martin, 2006; pp. 514).

The scholars also assess, on second instance, that business education needs to give more collaborative skills to business students, since that, following the scholars, students have to learn how to listen to other people and understand others reasoning process, since that what is actually taught to most of the students is that anyone who thinks otherwise must be considered enemy. As a matter of fact, the misunderstanding of what others — customers and society — think can be detrimental for both the businesses and the society as a whole.

According with Ghoshal, students who do not develop a proper sense of empathy, fail also to develop any sense of moral responsibility (Ghoshal, 2005; pp. 76). As a matter of fact, what Ghoshal claims, is that the overemphasis on shareholders' interest at the expenses of those of customers and society has lead to the occurrence of events like Enron scandal.

Even if the Ghoshal assertion is quite dramatic, it reveals to be partly true, since that what is taught in Business schools as management theories, will influence the manager's behaviours that will start to behave in accordance to that given theories. Consequently Martin admits that the Design ideas paired with Business Education could address the set of problems raised by Ghoshal, since through integrative thinking students can learn to think in term of both the customers and the shareholders.

More than one scholars is indeed dissatisfied from the traditional management education, and ask for a restructuring thereof. The solution proposed by scholars is in fact to transform business education to be more like Design education (BROWN, 2015; Dunne & Martin, 2006; Glen, Suciu, Baughn & Anson, 2015; Wastell, 2012) by inserting team collaboration and project base learning in addition to the classical deductive and inductive skills that are usually taught in Business Schools.

In the next section we will explore which are the tools to this day for implementing Design Thinking in a pedagogical environment, along with their reliability.

#### **4.1.2 Skills acquired through Design Thinking**

*"The people who rise to the top of these companies are designers more often than not"* (Dunne & Martin, 2006; pp. 516)

The fact that Design Thinking has become a necessity both for the business environment, and as a consequence, in the Education curriculums is almost confirmed. However, it would be legitimate to ask ourselves which are actually the advantage brought by Design Thinking tools in terms of pedagogical capabilities? Furthermore, which are the new mindsets that need to be provided to future managers? And finally, which would be the mindsets transmitted through the different Design tool and methodologies? Throughout the next sections we will try to address all the just raised questions.

First of all the Design Thinking is paired with Business Education with the main goal of preparing students to develop a human-centred approach. With those capabilities, students

will be able to connect with the subjects — users — affected by their decisions (Glen, Suciu, Baughn & Anson, 2015). Connecting with people, by observing their behaviours and everyday actions, allows managers to develop the empathy — seeing the world through the eyes of others — which grants for the translation of observations into insights and in turn insights into tangible solutions designed to improve people's lives. As we have just seen in the previous section, the

Even though Brown assess that the principles of Design Thinking, such as creativity, imagination, the ability to observe, are not innate but rather accessible to a great range of people, those abilities have to be stimulated.

A hypothetical student trained to managing as design, should acquire capabilities that allow him to work in multidisciplinary teams and solve wicked problems using abductive reasoning, in addition to deductive and inductive skills (Dunne & Martin, 2006). Many collaborative skills are needed to work along with colleagues — ideally pertaining to different background — and with final users. The idea of listening to a person, with the intent of gaining some insight about something that does not exist yet is not usually taught in business schools. Design Thinker's profile should be essentially the one of a T-shape manager. A T-shape manager is a person that has on the vertical axis strong notions of business concepts, and on the horizontal axis some concepts about the Design sector, and the disposition for collaboration across disciplines.

The attributes that characterise a Design Thinker can be summarised into five attitudes (BROWN, 2008):

- 1) **Empathy** — Taking people first, and imagine the world from multiple perspectives is the first and most important ability that a Design Thinker must learn. Empathy is in fact what inspires innovation and what allow for the creation of desirable solutions, through the minute observation of the world. To observe and to stand in the shoes of others, help also students to appreciate the impact of the business decisions in real life. Working with empathy as a matter of fact, is what distinguish between classical academic thinking — the analytical thinking — and Design Thinking (Brown, 2009).

Empathy implies more than mere observation, it means to connect with people at the more basic level, trying to decode their most inexplicable behaviours, understanding their desires through their experiences, behaviours, emotions and feels. At the end of the day, every solution, in every sector is made for humans, and empathy is what allow to understand what humans need.

- 2) **Integrative Thinking** — The second quality that has to be found in the profile of a good manager and Design Thinker is the ability to reason with the logic of integration, rather than on the logic of the exclusion. Traditional managers, as we already explained, are used to drawing decisions among a fixed set of possibilities, choosing one possibility at the expenses of the others. Managing by designing instead allows managers to apply integrative thinking while solving problems. Martin defined integrative thinking in his book “The opposable mind” as the “*meta-skill of being able to face two (or more) opposing ideas or models and instead of choosing one versus the other, to generate a creative resolution of the tension in the form of a better model*” (Martin, 2009; pp. 296). Through integrative thinking managers will merge analytical process with insights collected through on field experiences to create a novel solution, detached from existing alternatives.
- 3) **Optimism** — One of the requirements for harvesting the power of Design Thinking is optimism. Optimism is the third characteristic that a manager should have, and it is also the seed of new ideas and curiosity. Managers have to believe and assume that they could solve every possible problem to create a better future. Nevertheless, optimism is not an innate ability; it has to be stimulated and cultivated. Also accepting failures is part of an optimistic culture since it goes without saying that not every mystery can be transformed into an algorithm (Martin, 2009).
- 4) **Experimentalism** — The capability to rely on experiments is someway connected with optimism, since greater solutions do not come from already seen situations, and to this extent managers must be ready to explore all the possible solutions to find the right way to the algorithm (see Knowledge Funnel, chapter 1). It would be far easy if a fixed analytical procedure would exist to guarantee success. Also, as we

experienced, solutions are delivered and showed to users through various prototypes, and to this end, managers should learn from the Design's field to construct visual prototypes to interact and get feedback from final users.

- 5) **Collaboration** — Working with others is one of the principal aspects of being a manager. Managing by designing implies to collaborate with other people at two different levels, first with final users, and second along with colleagues. Working with final users is not contemplated in every business course, but it is an ability that must be learned if the managing by design is the objective. Furthermore, the predisposition of working with colleagues and across different disciplines is a characteristic that is proper of a t-shaped manager. As we saw in the first chapter, the ideal team of Design Thinkers is made up by people pertaining to different sectors (engineers, anthropologists, designers)

Being those the crucial characteristics that valid managers need to have to tackle with the actual business environment, and since that it has been confirmed that Design along with management education is the way to persecute, it would be interesting to realise how the Design Thinking experience could be inserted in management education.

The personal knowledge system defines how we acquire knowledge and expertise, and the goal of integrating Design Thinking in business education is to help the development of managers and leaders with an *integrative thinking* capability.

The advantage retained by integrative thinkers is to be predisposed to hold two opposing ideas in their mind, and, without settling for one or the other, produce a solution superior to either opposing ideas (Martin, 2009 b). For the capability of holding to opposing ideas at the same time, integrative thinkers are also said to have “*opposable minds*”.

However, integrative thinking can be learned by every person inclined to question the logic of either or. The opposable mind path of learning has been compared to the evolution that bring humans to the use of opposable thumbs, since, as we had been able to develop and refine the

skills to develop our opposable thumb, we can also develop the ability to use opposable thoughts to unlock solutions (Martin, 2009 b).

Each individual has indeed a personal knowledge system, whether or not they recognize it. Even though, for the majority of the people, this system develops in an implicit and unguided fashion and tend to be reliability oriented. The role of business education is indeed to shape the students personal knowledge system.

Each person's knowledge system is composed by three reinforcing components (Martin, 2009): the **stance**, the **tools** and **experiences**.

The stance is the top element of the personal knowledge system, and is what define each individual inclination in thinking.

The second element of the system are the tools that each individual use to organise his thinkings and understand the environment. The tools can be individuates as theories, processes or rule of thumbs that are applied while solving problems. Without the proper toolkit, managers have to tackle problems from scratch, every time. Theories learned, processes, and past experiences can help managers to categorise problems, and apply the tools that proved to be effective in a similar circumstance.

The third element of the knowledge system are the experiences: during the experiences the stance and the tool meet the real word. Through experience a manager is able to develop the sensitivity to distinguish between past conditions that result to be similar, but not exactly the same, whereas through skills managers are able to act to produce the desired result.

By inserting Design Thinking in the educational path of future managers it would be possible to teach students how to develop integrative thinking and — as a consequence — a state of mind suitable to hold different conflicting ideas at time, making thus possible to accommodate both the customers and the shareholders, avoiding the before cited issues (see Ghoshal, 2005).

Finally, It can be concluded indeed that by complementing Business Education with Design Thinking future managers would be able to enrich their personal knowledge system with a

series of Design tools and mindsets that will spur them to reasoning in an integrative way to produce solutions that will be satisfying both the customers and the shareholders.

In the following section, instead, we are going to address the limitations or boundaries that must be accepted for the Design Thinking process, in order to have a positive outcome, both for the business environment and for an inclusion in the academical environment.

### **4.1.3 Boundary conditions for efficacy**

As we already admitted in chapter one, Design Thinking is certainly not miraculous and for this reason cannot solve every posed problem. Moreover it is also true that to use the Design Thinking methodology each individual, in this case the manager, must have, upstream, a good preparation in business discipline.

We will start by analysing the possible areas of application and issues handled to have an idea of which are the situations that can be handled by applying the process in a business landscape, and then we proceed by drawing the

#### **4.1.3.1 When Design Thinking is applicable**

In order to understand which are the boundary conditions in which the Design Thinking could work, it would be interesting to analyse the elaborate titled “*Solving Problems with Design Thinking: Ten Stories of What Works*” (Liedtka & Bennett, 2013). The elaborate includes a collection of real business projects, where Design Thinking worked successfully. The scope embedded in the collection’s analysis is that the body of experience can be taken as a proxy or benchmark to define the possibilities and limits of the Design Thinking methodology in the real-life projects.

We should underline, on first instance, that the ten projects analysed through the book are completely detached from the Product Development area, coherently with the scope of this thesis, and can be grouped into three wide categories:

- 1) Redesign of internal firms’ processes
- 2) Customer engagement
- 3) Personal skills building

Through the following sections, we will analyse specifically the outcomes of each project, along with the Design Thinking contribution to the specific case, in order to draw some conclusions about the boundary conditions for efficacy.

### **Firm merger management**

The first area where Design Thinking has been applied successfully through project is to firms' process redesign. Here the panorama is shaped by three cases, where Design Thinking has worked successfully. Liedtka brings as first instance the integration of two giant Australian commercial insurance firms (Suncorp<sup>22</sup> and Promina<sup>23</sup>) with significantly different cultures and business approaches. The two firms were highly different in terms of organisational approaches, since Suncorp was very centralised, whereas Promina highly decentralised and worked as a house of brands. For this reason the two groups decided to hire a consultancy partner (Second Road) to help them to lead the merge using Design Thinking instruments. After eighteen months, through the use of Design instruments like *visualisation* — to paint a new future of the two organisations together — *metaphors* — to unlock the creative side of the brain and to escape from old rooted mental models.

### **Strategic Planning**

The second successful case of process redesign provided by Liedtka sees Design Thinking involved in the translation of market opportunities and threats into a new business strategy. The world largest enterprise software — SAP — used Design Thinking to introduce a new strategic planning process as a consequence of the Web 2.0. They used Design Thinking tools to examine how the Web 2.0 was affecting their customers, using their own company as sample. Using Design Thinking tools, the firm had been able to recognise which were the new customers' necessities, in the light of the Web 2.0, by connecting with groups inside the companies that contributes to the ERP development. Through this research the team assigned to the project discovered many strange situations, for example that many sales persons used to go through LinkedIn to see which vendors worked in the organisation, and then through the ERP

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<sup>22</sup> Suncorp Group, provider of general insurance, banking, life insurance and wealth management in Australia and New Zealand. See more details at [suncorp.com.au/](http://suncorp.com.au/)

<sup>23</sup> Promina Group, Australian insurance company, acquired by Suncorp in 2007.

system. These discoveries made with the use of Design Thinking tools convinced also managers of the old guard to accept the need for the entire SAP's suite of products, that allow for a better management of information flux.

### **Internal Process Redesign**

Another successful case in the context of firms' process redesign, had been the one of Toyota. The problem addressed through this project was how to give a great customers service. The Toyota customer service is very important for the whole firm, since it includes the service for multiple brands: Toyota, Lexus and Scion. Before the redesign customers have to stay on hold for an average of 20 to 40 minutes, to even get a phone call answered. Using Design Thinking methodologies (*journey mapping, ethnography*) consultants were able to understand which were the sources of those infinite waits that customers need to bear. It was revealed that repliers during calls leaved their desks to found information in hard copies or to look for a technology support person, extending significantly the waiting time, and reducing the customers served. Moreover it arises also that during the calls replies used to have an average of thirteen applications opened on their desktops (most of them not even official) to search for suitable solutions. These findings lead consultants to revise the entire customer service process, from the human to the technical aspects. They mapped the journey of the replies and built a process flow diagram to understand which are the sites and apps at which they looked most, in order to provide replies with the information they needed more quickly. By integrating the necessary information into replies instruments Toyota was able to decrease holding time to an average of less than a minute, and a cost saving of million of dollars saving time and solving more queries.

The second area were Design Thinking has been applied successfully is the customer engagement; the project presented has as subject the 3M's sales force.

### **B2B customer engagement**

The customer engagement case sees the 3M's sales force agents of the electronics and Energy business involved in bettering the customers' interests in their B2B solutions. The problem that was individuated was that sales people, along with the R&D and marketing team whose use to participate to fairs, conferences and sectors' events were not able to transmit the

technological and quality innovation embedded in 3M's Electronics and Energy business solutions. This was a very difficult act for a sales person who is usually more concerned with numbers and prices. The consultants in this case individuated the problem relied on the impossibility of sales persons to transmit the real innovations and technologies embedded in the products sold by 3M. Nevertheless, the typical customers of 3M's Electronics and Energy solutions are business professionals or technicians that want to make sense of the new technology and capabilities that the product embed. Unfortunately, the majority of sales managers are not enough skilled to know each technical detail of the innovation proposed. For this reason the consultants working on the project, after having studied sales force persons in their natural environment, decided to equip salesmen with a series of deliverables: Physical mock ups, that worked as a technical demonstration, an educational video to communicate the real innovation to the customers. These tools helped indeed the sales personnel in transmitting to customers also the more specifics and technical details related to 3M's products, making clients unbelievable of the amount of technological effort a simple product as a plastic connector could embed.

After the few cases just presented, we can have a more concrete idea of the kind of organisational issues that can handle. In the next chapter, we will explore how the Design Thinking methodology still need

#### **4.1.3.2 Business subjects as a prerequisite**

Design Thinking has been defined by scholars as a strategy to influence on processes, services, interactions, and way of communicating in order to stimulate and liberate creativity, with the final aim of producing breakthrough ideas ranging from the business to the social problems, as we have seen from the successful business cases (Brown 2009; Glen, Suciu & Baughn, 2014; Liedtka, King & Bennett, 2013). It becomes clear indeed that Design Thinking can help managers to become better problem solvers, by transmitting a series of soft-skills, that enable non-designers to think like Designers (Aflatoony, Wakkary & Neustaedter, 2017).

Being involved in a Design Thinking project can provide indeed the opportunity to develop the following skills:

- Empathy

- Optimism
- Thinking Integratively
- Collaboration
- Experimentalism

Even if those soft skills are very good tools to foster creativity and enable communication among people coming from different backgrounds (Nielsen & Stovang, 2015), they are not enough to face the typical business projects tackled by Business consultants. Design Thinking, in the context of high Business Education, must be surely paired with a large breadth of knowledges coming from different disciplines and business courses.

We would then argue that Design Thinking could be an instrument to provide help in mobilising the knowledges that a students has already acquired through the learning process, that the traditional business education, has always provided. From this reasoning it becomes indeed clear that the usual competencies in subjects as Economics, Accounting, Marketing and Analytics must be still provided; however, if the new managerial classes want to cope with the actual business reality, they will need to be provided also with Design tools and practical experiences. With the help of Design tools (Visualisation, mockups, journey mapping) future professionals will be able to use the traditional subjects in a real business context to solve wicked problems innovatively and with the necessities of the customers in mind.

These just made reflections on Design Thinking's skill transmission and boundary conditions for efficacy are not meant to discourage its usage, but rather to show how the business teachings will not long be divorced from the use of Design Thinking methodology in the education context.

After having assessed which are the boundary conditions both in term of solvable issues and transmitted capabilities, and having defined the determinants justifying the introduction of Design Thinking in the Business Education environment, we are now ready to explore which are the existing pedagogical models used for the scope of embedding Design Thinking in higher education.

## 4.2 How Design Thinking is taught

In this section existing models and experiences in the higher education environment will be analysed, in order to understand how Design Thinking is usually integrated into Business courses. This evaluation of Design Thinking education will help to understand the relevant challenges and issues that have to be faced when a pedagogical model has to be transformed to one that support the acquisition of soft skills and creative techniques.

As we have already assessed, Design Thinking has been debated and addressed over the past half century. However, only more recently Design Thinking has started to be related with the concept of innovation, and inserted in the management practice. One of the debates that is still scorching is, in fact, how to insert Design Thinking in the academic dialogue.

The debate is alive since 2009, when Vanessa Wong, in Bloomberg BusinessWeek affirmed that there still not consensus on *how to teach Design Thinking*, and which institutions — Design school versus Business schools — have to provide this kind of training. In line with the aim of this Master thesis, we can assess that it is still unclear how the Design Thinking approach has to be tough, but it is rather clear that the relation between the Business profession and Design profession is necessary to tackle wicked problems, even within the organisational sector.

We will continue through this section by providing first a brief description of what a pedagogical model is and successively a picture of the existing models.

### 4.2.1 The Research approach

Throughout this section, we will try to address the question “*How to teach Design Thinking?*” by analysing a range of educational models in business education, at the undergraduate and post graduate levels. Through this research it will be omitted the Design Thinking pedagogical model solely devoted to the Product Development scope, or pure Design education, since they are not in line with the scope of this final dissertation thesis. We will avoid also to analyse short courses of Design Thinking for professionals and senior

figures since the major aim here is to analyse how Design Thinking can be taught to undergraduate and graduate business students.

The pedagogical model individuated have been drawn through internet search engines, business papers, periodicals, literatures and universities websites.

Unfortunately not all the models and academical resources are well presented throughout the web, hence we will explain in detail those models and institutions which release the necessary information, whereas we will address in smeller details the models which provide only few information at regard.

### **4.2.2 Pedagogical Models**

A pedagogical model can be defined as an educational strategy designed in function of certain objectives and for a specific audience. It differentiated from the previously seen Design process (chapters 1 and 2) since it depicts the structure and methodologies used by the institutions in teaching Design Thinking principles. The so-called structure and methodology determine and explain how the professors and external actors like organisations and institutions interact with students and intellectual environment to cope with the stated objectives.

The aim of a pedagogical model is indeed to deliver notions, contents, theories, methodologies and evaluations to permits the inclusion of Design Thinking into a Business academical program.

The pedagogical model through which Design Thinking is tough has been broadly defined “d.school”. As it could have been imagined, the cause of bringing Design Thinking into education is strongly backed and influenced by the Stanford University of Design.

However, since 2015, many are the academical institutions attempting to teach and support the discipline through different pedagogical models added to programmes and courses.

We will now explore the basic assumptions and characteristics of the most popular d.school model, since it can be defined as the building base of each other pedagogical Design Thinking model, and we will then deep into different approaches.

#### **4.2.1.1 The former model — d.school**

The concept of d.school has been established in 2005, from the institutes of Hasso Plattner (Stanford, California) and HPI - Hasso Plattner Institut (Postdam, Germany). Those universities in fact have been the first institutions to mobilise in preparing students to become Design Thinkers (Rauth, Köppen, Jobst, & Meinel, 2010).

The d.school model has the objective of educating students to work together while solving big problems through a human-centred approach. The program within the d.school model is taught by business professor together to design professors, and it usually involves also the collaboration of companies, start-ups, non-profit organisations and governments. The projects tackled are always drawn from actual and real problems, not from the textbooks, so that students could be stimulated and convinced that they can make a real and palpable impact in the world.

Furthermore, the model is based upon the assertion “*everyone has the capacity to be creative*” and for this reasons, it hosts multidisciplinary teams of students coming from different disciplines and backgrounds. According to the model, having many points of view and perspectives, is one of the keys to unlock students’ creativity.

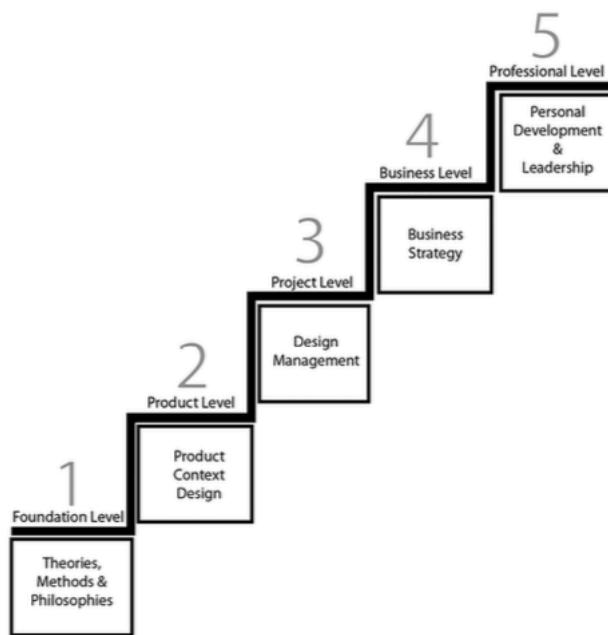
Moreover, also to the spatial environment is given attention, since that also the space can shape particular behaviours. The ideal working environment to host a d.school project would be in fact an arrangeable one, where people are encouraged to use the space and the furniture to accelerate their work. To this extent, following the model, the pieces of furniture (walls included) should be movable and accommodate work.

The process through which the practical experiences are performed has already been presented in the section 1.2.3.1 and can be further explored through the materials provided in the d.school webpage<sup>24</sup>.

However, as we already said, since the 2005 many other institutions started to incorporate Design Thinking into education, on the wave of the d.school.

#### 4.2.1.2 The Educational Design Ladder

Another interesting pedagogical model for the Design Thinking inclusion in business courses is the Danish Design Ladder, developed by the Danish Design Centre, Denmark (Straker & Wrigley, 2014). This pedagogical model is particularly interesting since it provides a truly complete path for students to be guided by the basic Design Thinking notions, to a professional and personal design leadership. The model is structured in five courses modules, ordered on the basis of the pedagogical difficulty (see fig. 10).



**Figure 9:** The Educational Design Ladder, (Straker & Wrigley, 2014).

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<sup>24</sup> d.school resources, at <https://dschool.stanford.edu/resources-collections/browse-all-resources>

## **The structure**

The first courses block is called the “*Foundation Level*” since it provides students with general knowledge of Design Thinking: its history, evolution and use. The first module includes indeed also the expositions of the various methodologies, philosophies and processes.

The second courses module is called the “Product Level” and it is indeed centred on the product design context, and it provide teachings about the practical application of Design Thinking principles to product and service design.

The third courses block — the “Project Level” — links the teachings on product and service design learned in the second module, with the Design management. Throughout the third module, in fact, to the product and service design are added marketing principles and branding decisions.

The fourth module is defined the “Business Level”, since it exposes students to the context of business strategy. Here principles coming from Business, technology and Design are merged to develop business models and strategic forecasting.

The last module, the “Professional Level” prepare students to address challenges of different nature, through Design Thinking.

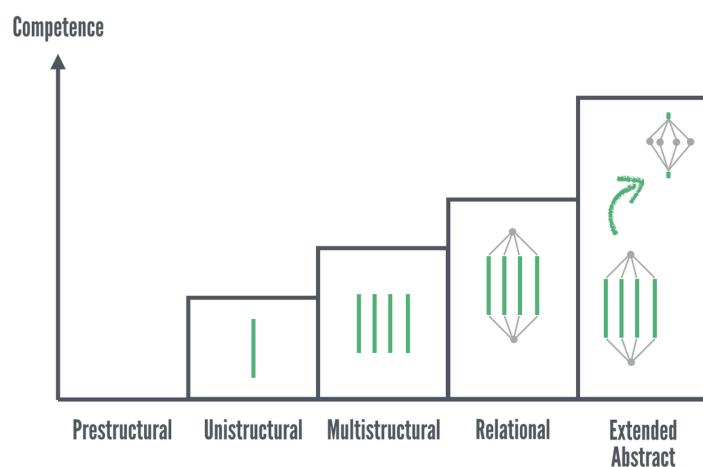
However, the even more interesting fact lies in the model structure, since it is specifically built to be applied to an academical setting, upon the concept of Constructive Alignment. With Constructive Alignment — therm invented by Professor John B. Biggs — it is defined what the learner does, in therm of learning activities, to construct his or her knowledge. A model constructed upon a constructive alignment assures that all the components of a teaching system — the curriculum, the outcomes, the teaching methods and assessment — are aligned each other to a unique scope (Biggs, 2003; pp: 1). In this way, the learner is somehow tapped into the learning system and cannot escape without having first learned the scheduled objectives (Biggs, 1996).

## The educational Design Ladder and SOLO taxonomy

Moreover, the Educational Design Ladder model has been paired with the SOLO model that stands for Structure of the Observed Learning Outcome<sup>25</sup> (Biggs, 1996) to assure that each module provides the right level of difficulty, and makes clear to students and professors what the learning outcomes of the programme are.

The SOLO model is used in the pedagogical environment to help academics in shaping and developing various curriculum objective for each specific module, and course. Each model indeed should be calibrated for the complexity of level, and the complexity must increase, only when the subject has acquired the necessary competence. As we can observe in Figure 10, the SOLO model is described with five levels, where at the first step (*unistructural*) only few aspects of the subjects are addressed. If we pair the SOLO model with the Design Ladder pedagogical model, we can evaluate its validity.

In the Design Ladder in fact, only a general smattering on Design Thinking is provided through the first module (Foundation Level, Fig.10). Then, as the competences increase, several aspect of Design Thinking are provided (Product Level, fig.10), such as teachings on products and services design. However, at this level (*multistructural* in the SOLO model, and Product Level in the Design Ladder) the Design Thinking potentials are still unrelated with the business context.



**Figure 10:** The SOLO taxonomy diagram. From Wikipedia, the free encyclopedia

<sup>25</sup>SOLO Taxonomy, John Biggs official website <http://www.johnbiggs.com.au/academic/solo-taxonomy/>

Once the students learn how Design Thinking methodology works on independent subjects, such as products and services, several strategic aspects are integrated into their learnings, moving their competence from a *multi-structural* to a *relational* (fig. 11). Finally when students are skilled enough on Design Thinking argument, they are introduced in the Professional Level (Design Ladder) and introduced in the *extended abstract level* (fig. 11) by applying Design Thinking to real business world problems.

Finally, the educational Design Ladder model provides us also with the outline of the pedagogy and curriculum objective for each step.

### **The educational Design Ladder pedagogy and curriculum**

In the Educational Design Ladder curriculum also other important characteristics of what a business student should learn are provided. As we can grasp Table 6 below, the educational Design Ladder provides, in addition to the Knowledge level already described (Figure 9) also the correspondent SOLO taxonomy levels, describing which are the competences acquired through the modules. Moreover it also defines the activities undertaken by students to acquire the established objectives, along with the methodologies to assess the competencies acquired by students. We will now proceed our research by analysing another interesting pedagogical model: the DesUni Model.

Table 6: Educational design ladder pedagogy and curriculum (Straker & Wrigley, 2014).

	<b>Module 1</b>	<b>Module 2</b>	<b>Module 3</b>	<b>Module 4</b>	<b>Module 5</b>
<b>Knowledge</b>	Factual	Conceptual	Conceptual	Procedural	Metacognitive
<b>Design Thinking Level</b>	Foundation Level	Product level	Project level	Business level	Professional level
<b>Lecture theme</b>	Theories, methods and philosophies	Product content design	Design management	Business strategy	Personal development and leadership
<b>SOLO Taxonomy and Description</b>	Knowledge comprehension: Recall and recognise information. Understand meaning, interpret, extrapolate, translate.	Application: Use or apply knowledge, putting theory into practice	Analysis: Interpret elements, organisational principles, structure, constt	Synthesis: develop new unique structures, systems, models, approaches, ideas; creative thinking, operations	Evaluation: assess effectiveness of whole concepts, in relation to values, outputs, efficacy, viability; critical thinking, strategic comparison and review
<b>Activity</b>	Multiple-choice test, recount facts or statistics, recall a process, rules, definitions. Explain or interpret meaning from a given scenario or statement, suggest treatment, reaction or solution to given problem, create examples or metaphors	Place theory into practice. demonstrate, solve and manage a design project	Identify constituent parts and functions of a process or concept, or deconstruct a methodology or process, making qualitative assessment of elements, relationships, values and effects; measure requirements or needs	Develop plans or procedures, design solutions, integrate methods, resources, ideas, parts; create teams or new approaches, write protocols or contingencies. review strategic options or plans in terms of efficacy, return on investment or cost-effectiveness	Develop personal and professional skills. demonstrate the importance of developing the correct skills to recognise opportunities and nurture the process of bringing innovative ideas to fruition
<b>Topics</b>	Reflection, ideation, design process, design history, defining design, creative thinking (idea generation), group dynamics, wicker problems, design contexts, visualisation, experimentation, prototyping	Idea generation, user focus, concepts, aesthetics, communicating visually, iterate and evolve design	New product design and development, project management, marketing research, market identification and theoretical and practical aspects of design, sketching, form and function	strategic design, business frameworks, service design, comparative analyses of business opportunities, branding strategies, brand management, business plans, budgets and financial capital and variable costs, environmental requirements	Integrate principles of client service provision, advertising, marketing, leadership, competitive threats, innovative concepts, change management, innovation, entrepreneurship, reflective practice, and professional development
<b>Learning modes</b>	lectures, tutorials, design charrette, group work, lectures, tutorials, online modules, discussions, panel discussion, case studies	Short collaborative design projects, workshops, lectures, tutorials, field study, individual and group challenges	Workshops, partner with industry sponsors, lectures, tutorials, course readings	Workshops, industry projects, tutorials, study visits, online class discussions, group activities, individual research, self-directed learning	Work integrated learning, digital lectures, online discussion, independent research, skype, blog posts, wikis, peer coaching
<b>Assessment</b>	Analysis of design process, designing research journal reflective essay active participation	Design projects. Written and oral, individual and group design activities	Oral Exam, project plan, research journal, intensive experimentation and project work, reflective essay	Business plans, pitches, business strategy simulation, exams, discussion online, blogs, workbooks, reflective essay	Reports, group work, presentations, critiques, solve industry-based problems, business reports, class participation

### **4.2.1.3 DesUni Model**

Likewise the previous model, the DesUni teaching model proposes a Design oriented approach to assess traditional business education, based on the rationale of Design Thinking (Nielsen & Stovang, 2015). The model's name already embeds its objectives and target audience: **DES**ign, that is the theoretical rationale underlying the DesUni teaching model and **UNI**versity that represents the target group at which it is directed, that is teachers and students<sup>26</sup>. The model has been developed over a five years period (from 2010 to 2015) and it has been tested on various business courses at the undergraduate and graduate level.

The principal aim of the DesUni model is not to make students becoming designers, but instead to support them in thinking and acting like designers, throughout their curriculum path. The DesUni goal is indeed to provide a creative approach to use Design principles to acquire new knowledge and solve complex problems<sup>27</sup> that we are now going to explore much in detail.

#### **The structure**

The DesUni model has been defined as a Universe (figure 12) where the student is placed in the centre, as the sun, encircled by two sets of planetary rings (Seelig, 2012). The innermost ring include three “planets” represented by elements and process through which the student should learn the Design Thinking process. Those processes are defined as: Action, Imagination and Mind-set.

**Action** — students should pass from a passive recipient of knowledge, to an active creator of knowledge, by embracing experimentation to solve wicked problems and create a better future.

**Imagination** — is the catalysts of Design Thinking, and should be the major element of each design-oriented mindset.

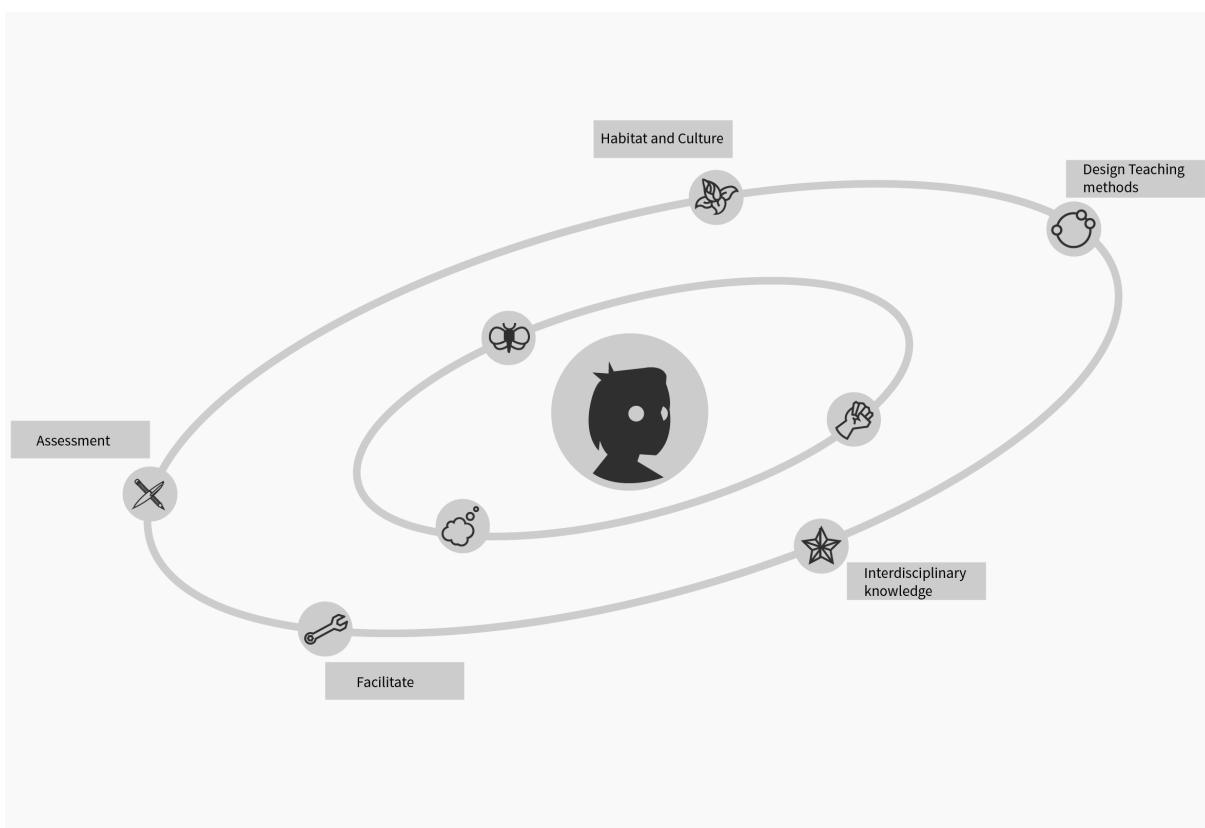
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<sup>26</sup> <http://desuni.eu/services/desuni-book>

<sup>27</sup> <http://desuni.eu/about>

**Mindset** — students should develop a mindset of a designer and thus think like designers while solving problems.

Nevertheless, all the just cited objectives, can difficulty be acquired without the help of a mentor. To this extent, the model includes also an outer ring (figure 12) illustrating the instruments and tools that professors and mentors should embrace in stimulating and support the stated design-oriented behaviours.



**Figure 11:** The DesUni model, from DesUni official website, [desuni.eu](http://desuni.eu)

The learning environment that should be created around the students is one that provide a pedagogical dimension (Action, Imagination and Mind-set) that allow students to bring out the desired objectives. This particular environment, according to the DesUni model, can be constructed by mentors through five dimensions:

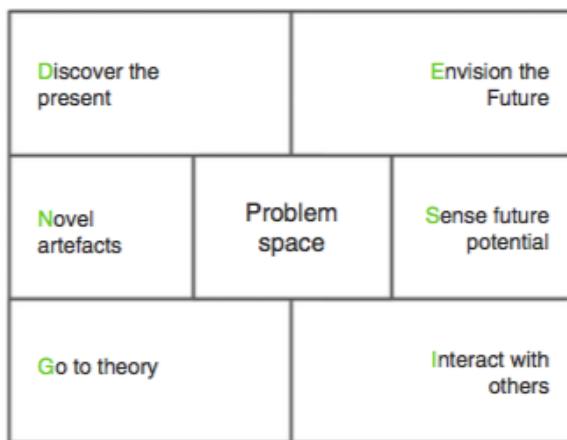
1. Design Process
2. Knowledge
3. Facilitated Teachings

4. Assessments
5. A proper Habitat and Culture

Now we will explore in little detail each instrument, however we will overlook many of the concepts embedded in the model, since they have been already addressed throughout the previous sections.

### **The first dimension: The DesUni Design Process**

The DesUni Design Process has been drawn from existing models and methods in the design literature (Figure 12) and it can be used from teachers to guide students through the problem-solving process.



**Figure 12:** The DesUni learning process, (Nielsen & Stovang, 2015).

As it can be grasped from the figure, the Design Process is composed by six learning modules, each exposing students with a particular objective. The process can be structured in either linear or iterative way, as it has been assessed in the official DesUni issue (Nielsen & Stovang, 2015; pp.984). In the linear version students can proceed in the following order: From D to proceed from **Discover the present**, to **Envision the future**, **Sense future potential**, **Interact with others**, **Novel artefacts** and finally to **Go to theory** as a circle. In the iterative version, instead, the learning process lead to solution of the problem space (at the centre, figure 13) via feedback loops that shifts back and forth between the six areas.

Each area of the Process embeds in fact various instruments to tackle the specific module, such as interviews, observations, or personality tests. However, all the instruments can be found at the official DesUni webpage<sup>28</sup>.

Moreover, according to the DesUni process, it can be applied both as an overall course structure, or through separate elements in different phases of education path. The DesUni Design Process, in short, has been constructed as a tool for designing teaching based on the design methods.

### **The second DesUni dimension: Knowledge**

The second instrument or principle that the DesUni model treats is knowledge. Following the model, in fact, knowledge should be constructed from a process of discovery and exploration, that allow students to move prior acquired information into other contexts, to combine it into new opportunities.

The model suggests also that the simpler way to connect prior knowledge — that is the traditional Business knowledge in this case — to create new knowledge is through interdisciplinary educational set-ups (Nielsen & Stovang, 2015) that are, indeed, the context in which Design Thinking projects take place.

Finally, another assertion exposed by the DesUni model is that also the tacit knowledge — ideas, values, imagination and needs — embedded in each student should be stimulated, since it represents a “boundless source of knowledge that students are not always aware they have” (Nielsen & Stovang, 2015; pp. 985). The tacit knowledge can indeed be stimulated through facilitation, social interaction and brainstorming, that are, indeed, typical Design Thinking tools.

According to the model, therefore, merging prior knowledge with other interdisciplinary context, together with the stimulation of tacit knowledge can help individuals to share and connect his specific knowledge in relation with a particular problem.

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<sup>28</sup> Design Teaching Methods and tools can be find at: <http://desuni.eu/teaching-methods/discover-the-present/gather-information>

However, the just cited evolutions of knowledge cannot be prompted by the student himself, but need instead to be supported by a mentor. Consequently, the model suggests a third dimension, that is the role of the teacher.

### **The third dimension: Facilitate teaching**

According to this model, the teacher should help students by collaborating and co-creating enhancing the learning by doing structure. The teacher should, in fact, set the proper scenario for learning, by first individuating the suitable wicked problem, and second by continuously putting inspirational contributes concerning ideas, artefacts or stakeholders.

Anyhow, even if the teacher play a considerable important role, the model underlines that the student-centred approach must be, in any how favoured.

Even so, also if the model suggests a student-centred pedagogy, still the need for assessment is insoluble from the curriculum.

### **The fourth dimension: Assessments**

The kind of assessment suggested by the DesUni model, is inspirited from the design education, and it is based on a flexible and process-oriented form of assessment. Generally students from the design education are evaluated over the process used in achieving the resulted outcome, rather than on the outcome, as the traditional university structure does. As a matter of fact, measuring students upon their outcomes can influence their behaviour since the tendency will be to act and think is function of the assessment methodology.

DesUni provides instead a pedagogical model, where the assessment is done through, the analysis of the design process, design activities (either oral or written), journal research, reflective assays, reports, presentations and many other activities that can be seen in the last row of Table 6.

### **The fifth dimension: habitat and culture**

The fifth and last dimension that according to the DesUni model is necessary for the implementation of a pedagogical Design Thinking model, is contained in the physical environment setting and the culture infused to students (Nielsen & Stovang, 2015).

The surrounding environment, ora habitat as defined in the model, defines the physical boundaries of the learning situation. The physical layout of the space is a key element according to the DesUni model, since it should work as a playground where students can try experiment and prototype by moving the furniture according to the current need.

The culture, defines instead the norms and visions as long with the lifestyle and the values at which the students is exposed. In the case of a project based on the Design Thinking logic, the atmosphere that need to be created is characterised by collaboration among students, shareholders and teachers.

Moreover we should conclude this section by clarify that this study has some limitations. The study provides a broad overview of the various models, but it does not reveal nor provide comparisons between the different courses and universities, as well as the success of the cited courses. Further investigation would be indeed needed to address those final limitations.

What can be assessed undoubtedly from the pedagogical analysis about Design Thinking model is that all the provided alternatives claim for a practical experience. A practicum seems indeed an insoluble element of the Design Thinking pedagogical model since it is presented and underlined in every structure. Through a practical experience, in fact, students can deep in the business environment, having the possibility to experiment and apply the learned concepts to solve real-life problems, and at the same time being protected being in a controlled environment.

Through the next section we are going to address the specific pedagogical structure that is attached to a practical experience, in the case of an academical business environment.

## 4.2.3 Many models, a unique Experience

« *Education is an admirable thing, but it is well to remember from time to time, that nothing worth knowing can be taught.* » (Wilde, 1989)

This citation from Oscar Wilde explains perfectly the ideology behind the need for a direct experience in teaching Design Thinking principles to managers. There are concepts that cannot be explained without practice, but need to be experienced in prime person to be comprehended in full.

The general model through which Design Thinking is applied to the business world and the managerial sphere is a collaborative, iterative, multidisciplinary and fix term projects, with the ultimate scope of dealing with the most challenging situations providing human-centred solutions. Education should then recreate — as far as possible — the same environment that a manager will experience in the field. The best way to recreate the environment that the managers will encounter in the professional life is through a *practicum*.

### 4.2.1 Projects as Active Learning

A *practicum* is essentially the action of learning a practice, in a context that approximates at the real world. By undertaking projects, under close supervision, managers are able to learn the Design Thinking art without the pressure of being wrong (Schön, 1987).

However, the question that need to be raised now is: how can it be possible to adapt practical experiences — a *practicum* — to the business pedagogy? The answer is through the “Active Learning”.

#### Active Learning

The pedagogical equivalent of the *practicum* is called *Active Learning* (Glen, Suci, Baughn & Anson, 2015). Active Learning is the term that indicates a wide form of teachings<sup>29</sup> where

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<sup>29</sup> Active Learning includes the learning through play, embracing technological instruments, group work or projects.

students are actively and directly involved in the learning process, rather than passively listening to concepts explanation, as it occurs in the traditional business courses.

The final objective of the merging of Design Thinking and business education is to teach students a practice, the one of managing by designing. As a matter of fact, the practice of managing by designing is carried in the business sector through the work of fixed term projects, moved by the wants to create solutions for a better future. Consequently, also business students have to be prepared to this extent, and it can be done in practical terms with the usage of *Project Based Learning*, a subcategory of Active Learning.

### **Project Based Learning**

Through Project Based Learning students are usually given with a real-world problem or challenge, that has to be solved along with the support of a mentor. The Design Challenge provides a general portrait of the problem situation (Glen, Suciu & Baughn, 2014) and is usually centred around the development of a new solution either dependent or independent from an existing organisation.

Still, the more realistic and actionable the challenge is, the more students will be facilitated to directly contribute to its development. Moreover, the challenge question should be generic enough to allow for unexpected possibilities but narrow enough to let students focus (Schurr, 2012).

As we identified in the first chapter, there are many available methods to pursue the Design Thinking process, and as we already note, all the methodologies are based around three key phases.

## 4.3 Challenges in teaching

Even if many materials are provided to prepare professors and mentors for approaching a right Design Thinking experience, still many challenges and difficulties have to be addressed, if the managerial experience what to be addressed fully.

The traditional Business universities are for the majority not well equipped to host workshops and project, especially if projects need to be extended for the whole duration of a course or even an academical year. Design Thinking indeed, being a very practical subject, brings a lot of challenges to the academical world, and throughout the next sections we will analyse some of them.

### 4.3.1 Timing and Access to Users

One of the major challenge in teaching using the Design Thinking methodology lies in the fact that the projects connected with Design Thinking pedagogy are both very time consuming and they need to include users' involvement.

On first instance, Design Thinking projects, are not a matter of a unique lecture (Luka, 2014) since as we experienced through the presented business cases (see section 4.1.3.1) a consultancy usually require a large time span — months or even years — to be completed. This ends in many complications regarding the alignment of a real

Anyway, timing is not the only inconvenient that render Design Thinking challenging for an educational environment. The second instance that must be taken into consideration, when students have to cope with a project, is the user engagement in activities. User engagement activities can be very tough, since they require space, time and resources. Within the therm “user engagement” it is intended both the participation of final users — the beneficiaries of the projected process or service — and the client, that is the subject that asks for the Design Thinking consultancy. The user engagement activities indeed, other than being very time consuming, require that students spend much of their time out of the university environment, rendering the project even more incompatible within the business curriculum.

### 4.3.2 Team composition

However, other are the contingencies that reside into a Design Thinking project. As it has been depicted throughout the whole thesis, a typical Design Thinking team, the so called “multidisciplinary team” is usually composed by figures pertaining to different backgrounds, going from engineering, ethnography, design to business, working together to satisfy the final user. However, whether in a business environment it could be easy to gather a team composed by different backgrounds figures, in the educational environment, it could result a considerable problem.

As a matter of fact, grouping students pertaining to completely different academical background into a unique project aimed to practice and learn Design Thinking is easier said than done. First of all, not every university campus cover the disciplines needed to form a multidisciplinary team, since that, as in the Italian case, many universities are specialised in a unique field of study: either business, or engineering or medicine. This fact gives an additional significant friction for the cause of including Design Thinking in the Business curricula. Second, even if a university campus would cover all the necessary disciplines, it would be very difficult to cross all the different curriculum schedules, lectures and availabilities.

### 4.3.3 Physical environments

Another issue that should not be undervalued is that Design Thinking require huge spaces to be practiced properly. As we saw through the first two chapters, where the various Design Thinking methodologies have been exposed, the Design Thinking process produce a lot of materials (posters, photos, deliverables, prototypes) that have to be stored somewhere, possibly hanging and visible, for the whole duration of the experience. Moreover also the team itself needs spaces, equipped with the necessary materials to meet discuss, and express their ideas.

Unfortunately in most of the universities, especially the most historically rooted, the teaching spaces and classrooms are constructed with fixed furniture, usually pointed towards the

professors (Nielsen & Stovang 2015), making impossible for students to work collectively and creatively with the surrounding environment.

#### 4.3.4 Support from professionals

The materials to support the Design Thinking projects, and the Design education in general are many, and can be found almost everywhere. Anyway, it is clear enough that students cannot be provided with a list of steps and leaved alone in the execution of the project. Students must be supported through all the project, both theoretically — through a set of predetermined phases — and personally — through the support of a mentor (Glen, Suciu, Baughn, & Anson, 2015). This signifies indeed that additional staff, composed by academics or external Design professionals must be introduced, increasing indeed the resources needed to provide a structured academical business course based on the Design Thinking concepts.

# Chapter 5

## The Analysis of a Case — Active Learning Lab

## 5.1 The case scenario

Throughout this chapter, a concrete application of Design Thinking in the education setting is proposed, with the primary intent of uncovering the importance but also the difficulties and frictions that students encounter while experiencing Design Thinking projects, in the context of management education.

Furthermore, by exposing this reality, we hope to open up the discussion regarding the necessity of the insertion of Design Thinking in the business educational paths, by giving the bases and inputs for further researches and in-depth analysis of the subjects treated throughout this research.

### 5.1.1 The Active Learning Lab (ALL)

In this first section, we expose the context in which the case study takes place. The case's context is called "Active Learning Lab". The ALL can be defined as an innovative didactical project, where master's students and young graduates have the possibility to work closely with local players at solving design challenges, using the Design Thinking methodology, along with other instruments as Lego Serious Play, Lean Startup or Business Model Canvas.

The ALL project has been activated at the Ca' Foscari University of Venice, since 2015 and, for this reason, it has been already proposed in various editions and contexts. The contexts in which students had the possibility to operate, during passed editions, had been: sustainability, agri-food, design, made in Italy and urban and market innovation. The players involved in the projects are represented by different entities, either firm or public institutions.

The final objective of the ALL is indeed transmitting to allow students to develop competencies such as the ability to share ideas, co-working with peers, and release creativity.

Throughout the next section, we are going to introduce briefly how the ALL is structured and how the projects are usually undertaken during the lab, in order to give the context of the case study.

### 5.1.2 The ALL structure

As we already mentioned, the ALL is a didactical project where master's students and young graduates pertaining to different academical backgrounds can work together to address wicked challenges, using the Design Thinking methodology.

In a typical ALL project, students are divided in small groups — usually up to 6 persons — and guided by dedicated mentors, professionals, guests speakers and professors to address the challenges posed by clients. The students are grouped interdisciplinary — according to the Design Thinking principles — so that technical, scientific, humanities and managerial backgrounds can work together to create superior solutions.

Each ALL edition is constructed to last six weeks, in a way that one entire week can be dedicated to a Design Thinking phase. The Design approach that is followed during the ALL is borrowed from IDEO, and it follows the five main steps of: *Discovery*, *Interpretation*, *Ideation*, *Prototyping* and *Evolution* (see Table 7) as reported in Design Thinking for Educators, (Schurr, 2012).

Table 7: The ALL structure

Week 1	Week 2	Week 3	Week 4	Week 5
<b>1. Discovery</b>	<b>2. Interpretation</b>	<b>3. Ideation</b>	<b>4. Experimentation</b>	<b>5. Evolution</b>
1.1 Understand the Challenge	2.1 Tell Stories	3.1 Generate Ideas	4.1 Make Prototypes	5.1 Track Learnings
1.2 Prepare Research	2.2 Search for meaning	3.2 Refine Ideas	4.2 Get Feedback	5.2 Move Forward
1.3 Gather Inspiration	2.3 Frame Opportunities			

As it has been reported in Table 7 above, the first week at the ALL is dedicated indeed to *Exploration*; here students get in touch with the posed challenge and place it in a real context, by interweaving clients, competitors and potential users. The second week is instead dedicated to *Interpretation*, that is basically the examination of information and material gathered during the first week. Here the potential users are identified and profiled through the

use of the tool called “users personas”. Through the third week students are instead guided into the *Ideation* phase, the process that has the objective of generating multiple possible solutions to the posed challenge. During this third phase, students usually start by performing a SOWT analysis to identify which are the characteristics and the difficulties that have to be faced while addressing the challenge. After the SWOT analysis, students — with a clearer idea about difficulties that must be faced — proceed with multiple sections of brainstorming where potential users are involved. After the brainstorming sessions, solutions are gathered and clustered into visible schemas ready to be implemented. During the fourth week, students enter into the *Prototyping* phase. Here the best solutions — according to the users opinion — are chosen and brought into raw but functioning prototypes so that the public can have the possibility to interact and give suggestions about it. Through the fifth and last week of the lab, students perform the *Evolution* phase, where the selected solution is transposed into a Business Model Canvas. Through the Business Model Canvas students can examine and plan various key characteristics pertaining to the chosen solution, such as, key partners, key activities and resources that need to be allocated; the value proposition offered by the selected solution; the customer segment to which the solution is dedicated along with the channels through which the customer segment will be reached, and the costs that have to be borne to establish customer relationships; costs and revenues streams. The Business Model Canvas help the students to proceed with the drawing of a three-years Business Plan with the foreseen earnings. After this last analysis the project is usually ready to be delivered to the client, who can decide to implement the solution as it is, to further analyse and expand it, or to take it as a starting point and reiterate the project.

After having described the ALL objectives, structure and functioning, we can deep into the research context, to describe the methodology through which the analysis had been run, and consequently, also results.

## 5.2 The research process

The main objective of this case analysis — as already mentioned — would be to uncover the importance of the Design Thinking subject in the students' academical path, with a special regards for the managerial courses.

However, uncovering the importance of Design Thinking does not represent the sole scope of this examination. Through this research, in fact, we hope to address also other important frictions that arise when a project as the ALL is organised. Frictions can be identified as the discontents encountered by students while facing Design Thinking projects are raised, or also contradictions with activities executed during the labs and Design Thinking's principles.

Moreover also the difficulties and frictions experienced by students are highly relevant and need to be raised, and consequently treated, since that they can represent — partly — the motivations for lack of complete participation to this kind of projects, also given the fact that the ALL is an elective activity for Ca' Foscari Students. Uncovering the frictions between ALL activities and Design Thinking principles, will help us indeed to perform a sort of stress test for determining which are the ALL's activities that do not work as expected, and need indeed to receive further attention.

In order to achieve the stated objectives, we need to connect our suppositions with the reality encountered during the ALL project. Therefore, we decided to pose our perplexities to students throughout a qualitative questionnaire, made by sixteen specific questions. As a matter of fact, the participants had been directly asked with the stated questions that prompted their opinion regarding the stated objectives, even if they had not asked directly.

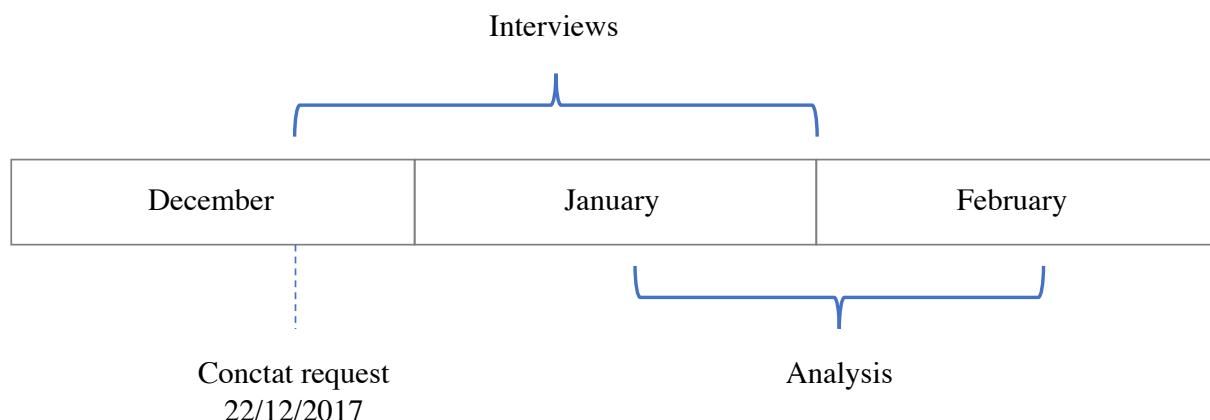
In the following paragraphs we will now expose briefly who are the subjects of our research, how had been reached and interviews, and also which had been the method used to run the analysis.

### 5.2.1 The Actors

As it has been just specified, the subject of our analysis are masters' students who participated to one or more ALL's editions. The "population" who take part to the past ALLs had been identified to be around 250 students, coming from various disciplines.

The students had been contacted through the institutional email, directly from the university administration. As a matter of fact, due to the privacy legislation, we were not allowed to have the students' contacts directly. For this reason, students had been asked from the university responsible to make themselves available to contact us. Hence, only the students who reply back could have been provided with the questionnaire.

Below we can visualise from the timeline, how the research process took place.



However given the fact that the laboratories are mainly constructed for master students, a great part of the ALL's participants are now out of the University and indeed not easily reachable through the institutional email contact. Given those restrictions, we had been able to collect a sample of ten testimony of Ca' Foscari's students who participated to the ALL in fact pertain to disciplines as philology, management, chemistry, business administration, marketing, show business and interpreting.

In the following section we are going to address in detail the questions that had been posed to the sampled students.

### **5.2.2 The Method**

We decided to run interviews, rather than propose an online form so that the responded could be guided through the questions, and more importantly, they had been given the possibility to better express themselves and, consequently, answer more completely to questions. As a matter of fact, the interviews had been run either by telephone or possibly face to face. Each informant had been asked with a base of six set of questions, that had been then adjusted on the base of each specific interview. In any case, in order to address all the treated matters, the interviews lasted, on average, half an our. The questions had been divided into five main arguments, that will be described in detail later on.

The questions had been proposed in Italian, since the majority of the students who we had been able to reach were Italian speaking, and here we provide a translation of the original questions. Still, we need to specify that the ALL projects are opened not only to Italian and Ca' Foscari students, and indeed we have had also the participation of exchange students, refugees and foreign students in generally. After all, as we mentioned, reaching students was not a simple matter, since that for the majority of the cases the institutional address that we dispose are not active anymore.

Below we will explore which are the questions that have been posed to students, and also which are the motivations behind each specific question.

### **5.2.1 The questions:**

#### **The First set, student background**

- 1) *In which ALL edition have you participated?*
- 2) *In which master course are you enrolled?*

The first set of questions have been constructed to connect the informants with a specific ALL context. To this extent, the students had been asked to disclose information about the ALL

edition to which they participated, and secondly, the course of study attended. The second question is particularly relevant to understand if the population that take part to ALL project is only — or mainly — composed by management students, or if, on the contrary, also other students are attracted by the consultancy sector and the Design Thinking subject as well.

### **The Second set, challenge assigned and project execution**

- 3) *Which was your client firm, and which was the challenge you had been given?*
- 4) *Do you think that the challenge and the associated problems that you received were real enough to push your team to find a solution?*
  - a) *Was the challenge instead too easy or too simple?*
  - b) *Was the challenge clear? Have you had the possibility to further investigate and deepen it with the client firm?*

The second set of questions, instead, is tailored to obtain a personal opinion regarding the ALL and, more specifically, in the regards to the posed challenge. As a matter of fact, we use the third question to invite the student to share some information about the assigned client and the given challenge. Using the fourth question, instead, we had been able to catch the student's opinion on the assigned challenge. As a matter of fact, it is essential that students while attending this kind of projects results to be deeply engaged in the given challenge. If the challenge is felt to be too wicked, too broad or not enough challenging, the project becomes automatically less attractive for students, whom, as a consequence, are less inspired in terms of innovative ideas generated. Moreover, we also stressed the argument of challenge's clearness and completeness in order to understand, indirectly, the level of clients' involvement in the ALL activities. By giving students the possibility of being truly involved in the clients' problems, requests and desires, it is possible to increase the project validity and seriousness, that is taken as a plus for the participants.

### **The Third set, team composition**

- 5) *Which was your team composition? (number of persons and component's background)*

- 6) *Was it the first time that you found yourself in a teamwork? Or, have you had other occasions of teamwork during your master?*

Through the third set of questions we investigated a totally different component of the Design Thinking's principles; the team's multidisciplinary. As we previously saw (section 4.3.2), the Design Thinking Methodology stresses the importance of the team composition when in front of wicked problems. As a matter of fact, a team stuttered following the multidisciplinary approach, gives the possibility to see the problem through many different lenses, and as a consequence, uncover, widen and create completely different insights. However, as it has been pointed out (see section 4.3.2) creating multidisciplinary teams is easier said than done. Thought the first question indeed, we investigated the multidisciplinary matter in past ALL projects, with the primary scope of individuating first if effectively the teams were multidisciplinary constructed and secondly, in case of non-multidisciplinarity, the possible motivations that lead to the occurrence of the just cited issue. The second question of the third set (question number six) investigates instead a totally different matter regarding the team's argument, whether the student had previous experiences with team-working, or if, instead, the ALL had been the first opportunity for experiencing team-working. For many students pertaining to disciplines as humanities, for example, is not automatically true that the courses are provided with the opportunity to participate to team-working activities, as it is instead more usual for management and business students.

## **The Fourth set, timing**

- 7) *Do you think that the time given for the ALL project (6 weeks) is enough and proportionated to the case difficulty? Do you think, instead, that this laboratory should have a major or minor duration?*
- 8) *The majority of ALL projects are carried out though the academical year, when lectures are ongoing.*
- a) *The just cited situation, was difficult to manage, or, instead you did not encountered any complication?*
  - b) *Did you have to skip lessons?*
  - c) *Was it difficult to conciliate the two activities (ALL and university's lectures)?*

- 9) *During the ALL, would you have given more time for some particular activities? Less to others? Which? (For example: I would have given more time to redact the business plan and less time for the brain storming.)*

The fourth set of questions had been constructed to understand two specific issues that can arise from a didactical activity as the ALL. The first issue that had been investigated is whether the students are satisfied with the amount of time given a single ALL project (six weeks) and whether they would have had, instead, a major or minor duration of time. The second matter investigated through the fourth set is the difficulties encountered by students in combining the ALL project within the mandatory courses, since ALL editions are usually carried out during the academical year. Even if those matters could be qualified as marginal, for students could be considered instead as crucial, representing a matter of reluctance for joining to initiatives as the ALL. For these just cited reasons we asked students to share with us their experience in term of time managing, so that we can understand if the actual time schedule and structure renders the laboratory enough manageable for Ca' Foscari's students. Within the ninth question, we investigate instead a different kind of time issue, an issue strictly related to the Design Thinking methodology and its execution. Here, we examined how the timing of each Design Thinking module had been structured during the ALL, so that we can visualise whether participants had been given the possibility to dedicate the proper amount of time to each Design Thinking's phase.

### **The Fifth set, students' relations with the users**

The fifth set of questions had been subdivided into two major areas since in the case of Design Thinking projects it often occurs to have two different subjects. As a matter of fact, a Design Thinking subject can be represented by two different entities: first the client, the entity asking for a consultancy, and proposing the challenge to be solved; second the user, the entity who is the subject of the challenge. To this extent, we prepared two distinct set of questions, one dedicated to the entity who proposed the challenge in the ALL context the firm or entity that proposed the challenge to be solved and another focused on the final user, the real centre of the whole Design Thinking methodology. These two set of questions serve to determine whether the students had been given the possibility and take advantage of the opportunity to work in close contact with the client, and final user. The activities held with clients represent

in fact a crucial aspect of the success of a Design Thinking process since they would serve — as we have analysed throughout this dissertation thesis — to uncover users hidden insights. It goes without saying that it is very unlikely that a project would be useful to match users needs if users and clients are not involved in the process. For both for the Design Thinking subjects — client and final users — we formulated some question regarding the students' possibility to interact within those figures (client and users) to extract information about students' procedures, means, frequency and contingencies through which clients and final users had been involved. Below the questions that had been proposed to ALL students.

## **The Client**

*10) Was it possible to encounter and have relationships with clients?*

- a) If Yes, how often did you encounter the clients during the project? (Sporadically or often)*
- b) The frequency of meetings (either face to face or remotely) was elevate?*
- c) Have you had the possibility to keep in touch with clients and ask them for feedbacks?*

## **Final users**

*11) Did you have the possibility to engage final users during Design Thinking's phases?*

*12) Did you follow potential final users during a typical journey or observe them while doing specific actions?*

## **The Eight set, final considerations**

*13) In your opinion, the setting that had been created during the ALL project, does reflects an idealistic future working environment?*

*14) Did you have the possibility to see your final solutions applied in the real context?*

*15) Do you still have contact with the client/client firm?*

*16) In your opinion, a project as the ALL, should be introduced in the curriculum of all the Ca' Foscari's students, becoming, consequently, mandatory?*

This last set of questions, differently from the others, comprehends a more personal opinion regarding the treated arguments. As a matter of fact, also in this case, we proposed specific questions to prompt — indirectly — students' opinion about some themes that can be underestimated by someone, but valued as crucial by university students. We asked in fact whether the ALL structure, in students' opinion, reflects what would be a potential future working environment to understand — indirectly — if they value the ALL simply as a didactical activity, or if, instead, they value it as a real working experience. As we have just mentioned, we also asked whether the students had the possibility to see their final solution and insights transported in the real world context.

However the questions are only indicative, in fact, students are left free to express their own thoughts.

In the following section, we are going to expose which have been had the most relevant discovering regarding the five macro areas that we just saw.

## 5.3 Empirical evidences

In this section we explore which the results of our investigation on Design Thinking application in an academical project as the ALL is. Through the question, we had been able to address five main areas regarding the Design Thinking methodology (team composition, interdisciplinary, timing and user engagement) that in turn, embed also some of the challenges that must be faced when Design Thinking is taught (see section 4.3).

During our case study, we managed to reach a sample of master students pertaining to different academical backgrounds. The student sampled were 10, among a population of 250 students who participated in the ALL initiative. Even if the sample of respondents is actually, very small, it revealed to be very informative and complete, since every individual managed to answer all the posed questions. As a matter of fact, each of the ten students resulted to be very interested in the matter proposed, and answer exhaustively to all our posed questions. As we already mentioned in the previous paragraphs, the interviews had been conducted in firsthand or alternatively by telephone or Skype calls, and additionally, all the interviews had been recorded as evidence.

### 5.3.1 Main results

In the tables below, a summary of the major findings regarding our interviews has been represented. As we can grasp from Table 8 for each informant various key findings had been reported. First, we reported the student's team composition in order to extract the following information (reported in column two): whether the ALL team could be considered interdisciplinary. Continuing with the third column, we examined and reported the level of user engagement that the student experienced during the ALL project. Subsequently, we reported both data about the student's personal academical background and information that expose whether the ALL had been the first student's experience with team-working and Design Thinking. Finally, we reported the student's opinion about the ALL timing adequacy and whether the student had been able to see the solution applied.

Table 8: Main Results

	<b>Team composition</b>	<b>Inter-disciplinary</b>	<b>User contact</b>	<b>First time for team-working ?</b>	<b>Fist time for DT?</b>	<b>Student Background</b>	<b>Was Timing Adequate?</b>	<b>Saw the solution applied?</b>
<b>Student 1 Martina</b>	3 Economics 2 Humanities	Not completely	Limited	No	No	International management	Yes	No
<b>Student 2 Giovanni</b>	6 Economics 1 Humanistic	No	Partial	No	Yes	Economics and Management	No	No
<b>Student 3 Ludovico</b>	Chemistry Marketing Cultural goods Economics Languages	Yes	Absent	No	Yes	Business Administration	Yes	No
<b>Student 4 Sara</b>	Chemistry Marketing Cultural goods Economics Languages	Yes	Very poor	Yes	Yes	Chemistry	Yes	No
<b>Student 5 Annachiara</b>	Political Sciences Environmental Sciences Economics Design Interpreting	Yes	Partial	No	No	Innovation and Marketing	Yes	No
<b>Student 6 Alessandro</b>	2 Economics 1 Languages 2 Cultural Goods	Yes	Partial	Yes	Yes	Cultural heritage and entertainment	Yes	No
<b>Student 7 Piero</b>	3 Economics Environmental sciences International Policies Philosophy	Yes	Limited	Yes	Yes	Philosophy	No	No
<b>Student 8 Claudia</b>	3 Economics 1 Humanities	No	No contacts	No	No	International Management	Yes	No
<b>Student 9 Elisa</b>	Political Sciences Environmental Sciences Economics Design Interpreting	Yes	Limited	Yes	No	Interpreting	No	No
<b>Student 10 Charlotte</b>	1 Marketing 2 Economics 1 Design 1 Philology	Yes	Absent	Yes	Yes	Philology	Yes	No

In the following section we will examine more in details the results reported in Table 8; to this extent we will subdivide the findings in two main areas: in the first section we will study whether the ALL respects the principles imposed by the Design Thinking methodology, and in the second section we will instead analyse the students' opinion about various ALL characteristics.

### 5.3.2 Testing Design Thinking Principles compliance

Regarding the Design Thinking principles, we can admit that — globally — the ALL respects fundamental Design Thinking bases.

Looking at the results table, however, we can observe that for the majority of the teams, the multidisciplinary principle is respected, since that seven over ten of the investigated teams were constructed to be interdisciplinary, including indeed students pertaining to different academical backgrounds, such as Philology, Environmental Sciences or International Policies. However, we should admit that it is more than probable to find more Economics students in a team with respect to students pertaining to other disciplines, as many students complain. This fact can be easily explained in two ways; first, because the number of enrolled Economics students is higher with respect to the other disciplines, and second because Economics students (comprehending management, business administration or marketing) probably see Design Thinking concepts more applicable within their knowledge.

Continuing with the analysis of the basic Design Thinking principles, however, we cannot say the same for the user engagement principle. As a matter of fact, as we can observe in the third column of Table 9, for the majority of the students, the user contact had been absent or very limited. Only for two students over ten, the contacts occurred to be partial. From the conducted interviews, unfortunately, it was found that during the ALL laboratories the most of the students had not had the possibility to get in touch with final users, since that, for the majority of the cases, the team managed to interview only relatives or peers. Actually, none of the team had the possibility to follow the potential users during a typical journey, or to spent time outside of a brief interview.

Table 9: Testing Design Thinking Principles compliance

	<b>Team composition (number &amp; background)</b>	<b>Inter-disciplinary?</b>	<b>User contact</b>
<b>Student 1 Martina</b>	5 students, - 3 Economics - 2 Humanities	Not completely	Limited
<b>Student 2 Giovanni</b>	7 students, - 6 Economics - 1 Humanistic	No	Partial
<b>Student 3 Ludovico</b>	5 students, - Chemistry - Marketing - Cultural goods - Economics - Languages	Yes	Absent
<b>Student 4 Sara</b>	5 students, - Chemistry - Marketing - Cultural goods - Economics - Languages	Yes	Very poor
<b>Student 5 Annachiara</b>	5 Students, - 1 Political Sciences - 1 Environmental Sciences - 1 Economics - 1 Design - 1 Interpreting	Yes	Partial, they interviewed only know persons (relatives, friends ...)
<b>Student 6 Alessandro</b>	5 Students, - 2 Economics - 1 Languages - 2 Cultural Goods	Yes	Partial, they interviewed only users found near to their site.
<b>Student 7 Piero</b>	6 students, - 3 Economics - 1 Environmental sciences - 1 International Policies - 1 Philosophy	Yes	Limited
<b>Student 8 Claudia</b>	4 students, - 3 Economics - 1 Humanities	No	No contacts with final users, only with clients
<b>Student 9 Elisa</b>	5 Students, - 1 Political Sciences - 1 Environmental Sciences - 1 Economics - 1 Design - 1 Interpreting	Yes	Limited
<b>Student 10 Charlotte</b>	5 Students, - 1 Marketing - 2 Economics - 1 Design - 1 Philology	Yes	Absent
<b>Results</b>	The majority of the teams (7 over 10 teams) were constructed to be Interdisciplinary, respecting the Design Thinking principles.	For the majority of the students, user contact had been <i>absent</i> or very <i>limited</i> . Only for 2 students over 10, the contacts have been <i>partial</i> .	

Anyway, we will discover that the ALL experience had been in either way a key components for students academical path, as we will see in the following section, where we are going to report more personal students opinions.

### 5.3.3 Students' opinion and experience

Throughout this section, we will analyse the students' personal opinion about the ALL. In detail, we will analyse whether the student experienced team-working and Design Thinking for the first time, the student background, their opinion about the time schedule and finally whether the students saw their solution applied.

Starting from students opinion about the ALL time schedule, we are pleased to admit that — despite our initial thoughts — the ALL timing structure is perceived to be adequate. We raised the issue of timing schedules through the posed questions, in order to understand if students had encountered difficulties in managing mandatory courses and the lab. To our surprise, the majority of them found the time given for each project as adequate (see Table 10, column 4) even if they assessed that the assigned challenges were in most of the cases too broad to be managed in 6 weeks. This last characteristic — the challenge complexity — could be linked to an ALL aspect of which the students complained.

As a matter of fact, many of the informants claimed that after the activities conclusion they did not get to see the solution applied, nor have any contact with the client firm. This situation created some discomfort among participants, since that it leads students to think that their efforts had been fruitless. We would admit indeed that providing students with the possibility to see their solution applied, along with the opportunity to get in touch with clients, also after the lab end, would be the second point of improvement, together with the already treated user contact issue.

Table 10: Students' opinion and experience

	First time for team-working ?	Fist time for Design Thinking?	Student Background	Was Timing Adequate?	Saw the solution applied?
<b>Student 1 Martina</b>	No	No	International management	Adequate	No
<b>Student 2 Giovanni</b>	No	Yes	Economics and Management	too little time	No
<b>Student 3 Ludovico</b>	No	Yes	Business Administration	Adequate	No
<b>Student 4 Sara</b>	Yes	Yes	Chemistry	Adequate	No
<b>Student 5 Annachiara</b>	No	No	Innovation and Marketing	Adequate	No
<b>Student 6 Alessandro</b>	Yes, and the first with a real business case	Yes	Cultural heritage and entertainment	Adequate	No
<b>Student 7 Piero</b>	Yes	Yes	Philosophy	Too short, this kind of project needs a bigger timeframe (2 months)	No
<b>Student 8 Claudia</b>	No	No	International Management	Adequate	No
<b>Student 9 Elisa</b>	Yes	No	Interpreting	Adequate	No
<b>Student 10 Charlotte</b>	Yes	Yes	Philology	Adequate	No
<b>Results</b>	For half of the students (5 over 10 students) the ALL had been the very first opportunity for team-working, especially for those pertaining to humanities disciplines.			The majority of the students found the time given for the ALL project as adequate.	All the students did not manage to see their solutions applied, nor had contact with the clients after the ALL conclusion.
	For more than half of the student (6 over 10) the ALL had been the first opportunity to work with the Design Thinking methodology.				

Continuing with the students experience, we can also admit that for half of the students (5 over 10 students — Table 10, column 1 ) the ALL had been the very first opportunity for team-working, and, if not the first, it had been in many cases the first occasion for conduct a project with an established firm. This fact reveals to be true especially for students enrolled in

humanities disciplines, disciplines that are not predisposed as the Economics ones to host teamwork activities. This can be considered a strong evidence for assessing that the ALL projects along with the Design Thinking play an important role in students introduction with the working life, and in many cases, the ALL lab worked just like a bridge between the university and the organisational world.

Moreover, some students complained about the fact that — giving the laboratory structure — it is not possible to reiterate the Design Thinking phases or restart the whole activity from zero, as the Design Thinking methodology suggests. Other students had complained that often there are individuals attending the ALL lab that are not interested and motivated in the activities proposed and, consequently, disturb and delay the work of the entire team. This problem is also the motivation that leads students to admit that the ALL cannot be compared to a real working experience since many students do not assume even the minimum responsibility. The informants, explained also that there are no mechanisms in place to discourage the free-rider behaviour. This situation, following the student's suggestions, may be solved by inserting a prize in the ALL structure. The prize should work as an incentive to encourage students to work consistently with the posed objectives.

However, despite those last complaining, many students still admit that the ALL experience, along with the Design Thinking methodology, is such an important activity that it should be included in all the master's curricula at Ca' Foscari. Some students in fact even admitted that they applied the Design Thinking method also to other personal projects.

Still, giving the importance of the ALL project, the students' considerations and suggestions should be considered to give an even more complete learning experience, since as we saw, certain guidelines have to be followed, when we are dealing with the Design Thinking methodology. To this extent, we offer our case analysis as a hint for the improvement of the successive ALL project.

In the following section, we will draw some conclusions that would offer a comparison between the analysed literature and the real world case study.

## 5.4 How theory differs from practice

After the case analysis we need to admit that academical projects as the ALL are very challenging themselves, since that the Design Thinking's theory differs substantially from practice.

During the first chapters we identified the Design Thinking's importance in the regards of the business and the academical environment. As a matter of fact, we individuated also that the two major obstacles to the development of the Design Thinking's potential resides especially in those two just cited areas. We identified that the lack of Design Thinking usage and spreading is due to the established organisational traditions and the lack of the design concept in the business education curriculums. In the regards of the second contingent — the lack of design concept in the business curriculum — we identified also, analysing the available literature, that a practicum — the action of learning a practice, in a context that approximates at the real world — is needed to bring the Design Thinking concept in the business studies.

To this extent, the ALL has revealed to be a suitable pedagogical practicum, since as we saw during the analysis, it offers a stimulating environment that provides students with the possibility to be actively involved in the learning process, by addressing real business cases. Still, during the literature review, we identified that when we are dealing with a pedagogical practicum, some difficulties have to be faced. We recognised, among the obstacles, the difficulties residing in grouping students interdisciplinary, the difficulties associated with the time schedules and the interaction with final users and finally also the difficulties that are associated to the provision of a suitable physical environment. However, through our case study, we had been able to address specifically some of the challenges associated to the Design Thinking's teaching: the team composition, and the timing and access to users.

In the regards of team composition, as we already admitted, we should state that this principle is generally respected in the ALL activity, but unfortunately we cannot affirm the same for the other addressed challenged. The access to user is in fact almost absent, and this can be confirmed from what emerged from students interviews. We should conclude indeed that the access to users remains still a challenge to be addressed while dealing with this kind of

project. Moreover, even if the time-schedule matter did not resulted to be an issue for the participants, it could be instead in the regards of user engagement. The time shortage, in fact, could explain partly the fact that students did not spend any time with the final or potential users. Even though, also the fact that students are not provided with the necessary resources, could be a good point to explain the lack of contact with users. However this particular obstacle would require further investigation, since it is one of the main pillars on which Design Thinking methodology is based, and demands indeed to be respected, in order to have the expected results. One solution could be to insert an ALL as a mandatory semestral activity in the Ca' Foscari's curriculums — as some informants suggested — so that a major time frame and resources could be allocated to the practicum.

Still, we need to be aware that constructing such a pedagogical model would not be a simple matter. However it could provide students with an even more structured and complete experience, giving the fact that more time and possibilities — in term of resources and teachings — could be offered also to explore all the tools created to support the Design Thinking process, which are, at the moment, undervalued during the ALL projects.

However, in the short run, it would be excellent if the suggestions provided by our informant would be followed, to assure, other than a better experience, also improved outcomes in term of ideas and solutions after the ALL conclusion.

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