Improving university industrial design courses: An action research study

Thesis submitted to the University of Liverpool for the degree of

Doctor of Business Administration

By

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This Thesis is dedicated to everyone who has given me their personal support and professional advices to make it come true. To my family, to my students, and to my University of Liverpool assessor, Dr. Ron Fisher.

I would especially like to thank Dr. Ron Fisher, my personal assessor of this Thesis, for all his professional advices, comments and suggestions, and time dedicated that helped me accomplish this document with quality by always motivating me to seek continuous improvement in my work. Thank you.

Abstract

This research focuses on the improvement of the bachelor of industrial design program offered by the University of Monterrey and the generation of knowledge through the use of several methods and methodologies relevant to the field of business administration and research.

As a former employee in the industry, the researcher is aware of the importance for students and graduates to develop technical and interpersonal skills in order to efficiently attend their working demands. These skills however, are sometimes not in accordance to what the industry (identified in this research as the demand side in the stakeholder theory) might require, and the university (the supply side) offers as potential professionals as the result of years of training and education in the field of industrial design. This mismatch was identified as the managerial problem in this Thesis.

For this study, the methodology of Action Research was selected. Different from traditional research methodologies, AR not only pretends to obtain and analyze data to obtain conclusions regarding a managerial problem, but also seeks to provide improvement in the organization. With the use of Action Research in this Thesis, the researcher was not only able to obtain valuable data from the stakeholders but to conduct analysis through various different cycles of learning, discuss the results with the organization, identify opportunity areas to mitigate and improve the situation of the problem. It was precisely thanks to the involvement and discussion of results that is expected to occur with the methodology that the researcher was able to obtain solid conclusions and identify areas of improvement that wouldn't be possible to achieve with other methodologies.

To better understand how to attend the managerial problem, it was necessary to obtain data from every stakeholder regarding their perceptions and expectations towards different topics of industrial design such as skills and abilities they believed designers should have, as well as their perception towards this profession within the industry. Using Template Analysis as the data analysis

method, the researcher was able to acquire seven overarching themes that gave a broad perspective of the different topics regarding the design profession. These were then discussed with the organization, and their analysis derived in four major opportunity areas that require their attention to mitigate the problem. Finally, the researcher was able to propose improvements to the program and offer methodological and practical contributions for knowledge, as well as for the organization, which the reader can find in the final chapter of this study.

Declaration of Own Work

I declare that this Thesis entitled ‘Improving university industrial design courses: An action research study’, is my own work and was conducted under the supervision of my first supervisor Dr. Ron Fisher, from the University of Liverpool.

I further declare that I have not copied or based my work on any samples to which I had access during its development. Any work that was taken from another source has been appropriately referenced and acknowledged in regards to the established guidelines.

I also declare that all tables and figures present in this Thesis are as well of my own work.

Signature: 

Name of student: David Alejandro González Solís

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Chapter 1: Introduction

The following chapter presents an introduction to the thesis. The introduction includes the context of the study, the researcher's position, the aim of the study and justification for it, an overview of the key literature relating to the problem and the management problem. Following this the research questions, the methodology and methods, and an overview of the structure of the thesis are presented.

1.1 Context of the Study

The study reflects research that originated from when the researcher worked in the manufacturing industry, up to and including his work as an academic at the University of Monterrey, Mexico. Over this period of time the study has changed, moving from a focus on the problem of employee desertion to considering differences in the supply and demand for industrial design programs. Specifically, the research focuses on possible mismatches in perceptions and expectations of what design programs offer between: 1) the supply side, which are professors and students at the University; and 2) the demand side, which includes industrial designers and their employers.

The researcher recognizes that while employee desertion is a problem, providing actionable outcomes to address the problem directly is beyond his remit. The refocused study provides a greater opportunity to make an impact in the researcher's work area. It also offers a greater contribution to workplace improvement by focusing on improving practices inside the researcher's organization instead of trying to address an external issue over which he has little control.

1.2 The Researcher's Position

As a former employee in the manufacturing industry sector the researcher had the opportunity to witness the demands in skills and competences that employers seek from potential employees. His current position at the University allows him direct contact with students of the bachelor program. This allows him to become a first-hand witness of the skills that students develop during their learning time at the University and how they become involved with the development of a product, from the initial proposals to the final prototype. Also, to understand students' involvement with other individuals, related and unrelated to their profession, to learn their perceptions as potential clients or users.

At the same time, while working in the manufacturing industry and co-working with industrial designers, he is well aware of the skills designers have contributed to the successful development of industrial products, ranging from small domestic articles to huge industrial equipment for raw material handling. By considering both the industrial and academic perspectives of the topic the research holds great relevance for the researcher.

1.3 Aim and Justification of the Research

The aim of the research is to understand any mismatch that exists between the perceptions and expectations that the supply and demand sides of industrial design have in Monterrey, Mexico. On the supply side at the University of Monterrey are professors providing industrial design education and students receiving it. On the demand side are employers in manufacturing industries in the Monterrey area who employ university graduates.

The study is justified for two main reasons. The first reason this research is important is due to high instances of employee turnover in industrial design businesses, leading to costly and disruptive consequences. Research has shown that businesses spend up to one fifth of a person's annual salary if he or she has to be replaced (Boushley and Glynn, 2012). Therefore, it is important to ensure that graduates have the knowledge and skills that business demands in order to provide an effective person-job fit. While the focus of the study is not on employee desertion per se it is important to highlight that mismatches between stakeholders' perceptions might in one way or another lead to sub-optimal outcomes. Clearly any mismatches between what educational attributes are supplied and what are demanded are important considerations for business and academe.

The second reason is that from the perspective of academic staff the research represents an opportunity for the University to become aware of how to improve courses, as well as to provide possible insights into future program and course development. It seems likely that while University professors believe the curricula and programs they are providing meet the needs of industrial design businesses, this may not be the case. The research allows stakeholders on the educational supply side (i.e. educators and students) to be aware of the importance of identifying mismatches and to attend to them in a timely manner.

1.4 Management Problem

There is a potential mismatch in perceptions and expectations between the supply of industrial design programs and the demand for them. Up to this point the University does not know how to address the problem. The issue is that on the university side professors and students are engaged with providing qualifications that do not meet the requirements demanded by industrial design employers and employees.

1.5 Overview of Key Literature and Definitions

What is industrial design and how it is offered at the University of Monterrey

Before focusing on the key definitions and literature presented in the thesis it is necessary to clarify what the profession of industrial design is. For that reason, the researcher provides an overview of what industrial design is and insights into the bachelor program at his workplace. In brief, industrial design is defined as a profession that consists of the planning and production of objects, services, or life cycle systems through creative activities. This process begins with the identification and analysis of the problem the user has, to its prototype development and manufacturing (Herrera and Neve, 2009). The University of Monterrey offers its industrial design bachelor program over a period of nine semesters. In common with many other universities it offers a study plan that involves subjects that make students develop specific technical and analytical skills to deal with understanding problems and providing design solutions.

Stakeholder theory

Having clarified what industrial design is we now consider stakeholders in industrial design education through the lens of stakeholder theory. Stakeholders, as defined by Freeman, Harrison, and Zyglidopoulos (2018), are a group of individuals who are associated with an organization

and have specific interests and expectations in obtaining results from activities that ultimately affect the organization's outcomes.

Stakeholder theory is normally used in organizations that identify their stakeholders as employees, clients, suppliers, etcetera. However, stakeholder theory is appropriate for this study as it enables us to consider both the demand and the supply side of the educational system. In particular it provides a framework to examine how the University of Monterrey designs and presents its study plans.

Supply and demand sides of industrial design education

The supply and demand side are key elements for consideration in conceptualizing industrial design education. These two concepts are identified by Moon (2018) as being part of an integration of the concepts that affect the functions, plans, and decisions taken in an organization to optimize its resources and achieve a balance to what each part is looking forward to obtaining with such resources. They are key to the study because they are identified as the main stakeholders in this research, comprising students and professors on the supply side and employees and professionals on the demand side.

Commitment, job satisfaction, and the psychological contract

The concepts of commitment and job satisfaction, amongst others, are also present in the study. In an organization, commitment is defined as the strength of identification and involvement an individual has with his or her organization (Porter et al, 1974). Normative, affective and continuance commitment (Meyer et al, 1990) refer an individual's decision to stay with their organization due to perceptions of obligation, emotional attachment or a perceived lack of alternatives. The psychological contract (Morrison and Robinson, 1997) is a concept that refers to an unwritten 'contract' between employers and recently hired employees that represents expectations, often tacit and usually unwritten, to be received by employees in exchange for their work. Consideration of the psychological contract is important as it is this phenomenon that highlights what new employees experience in the hiring processes of a company. It highlights different expectations they believe or assume will accrue as time goes by while working in that organization.

However, it is often the case that an employee is left with unmet expectations that might cause resentment towards the organization, leading to intention to leave.

1.6 Research Questions

Considering the managerial problem as outlined above, together with literature reviewed in the next chapter, the researcher established the following research questions:

RQ 1 What are the perceptions/expectations of professors and students about the effectiveness of industrial design programs offered by University of Monterey?

RQ 2 What are the perceptions/expectations of industrial design employers and employees about the effectiveness of industrial design programs offered by University of Monterey?

RQ 3 How can sustainable action outcomes that address any differences in perceptions/expectations between the supply of and demand for programs be achieved?

The attendance of these questions is available for the reader in Chapter 7, Section 7.3: Attendance to the Management Problem & RQ's.

1.7 Methodology and Methods Used in the Research

This is a qualitative study guided by an Action Research (AR) methodology. An AR methodology enables the researcher to generate practical outcomes that can be implemented in his workplace, which is the University of Monterrey. As Greenwood and Levin (2007) argued, an AR methodology has the advantage that change is expected to be carried out and justified, as well as being identified. In addition to the methodological considerations favoring AR, action research is also a requirement of the University of Liverpool's DBA program.

The research will use multiple action cycles following the steps Plan-Do-Study-Act advocated by Deming (1986, 1993). Although originally proposed as a process improvement cycle, PDSA has been used in numerous studies as a framework for action research (e.g. Gapp and Fisher, 2008). The researcher will reflect on each step of the cycles as they proceed in order to engage effectively with the learning processes of action research (Argyris, 2003). Action research cycles will focus on the researcher's first-person practice together with the second-person practices of students, professors, employees and employers associated with design courses at the University.

Guided by the AR methodology qualitative data are collected using semi-structured interviews. Data are then analyzed using template analysis (King, 2012) for coding and generating themes. The template analysis method allows researchers to organize relevant data in codes, from which higher order concepts and themes can be identified.

1.8 Thesis Structure

Chapter 1 presents an Introduction to the study, setting out the aims of the study, management problem, research questions, and an overview of methodology and methods.

Chapter 2 provides a review of literature relevant to the management problem. It also identifies research questions and a theoretical framework to guide the study.

Chapter 3 corresponds with the research methods and methodologies used in this study.

Chapter 4 expands the findings and data analysis.

Chapter 5 presents the data findings and discussion derived from the presentation to the organization.

Chapter 6 presents the analysis of the findings, as well as the relevance and attendance to the supply chain in the organization.

Finally, Chapter 7 presents the conclusions and reflections of the researcher, contributions, opportunities for future research and limitations of the study.

Chapter 2: Literature Review

2.1 Introduction

The following review comprises literature relevant to the management problem set out in the previous chapter. It starts by detailing the profession of industrial design and the nature of the design process. It continues by reviewing how the design program is offered by the University of Monterrey to its students, what topics are included in the program, what the topic objectives are and how the design profession is perceived and related to industry. The chapter continues by presenting stakeholder theory, which provides a theoretical basis for this study. Following a review of stakeholder theory, the researcher discusses the parties involved in the supply and demand of industrial design education at the University, namely professors and students, and employees and employers respectively.

Literature relating to work commitment, employee engagement and job satisfaction is reviewed. Also, the impact of the psychological contract on employees is considered. However, before going directly to the literature, the researcher presents a literature overview, which sets out the relevance and importance course material has to the research, especially in regards to the RQ.

2.2 Literature Overview

As previously argued, this research aims to address any possible mismatch in perceptions and expectations between the supply of industrial design programs and the demand for them. Three research questions were developed in order to help the researcher address the problem:

RQ 1 What are the perceptions/expectations of professors and students about the effectiveness of industrial design programs offered by University of Monterey?

RQ 2 What are the perceptions/expectations of industrial design employers and employees about the effectiveness of industrial design programs offered by University of Monterey?

RQ 3 How can sustainable action outcomes that address any differences in perceptions/expectations between the supply of and demand for programs be achieved?

Before analyzing the literature review, It is important to highlight the relevance and importance it has to these questions and to give the reader an expectation of what he/she will uncover in this chapter:

1. The importance that industrial design practices hold in the industry. This has been suggested by authors such as Homburg, Schwemmle and Kuehnl (2015), and Márquez and Cisneros (2014), where the authors argued how design helps organizations make their products differentiable and becomes a competitive advantage for organizations.

2. A global view of the Bachelor of Industrial Design program offered by the University of Monterrey. The summarized program serves to globally understand how the profession is formed and focus on key details. For instance, we can observe designers learning technical abilities mostly during their first semesters, and while they move forward, they acquire more analytical and other interpersonal skills through different challenges such as working with real company projects or with students from other professions to address a particular problem.

3. Stakeholder theory as a theory that is applicable to the study: Who are stakeholders in the study? Why is it relevant? Also, considering a demand side consisting of those individuals who seek workforce specific qualifications and their employers, and the supply side, involving other individuals that form part of the educational system, in the main students and professors.

4. Literature review on engagement and commitment, where some authors like Ahr and Ahr (2000) have discussed the reasons why individuals decide to stay in their organizations, such as loyalty or economic reasons. On the other hand, others have argued over how employees can consider certain practices done in their organizations as a threat to their professional career.

5. Literature regarding the psychological contract and employee satisfaction, which is of significant relevance to understanding how important it is to identify possible mismatches between potential graduates and employers.

Even though of all of these topics directly address the RQ, they do give insights into how expectations and perceptions in the field of industrial design might develop. They are also important constructs in developing the interview protocols.

2.3 What is Industrial Design?

The International Council of Societies of Industrial Design (ICSID) defined the term ‘’industrial design’’ as: ‘’a creative activity whose purpose is to establish multifaceted characteristics of objects, processes, services, and life cycles systems’’ (Macías and Bribiescas, 2011, Pp. 20). The design methodology presented by Herrera Gutierrez de Velasco and Ariza (2009) identified and analyzed initial problems faced by a designer. During this early stage a designer must know how to visualize the solution before representing the ideas in a sketch. It is precisely because of this that the materialization of the idea takes place at the beginning of the process and continues through the entire process. The same occurs with the next stages that are analysis of materials, production and distribution. The nature of these processes involves a constant interaction between the customer and designer in several ways, not only because it allows the designer to understand better the customer’s needs, but because this interaction allows for feedback of the original results to improve the next ones. In a previous investigation done by Neve (2005) and Herrera (2003), the authors analyzed the ways in which students adopt the design process, concluding that this process was precisely characterized as being a cycle where the designer moves backwards and forwards in a constant quest in order to obtain the best possible solution to the problem.

An alternative view was expressed by Dorst (2003), when the author explored the structure of design problems as seen within the design methodology. Dorst (2003) found that often problems are described as undetermined and the level of expertise from the designer is critical in understanding how to interpret and solve these problems based on his/her subjectivity or objectivity. Several aspects influence the level to which emerging issues are going to be adopted. Among them are:

- Design projects must be controlled and justified.
- When a design project demands freedom of choice from the designer, the result will be given based on his interpretation and perception of the problem analyzed.

- Long periods of time are usually spent by designers at the beginning of the design process considering the type of problem they are going to address.

As argued by Valkenburg (2000), groups involved in design processes require a large number of arguments and statements to be objectively focused in order to keep track of the advances every individual has made.

Other authors like Homburg, Schwemmle and Kuehnl (2015) have argued that product design holds an importance in today's marketplace because it enables companies to make their products differentiable from competitors. In their article, the authors presented three design dimensions that occur during the product design process: aesthetics, functionality, and symbolism. Aesthetics refers to the perceived beauty and appearance of the product (Bloch 2011; Desmet and Hekkert 2007), and according to Reber, Schwarz, and Winkielman (2004) the aesthetic can be an attribute of the product itself or can be created through the perceptions of the beholder. In another definition given by Leder et al. (2004), aesthetics is the combination of the attributes of the product and the perception of beauty created by such attributes as perceived by the beholder. The term functionality refers to the ability the product has to accomplish its purpose for which it was designed. Finally, symbolism refers to the perceived message a product communicates to the beholder (Aaker 1999; Belk 1988; Bloch 2011). In order to demonstrate their argument qualitative interviews of consumers were conducted by the authors to see if consumers conceive product design within these dimensions. The interviews involved making the selection of a smartphone and analyzing why they selected that specific product for themselves. The consumer data varied between the three dimensions for different customers. For instance, in the aesthetics dimension consumers argued that their selected smartphone appeared to be more beautiful than others, with some even claiming their product to be an 'eye-catcher'. Responses relating to the functional dimension enhancing the product's technology and material advantages such as weight and strength of Wifi connection. With regard to the symbolic dimension, consumers referred to their chosen phone as being perceived as a more elegant one compared to others and how they wanted to portray that appearance to the outside world.

In other research Ross and Wensveen (2010) argued that the aesthetic is essential to the field of industrial design. It expresses socio-cultural messages such as specific lifestyles through the different ways in which materials and forms are applied to products (Muller, 1997). In the words of Shusterman (2000), ‘’an aesthetic experience invigorates and vitalizes us, and thus help us achieve our main goals in a similar way in which singing a song helps workers perform hard labor’’ (Shusterman, 2000, P. 9). In emphasizing the importance of aesthetics for this field the authors introduced the concept of Aesthetic Interaction, a concept that involves four principles: 1) it has practical use next to intrinsic value, meaning the beauty of an object as perceived by the beholder invites the individual to interact with it.; 2) it is highly related to social and ethical values. Beauty is not perceived by everyone in the same way, the experience that users will have regarding aesthetics will depend on socio-cultural factors like people’s values and personality, as well as their history (Locher, Overbeeke, and Wensveen, 2010); 3) its dynamic form is satisfying, meaning products become dynamic once they interact with users enhancing their design with this interaction; and 4) it involves the whole human being. It not only involves the perception of the product’s form by humans, but also the emotions driven by the interaction of the individual through the experience of mastering its usability.

2.4 Industrial Design in the Industry

In order to understand the significance that industrial design has in several areas of the industry, a literature review was undertaken enhancing the relationship that industrial design has in several companies. One article reviewed is that of Márquez and Cisneros (2014), where the authors demonstrated how several small and medium sized organizations in Venezuela used an innate model of design as a competitive advantage over their rivals. This model is one of the two design models that Borja (2003) suggested companies may adopt as a positioning strategy. In this model, design is incorporated in the companies from inception and constitutes a fundamental element in most of the processes of the organization. As argued by Márquez and Cisneros (2014), this model is applied in companies whose top management has a clear vision of how design can provide a strong competitive advantage. On the other hand, the experience-based model (Borja, 2003) consists of incorporating design in organizations that, according to Buil, Martínez, and Montaner (2005), are well established and require design in their products to differentiate them from their competitors. According to Best (2010), small and medium sized companies play a strong economic role for most of the Latin-American countries.

However, several barriers are still present in these companies that have not allowed design to be fully adopted as part of their strategy or even implement an experience-based model. One of the most significant reasons is pointed out by Bonsiepe (1999) and Iduarte and Zarza (2010) who stated that business owners are unaware of what design is capable of doing in their companies, tending to regard it as irrelevant and expensive. In their study, Marquéz and Cisneros (2014) found that from four selected companies each one of them regarded design as a fundamental process in their operational structure. In some cases, some of them even define themselves more as a design company than a manufacturing one. Industrial designers are also present in most of the activities of organizations. In the case of one particular company called P.O.P Business, a company dedicated to the design and manufacturing of product exhibition systems, the designer serves as a customer representative inside the organization and at the same time forms part of their sales team. In relation to engineering design, on the other hand, authors Spuzic, Narayanan,

Abhary, Adriansen, Pignata, Uzunovic, and Guang (2016) described design as being a very creative activity that has been typically defined as a systematic and intelligent process where designers generate and evaluate several concepts for products, processes or even systems that will help achieve the user's objectives or needs by satisfying specific constraints (Winner and Hertland, 2000).

In a study conducted by Macías and Bribiescas' (2011), the authors described the skills that industrial designers should have during the process of product development. Several definitions of the concept of industrial design are mentioned in their article, however one of the most significant is that from the International Council of Societies of Industrial Design, ICSID (1957). ICSID, established in 1957 as a non-profit organization, defined industrial design as a creative activity whose purpose is to establish the versatile qualities of objects, processes, life cycles, and services. The term ''industrial'' is related to the industry or industrial activity. Therefore, the designer is seen as an individual who embraces an intellectual profession, rather than a commercial one in an organization (ICSID, 2009). According to Rodriguez (1983) the main activities performed by industrial designers include product development, analysis and evaluation of products, patent development, and consulting.

Based on the argument by Flores (2007) that we are in constant contact with objects from birth and they become a fundamental part of our normal lives, we can envisage the impact that the design profession has on everyday life. The physical, ergonomic, and safety characteristics that objects should have are the responsibility of industrial designers. At the organizational level Cabrero and Orihuela (2007) suggested that those organizations that engage with industrial design as a competitive advantage must make three critical changes in their structure: 1) in order to adopt industrial design as a strategic variable to enhance competitiveness in the entire organization it is necessary to have full commitment from the top management for such adoption, and the establishment of design in the organization that supports changes in the company's structure; 2) because of this, the authors argue, an industrial designer will be strongly connected to the fabrication process, which includes areas such as manufacturing, material technology, ergonomics, etc; and 3) the designer must also be aware of innovations occurring outside and inside the orga-

nization where he/she works such as patent acquisitions, redesigns or modifications of a product, etc. (Cabrero and Orihuela, 2007).

According to Haddad (2007) competencies are a set of behaviors that vary between individuals. They present observable qualities of the individual such as personality and aptitudes and represent a link between the individual characteristics that everyone has, and the aspects required to fulfill specific tasks in their jobs. However, Haddad's (2007) is not the only definition of competencies reported in the literature. For example, Spencer and Spencer (1993) defined a competency as a particular characteristic of an individual that is strongly related to an effective or superior performance in a given situation. In other research Cao de Ansorena (1996) regarded competency as a personal ability or attribute of an individual that can be defined as a characteristic of his or her behavior and that is oriented to the particular task in a logical manner. The most relevant competencies described by Macias and Bribiescas (2011) are: 1) a radical, global, and industrial vision of established projects in order to be able to identify new opportunity areas in the market; 2) teamwork; 3) visionary attitude towards business opportunities; 4) a good domain of modeling and visualization tools for 3D design; and 5) being capable of generating sustainable products and processes while considering the environment. Also, these competencies should be applicable to different steps of any product development such as planning, designing, and prototyping.

To this point, we can summarize that what has been presented so far overall describes what an industrial designer does in the workplace and what is expected from him/her as a professional individual. As an industrial designer himself, the researcher agrees with certain topics mentioned but has reservations about others. For example, as ICSID mentioned, it is true that industrial design is a creative profession. In fact, and as the researcher further presents, in the career study plan there are subjects that are particularly dedicated to enhancing creativity to enable students to search for solutions to social problematics and products in general. It is also true that the level of expertise an industrial designer has is critical for identifying and interpreting in a better way the problems that clients have and to provide a more effective solution to that problem. However, contrary to the process espoused by Herrera and Neve, and from the perspective of academic staff, the materialization of the idea is not usually proposed from the beginning. In fact, the pro-

posal of a solution is normally given at the end of the creative process, because in order to get there, designers need to take a long path of problem analysis, data interpretation and a whole creative stage that includes concept expressions and prototyping. Also, and in relation to the design process itself, we must not forget that the presented process makes the supposition of fixed situations where things flow according to plan. In the researcher's experience, based on previous work in industry, the design process of every company varies one from another and doesn't always resemble the process depicted here. After working for several years in the metal mechanical industry as a product designer, the researcher can argue that in his experience the design process in each workplace was not similar to the one he learnt during his studies and the one presented in the lecture. To begin with, the process itself is never undertaken by a single individual, it is always a team with people directly and indirectly associated with the client and designer. In this sense the researcher agrees that one of the main attributes designers must have is to know how to work in a team. As mentioned by Macias and Bribiescas, and based on the researcher's experience, there was no project where he worked alone.

In relation to the software and technical abilities that a designer should have, the domain of 3D software does become an indispensable ability. This is because of the industrial designers need to work with software such as Inventor, Solid Edge, Rhino, Adobe, etc. The first ones are used mainly for solid and surface modeling for machining industrial parts or to create digital prototypes and graphic representations of the design proposals. The software from Adobe are mainly used as a graphic complement to build presentations to users and clients.

Macias and Bribiescas also mentioned that a designer must be capable of identifying opportunity areas in the market and have vision regarding these opportunities. However, this will strongly depend in real life of the position that the designer has in his workplace. If a designer works on his own it is indispensable that he has such dominion or at least develops it. However, as a fresh graduate or one having little time in a company it is very probable he will first need to learn other abilities or accomplish other task or projects before being able to take stronger decisions in his organization. Other considerations we have in mind are all the other involved parts in the development process of products that have not been mentioned before. In the first place we cannot

forget the fact that organizations usually have departments that work together to finish their established projects. Among them are sales, marketing, production, quality, among others. And while each department has specific tasks to accomplish, every individual involved in the process has to work to get the products finished. This implies that designers must work with certain restrictions and specifications that will be established with the customers or other departments.

2.5 The Industrial Design Program at the University of Monterrey

The industrial design program of the University of Monterrey's 2015 plan (UDEM, 2019) is delivered over nine semesters focused on transforming students to professionals capable of designing and creating products with an industrial production focus. These products vary enormously across industries, going from furniture and personal accessories, to vehicles and medical equipment. The extensive range is possible because during their studies students learn different design techniques and methodologies, as well as material handling that help them develop products from inception to serial production, and in some cases packaging and distribution.

Among the subjects that are the focus of these topics are two other groups of subjects that students must undertake. The first group corresponds to general subjects offered to all the bachelor programs of the University. These subjects can be divided in two sub-groups of electives and co-curricular. The elective subjects are those where the student has total freedom of choice depending on his/her interest in the subject. These might include sports, art, or other theoretical subjects in different design areas such as electronics, engineering, etc. The second group corresponds to those subjects that every student in the university must undertake no matter what bachelor program they undertake. These subjects are International Context Studies, Social Thinking of the Church, and General Elective Studies.

In addition, the bachelor program of industrial design offers three specializations to all of their students: Packaging Design, Transport Design, and Consumer and Life Goods. Completing a specialization is obligatory for each student and they can decide on which one. Each of these specializations consists of three subjects. In the case of Packaging Design these are Introduction to Containers and Packaging, Commercial Packaging Design, and Packaging Design. For Transport Design they are Introduction to Transportation Media, Transport Design, and 3D Model Fabrication of Transport Design. Finally, for Consumer and Life Goods, these include Introduction to Consumer and Life, Goods and Tendencies, and Goods and Commercialization Design.

In summary, the researcher now presents a brief description of the study plans of each subject. It is worth mentioning that this description is important for the lecturer to have a global understanding of what we refer to as the University Bachelor Program. For this reason the researcher considers it necessary to include this description in the literature review:

Semester	Subject	Description
1	Introduction to Industrial Design	The student will reflect upon the discipline of industrial design. An introduction to the different design paradigms and design fundamentals are introduced.
	Conceptual and Morphological Studio I	Offer solutions to industrial design problems focusing in the exploration and conceptualization of forms.
	Constructive Geometry	Develop technical abilities to draw geometrical objects with instruments.
	Manufacturing Processes of Wood	To know and apply the existing resources for the creation of products and objects made of wood.
2	Conceptual and Morphological Studio II	To acquire the knowledge to analyze and generate forms of greater complexity, applying them to proposals of simple industrial products.
	Ergonomics	Know, identify, and apply the elements involved in the relationship that man has with objects and products, their measurements and characteristics that serve as reference for the adequate design of products that adapt to human necessities.
	Product Sketching I	Develop abilities and techniques to represent products through sketching
	Digital Media Basics	Use digital software to communicate product design ideas.
	Manufacturing Processes of Ceramics	Learn the chemical and physical characteristics of ceramic materials and its practical applications in the industrial and commercial market.
	Technical Drawing	Learn to apply the codes and methods for developing technical drawings of items and products.
3	Creativity Studio I	Learn and apply strategies in the creative process of product development so that the student can try different results and solutions for a specific design problem.
	Product Sketching II	Learn and apply techniques of rapid sketching to create design proposals or transmit an effective visual communication of their design concepts.
	Digital Solid Modelling	Learn the parametric modeling tools to create detailed digital prototypes.
	Manufacturing Processes of Metals	Learn the chemical and physical characteristics of metallic materials and its practical applications in the industrial and commercial market.
	Creativity Studio II	Create solutions focused on the basic needs of users with limited access to products and services. Learn and apply different strategies in the creative process.
	Theory of Sustainable Design	Analyze and study the social, economical and environmental impact of a sustainable project.

4	Presentations of Effective Projects	Know and apply different graphic techniques to develop effective project presentations such as product design proposals to clients or users.
	Digital Surfaces Modelling	Understand the different modeling tools to create rapid models that can be used to simulate the aesthetics or appearance of a design proposal.
	Manufacturing Processes of Polymers	Learn the chemical and physical characteristics of polymeric materials and its practical applications in the industrial and commercial market.
	Functions and Mechanisms	Stimulate and develop the knowledge and criteria of different mechanisms that are commonly used in product design.
5	Product Development Studio I	Create design solutions of products with notorious problems through research, problem detection, and analysis techniques.
	Product and Distribution	Design products focused on logistic systems, packaging and costs. Challenges include cost, space, and damage reduction that might be present during transportation.
	Parametric Modelling	Understand the tools that a parametric 3D modeling software uses in order to create detailed design proposals of products.
	Laboratory of Prototypes	Know the different materials, tools and equipment used in the development and production of prototypes.
6	Product Development Studio II	Create solutions, focused on products with highly complex problems that require a systematic project development involving research, analysis, and problem detection, as well as opportunity areas applied through industrial design.
	Business Strategies for Designers	Understand the tools and techniques necessary for the development of a business.
	Seminary of Industrial Design	Understand the tools needed to identify present and future tendencies in industrial design for their application in design projects.
	Digital Prototypes and Industrial Processes	Understand the parameters and technological variables of different materials used in prototyping for their application in design proposals.
7	Advanced Design Studio	Enable the student to study and interpret their surroundings, detect design opportunity areas, and being capable of proposing design solutions with arguments based on strong, solid research.
	Interdisciplinary Design Solutions	Develop projects with students from other design professions and reflect their results and knowledge acquired with such collaboration.
	General Studies of Industrial Design	Investigate over specific topics related to the area of industrial design with the objective of broadening our knowledge of possibilities as industrial design professionals.
8	Professional Practices	Apply, in the labor field, the knowledge and criteria learnt during the past years as students form the bachelor program.
	Selective Studies of Industrial Design	Investigate over specific topics related to the area of industrial design with the objective of broadening our knowledge of possibilities as industrial design professionals.
	Modern Studies of Industrial Design	Investigate over specific topics related to the area of industrial design with the objective of broadening our knowledge of possibilities as industrial design professionals.
9	Final Evaluation Project	Being qualified to practice the profession of industrial design. At this stage, the student presents a design project that he choses freely and should apply the knowledge learnt during his career to demonstrate he is qualified to practice the profession.

Table 1 - Industrial design program at the University of Monterrey.

Having presented the complete study plan we can visualize in greater detail that an industrial designer is an individual capable of identifying design problems, necessities, and opportunity areas in the industry as well as in the community. Also, through different techniques and knowledge, being able to offer physical and representative solutions that complement capabilities in order to achieve community welfare.

2.6 Stakeholder Theory and its Relevance

During the early part of the research, the researcher identified four groups of individuals related to the profession of industrial design: professors, employers, employees, and students. These four groups provided qualitative data and their responses were analyzed in order to obtain and develop their interpretation of issues that included work commitment and work expectations. However, it was later decided to consolidate the four groups into two, which represent the supply - demand relationship in the study. The supply side then corresponds to professors and students, while the demand side corresponds to employees and employers in the industrial design field. In other words, in the supply side are the students and professors that offer the theoretical experience of the program of industrial design, while the demand side seeks to hire new individuals to the industry in the field of this profession. The demand side constitutes the group of people that are directly related to real problems in the industry, negotiations with clients, and budget handling, while the supply side has its main focus in teaching the program and theories to individuals and experiencing these teaching at the university without living real life working experiences. There are differences, expectations, values, and priorities from each side that help them take adaptive decisions that are most convenient for them. For this reason, the researcher considers that stakeholder theory provides a sound approach to explain how each group of individuals is guided by the characteristics previously mentioned.

While many authors discuss or refer to a stakeholder approach it was the work of Mitchel et al. (1997) that grounded stakeholder theory in the management literature. In their seminal article Mitchel et al. (1997) presented a model of stakeholder salience that allowed managers to identify whether specific groups of individuals could be considered true stakeholders of an organization depending on the power they had over decision making, the legitimacy of the stakeholder's relationship with the company, and the urgency that such stakeholder claims on the organization. These variables presented would define to whom managers should pay attention, as they could have a major influence on decisions made in the organization.

In more recent research Freeman, Harrison, and Zyglidopoulos (2018) referred to stakeholders as a group of individuals that have a valid interest in activities and results of an organization, one that trusts them to reach its objectives. The group can be employees, clients, members of a government organization, suppliers, etc. Freeman et al. (2018) argued that the perspective of stakeholders came to be an alternative way to understand how companies and individuals create value and exchange between them in a world where there exist uncertainty and instability. Freeman et al. (2018) argued that stakeholder theory was created to solve three main problems: 1) how to create value in a turbulent world; 2) how to understand ethics in capitalist models; and 3) how we should teach in business schools. Various guiding concepts are presented for stakeholder management. The first resides in a managerial focus, which establishes that the challenge of stakeholder management lies in establishing the best practices to obtain the best results with regard to value creation. Here, administration does not refer to personnel handling, but to an adequate management of relations to obtain a win-win outcome for all the parties. Stakeholder theory opts for respect and basic human rights such as integrity, honesty, freedom of choice and responsibility assumptions for the actions taken. In this theory, businesses seek a purpose, define a purpose, and create action to achieve it. At the same time, they create economic and non-economic value. Besides obtaining income and economic benefits, stakeholders can obtain esoteric advantages such as finding tranquility and happiness. Clients, suppliers, and community members can receive these benefits through affiliations to the company.

The other two concepts relevant to Freeman et al.'s (2018) research are reciprocity and reputation. Reciprocity refers to the expectations that each of the parties would want to receive as a fair return for their efforts. For instance, an employee who feels he receives a fair salary for his work would be more likely to feel more engaged and connected with the company, thus providing a potential competitive advantage that a company can use to its benefit, distinguishing it from others. In this way a business can retain existing clients and acquire potential new clients. Stakeholder theory is an approach for organizations that underpins making important decisions where

four crucial activities are highlighted for managers to consider: value creation, innovation, inclusivity, and ethical management.

Continuing a theme of competitive advantage Jones, Harrison and Felps (2018) suggested that stakeholder theory is an instrument for achieving sustainable competitive advantage, although others argue that not enough solid evaluations that help identify potentially strong sustainable advantages have been made (e.g. García-Castro and Francoeur (2016)). The term sustainable is described by Peter and Barney (2003) as the persistent ability that companies have to create more economic value than its marginal competitor. It is important to note that there are several opportunity areas that should be mentioned for further discussion.

From the critical point of view of the researcher, there are several aspects that warrant further discussion. On one hand, it is true that both organizations and people seeking a job look for goodness of fit and wellbeing in various senses. New incomers or employees begin working at a company having expectations in terms of economic stability, benefits, growth, or even to feel more satisfied with their work. The researcher has been a witness to this having worked in the design industry for several years. On the other hand, we have the companies that seek qualified employees who can develop fundamental activities inside the organization to produce finished projects on time and as expected in order to satisfy their clients' requirements. However, it is worth mentioning that even though stakeholder theory sounds very attractive, many organizations don't always cover the growth expectations their stakeholders (in this case graduates) hope to find in a job. And it is here that an ethical theme comes to light. Being in the place of the employees, as a business, and being aware one needs to cover the vacancies with people that have specific characteristics to perform specific jobs, should a business be totally honest with my future employees regarding its economic situation and growth plan, knowing that disclosing this might affect the decision of a potential employee of being part of the company or not? Knowing that the employee needs to perform indispensable activities that will generate an economic value, is it convenient for me to offer him/her a lower salary without him knowing the real economic impact his work does for the organization? After all, as deLuque et al (2008) argued companies are not democracies. They have managers and directors that are whom will make the important

decisions and have influence with the rest of the people in the organization chart to align them to accomplish their objectives.

At the same time the potentially future workers can hide their true intentions during their interviews either for fear of not being accepted in the organization or the sense of safety in having stable work. In some cases because their expectations/ideas of future commitment on the organizational side seem intrinsic they believe that in time, the company will see desired results and employees will automatically obtain benefits. These situations are quite common and involve the topic of psychological contract, which will be presented later in this review.

However, we can observe that the literature on stakeholders relates to businesses in the marketplace. In contrast, this study is focused on a group of individuals that are not commonly seen as stakeholders as presented in the literature. This is due to the stakeholders in this research being identified by the researcher in a previous analysis made during the original research. How is a traditional stakeholder different to the one presented in this study? In several ways. First, we are talking about a group of individuals as a single stakeholder. Although traditionally a stakeholder can be a supplier or a client, we will refer to the supply side as a stakeholder comprising professors and students. On the other side, demand consists of employees and employers, a different type of stakeholder to that which would usually be represented as a business or specific manufacturing company. Also, in this study issues such as income or economic benefits as a final objective of a stakeholder are not established, rather other topics such as motivation, competencies and expectations will be presented as the study advances. Finally, and with respect to regarding stakeholders as a group of people, as in this study, it is not common to see stakeholder theory represented in such as way. However, using stakeholder theory as discussed above is an effective way of identifying the main actors in this research.

2.7 Supply and Demand Sides

As mentioned previously, at the beginning of this study four groups of individuals were identified whose opinions regarding topics such as motivation and work expectations for industrial designers were compared. However, these groups were later divided into those involving the academic side of industrial design, and those that have a direct relationship with the industry in which designers work. To understand better the relationship that exists between these groups, the researcher decided to further group them as the demand and supply sides of industrial design. Just as with the theory of stakeholders, analysis was done to understand better what relationship exists between these two groups. It is important to mention that even though this study is not focused on supply and demand chains, the concept of this structure is an effective way to identify how both parts interact.

Moon (2018) described the integration of demand and supply as a process that involves all functions in creating a well-structured, aligned plan and in making decisions that help optimize resources and achieve a balance in organizational goals. In this overall process other smaller processes exist such as demand, inventory, financial planning and others. However, the ultimate goal of the supply and demand relationship is to achieve adequate business planning and outcomes. Moon (2018) also identified several signs that indicate there is little effective integration between the demand and supply sides in industry. Examples of these include misaligned purchases of raw materials, delays in deliveries by the manufacturing team to the sales team, different functions like sales and manufacturing experiencing communication problems along the way, among others.

How ideal the process of integration of demand and supply is can be exemplified in a very simple example proposed by the researcher. Let's suppose that the demand side (sales or marketing) of a company forecasts manufacture of 10 thousand units of a certain product in a three months timeframe. At the same time the supply side (manufacturing and operations), forecasts being able to produce up to 7 thousand units in that same period of time, a situation where demand is higher

than supply. Different alternatives are presented to mitigate the situation, including creating an inventory of such products or reducing the demand. In other words, it's about a balanced process in which, ideally speaking, the supply side should level with the demand one and vice versa. It might be possible as well that the contrary occurs and the supply is higher than the demand. In this case it will be necessary to dispose of certain inventory, or reduce the production rate, among other alternatives.

Considering the concept of this integration, and in a critical manner, the researcher can argue that demand and supply integration can apply to the group of individuals identified in the study. On the supply side, the universities (in this case in particular the University of Monterrey), offers the industry high level competitive professionals with particular values that distinguish them from other Universities. From the demand side, the industry seeks individuals with values and specific characteristics that will help them accomplish their objectives. There are, however, specific characteristics that should be considered with this concept of integration. In the first place, we should be aware that in order for this integration to work adequately, it should be motivated mainly by the existing demand in the market. This idea is equally shared by James (2014), and several empirical cases are presented where the demand (consumers mainly) are who determine the supply in the industry. During the 1990´s, manufacturing industry made its demand forecasts based only on which products were sold during the past months or years. They also used to make this in an individual manner, without considering suppliers or other organizations involved in the process. However, it is well known (and argued by James) that market decisions are very unpredictable in modern times. According to the Boston Consulting Group (2013) traders recognize that working together with suppliers helps businesses reduce their stockout, improve their service levels, and increase their sales in general as well as their clients' satisfaction.

A modern way to work in a team in the supply chain is through demand adaptation in real time. For example, RS Components is an electronics and maintenance provider that has established demand adaptation in its operations since 2012. What this business does is basically monitor the ´path´ that clients take when visiting their web site; from the start menu to the checkout. During this last step, the webpage may suggest the consumer tools or complimentary accessories related

to his/her original purchase. Del Monte, a global food industry company, after experiencing high levels of inventory and low accuracy in their forecasts, decided to install a platform in a global level that uses demand signals to obtain data from their consumers. At the same time, Danone Dairy collects data from its point of sales and daily predicts its sales by unit, for each store. This allowed the company to have 98% availability of their products. With this information relating to the interaction between supply and demand, it is relevant to mention the importance of establishing good communication between both parties. Ineffective communications would evidently lead organizations to be disadvantage relative to their competitors. Adequate communication, on the other hand, becomes of great advantage, and the education industry is not an exception to these characteristics.

2.8 Commitment, Engagement and Job Satisfaction

Having examined the industrial background of Monterrey, topics regarding the relationships between employee and employers seemed to be relevant to the study. Therefore, topics such as job satisfaction, employee commitment and others were included. Regarding this topic, García and Rivas´ (2007) analyzed the correlation between employee turnover and employee perceptions of aspects such as leadership, remuneration, and equity in the 'maquila' industry. The term 'maquila' refers mostly to assembly plants such as contracted plants, textile factories, etc. It has been argued that while employee turnover is usually high in these companies, it is not much of a concern to them because of the abundant labor available searching for jobs (Carrillo and Sanibáñez, 2001). On the other hand, Ahr and Ahr (2000) pointed out that some employees decide to stay in their organizations for several reasons including loyalty or the fact that the cost for leaving is much higher than what they are willing to pay, and it is precisely these employees that tend to stay in their jobs for long periods of time (Ahr and Ahr, 2000).

Meyer et al. (1990) used the term continuance commitment to describe these situations. Work commitment has a long history of research, for example Porter et al. (1974) who identified the term commitment as the ´´strength of an individual's identification with and involvement in a particular organization´´ (p. 604), while Becker (1960) argued that commitment was the tendency to engage in ´´consistent lines of activity´´ (p. 33) thanks to the perception of the resulting cost for doing otherwise (the "side-bets" involved with-leaving). Affective commitment and continuance commitment were terms used by Meyer et al. (1990) to characterize these arguments made by Porter and Becker. Affective commitment is reflected in the decision of employees to stay at their organizations because they want to, while employees with strong continuance commitment decide to stay at their company because they need to.

On the other hand, employee engagement, according to ACAS (2011), is based upon an exchange between employers and employees (ACAS, 2011). This exchange requires a commitment from both parts. In the first place, employers must demonstrate to their employees they are

committed to providing them with good career opportunities. In return employees should commit with loyalty and motivation towards their job and organization. However, other authors like Khan (1990) have highlighted that engagement at work involves three important psychological conditions. These are availability, safety, and meaningfulness. The first one refers to the employee's perception that they can have all the physical and emotional resources to completely commit with their work roles and fulfill them without trouble. The second one refers to the sense of freedom an employee can perceive in their work role, for instance, how authentic they can be while conducting it. The final condition is meaningfulness, as mentioned by May et al. (2004), which refers to the intrinsic value employees attach to performance in the work role (May et al., 2004). For this study, the authors surveyed employees of a large retail store based in the UK, receiving 64 of the original 85 questionnaires to their employees, that represents a response rate of 75%. Overall, the results demonstrated that there was poor engagement from the employees from 57% of the participants. Actually, only 32% felt engaged to the organization, while 11% were unsure how to feel about it.

However, when discussing decision-making in an organization by the top management, it is important to consider how employees and staff members can perceive such practices as being a threat or an opportunity for them. Kacmar et al. (1999), for instance, have argued that decisions made by a single individual will unlikely be considered as objective and functional. This type of decision making is perceived as unfair by employees and might have an effect on how they also perceive other activities such as forms of remuneration and opportunities. The results of this study indicated that employee turnover had a strong relationship between fairness and applying leadership to adaptability and good relationships (García and Rivas, 2007). The Chartered Institute of Personnel and Development (CIPD) in the UK defined employee turnover as the amount of people leaving their organization in a given period of time, expressed as a percentage of the entire workforce (CIPD, 2012). According to Hom and Kinicki (2001), there are three main factors that are involved in any voluntary turnover. These are external unemployment rates, personal conflicts amongst co-workers, and low job satisfaction. Research conducted by other like Hendrie (2004) suggested that the main reasons for employees to leave their firms were poor pay,

working too many extra hours without the possibility of having a decent social life, and with no career prospects (Hendrie, 2004).

In other research Futage, Kinicki, and Ashford (2004), have argued that over the last years employees have become more independent in the sense that they quickly adapt to any career changes they might face as the labor market has also become more volatile. Cuyper and Witte (2011) have argued that employees who have worked in several organizations are more likely to be high performers because they have acquired a much wider variety of skills, abilities, and knowledge from former jobs. Acikgoz, Sumer and Sumer (2016) used the theory of conservation of resources (COR) introduced by Hobfoll (1989) to investigate the relationship between turnover intentions by employees and perceived employability. This theory proposes that people will try to conserve their resources while at the same time try to build more. It also proposes that any loss or risk of losing such resources will lead to stress. Examples of resources include physical objects, personal conditions such as marriage or academic degrees, personal characteristics, and energies like time and knowledge (Hobfoll, 1989). According to this theory, individuals will also try to minimize their resource loss by protecting or replacing them with other resources. Based on the definition of job satisfaction by Locke (1976), as an emotional state resulting from the appraisal of one's experiences with his or her current job (Locke, 1976), the research involved 721 participants, each of which was recruited by HR department of a manufacturing corporation in Turkey. From these participants, 87% were male and only 16% of them had a college degree or higher. Results showed that the interaction between job satisfaction and perceived employability did not represent a strong reason for turnover intentions.

2.9 The Psychological Contract and Employee Satisfaction

During this research, the topics of employee satisfaction and psychological contract become relevant in order to have a better understanding of employee retention in the design industry. Several authors such as Bauer (2010), Stanley (2012) and Srimannarayana (2016) have advanced arguments related to these topics in terms of the process for candidates' selection in organizations. For instance, Stanley (2012) argued that companies tend to see the contract and on-boarding process, that is when new employees begin to work at organizations, as an expense instead of looking at it as an investment. This a view that Bauer (2010) had also advanced, stating that at the moment of hiring employers focus their attention exclusively on the organization's goals and outcomes instead of the need that every newcomer has. Bauer explains that for organizations to have an effective contract process to improve performance and avoid turnover, four aspects should be taken in consideration. The first one, compliance, has to do with a transparent expression to the employees on the rules and policies associated while working in the organization. This is strongly related to the second aspect, which is clarification. In this aspect, employers should clearly express the employee's job activities and make sure he or she understand them clearly. Culture is the next aspect, which refers to the formal and informal norms that exist in the company. It is argued that the importance of work culture is sometimes overlooked because organizational members assume the values of the company are well understood by employees.

Finally, the concept of connection, which refers to the interpersonal relationship between employees, and as Bauer (2010) argued is the key for employees to successfully perform inside the company. Having those aspects well employed and in mind while performing a new contract can help employees increase their job satisfaction, but as Acevedo and Yancey (2011) argued, most organizations do a mediocre job of it, thus preventing performance improving which might lead to turnover events.

Because the process of employment implies a contract between the newcomer and the organization through its human resource department, this is the first interpersonal relationship that employees will have with the organization and it is here where commitment between the two parties will commence. There will be an exchange agreement between the services given by the employee and the payment that the company gives the employee for such services. This relationship frames the psychological contract, which in landmark research by Rousseau (1995), and Robinson and Rousseau (1994), was presented as being an unwritten contract that reflects the reciprocal obligations that both parties will have once the employment process is done and the employee begins working at the organization. Morrison and Robinson (1997) defined this concept as the 'beliefs that employees have about what they are entitled to receive or should receive, based on perceived promises made by the organization' (Pp. 176). Trust is generated at this moment, and according to Beer (2009) and Caldwell and Floyd (2014) when employees and employers create high trust and commitment relationships between them, employees may exhibit extra-role behaviors, such as increased creativity and innovation. However, if such trust is lost and employees perceive a betrayal or unfulfilled expectations, employee organizational commitment will eventually decrease.

One interesting study performed by Agarwal and Gupta (2016) regarding psychological contract in an Indian company, serves as a good example of the extent that this concept has in organizations. Before introducing the lecturers to their findings, the authors presented aspects from Indian culture regarding working environments, where according to several authors a paternalistic style is preferred with close guidance from their senior managers and supervisors being expected by newcomers (Suri and Abbott, 2013). The data for the study were collected from a family owned company named UPAA, which is a paint brand with 50 years in the market with over 3,000 employees. A total of 70 employees participated in a set of interviews that produced interesting results. Among them were that employees expect their activities to be meaningful and compatible with their skills, have growth opportunities within the organization, create supportive work relationships meaning they expected the organization to engage with them not only as an economic entity but to a personal level, have mentoring support by enabling employees to be connected to more experienced people, recognition and dignity for their contributions by their colleagues, ju-

niors, and superiors, and have an ethical working culture, with transparent processes and avoiding malpractices.

In relation to employee satisfaction Wood et al (2012) explored the relationship that exists between job satisfaction, well-being and an enriched job design along with a high management involvement (HIM). This highlighted the importance of having a well-designed job and communication between employees and management in order to have employee satisfaction and well-being inside organizations. Wood et al. (2012) adapted the term enriched job designed considering that all jobs are designed and cover a specific profile in organizations but differentiate it as a job where employees have discretion and flexibility in the way they execute their activities. High involvement management, on the other hand, refers to an approach of management concerned about the proactivity and collaboration of employees. According to Griffin et al. (2007) high involvement management included adaptation and proactivity which are seen as requirements for a culture of continuous improvement. The authors have argued that HIM, besides reducing job anxiety as Warr (2007) claimed, enables information sharing with co-workers, which in turn helps employees understand an organization's objectives and their roles in order to achieve the company's goals and reduce uncertainty. As for their discoveries, they realized that HIM is directly and positively related to labor productivity, quality, and financial performance (Wood et al, 2012, pp. 433).

Following on the topic of job satisfaction Chen, Sparrow, and Cooper (2016) explored an existing relationship between job satisfaction and person-organization fit (P-Of) (George, 1992; Kristof, 1996). Several interesting concepts are presented with regard to the relationship that exists between employees and their employers. In the first place, the authors argued that in an organization, stress comes from having a poor match between the employee's individual characteristics, and the job they seek to accomplish (Chen, Sparrow, and Cooper, 2016). A study performed by Ahsan et al. (2009) showed that there is a negative relationship between job satisfaction and stress. In an earlier study Eisenberger et al. (2002) argued that the way in which employers treat their subordinates affects the way they perceive their organization. The study also found that high person-organization fit can actually improve an employee's motivation, which

they consider to be the basics for creating a harmonious organization. Finally, the authors suggest the existence of a moderating role from the supervisor in an organization in order to deal with job stress and enhance job satisfaction (Chen, Sparrow, and Cooper, 2016). According to Tett and Meyer (1993) this relationship has important consequences for organizations, since employee turnover is a consequence of lack of job satisfaction, leading to significant expenses for any company.

2.10 Theoretical Framework

Having presented the literature in this chapter, the researcher now presents the following theoretical framework and the relationship that each concept present in this chapter will have with the rest of the study in the following diagram. This, as well, evidences the relevance and importance that each literature has for the study.

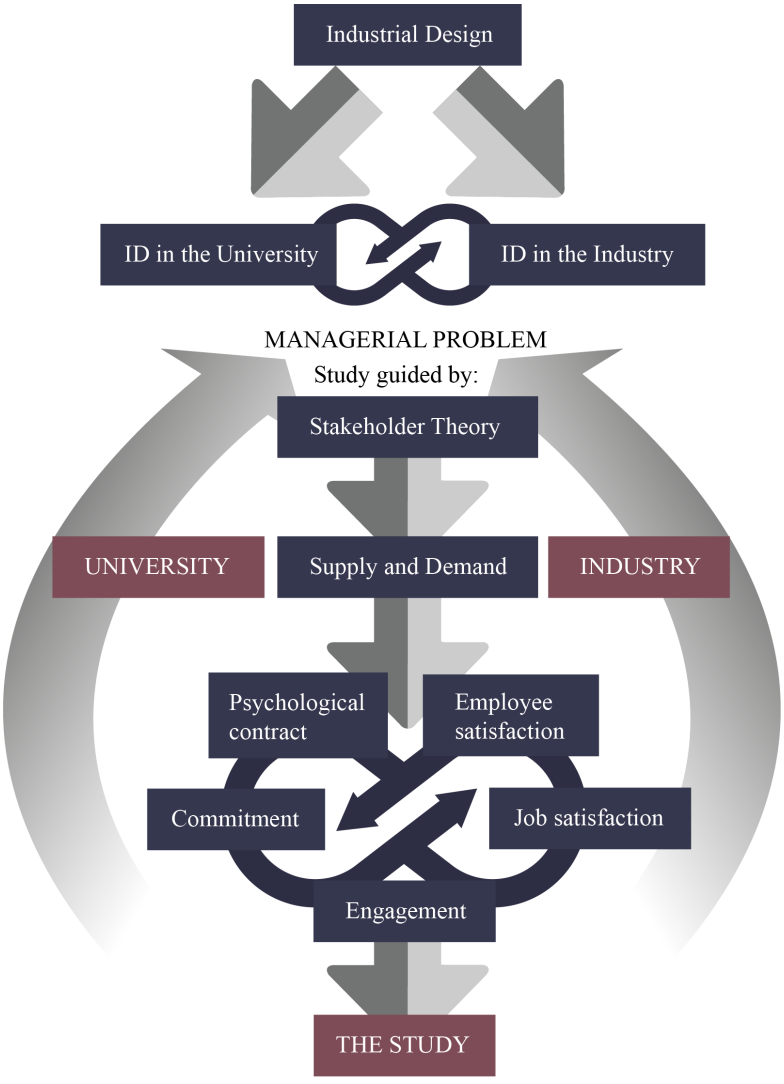

Figure 1 - Theoretical framework diagram

What we observe in this diagram at first is the field of industrial design as a starting point, since the researcher focuses in this profession as the one that will require attendance at his workplace. We identify two main streams where the managerial problem is present: the profession of industrial design at the university, and at the industry. Literature regarding this is present at the beginning of this chapter. This includes subjects such as what the profession of industrial design is and what processes are involved as argued by different authors such as Dorst (2003) and Valkenburg (2000). Its importance in the marketplace, as defended by Homburg, Schwemmle and Kuehnl (2015), and the attributes that are perceived in the profession as well such as aesthetics and functionality, as mentioned by Leder et al (2004), among others. We also find its relevance within the industry through literature that argue its practice as a competitive advantage that companies should adopt in their own practices. Authors such as Macías and Bribiescas (2011) have focused their efforts in describing the skills that designers should have. These skills are important to understand and know how they are useful in the industry because they give us a glimpse on what is expected for design students to learn during their studies. At this point, and in parallel, the researcher presents the design program that the University of Monterrey offers. This includes all the subjects of the program and a brief description of what each subject comprises. The reader will find relevance to this in further chapters when the attendance of the program for its improvement is performed.

These two branches, so to speak, that encompass the design profession, are also the ones where the managerial problem of mismatching occurs in this study. And as we can observe in the diagram, this is followed by the stakeholder theory and the supply and demand side relationship as well. The importance of establishing the stakeholder theory after the introduction of the profession is because it is necessary to first understand the field this study is focused on, as well as who are involved in it. Stakeholder theory, on the other hand, involves the supply and demand side that are represented in this study as the key actors. As both the stakeholder theory and supply and demand relationship guide the study, their presence in this Thesis is evident in every chapter, going from their identification, to the analysis of their data obtained.

We finally reach the literature regarding engagement, commitment, psychological contract, and the rest of the constructs in this review. The relevance and use of this literature come in an attempt to understand different perceptions towards subjects related to them by both the demand and supply side. This is evident especially when trying to understand what the supply side expects when working in the industry and what is expected for them from the demand side to have in order to fulfill the activities in their jobs adequately. They also help the reader understand what possible motivations do employees have while working in the industry, and to what degree are they willing to commit themselves to their workplaces and avoid leaving their organizations. This is especially evident in further chapters where the researcher presents the results of the analysis of the data obtained from the different stakeholders.

We observe that after the different constructs have been presented in the theoretical framework diagram, the final arrow points towards the study, indicating that all the previous concepts are involved in it and this last section points towards the management problem, representing its effort to attend it.

2.11 Chapter Summary

Reviewing the literature presented in this section we can now have a clear visual on the concepts that are key to understanding and justifying the importance this research has to address the managerial problem. We explored what industrial design is as a general concept and how the University offers it in its study plan. We have reviewed the theory of stakeholders and how we are able to bring this from its traditional organizational use in large companies, to the bachelor program of industrial design at the university then identified stakeholders in terms of the supply and demand sides. Along with this, we have also covered topics regarding commitment, job satisfaction, and the psychological contract, which are in a way important to take into consideration when dealing with the managerial problem previously presented.

In the next chapter, the researcher will present the research methodology used in this Thesis. This includes the theoretical framework used, how the data obtained were managed, and how the concepts gathered from this chapter help address the managerial problem and the research questions previously presented.

Chapter 3: Research Methodology and Methods

3.1 Introduction

The following chapter presents the research methodology, methods, and frameworks used in this research. An Action Research (AR) approach is used for this study utilizing one of the main advantages of the methodology which is its capacity to identify opportunities for organizational change. This evidence involves, first, the data gathered by the implementation of questionnaires to the different stakeholders of the study and its analysis. Second, the involvement of relevant stakeholders in the organization through discussion of the data obtained. And third, the possible outcomes that this will have in the operations of the bachelor program based on what was discussed.

3.2 Research Philosophy

For the purpose of this study, a qualitative approach was used. A qualitative approach was appropriate given that the aim of the researcher was to investigate and understand phenomena in the supply of and demand for industrial design education through the experiences of stakeholders. Measurement was not a part of the research therefore quantitative methods were not appropriate. Thorpe and Holt (2012) defined qualitative method as one that "looks to the experiencing subjects' direct and unmediated awareness of phenomena" (p. 152). Smith and Smith (1995) have argued that in order for the researcher to understand the meaning that individuals give to concepts or objects, one must look into specific episodes of perceiving, thinking and believing of these individuals. For instance, the same concept will not be perceived in the same way by different individuals such as employees, shareholders, or employers, or students. After determining that a qualitative approach was appropriate the researcher then considered the main qualitative methodologies, namely, ethnography, grounded theory, narrative inquiry, phenomenology and action research. The characteristics of ethnography involve study of participants in a cultural setting. These conditions did not apply in this research therefore ethnography was rejected. The purpose of grounded theory is to develop theory inductively based on the ways people interact with others. Developing a theory on the basis of participant interaction was not relevant to this study therefore grounded theory was rejected. Phenomenology aims to describe or interpret the ways in which individuals understand phenomena in their lifeworld and is essentially a search for an essence or necessary condition applicable to a situation. These characteristics did not apply to the study. Narrative Inquiry (NI) aims to give voice to unheard stories and is particularly relevant when used in the context of suppressed minorities. This research was not congruent with the aims of NI, therefore it was rejected. Finally, the researcher considered action research (AR), which is a methodology grounded in participative organizational change as set out in the early work of Lewin (1943) in his seminal model of unfreeze-move-refreeze. Lewin went on to propose cycles of action to guide organizational change. It is this cyclical approach to analysis and change that seemed most appropriate to this study, therefore AR was selected as methodology.

Despite having rejected phenomenology as methodology the phenomenological method provides several advantages regarding data handling and analysis, which will be discussed later. It is precisely the experiences and perception of individuals that drove the researcher to select this as the preferred method for analysis. In the first place, the researcher needed data that could be interpreted through experience from both the supply and demand side in regards to specific topics in order to find possible mismatches. However, this data could only be obtained through the observation and awareness of a stakeholder towards others. For instance, employers could not possible identify if students or potential professionals had or lacked a specific attribute only through objective data such as a certification or grade. Employers could only accurately know if students had an attribute through their experience and observation of how they reacted in specific situations where such attributes were required, either personal or technical.

In this sense, individuals describe the context of their experiences and with that in hand, the researcher then attempts to interpret the meaning of such context. These attempts are reflected in data analysis through several methods, but mostly they are reflected through the use of Template Analysis in this study. At the same time, once the data has been analyzed, it must be discussed within the organization, creating further analysis of interpretations made by the study of perceptions of individuals through Action Research.

In the following chapters and sections, this method is clearly seen as how it was used by the researcher in this study. First and foremost, with the obtaining of the initial data and its analysis and interpretation from the different stakeholders regarding specific topics. Second, through the grouping of similar concepts in general overarching themes. Following this, having to interpret the results with his organization was also a clear example of data and phenomena discussion, since, as the reader will be aware, the phenomena obtained through the analysis was not evident at first sight and could only be highlighted through a more in-depth analysis and comparison of arguments between stakeholders' perceptions. Finally, through these discussions, the researcher was able to synthesize and identify relevant opportunity areas where change and improvement could be achieved, not being able to develop it otherwise without this method of data interpretation.

3.3 Research Methodology: Action Research

AR seeks to provide improvement in an organization by generating actions where the researcher and participants benefit by learning from those actions and then implementing changes in their workplace. One of the biggest advantages of this methodology is that change is expected to be made and is justified by the evidence acquired through research. The history of AR goes back to Kurt Lewin's (1943) work. A German psychologist seeking refuge in the United States during WWII, Lewin's main interest was focused on the conceptualization and promotion of social change. According to him social change arises through a set of discrete processes where in order to achieve change in a situation, such a situation should experience a process of unfreezing, modifying, and refreezing its state. Lewin's approach means that a well-established situation will have to give in, suffer important changes, and re-establish itself in order to argue that change has occurred. Greenwood and Levin (2007) discussed this methodology in the sense that they do not consider it to be a 'form of short-term intervention' (Pp. 17), rather a learning process that has no definite end point and is useful for continuous improvement.

Three critical aspects are present in AR, these being that the methodology is a participatory one, and action and research are involved (Greenwood and Levin, 2007). It is participatory because it aims to change an initial situation in the organization, and every individual takes some responsibility for change to occur. We can differentiate traditional research from AR precisely because of its participative nature, but other characteristics are also present that are worth mentioning. First, the techniques that traditional positivistic research relies on involve a separation between the researcher and the research subjects. Also, the data acquired is only handled by research professionals and the subjects are usually not aware of the results of analysis of the data. In AR all social science methods for research are applicable as long as there exists participation and collaboration between the stakeholders. The process in this methodology aims to create knowledge for the research subjects as well as to the professional researchers.

AR involves changes in real social problems. It focuses on a particular problem and seeks assistance over it. At the same time, it involves a re-educational process by defying the modus operandi of the organization from a participatory position. Finally, it seeks to contribute simultaneously to knowledge and social science.

Gummerson (2000) also integrates the characteristics of the methodology, arguing that the researchers take action in the study, which is interactive between the participants and involved individuals. It does not limit the researcher to either qualitative or quantitative data gathering methods. Also, aside from other theoretical methodologies AR provides its own quality criteria based on the involvement of the researcher in the field , which ultimately is much greater than in other traditional methods.

In this study AR brings an advantage not only for the researcher but also for the institution in several ways. First, the research serves not only the profession of industrial design but other professions as a guide to improve their study plans. It is important to mention, that if such were the case in the future, the changes those study plans will be subjected to will be directly in relationship to the data gatherers and analyzed by future researchers. Second, because future companies and scholars can conduct their own research to identify what mismatches might be present and attend them. Finally, it can serve as a comparison of how different stakeholders of other professions perceive their priorities and needs. From the researcher's side, and in a very personal way, he would also benefit from the study because through this research he is capable of understanding the perceptions that his students have over several topics related to the industry and how they visualize themselves as future industrial designers.

3.4 Action Research Framework

The AR framework used in this methodology consists of four stages known as the W. Edwards Deming's PDSA cycle of continuous improvement (Deming, 1983). The model was used on several occasions during this investigation. At the beginning of the research, the model served as a guide for the researcher to analyze his own interpretations regarding the data obtained through the questionnaires applied to the individuals involved in the study, and his interpretations that derived from the Template Analysis method, which will be presented later in the study. Later, this model was used again in a more practical manner with stakeholders inside the organization as a learning set, evidencing AR in practice. During the first time it was used, the researcher originally generated four cycles, which are shown in the following paragraphs. The model consists of four steps: Plan, Do, Study, and Act, as shown in the following diagram.

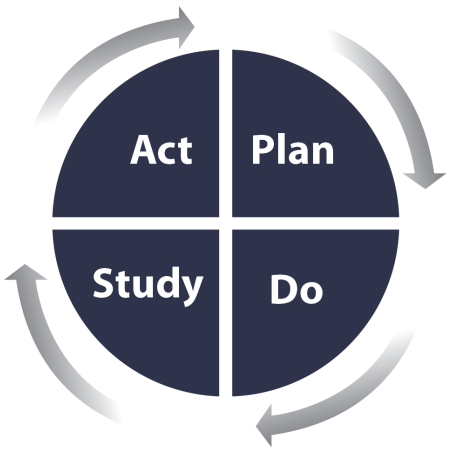

Figure 2 - W. Edwards Deming's PDSA cycle of continuous improvement.

Gapp and Fisher (2007) have presented each step in a neat and summarized manner in their article without losing the essence of each one: The first element, "plan" refers to an analysis of the situation being studied and a visualization of the impacts of any decision that might affect such

situation. The next step on the cycle, “do”, involves confronting the problem on a small scale with different measures in order to obtain more relevant data for further analysis, which is in essence the next step “study”. Finally, “act” involves applying innovation and changes into the established operations in an organization. In this sense, AR is applied on different levels of this study.

As a professor at the University of Monterrey, the researcher had a close professional relationship with students from all study years of the Bachelor of Industrial Design program and was able to collect data from each cohort. Once all data were recovered from the participants, analysis was performed to understand the perception that each group had towards the topics involved. Data collection was conducted through questionnaires from industrial design students, professors, and graduates, as well as employers of industrial designers. In order to simplify the vast amount of information gathered through each open question, a template analysis (Crabtree and Miller, 1999; King, 2004) was first used for each category of participants and was then compared between them in order to understand what relationship existed between the topics the researcher was investigating in order to address the management issue and research questions previously presented. The following diagrams show how the PDSA Cycle was originally applied by the researcher throughout this study and how AR was present during each cycle.

First PDSA Cycle

The first PDSA Cycle begins with the gathering of data that would help the researcher attend the research questions and proposals. Once the questionnaires were applied and results obtained, the development of the template analysis was performed, which then became the beginning of the next PDSA Cycle.

First PDSA Cycle			
Plan	Having established the RQ's, the researcher was ready to perform data gathering.	Do	The researcher performed the application of the questionnaires to the four different stakeholders.
Act	The template analyses for each of the four stakeholders were developed.	Study	The researcher analyzed the information gathered from the questionnaires.

Table 2 - First PDSA cycle.

Second PDSA Cycle

During this stage, the researcher developed a comparison between the results in each of the labels of the template analysis from all stakeholders in order to synthesis the vast information gathered. Here, the implementation of the PDSA Cycle became evident from analyzing the results of the first templates, to the establishment of seven overarching themes, which would help address the research questions and management problem.

Second PDSA Cycle			
Plan	The information of all the template analyses was reviewed.	Do	A comparative table with all the codes present in the templates was developed.
Act	Seven overarching themes were established that would help address the RQ.	Study	The information in the comparative table could now be easily analyzed for the next step.

Table 3 - Second PDSA cycle.

Third PDSA Cycle

Having reviewed the seven overarching themes, the researcher could compare the different outcomes between the groups by each particular theme and obtain his conclusions.

Third PDSA Cycle			
Plan	The seven overarching themes were arranged individually with their corresponding comments for review.	Do	Each theme was analyzed individually by the researcher comparing the results from every group.
Act	The researcher was able to obtain critical conclusions from the study of the individual templates.	Study	Abstracts were taken from the analysis of the individual themes.

Table 4 - Third PDSA cycle.

3.5 Action Research Framework Involving the Organization

At this point the researcher needed to consider additional issues arising from the research. During the original research, he developed a fourth PDSA Cycle where opportunity areas were identified in accordance to the results obtained in the seven themes and proceeded to apply changes to subjects from the study plan.

However, as previously argued, AR requires involvement with the organization. Until now, there was great involvement with the university's stakeholders with the questionnaires applied to students and professors, but aside from that there wasn't any further involvement once the results were obtained and analyzed by the researcher. It became evident for the researcher that more organizational involvement was necessary. At this point the researcher questioned in what ways might organizational change be more efficient and sustainable to perform. Several options were considered as to how to present the data to the institution before opting for the most convenient one from his perspective and analysis:

First, he could address the research directly with his superior, that is the bachelor program director, discussing with her the results obtained from the template analysis method and identify possible mismatches in the subjects. Though this seemed to be the most obvious path, it also had several flaws, that the researcher can totally argue based on his experience as a professor. The first one is that every major decision based on the results will rely on one person, in this case, the bachelor program director. So, even though there is notionally involvement with the organization to seek change, there is not that much of it if we consider only one person. Another major flaw is that the director of the bachelor program is aware of the program in general but is not so aware of the activities and changes that occur during each semester on every subject. This means that decisions made from only one person will be based on the experience she had from indirect sources, not from direct experience herself.

Another disadvantage was that potential decisions should flow to a lower level, that is, professors involved in their subjects. On many occasions the nature of what drove a decision to be made or what influenced top management is not totally shared, so changes might apply but not be fully understood by everyone who must apply such changes in their activities.

A second option the researcher considered was to design the possible changes that might serve to attend the main problem by himself and then present them to the top management and other colleagues and see how these changes might apply or not. However, this has major disadvantages since it means the researcher would be practically taking all initial decisions as to how and what should be done regarding activities and topics with subjects that he doesn't even fully understand. Compared to the previous alternative, this one would have less involvement with the organization since the data that was going to be presented in the first alternative would not be shown in this one. Finally, there is no guarantee any change might be even considered since there would be no way to truly assure that other professors would apply any change in their subjects. Also, taking decisions in such a way without the involvement or at least knowledge of other colleagues over their subjects is not considered ethical by the researcher, even if it's intentionally done for a good purpose.

The last and most appropriate manner considered by the researcher, and that would have the strongest involvement with the organization as required by the AR methodology, is to present the results to those involved in the researcher's organization where change is expected to be made. Then, discuss these results to find a way in identifying such mismatches presented as the managerial problem, and offer a solution based on the discussions that will occur with everyone on how to deal with it. In order to do this, the researcher considered three possibilities. The first one was to present the data and problem to a major group of professors involved in every semester or course year and discuss in the group the results gathered and their thoughts. The second one was to individually seek every professor from the bachelor program and discuss the results with them. Both ways have their advantages and disadvantages regarding effective communication. The first one, for instance would allow many individuals to obtain the information the researcher would have otherwise present individually. The second one would allow the researcher to have a

detailed scenario of how each subject is given and how each professor communicates with their students in a very specific manner. However, these two methods had their own particular flaws that made the researcher opt for the third and final option. One of the main issues regarding the first option is that in a major group, not necessarily everyone gets involved in answering or commenting on certain topics. This can end up diminishing the broad data and quality that the researcher seeks in the answers he expects to receive from everyone.

The third and most practical possibility was to present and discuss the results with the academic - year responsibles of the bachelor program. These are professors who coordinate and watch over the activities and subjects of an entire academic year, meaning they are, first, aware of the subjects and the activities corresponding to two semesters in the program each, and second, responsible for ensuring that the activities and guidance of the topics present in each subject is in accordance to the objectives of those subjects they are responsible of. In Chapter 5: Actionable Research, the researcher presents the reader with more detailed information on how he approached and discussed the data with the academic staff concerned.

3.6 Data Collection

The approach used for data gathering from all participants was open-ended questionnaires to collect qualitative data. Creswell (2013) argued that researchers can use questionnaires designed by them as an instrument for data gathering with open questions as long as they do not use or rely on other researcher's questionnaires or instruments.

Amedeo Giorgi (1982) also supports the idea that written data collection in psychological and phenomenological research is a valid method for data analysis. According to him this method of analysis is defined by having four essential steps that are summarized as: First, obtain a sense of the whole scenario by reading all the descriptions gathered. Second, go back to the beginning of the descriptions and discriminate "meaning units" (Creswell, 2013. P. 194) that are useful for the research. Third, express the psychological insights with emphasis on the phenomenon being investigated through an analysis of all the meaningful data. And fourth, create a consistent statement based on the synthesis of all the insights.

Regarding the present study, the questionnaires were conducted with different individuals related to the profession of Industrial Design. The first ones were students from the Bachelor of Industrial Design from the University of Monterrey. Creswell (2013) states that in a phenomenology approach, samples range from 5 to 25. According to him, others like Riemen (1986) studied only 10 individuals. According to Alase (2017), Husserl (1962) was the first to conceptualize phenomenology as a research method with the intention to understand the experiences lived by participants and their meaning. The interpretative phenomenology method, which was used in this research, is concerned with the lived experience and proposes that such experience is understood through examination (Alase, 2017). This approach allows multiple participants to tell their experiences to researchers and they then focus on describing what all participants have in common as their experience or phenomenon (Creswell, 2012). This, then, enhances researchers to explore such phenomenon in their investigations.

In order to understand the different perceptions that might exist between cohorts, these questionnaires were applied to 80 students of the entire bachelor program at the University. The questionnaires, designed by the researcher, were based on the literature, the relationship to the research questions, and his knowledge of the research topic. They contain open-ended questions to obtain mainly first order perceptions but also some second order perceptions. These were divided by 20 questionnaires per academic year, which was decided on the highest number a classroom holds in the bachelor program in order to achieve a maximum spread of data from each cohort. All student questionnaires were hand-filled by the participants. The questionnaires were responded by 17 students of first year, 14 of second year, 20 of third year, and 17 of fourth year, giving a response rate of 85%.

Five questionnaires were conducted to industrial design professors working at the University of Monterrey. The number was decided based on the professors that occupy the full-time positions at the campus. These were also personally handled along with the participant information sheet. All questionnaires were also hand-filled except for one, which was computer written and returned signed by the professor. Five more questionnaires were conducted with graduates that currently work at the manufacturing industry in the city of Monterrey. Finally, five questionnaires were conducted to employers that hire industrial designers, from which four employers responded. Numbers of both employees and employers were also selected based on the previous number of full-time professors for equity in amounts between these groups of individuals. Though initially these questionnaires were also going to be handed personally, for practical purposes and in order not to interfere with employers and graduates professional activities, they were handled via email, along with the participant information sheet.

3.7 Mitigation of Potential Risks

Before presenting the different ways in which the researcher avoided any conflicts or discomfort with participants in the study, it is important to highlight the relevance that attending potential risks has to the research. Brannick and Coghlan (2007) have argued that insider research studies have been criticized for researchers being too close to their organization or participants for objectivity. And while we might agree or disagree with this statement, attending the potential risks that exist in this study need to be addressed and the researcher be prepared to avoid them.

Due to the nature of the researcher's profession, a potential risk was clearly evident during the first data gathering because the researcher is a professor in the Bachelor of Industrial Design program and the students that responded to the questionnaires are from such program as well. For this reason, there was a consideration of unequal relationships between the researcher and students. The risk that this could have was in regards as how students might feel when asked to answer the questionnaires such as forced, compromised, or threatened by their professor. For this reason, questionnaires were personally handled randomly to students during periods that did not interfere with their lessons. Also, participant information sheets were handled to them were it stated that their participation was anonymous. Fleming (2018) has argued that the use of a disclaimer before starting any interview is a key strategy for researchers to avoid risks. In this participant information sheets, students were advised that if they experienced any discomfort or disadvantage, regarding the unequal relationship between them and the researcher, they should contact the researcher immediately. This could result in them stopping participating in the research in order to avoid any psychological risk for the participant. As argued by Chavez (2008) and Mercer (2007), if participants fear being judged, they may not share any information with the researcher. In addition to this, the researcher clearly indicated to students personally that their participation was voluntarily before handing them the questionnaires. An additional telephone number and email address of the Research Participant Advocate was provided in the document to all participants in case they felt unhappy or had a complaint that could not be discussed with the researcher. Students were asked to read the participant information sheets before answering the

questionnaires in order for them to avoid feeling threatened, unhappy, or in discomfort during their participation and mitigate any potential risk due to this unequal relationship between the researcher and students.

In regards to data handling, the information gathered by the researcher through the questionnaires was handled solely by the researcher in a completely anonymous way. Because of this, on one side, no other individual had access to the information given by the participants. On the other hand, due to the anonymity of the questionnaires, the researcher guaranteed that the data obtained were treated indifferently, meaning, he could only rely on the responses given by the individuals, since no personal data from participants was provided. Finally, it is relevant to state that the nature of the questions present in the questionnaires did not relate to specific subjects where the respondents (especially students) answers could turn out in a negative outcome towards the researcher. Meaning, the questions were not related to any subject in particular the researcher taught to students, of their opinion towards him, for instance. In regards to data analysis, during the entire study, the researcher avoided role duality almost automatically thanks to the points mentioned previously. Data from participants was handled completely anonymous by the researcher and was never shared between them. To address any potential preconceptions and beliefs that could exist of the bachelor program by the researcher, he opted to put aside any previous knowledge by means of bracketing, as suggested by Husserl (1962). Through this method, and as interpreted by Swingewood (1991), every idea that exists from the external world and its objects are abandoned by the consciousness. In this sense, and as argued by Lowes and Drowse (2001), the researcher ‘stands outside’ of the research process and through assuming distance and objectivity is able to avoid potential preconceptions and biases that might affect or influence analyses. In a practical manner, the researcher put aside every misconception and maintained neutrality throughout the study.

Regarding the second period, where the researcher discussed with other colleagues the data and analysis originally obtained, another totally unexpected potential risk during the improvement of this research was regarding the 2020 pandemic of Covid-19. Though it might seem this pandemic doesn’t have any involvement with the study it certainly affected the way in which the study

had to be performed in its latter stages. The major risk undoubtedly was the one regarding health issues. By mid March 2020, the researcher was informed by the University that the classes were suspended and would end in an online manner. The second half of the scholar year, that is from August to December, was decided that the semester was going to be driven totally online. By mid July 2020, the pandemic was at its peak in Mexico and the risk of getting infected was very high in the major cities of the country. These included Mexico City, Guadalajara, and Monterrey, where the university is.

For this reason, the only possible ways to conduct the interviews with other professors were through phone calls or online meeting apps such as Zoom or Microsoft Teams. Though these softwares did help the researcher have effective communication with his colleagues, the major risk this implied was that participants might have distractions at their homes and the researcher would not be able to guarantee full attention of the participants each time. Also, observing verbal language would be practically impossible and the researcher might not be aware of any particular reaction that might be useful to flow on conversation of specific topics. The only way to ensure a good concentration from the participant's side was to establish meetings with every new participant in order guarantee the mutual interaction was going to take place at a distance. This became possible through formal meetings with other colleagues adapting in times that were more suitable for participants to be able to perform the interview.

During this second period, the researcher also considered anonymity to be held at all times. This was done primarily because since the findings were going to be shared with the organization, they were going to understand the perception that other stakeholders would have towards specific topics. Since the data was first analyzed by the researcher through anonymity and condensed through Template Analysis, there was no way that the participants could identify textual data provided by others. Finally, anonymity is held at all times form the discussion between the members of the organization. Their names and other personal information are only known to the researcher and this information is not shared publicly.

3.8 Questionnaire Design

The four questionnaires employed in this study were designed by the researcher in order to understand the beliefs and perceptions of each stakeholder in gaining a clearer sense of their own and other stakeholder's positions. They consider the literature review presented in chapter 2 during their development. Topics such as commitment, job satisfaction and psychological contract are evident through specific questions in the four questionnaires. For instance, when asking the different stakeholders for the reasons they believe designers leave their organization, their answers provide information to the researcher regarding their job satisfaction or commitment to the organization. In another example, when asking students about the abilities and skills they believe they will develop or have developed during their studies, their perception of what an industrial designer does while working at the local industry, as well as the demands they believe their employers will require from them, we can observe the influence of the psychological contract since they provide an insight of what designers believe will be expected from them in their organization and even in the way they visualize themselves.

It is important to mention as well that the researcher designed the questionnaires accordingly to the position that each stakeholder has, based on his perception towards that particular position. The complete questionnaires of the four stakeholders are available in the Appendix section.

3.8.1 Student's Questionnaires

Students' questionnaires were designed to understand the motivations that drove them to study the Bachelor of Industrial Design program, how well they know the program, their vision and expectations as industrial designers once they graduate. Broadly speaking, this questionnaire focuses mainly on: Perceptions towards the profession of industrial design, perceptions towards the industry, and motivation and visualization as an industrial designer. These three concepts include topics such as beliefs towards skills, abilities, and working methodologies that students believe are important to have as designers to exert the profession in the industry. This is strongly relevant to the psychological contract's theory in regards to the how they believe their work will be performed once they enter the organization. Also relevant was to understand the degree of job satisfaction and commitment that students would have as design employees in their potential workplace by knowing the different reasons that would make them leave their organizations. This is important to understand because it gives the reader the first glance to understand the perception of a stakeholder towards another. For this study, it was of high importance to understand how the profession of industrial design was perceived by what is possible the main stakeholder in this researcher: students, since they represent the main supply that will be provided to the demand side once they graduate.

Having said this, we begin the questionnaire with questions 1 to 8 by trying to understand the motives, ideas and perceptions towards industrial design, and if they are somewhat familiarized with this profession. Next, questions 9 to 15 focus in the skills and competencies that they believe are necessary to have as designers as well as those requested by the demand side. The last two questions of this group leave space for students to comment on any issues they might have towards this topic and the reasons they would have for considering leaving their job in the industry. For this particular question, the researcher aimed to understand what reasons might be strong enough to motivate a potential designer to leave their job as a way to understand whether this decision leans more towards an affective or a continuance commitment to stay in a job, as previously discussed.

3.8.2 Professor's Questionnaires

In the case of the questionnaires applied to industrial design professors, these were developed taking in consideration their knowledge and experience towards how working at the local manufacturing industry as an industrial designer is. This questionnaire focused on questions that sought to understand what professors believe industrial design employers expect from designers once they graduate, the main skills and abilities they believe a designer should have while working in the industry, as well as the main skills a designer should have compared to other professionals. It was also designed to understand what subjects they considered to be the most important ones for designers based on their knowledge of the industry, as well as in what ways do their skills affect the perceptions their employers have towards design students. Also, their perceptions of what abilities and skills employers are seeking.

This questionnaire, even though it still belongs to the supply side of the supply-demand relationship, differs considerably from the student one in several aspects. However, it enhances the way in which the supply side has awareness of the needs and requirements of the demand side. Contrary to the students in general, professors have experience and maturity in topics of industrial design and the industry in general. This stakeholder's questionnaire in particular is relevant because it provides the closest link between students and employers. Either because they have worked in the industry previously or are related with it through academic or professional projects, theoretically speaking at least, they have a much wider notion of how the design process is done in real life and the requirements and skills that employers are usually looking for before hiring designers. Professors are also significantly important stakeholders in this study because it is through them that knowledge and information will be transmitted from the demand side to the supply side. They are the ones who educate design students through their activities and subjects, and the skills that students develop will eventually depend on the techniques shown to them during their bachelor studies. In other words, they are indirectly responsible for how employers perceive students and designers in organizations.

For this reason, it was important for the researcher to understand how professors believed the demand side perceive the supply side, since the links between them are critical in this subject. The researcher designed this questionnaire taking in consideration this aspect in the following way: The first questions were designed to understand the experience that the professor had in the industry, whereas questions 5 to 7 seek to compare their perceptions of a design student in present times to when they were students themselves. This might give the researcher insight into how professors have visualized changes occurring in the education system, the way of teaching and responses of students towards different scenarios. As the reader will notice in future sections, this is a topic that became of significant importance when comparing the results with the organization in future chapters. Moving forward, questions 8 to 11 aim to understand the skills that professors believe designers need to work in the industry. Further questions propose different scenarios where the aim is to understand how professors believe the demand side influences or perceives students regarding their experience, technical knowledge and skills, as well as use of situations that might affect students in any way professionally. Also, they aim to understand the reasons professors believe designers abandon their jobs and if students have expressed any perceptions to them of what working in the industry is about. This last one helps the researcher understand how students usually perform any kind of research previous to working in a company. Again, this concept of research will be of high relevance in future chapters.

3.8.3 Graduates's Questionnaires

The industrial design graduates' questionnaire was focused on understanding how design graduates perceived their actual workplace in comparison to those students that are currently studying the bachelor program. It includes questions that try to answer the general perception they had of an industrial designer before graduating and working at the industry, their visualization while they were students, as well as the main motivations they drove them to study the program. It was also designed to explain the reasons why they would leave their organization and if there is a relationship between this and the use or lack of use of the design methodologies. Also, it enables the participant to express their thoughts towards the key knowledge, skills and abilities they believe an industrial designer must have in comparison to other professionals.

Graduates represent the demand side that has been working in the industry as industrial designers and have acquired some experience in the work field. However, different from students as they are already working for some time in the industry they might have had the opportunity to hire new designers, thus becoming aligned with the demand side. In fact, this line between forming part of one or the other side is very delimitated in the sense that the supply side refers exclusively within the university and the demand side refers exclusively outside it. Similar to professors, graduates have their relevance in the sense that they experienced the bachelor program in their university and can make a comparison between when they were students and now at work. For this reason, the questionnaire was designed with questions that take in account past experiences and comparisons between perceptions and ideas these graduates have as design students compared to how they live them as design employees.

The questionnaire opens with a general question where the interviewee anonymously shares his/her position in his organization, responsibilities, and time working on it as a reference. Questions 2 to 5 aim to understand the motivations and perceptions that graduates had towards the career and designers in general when they were studying, compared to nowadays when they are working. Then, questions 6 to 8 focus on the knowledge, skills and attributes they believe are neces-

sary for designers to have as professionals and what they believe are key skills that differentiate designers from other professions. Questions 9 to 12 focuses on the methodologies and processes they use at work and how they feel these are relevant for designers at work. Finally, the interviewees are asked for any reasons for intention to leave their workplaces and if they would like to share any particular subject in an aim to understand as well their degree of commitment and job satisfaction.

3.8.4 Employers's Questionnaires

Finally, the questionnaire for employers of industrial designers was designed to know how employers were familiarized with working with industrial designers, their general perception of them, how their experience or lack of it affect their motivation while performing their job, as well as the abilities they believed industrial designers should have depending on the current demands of the local manufacturing industry. Also, it tries to understand the most common reasons for an industrial designer to leave their jobs and if they believe the decision making at their organization represents a threat to industrial designers' career development.

In addition to the students', this is one of the most important questionnaires as it directly represents the demand side, those individuals that seek designers to work in their organizations. The designers are the ones that require specific knowledge, skills and abilities that employers expect them to have or to be able to acquire relatively quickly in the organization. In an organization, employers not only might hire designers but also to supervise or train them if necessary. In some cases then, they also become observers and can witness designers from the outside. During this observation they might identify how their employees behave, react, and face new challenges, thus helping develop a perception towards them.

These aspects serve as a base for the design of the questionnaire. At first glance this questionnaire might look very similar in the arrangement of the questions to that of the graduates. However it differs in the fact that employers' questionnaire is focused on how they perceive and consider designers from a totally external point of view, meaning no personal experience as design students from them is present in this questionnaire because employers might not always be industrial designers themselves. The first question serves only as a reference to understand the position and work experience of the interviewee. Questions 2 to 4 pretend to understand how familiar employers are with working with designers, their general perceptions towards them, and if they consider them to be key in their organization. The next questions up to number 9, focus on the skills and abilities that employers believe designers should have compared to other professionals.

Moving forward, questions 10 to 13 are more focused in the design process at the organizations, as well as how they believe decision making affects designers in their developments and motivation. Finally, the last questions try to understand the most common reasons for designers to leaving their positions, as well as any particular or extra comment they believe might be relevant and wish to add.

It is important to realize as well that the perceptions and comments this stakeholder group has towards designers will have an enormous influence on the decision taken to improve the program in the university. This is obvious in the sense that employers are the ones in need of graduates with specific characteristics and if those characteristics are not met, they might eventually end up losing interest in hiring more designers and focus on exploring other professionals. At large, this decision would eventually be noticeable from the supply side, realizing that designers are not being hired in the industry and will need to modify their supply offer to adapt to the needs of the market.

3.9 Data Analysis Method

Even though it initially was intended to adopt an interpretative phenomenological (IP) approach, for the analysis of data gathered during the questionnaire application, IP was adapted to accommodate Template Analysis in the analytic stage of this research. TA assists the researcher in producing a list of codes that represent themes identified in textual data (King, 2004). It can also be used, as Nigel King argues, with a variety of epistemological positions. First, it can be used in a scenario where the researcher tries to discover underlying causes of certain human actions and demonstrate coding reliability (Miles and Huberman, 1994), and second, this method can be used within a contextual constructivist position (Madill, Jordan, and Shirley, 2000) where the researcher assumes that for any phenomenon there are many interpretations to be made that will depend on the position the researcher has at the time of the study and the context of the research. The codes generated through TA are in reality a label attached to a particular text that refers to a theme or issue that the researcher identifies as relevant or important for the study to his or her interpretation. Codes can be organized hierarchically or can be unified to form a much higher-order code. This helps the researcher to have a much broader overview of the data collected. Crabtree and Miller (1999) have argued that codes can develop only when researchers have done initial exploration of the data gathered. They are eventually refined and modified during the process of analysis.

King (2004) suggests several advantages of using TA instead of other known data analysis methodologies such as grounded theory (Strauss and Corbin, 1990), and interpretative phenomenological analysis (Smith, 1996). The advantage over grounded theory is that researchers using grounded theory find it very prescriptive for data gathering and analysis that must be followed through specific procedures (Strauss and Corbin, 1990), whereas TA seems to be more flexible to researchers, allowing them to adjust it to their specific requirements. When compared to a phenomenological approach, TA complements interpretative phenomenological analysis by developing conceptual topics and clustering them into groups to eventually identify them as main and constituent. However, TA offers a less time-consuming option that can handle a larger number of

participants (King, 2004). In this sense, TA also provides parsimony when comparing and analyzing data while not compromising the rigor of the main concepts. In relation to the present study, TA was the method chosen because of the facility it gave the research to interpret large amounts of data collected from a high number of participants and the flexibility of organizing this data into similar topics (codes) that helped the researcher visualize the perception of the participants in a much broader way without the risk of omitting relevant information for the comparison made between students and professionals. Also, from the researcher's perspective, the trustworthiness of TA relies precisely on the use of codes. Because these codes emerge from similar topics discussed by participants, and specific themes that are analyzed by researchers, codes become the result of evident concepts present during the study, which cannot be formed otherwise. In this study, codes are supported by the direct quotes of participants, since they were the individuals from whom data was obtained for analysis. In order to provide clarity in the development of themes, making it clearer for the reader, direct quotes can be found in the Appendix Section.

TA was used in this research on several occasions. First, the method was used as a tool to synthesize the vast information gathered from the original primary questionnaires made to all the individuals. This tool became of great importance for the researcher as he was able to gather the most significant concepts and relate them to major clusters. The method was then used again to refine all the information and develop the seven main themes. A detailed explanation of how it was used during these times is present in the next chapter, Chapter 4: Findings and Data Analysis.

3.10 Chapter Summary

In this chapter the researcher highlighted relevant topics that were evident in the literature review and linked these with the research questions and management issues in the study. An AR framework was also established, using the four stages of W. Edwards Deming's PDSA cycle of continuous improvement. From the researcher's perspective, the PDSA cycle became important to the research for it served as a guide that summarizes the actions taken in order to achieve the goal of the study.

During this chapter, four main topics were addressed regarding the research methodology used for this research. First, the methodology of AR was presented, along with a brief history of its origins, advantages, and the expectations of change that come afterwards. The approach used for gathering data from participants was presented next, using open-ended questionnaires, indicating the number of questionnaires that were applied to the focus groups of individuals involved in this research. Next, the researcher explained how each questionnaire was developed, based on the research questions and propositions presented during previous chapters. Finally, the data analysis method used for this study was presented as the methodology of Template Analysis. Advantages of the use of this methodology were also presented.

Chapter 4: Findings and Data Analysis

4.1 Chapter Introduction

After organizing and reviewing the responses from the questionnaires applied to the four original groups, the researcher was able to identify specific themes using Template Analysis. The extensive amount of information gathered from these templates was reviewed and organized in different themes according to the nature of the questions per se.

In regards to the supply side, and as stated in the previous chapter, the questionnaires applied to students' perceptions that they have towards the design program itself, their own visualization and expectations as designers once they graduate from the program, and that of working at a local manufacturing company. In the case of professors the aim is to understand their general perception towards the bachelor program, as well as their beliefs on how design students perceive the local industry. They also share their ideas on how they believe employers perceive industrial design students.

From the demand side, the questionnaires applied to industrial design employers' perceptions towards designers. These include the major knowledge, skills and abilities they consider an industrial designer should have while working in manufacturing industry, as well as their perception of design as a key activity of their organizations. They also include the skills that designers currently lack once they graduate, what they believe other employers think about current industrial design graduates, and if the decision making at their organizations is considered a threat by designers for their professional development, among other topics. Finally, the questionnaire applied to graduates aimed to understand the motivations and own visualizations that drove these individuals to study the bachelor program, to compare their perceptions before and after they graduate towards what industrial design is along with how work is done in the local manufacturing industry. It also attempts to understand the reasons why employees would leave their organi-

zation, and if the decision making at their company was seen as a threat for their professional development.

Before discussing the template analyses in this Chapter, however, the researcher first presents for the reader the connections that each side and stakeholder represents for the study. Their relevance and relationship with each other, as well as their position in the supply-demand chain. Moving forward, the researcher then shows how the overarching themes tables were developed. This is an important step for the reader to understand how the data from the questionnaires was gathered, analyzed, and the codes and sub-themes extracted to be then organized in the overarching themes. Finally, the researcher presents the analysis of the themes, comparing the data obtained from each stakeholder with their counterparts.

4.2 Supply and Demand Sides Connection in the Study

Before presenting the results from the data obtained from the application of the questionnaires to the participants, the researcher reiterates several concepts that will make the information clearer for the reader to understand the reasons for them to exist in this study. These include the relationship between the supply and demand sides in the study, and which stakeholders are referred to as the suppliers and their counterparts. To have a better understanding of this, we can look at the University in the same way in which a company would look to its suppliers. At the end, the University supplies students to the labor world with different qualifications that should be beneficial for companies, and that should fit the needs of vacancies these companies are in need to fulfill. Looking at the study from this perspective, it becomes easier to understand the need to have a positive match between what the industry needs, and the University provides, since, as argued by Moon (2018) the ultimate goal of this relationship is to obtain the best fit between business planning and outcomes.

Another aspect to recall is the importance each stakeholder represents in the study. In the following sections, the reader will see how the data obtained from the questionnaires were analyzed and developed into themes where the arguments and information gathered from each stakeholders were compared. Each stakeholder forms part either of the supply or demand side in this study and in order to avoid confusion, the researcher considers relevant to clarify what each stakeholder represents in these comparisons.

Students, on the first hand, are undoubtedly the output that the supply side will provide to the demand side. They are potential industrial designers whose experience in the field is mostly dictated by the activities and formation they receive during their bachelor studies in the University. Most of them have no experience working in the industry and those who have is usually because of their professional practices. Because of this, it is relevant to argue that their arguments are mostly based on perceptions or ideas they might have towards the industry or activities within it, rather than lived experiences obtained when working as industrial designers per se.

Professors also form part of the supply side. They have more experience and knowledge of the industry through either having worked there or having developed relationships with industry for studio projects or other academic activities. Professors play a critical role in the formation of students during their bachelor studies since they provide the theoretical information for them to learn and to apply in their projects, meaning, their influence towards students is considerably strong. Because of their past experience or relationship with the industry, professors also represent a potential link with them and students. However, because their main role is in the formation of students and their work as academics, they are considered as part of the supply side, independently speaking of their experience they may o may not have towards working in the industry.

Employers form part of the demand side in this study. They are the ones that will receive the candidates to work with them in their organizations. Besides being those who seek for professional designers with specific skills or profiles, they also provide relevant data for analysis, such as reasons that employees share with them for leaving their workplaces. Employers, in a way, represent also a potential link with the supply side with professors, since in some cases the supply and demand side work together in academic projects within the design studios of the bachelor program.

Finally, graduates also form part of the demand side. They represent industrial designers with their bachelor degree completed who are currently working in the industry. And while we might argue they are closer to a student than an employer because of this, graduates form part of the demand side for two main reasons. First, they are now totally focused on their work in the industry. They experience design methods in real life and face real challenges when performing their activities. Graduates, in fact, have no active connection with the academics anymore. They might have close relations with students and professors but are not considered part of the supply side since they are now active in the counterpart of this supply-demand relationship. Second, since graduates are now active in the demand side, they can also become potential employers of students. From the researcher's experience, it is not uncommon for industrial design graduates to interview and hire newcomers in many companies. Because they become potential employers, they may now need to establish what skills they demand for students to have to work with them.

However, graduates are also in an interesting position, since they can easily perform comparisons between their perceptions towards different scenarios or subjects as when they were students, compared to their lived experiences now as employees. This gives graduates an interesting relevance and connection to the study as a reliable source of information of the true modus operandi in organizations, while at the same time comparing them with “fresh perceptions” of activities, visualizations, and other subjects they had as former students.

With these concepts and connections clarified, the researcher can now present the reader with the selection and development of concepts gathered from the analysis of data acquired from the questionnaires. Having identified the position that each stakeholder represents in the study will make it easier for the reader to understand their relevance in the following template analyses.

4.3 Selection of Overarching Themes

Within the stakeholders, seven overarching themes were established overall. These were:

1. **Motivation.** Generally speaking, this overarching theme refers to the motivation that drove students and graduates to study the bachelor program and how employers perceive the motivation from industrial designers is affected. It also reflects what professors believe to be student's main motivations when working in design projects, as well as their reaction towards adversity and new challenges.
2. **Visualization as designers.** This theme refers to the way in which industrial design students visualized themselves in their future as graduates and professionals, and at the same time, how the rest of the stakeholders visualize them at their work. In the case of graduates, this theme serves also as a comparison between their visualization as students now they are employees in the industry.
3. **General perception of an industrial designer.** In contrast to the second theme of 'visualization as designers', this theme refers to how stakeholders perceive industrial design professionals as individuals.
4. **Abilities that distinguish industrial designers.** In this theme, a comparison between the perception that all groups have towards the abilities that distinguish industrial designers from other professions is made.
5. **Skills and abilities demanded by the industry.** This theme represents those skills that each group considered were required, important, useful, and relevant to have as industrial design professionals working in the industry.
6. **Design process perception.** With this theme, the researcher could easily compare how students believed the design process at the manufacturing industry is done and how it is really done, as explained by employers of industrial design graduates.
7. **Reasons to leave their jobs** explain the reasons each group believed were the main causes for industrial designers to voluntarily abandon their actual jobs.

In the case of motivation and reasons for leaving their jobs it is important to understand what factors drive or affect designer's motivation both as a student and as a professional. Also, what the main reasons that employers witnessed for their employees to quit were, compared to what would these reasons be for students if they were to work at the manufacturing industry. It is also important to know, from an employer's perspective, why industrial designers might feel demotivated in their jobs. Understanding these reasons can help the researcher find ways to address them through academic programs. In regards to how much knowledge students and professors have of the actual study plan, the researcher wanted to ensure that individuals that are directly related to the bachelor program, especially students, were aware of what their study plan could offer them in order to avoid any possible misconception of what studying to become an industrial designer requires as well as understanding where and how they exercise their profession. The theme Visualization as Designers helps in understanding how students and graduates view themselves in the future working as industrial designers. It also shows how students visualize themselves working in the industry as professionals in comparison to how employers perceive them, as well as understanding the differences of what students expected and employees are experiencing in their jobs. Also important was the perception that students have towards industrial designers in general. Design students, from the researcher's experience, are influenced by others such as famous designers or designers whose products or methodologies are studied and used during some of their design courses. This can also play an important role in the perception that students might have of the design process carried out at the manufacturing industry. Having said all this, we might argue that being used to specific methodologies and processes during their studies can make students believe is the only way in which design is carried out and reviewing the contrast from their design process to the ones carried out in the industry can help the researcher understand a student's expectations and perceptions towards it. Finally, the researcher wanted to know if the knowledge, skills and abilities that design students developed or lack during their bachelor program were a strong issue affecting their motivation possibly leading to leaving their jobs.

The development of these overarching themes with their corresponding sub-themes were the result of a long process of analysis of the data obtained through the questionnaires, development of codes and sub-themes using TA, and the analysis and interpretation of the researcher towards the

information gathered. As mentioned in the previous chapter, the researcher identified the need to involve his organization to justify the Action Research methodology. However, before presenting the results, in the next section, the researcher provides the reader how the overarching themes were developed, from the data obtained to the development of the OT, and an in-depth analysis of what each theme represents to the different stakeholders and how its relevance is supported by direct arguments from them.

4.4 Development of Overarching Themes

In order to provide understanding of how themes were developed, the researcher now presents an example of how these overarching themes tables came to be. In Template Analysis, the codes are labels based on the researcher's interpretation of phenomena in the data. To understand how TA was used in this study, and as mentioned in the previous chapter, the researcher first developed and applied questionnaires to the four stakeholder groups. For the establishment of these overarching themes, the researcher first extracted the main concepts that each question intended to address. This concept extraction was performed with every question from every questionnaire from each of the four stakeholders at play. Similar concepts were then grouped together in a general major concept that determined the main idea the questionnaires were addressing to, or were relevant with.

Then, from each of the four groups, all the answers obtained from their questionnaires were arranged in tables individually. Afterwards, the researcher arranged, in a larger table, the codes emerging from the analysis of the obtained data, which in this case were the answers given from all the stakeholders. As more data was being analyzed, more codes emerged. Some of them were strongly related between them. These were then grouped in sub-themes in order to make it clearer which topic was being addressed and compared. Because each question corresponded to a specific concept previously obtained, the arrangement of the sub-themes in their corresponding concept tables (main themes) could be successfully performed. This arrangement of the shared concept between the questions, codes, and sub themes conform what the researcher calls the overarching themes in this study.

As previously mentioned, it's important to understand how these themes came to be before presenting their analysis. If we recall Section 3.4: Action Research Framework, the researcher presented Deming's PDSA cycle as the model he used to go from establishing the RQ, develop the analysis through the method of TA, and obtain and discuss the results.

The first action taken after establishing the RQ's and developing the questionnaires, was to apply these questionnaires to the four stakeholders involved: students, professors, employers, and graduates. Once the data was received back, the researcher began organizing the information with the answers given to develop the codes, sub-themes, and eventually arrange the information in the overarching themes table.

Now, to better understand all this, let's take as an example the first two questions of the student's questionnaire:

Question 1: What were your main motivations that drove you to study the bachelor of industrial design?

Question 2: When you entered the bachelor program, what was the general perception you had of an industrial designer, and what is the perception you have of it today?

If we observe the first question, this one clearly intends to understand the motivations that students had when choosing what profession to study. So in this case we can argue that motivation is the core concept that the question is aiming for. In the case of the second one, we can clearly see that the question intends to understand how students perceive industrial designers. So we can argue that this question's main concept is perception or impression towards designers.

Having said this, we can now begin to look at the evolution of this analysis, going from the raw questionnaires to the gathering of the themes. We can begin by looking at the student's questionnaire. In the following tables, we can observe all the questions in each stakeholder's questionnaire and their main concepts extracted, beginning with the stakeholders from the supply side, and continuing with the stakeholders from the demand side:

Student's questionnaire and concept extraction		
Question No.	**Question**	**Concept extraction**
1	What were your main motivation that drove you to study the bachelor of industrial design program?	Motivation
2	When you entered the bachelor program, what was the general perception you had of an industrial designer, and what is the perception you have of it today?	Perception / impression of designers
3	How well do you know the entire study plan structure offered in the bachelor of industrial design program at the UdeM?	Study plan knowledge
4	Where do you expect to be working as an industrial designer once you graduate?	Expectation / visualization
5	If you were to work at the industry, how do you visualize yourself there as a designer?	Visualization
6	What is your general perception of working in the industry as an industrial designer?	Work perception
7	Do you know anyone that is currently working in the industry as an industrial designer?	References
8	If so, what comments have you received from them about their jobs?	References
9	What skills do you believe you'll develop, of have developed, during your time as a student of ID at the UdeM?	Skills develop
10	Generally speaking, what key skills do you believe distinguish an industrial designer from other professionals at their workplaces?	Designer skills
11	From the skills you mentioned, which ones do you consider to be the most important ones?	Designer skills
12	How do you believe the design process is done at the industry?	Design process
13	Which subjects do you believe are the ones you might use the most when working as an industrial designer at the industry?	Subjects relevant at work
14	Which ones do you think are the industry demands in actuality when hiring an industrial designer?	Demands by the industry
15	If you were to hire designers at your organization, what technical knowledge and skills do you expect them to have in order to fulfill the profile you would seek when hiring them?	Profile skills
16	If you where to voluntarily leave the organization you are working at, what would the main reasons for doing so be?	Reasons to leave
17	Is there any particular comment you would like to express regarding the topics addressed in this questionnaire?	Extra

Table 5 - Students' questionnaire concept extraction.

Professors' questionnaire and concept extraction		
Question No.	**Question**	**Concept extraction**
1	What subjects are you currently teaching?	General info.
2	How many years of experience do you have when working in the industry (if applicable)	Experience
3	What was your position and what were your responsibilities while working at the industry?	Experience
4	What is your area(s) of expertise as an industrial design professor?	Experience
5	What perception do you have of the current ID students compared to when you were studying the bachelor program and how do you think they should address design problems present in the industry?	Perception
6	What major differences can you tell an industrial design student has compared to other students you have worked with at the University?	Comparison between professionals
7	From the time you were a student of the bachelor program to this day, what major changes you consider have been done in the program that have helped students understand the demands of the industry?	Program changes / improvements
8	Do you think employers of designers consider design to be a key activity at their organization or as an activity that can be replaced by other professionals they hire?	Design as key activity
9	What are the main skills you believe an industrial designer should have while working at the industry?	Skills
10	What skills do you think an industrial designer currently lack of once they graduate based on the demands of the industry?	Skills
11	In what ways do you believe the skills an industrial designer has affect the perception employers have towards these professionals?	Skills
12	How well do you know the study plan of the bachelor of industrial design program at the UdeM?	Study plan knowledge
13	Which subjects from the study plan do you consider to be highly related to the demands required by the industry hiring industrial designers?	Highly demanded subjects / skills
14	Generally speaking, what perceptions do you believe / have knowledge of that industrial design employers have towards them?	Perception
15	Do you believe the lack of knowledge or experience of a particular subject affect the designer's motivation as an employee of the industry?	Motivation
16	Do you believe that not using design methodologies in the design process in the industry directly affect the designers' motivation?	Motivation
17	Based on your knowledge of the decision making process at the industry, do you consider it to be a threat to industrial designers for their career development? If so, in what ways?	Career threat
18	If you were to hire design students in your company, what skills do you expect them to have?	Skills
19	What skills would you seek in designers to improve in order to become more qualified for the job you're offering them?	Skills
20	Do you involve students with the industry in Monterrey? If so, please explain.	Industry involvement
21	Which do you think are the most common reasons for designers to abandon their jobs at the industry?	Reasons to leave
22	Have industrial designers expressed to you their perceptions of what working at the industry would be like before they start working?	How is work like
23	Is there any particular comment you would like to express regarding the topics addressed during this questionnaire?	Extra

Table 6 - Professors' questionnaire concept extraction.

Employers' questionnaire and concept extraction		
Question No.	**Question**	**Concept extraction**
1	Please mention your work, position, how long have you been working in the company, and main responsibilities.	General info.
2	How familiar are you working with industrial designers in your organization?	Experience
3	What is the perception you have of an industrial designer and how do you think they should address the design problems present at your company?	Perception
4	Do you consider design to be key at your organization or as an activity that can be replaced by other professionals?	Design as key
5	What major differences can you tell an industrial designer has compared to other professionals you have worked with?	Comparisson
6	What are the main skills you believe an industrial designer should have while working at the industry?	Skills in the industry
7	Based on your experience, what skills do you think an industrial designer currently lack of once they graduate based on the demands of the industry?	Skills designers lack
8	How do you believe the skills an industrial designer has affect the perception employers have towards them?	Skills perceived
9	What perceptions do you believe, or have knowledge of, other employers have towards industrial designers?	Perception
10	Do you believe the lack of knowledge or experience of a particular subject of an industrial designer affect their motivation as employee of the industry? If so, in what ways?	Motivation
11	Could you please explain in detail the design process used at your organization.	Design process
12	Do you typically use design methodologies at your workplace? If not, do you believe this to have a direct effect on the motivation of your design employees?	Motivation
13	Have you ever considered the decision making at your company to be a threat to industrial designers for their career development?	Decision making as a threat
14	What are the most common reasons for a designer to abandon their jobs at your organization?	Reasons to leave
15	Have industrial designers expressed to you their perceptions of what working in the industry be like when they recently begin working at your company?	How is work like
16	Is there any particular comment you would like to express regarding the topics addressed during this questionnaire?	Extra

Table 7 - Employers' questionnaire concept extraction.

Graduates' questionnaire and concept extraction		
Question No.	**Question**	**Concept extraction**
1	Please mention your work, position, how long have you been working in the company, and main responsibilities.	General info.
2	What were your main motivations that drove you to study the bachelor of industrial design?	Motivation
3	What was the perception you had of an industrial designer while you were studying the bachelor program?	Perception
4	Based on this perception, what major differences you believe are most noticeable now with your experience as an employee working in the industry?	Comparisson
5	While studying the bachelor program, how did you visualize yourself working as a graduate in industrial design?	Visualization
6	What was your perception of working at the industry as an industrial designer?	Perception
7	What key skills do you believe distinguish an industrial designer from other professions?	Skills
8	In what ways do you believe the skills an industrial designer graduate has affect the perception employers have towards industrial designers?	Skills
9	How is the design process done at your company?	Design process
10	Have you considered leaving the company?	Reasons to leave
11	Do you normally use design methodologies at work? If not, does this have a direct effect on your motivation as an industrial design employee?	Motivation
12	In what ways do you believe the lack of use of design methodologies affect industrial designers at their workplaces?	Motivation
13	Have you ever considered the decision making at your workplace to be a threat to your career development? If so, please explain.	Decision making as a threat
14	If you were to voluntarily leave the organization you are working at, what would the main reasons be for doing so?	Reasons to leave
15	Is there any particular comment you would like to express regarding the topics addressed during this questionnaire?	Extra

Table 8 - Graduates' questionnaire concept extraction.

Having extracted the main concepts from each question, the researcher was able to compare each stakeholder's concepts and see which ones relate in order to group them. To simplify this process, the following table presents the concepts from all the questions of the four stakeholders. This made the arrangement of the concepts in common much easier since they can be quickly identified and related between them.

Concepts grouping from stakeholder's questionnaires			
Students	**Professors**	**Employers**	**Graduates**
Motivation	General info.	General info.	General info.
Perception / impression of designers	Experience	Experience	Motivation
Study plan knowledge	Experience	Perception	Perception
Expectation / visualization	Experience	Design as key	Comparisson
Visualization	Perception	Comparisson	Visualization
Work perception	Comparison between professionals	Skills in the industry	Perception
References	Program changes / improvements	Skills designers lack	Skills
References	Design as key activity	Skills perceived	Skills
Skills develop	Skills	Perception	Design process
Designer skills	Skills	Motivation	Reasons to leave
Designer skills	Skills	Design process	Motivation
Design process	Study plan knowledge	Motivation	Motivation
Subjects relevant at work	Highly demanded subjects / skills	Decision making as a threat	Decision making as a threat
Demands by the industry	Perception	Reasons to leave	Reasons to leave
Profile skills	Motivation	How is work like	Extra
Reasons to leave	Motivation	Extra	
Extra	Career threat		
	Skills		
	Skills		
	Industry involvement		
	Reasons to leave		
	How is work like		
	Extra		

Table 9 - Stakeholders' concept grouping.

At this point we haven't obtained the overarching themes yet, since we've only just extracted the concepts for the questions and haven't obtained the codes and sub-themes from the stakeholders. However, we can start by identifying the same concepts or similar concepts and group them. To do this, the researcher organized similar concepts in accordance to the subject they were directly addressing, as well as the context in which they were presented. This is important to highlight since there are cases in this comparison where similar concepts required to be differentiated to be adequately identified between one theme or another. For example, in the case of skills concept, several questions had this word as the concept extraction and there was a need to clarify more its meaning, since the word by itself relies extremely ambiguous. As we can see in the table, the concept skills can refer to skills in the industry, profile skills, perceived skills, and so on. It was important to identify what exactly was the subject the question was trying to address in order to know in what major group to adequately arrange it. After analyzing the concepts, the researcher identified seven main groups where these concepts could be arranged.

The first group was conformed by the concepts of motivation, career threat, and decision making as a threat. Motivation, as we can observe in the previous table, was present in every stakeholder at least once. This concept word was relatively easy to identify in most cases, however, career threat and decision making as a threat were grouped together since these are factors that we can argue can affect the motivation of designers in their work. This makes absolute sense if we recall Kacmar et al. (1999) arguing over how decisions made by single individuals in organizations can even be perceived as unfair. Not to mention that employees can perceive some practices as a threat or opportunity for them. Since decision making in the organization can be perceived either positively or negatively, we can therefore argue that individuals will react accordingly as how they feel or perceive the situation in front of them. If they perceive it positively, then they would most probably feel motivated to those decisions. If they perceive them negatively, they would feel demotivated. For this reason, the researcher considers convenient to group these concepts together and rename this group as motivation.

Other groups were conformed by several concepts that required a much detailed differentiation between them. To understand how differentiations are made between the concepts, we can discuss the ones related to skills. As the reader can observe, skills is a concept that is present many times in the table of concepts. However, if we look at the questions from where these concepts emerged, we see these are mostly referring to two different contexts: skills of designers in general, and skills for the industry. Having differentiated these two major topics, the researcher could easily separate those questions related to skills that exclusively attend to industrial designers. Here, stakeholders expressed their beliefs of those skills that industrial designers have, should have, lack, differentiate them from others, and would acquire in their bachelor studies. Also, in the particular case of professors, a comparison of the bachelor program from when they were studying to now. This is due to the fact that professors are in a position where they can compare the skills that designers had and lacked in the past, versus those that they have (and lack of) today. On the other hand, the skills that are demanded or expected at the industry include topics such as designer's profiles for the industry, demands by the industry, skills in the industry, highly demanded skills, and subjects from the bachelor program that can be considered essential when working in the industry, in the particular case of students.

Finally, we also have particular concepts that undoubtedly attend a specific topic which is not related to others. Examples of this are reasons to leave and design process. Reasons to leave, for instance, solely tries to understand what factors might make individuals leave their current jobs, whether they are personal, professional, economical, or from any other nature, they only try to attend that specific issue. Having said this, the groups were conformed and divided in the following order and their corresponding concepts in the following arrangement:

Arrangement of concepts in themes						
Motivation	**Visualization as designers**	**Perception of designers**	**Skills/abilities of industrial designers**	**Skills/abilities demanded by the industry**	**Design process perception**	**Reasons to leave the organization**
Motivation, career threat, decision making as a threat.	Expectation, visualization, how is work like, comparison.	Work perception, impression, references, design as key activity, comparison.	Skills developed, designer skills, comparison between professionals, program changes / improvements, skills designers lack, skills perceived.	Subjects relevant at work, demands by the industry, profile skills, skills, highly demanded skills, skills in the industry	Design process	Reasons to leave

Table 10 - Arrangement of concepts in themes.

In this process, it was evident that some of the concepts might not be related to others due to the nature of their meaning. For instance, study plan knowledge appears to be absolutely isolated form the rest since it only tries to answer the question if the individual knows the study plan offered by the University or not. Other questions regarding position and experience in the industry, or extra comments were also considered as side references since they mostly provided general information towards how long have participants worked in the industry or if they had some experience with projects within it, but only helped the researcher have a general overview of the profile of the participants. In this case, these questions were not considered critically influential to the core concepts extracted by the researcher for the analysis.

For the next step, we need to go back to the individual questionnaires and now focus on the codes present that derived from the analysis and interpretation of the respondents' answers. This is not only useful to understand the perspectives from the stakeholders towards specific topics, but extremely helpful to summarize the main concepts from each topic and easily have a broad overview of the situation without loosing important data.

To obtain the codes, it was necessary to have all the answers relevant to a specific subject and extract their concept in the same way in which the themes were extracted from the questions perse. The following table exemplifies how this was done taking the first question of the students' questionnaire as a reference. In the left side, the reader will find the textual answers from the participants, and on the right side, the codes extracted from the answers as shown:

What were your main motivation that drove you to study the bachelor of industrial design program?		
Individual	**Individual answer**	**Codes extracted**
1	I like the idea to create new products.	Product creation

Table 11 - Example of code extraction from student's questionnaire.

We can now observe the answers for this question for all the respondents from the students' questionnaire in the following table:

What were your main motivation that drove you to study the bachelor of industrial design program?		
Individual	**Individual answer**	**Codes extracted**
1	I like the idea to create new products.	Product creation
2	The labor demand that exists. Also, being able to create something from the imagination.	Product creation / labor demand
3	Being able to have the opportunity to create products from new ideas. Being able to offer beneficial solutions to the world and society.	Product creation / society benefit
4	The complete study plan that was offered.	Study plan offer
5	I wanted to study product renovation, and industrial design is the most similar program.	Product renovation
6	Industrial design allows people to get involved in many projects, both personal and social.	Multidisciplinarity.
7	Being able to solve problems through my design skills	Problem solving.
8	Create products to improve the quality of life of people.	Improve quality of life of people
9	The variety of labor field I can focus on.	Labor field variety
10	I love making handmade products.	Product creation
11	I like creating and innovating products.	Product creation
12	I think this is a profession that has a huge labor field.	Labor field variety
13	Create and innovate products	Product creation
14	Being able to offer solutions without loosing aesthetics	Problem solving.
15	I think industrial design has a wide variety of professions where to specialize.	Specialization field variety
16	Being able to create products and give solutions to design problems.	Product creation / problem solving
17	I like working with social projects that benefit our society, as well as the large variety of work field available.	Social improvement / labor demand.
18	Help people through design. I also like the car design industry	Improve the life of individuals
19	I believe industrial design has a large working field.	Labor demand
20	I want to work in the industry and with mass production projects	Industry work
21	To create products. I always wanted to study design but in my city there was only graphic design, so when I learnt this program was offered at the University I decided to come here.	Product creation
22	Being able to create products and to have diversity of projects	Product creation
23	Create tangible products, offer solutions to others.	Product creation / solution offering
24	Offer design product to individuals that have been excluded from typical design. (pregnant women, people with disabilities, etc.)	Improve quality of life of people
25	Being able to design and create products for helping people with some disability or problems that doesn't let them have the opportunity to have a better quality of life.	Improve quality of life of people
26	The study plan caught my attention	Study plan offer
27	When I knew what industrial design was and what they can do I wanted to study that career	Design activities
28	I always wanted to create things and learn from the process.	Product creation
29	I like to manipulate different materials and processes.	Material handling
30	It is a career that allows you to make many different things and you can work in many areas. Also, I want to get involved in products that can help people improve their life quality.	Work offer / Improve quality of life
31	We as designers can create products to improve society.	Improve quality of life of people

32	It is a career that does not limit you to particular products but you can make very different projects always.	Product creation
33	The wide variety of applications the career offers.	Variety
34	I always wanted to learn how products work.	Product functionality
35	I wanted to study architecture but industrial design has more variety on what you can do.	Variety
36	I love to sketch, prototype, and model products	Design skills
37	I love to create manual products of daily life use.	Product creation
38	I wanted to study something between architecture or engineering	Study plan offer
39	The variety of topics seen in the program	Variety
40	I realized I had passion and skills to create things	Product creation
41	I liked the idea to create things or products	Product creation
42	Create thing that help other people	Product creation / society benefit
43	I like the idea to create new things and design in general	Product creation
44	I wasn't sure what to focus on (architecture, interior or graphic design)	Design related
45	I think the world needs more people that can contribute to improve the life of individuals	Improve the life of individuals
46	I like the idea to create new things.	Product creation
47	Constructing and innovating products	Product creation
48	Being able to express myself through products and learn different materials	Material handling
49	Being able to help others through design	Help people
50	I like the idea of creating objets and to have the freedom to work in many areas.	Object creation / labor field
51	The huge variety of areas I can work in	Labor field variety
52	Help improve the life of people, improve designs.	Improve the life of individuals
53	I like that the career encompass art and engineering topics with the possibility of creating any design.	Skills / design creation
54	To create aesthetically and functional objects.	Object creation
55	I always wanted to recreate things I couldn't have and this career allows me to create more things.	Product creation
56	I always wanted to learn how to use different materials and want to specialize in shoemaking	Material handling / shoemaking
57	I wanted to create any product from raw materials	Product creation
58	My will to create new things that are useful.	Product creation
59	I always wanted to become a product designer.	Product design
60	To help others improve their aspects of their lives through design	Life improvement
61	The work field I could focus on	Work-field demand
62	Because it is a career that helps me develop my skills in different areas of design.	Skills development
63	It involves the creation and redesign of products.	Product creation
64	The career allows me to explore my skills to create my own products.	Product creation
65	Help others through design projects	Help people
66	I like to create tangible things.	Product creation
67	Product and service creation that come from your creativity.	Product creation

68	I was curious to learn about the materials and how to use them to create new things.	Material handling / product creation

Table 12 - Complete code extraction from one question of the students' questionnaire.

What we now have is a set of codes that we can easily group, since, as the reader can observe, many of them have a similar reference or were labeled in the same way for referring to the same concept by different students. The researcher once again grouped the codes in similar concepts to obtain a more synthesized data to work with. In the following table, we can see how the codes where grouped in sub-themes:

Grouping of codes in sub-themes for the students' responses			
Product creation	**Quality of life improvement**	**Labor demand**	**Others**
Product creation	Society benefit	Multidisciplinarity	Study plan offer
Product renovation	Problem solving	Labor field variety	
Product functionality	Improve quality of life	Specialization field variety	
Object creation	Social improvement	Labor demand	
Product design	Improve life of individuals	Industry work	
Material handling	Help people	Variety	
Design creation	Life improvement	Work-field demand	
Design activities			
Design skills			
Design related			
Skills development			

Table 13 - Grouping of codes in sub-themes.

As we can see, the sub-themes compile three main topics that highlight from the responses of the participants in the questionnaire for that specific question. While most of the students answers had relation to product design or their will to help others through design, only a few students' motivation was driven by the study plan offer. For this case, the researcher decided to arrange this specific code into the product creation sub theme, since understanding the study plan offer give the students a sense of the topics and subjects they will learn during their career related to product design, however, it doesn't tell us much about their will for improving the quality of life

of people or their aspirations into the labor world. At the end, for this particular subject, three sub themes came to be: product creation, quality of life improvement, and labor demand:

Theme	Subthemes
	Supply
	Students
Motivation	- Product creation
	- Quality of life improvement
	- Labor demand

Table 14 - 'Motivation' overarching theme with first stakeholder's sub-themes.

In this same way, the rest of the stakeholders: professors from the supply side, and employers and graduates from the demand side, gave their answers from which the researcher obtained the codes and sub-themes. Let's now observe the development of the sub-themes from the professors' perspective. For the case of professors, we know that the questions that refer to the theme motivation are two:

1. Do you believe the lack of knowledge or experience of a particular subject affect the designer's motivation as an employee?

2. Do you believe that not using design methodologies in the design process in the industry directly affect the designer's motivation?

The following tables show the answers from the participants in regards to this questions and their codes extracted in the same way as previously presented:

Do you believe the lack of knowledge or experience of a particular subject affect the designer's motivation as an employee?		
Individual	**Individual answer**	**Codes extracted**
1	- Yes and no. Yes because when the student has worked, he knows what he likes and what he's good at. No, because when a student graduates he is anxious to work and is going to say yes to everything and will do his best at that job.	Interest and dislike from experience, willing to work
2	Yes if it's something very technical	Dislike technical subjects
3	Yes when they have to deal with topics they don't dominate or is not of their total interest.	Student interest
4	It depends a lot of the job profile / description and what is the profile of the candidate.	Profile dependent
5	That will depend solely on the designer's own ability to pursue new challenges and goals, and as they are prepared that way during their education.	New challenges

Table 15 - Example of code extraction from professors' questionnaire.

Do you believe that not using design methodologies in the design process in the industry directly affect the designers' motivation?		
Individual	**Individual answer**	**Codes extracted**
1	Students don't like to follow methodologies, they only want to make things. In this sense, it shouldn't affect them.	It shouldn't affect
2	Not really, since there are many ways designers can manage to get to the desired results.	No
3	Yes, since designers are used to these methodologies and it's what they expect to see in the real world.	Yes
4	The lack of use of methodologies should never lead to a lack of motivation.	It should never affect
5	Designers should have empathy and sensibility towards users' needs. that doesn't mean they are experts in user research or behavior psychologists.	It shouldn't affect

Table 16 - Example of code extraction from professors' questionnaire.

Looking at the answers given by the respondents we notice they present more complex statements than in the previous example. However, code extraction is equally possible. Looking a the first question, we see how even though the answers given by the professors vary considerably, most of the concepts relate in either a positive or negative viewpoint from the student's perspective. Either students show interest towards topics they know, or dislike to particular subjects. We also observe how the profile of students is taken in consideration and that the motivation they will have or lack will depend on personal factors such as their ability to receive new challenges and their willingness to work once they, rather than their lack of knowledge over particular subjects.

On the other hand, we have the majority of professors arguing that the lack of use of design methodologies (which are in essence guides for product design when developing design projects) should not affect the students' motivation. Among their arguments for this decision are that the lack of use of methodologies should not be a reason to demotivate them and we can clearly see why they believe this by saying that students do not like to follow methodologies and that they need to have more sensitivity towards others' needs independently speaking if the have or not the experience to attend particular issues or perform specific research on how to solve design problems. So while only one professor did argue this situation would affect students, the main concept we can obtain from these answers is that the lack of use of them shouldn't really affect them. For this particular subject, we can establish a clear sub-theme which encompass what the majority of the codes present: the lack of use of methodologies in the industry should not affect student's motivation. Once finished, the researcher then needed to continue the same process for the demand side.

Theme	Sub-themes	
	Supply	
	Students	Professors
Motivation	- Product creation	- Student's motivation depends on their interest in the subject.
	- Quality of life improvement	- Depends on the desire to pursue new challenges.
	- Labor demand	- Lack of experience or methodologies should not affect their motivation.

Table 17 - 'Motivation' overarching theme with first and second stakeholders' sub-themes.

Now that the researcher had established the sub-themes from the supply side, what followed was to extract the codes from the demand side, arrange them in sub-themes, and assemble this new data in the main theme table. The process for doing so was exactly the same as shown in this section not only for this overarching theme but for the rest of them as well, as shown in the following table:

Theme	Subthemes			
	Supply		Demand	
	Students	Professors	Employers	Graduates
Motivation	- Product creation	- Student's motivation depends on their interest in the subject.	- Designers can feel frustrated or underestimate themselves.	- As students, they were motivated by the profession diversity and creative knowledge they could obtain.
	- Quality of life improvement	- Depends on the desire to pursue new challenges.	- Their motivation depends on how they react to adversity.	- Those that do not use methodologies are not affected.
	- Labor demand	- Lack of experience or methodologies should not affect their motivation.	- Their motivation is affected when they obtain negative results.	- Not using a methodology of design can affect a designer's success and innovation.

Table 18 - ‘Motivation’ overarching theme with all stakeholders’ sub-themes.

However, while the table did summarize the main concepts in this table design, improvements for enhancing comparison between subjects and analysis could still be done. Because of this, and even though the design of this table was intended to be the final one for analysis, the researcher decided to strengthen the sub-themes with with support from relevant arguments made by participants. Yet, as the reader might already be aware, introducing that amount of data in the tables would most likely end in confusion and wouldn’t justify the benefits of Template Analysis, which is precisely to synthesize data while maintaining core concepts during the analysis process. For this reason, the researcher opted to include a summary of the relevant arguments by participants that would support the sub-themes, rather than include every single comments, since the sub-themes, at the end, derived from a previous analysis from all the comments present in the questions, as it has already been shown previously. The result of this new arrangement can be observed in the following example:

	Motivation		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	Product creation	Students were mostly driven by their desire to create new products when they entered the bachelor program.
		Quality of life improvement	Most of them were also interested in improving people's live's through product creation, especially during their first semesters.
		Labor demand	A third reason students considered a motivation involves the actual labor offer. And very few chose to study design because they were looking at professions that they considered similar such as engineering and architecture.
	Professors	Students' motivation depends on their interest in the subject	Students motivation would very much depend on their interest and will to receive new challenges.
		Depends on the desire to pursue new challenges	They appear to dislike technical subjects.
		Lack of experience or methodologies should not affect their motivation.	Using or not a methodology shouldn't be a factor that has a negative effect on them.
Demand	Employers	Designers can feel frustrated or underestimate themselves.	Designers underestimate themselves and this makes them avoid working in the industry.
		Their motivation depends on how they react to adversity.	Designers can see the lack of knowledge or experience as demotivating or as a challenge to learn something new.
		Their motivation is affected when they obtain negative results.	They can feel frustrated when facing engineering calculus.
		Decision making processes are not considered a threat.	Most of the employers consider the design process not to be a threat to designer's professional development.
	Graduates	As students, they were motivated by the profession diversity and creative knowledge they could obtain.	When studying, motivation came in several ways such as huge fields of action the profession offers, experiencing the design process, and being able to integrate creativity to offer solutions to the industry.
		Those that do not use methodologies are not affected	Not following a methodology might become an obstacle for product achievement and innovation.
		Opinions on design processes in the industry are divided.	While 2 graduates do not consider this to be a threat to their development as professionals. Others have argued that the resources and support from the top management have a direct impact in the motivation of employees.
			Inexperienced bosses sometimes do not understand the importance of each stage of the design process. Decision making is oriented to numbers and results.
		Not using a methodology of design can affect a designer's success and innovation.	While half of the graduates sis not use methodologies at their work, they don't have a negative effect in their motivation.

Table 19 - 'Motivation' overarching theme complete with all stakeholders' sub-themes.

We can now call this finished table an overarching theme, with all of its components to begin its analysis. Once all the overarching themes were completed, the researcher proceeded with the analysis of each individual theme as the reader will see in the following section.

4.5 Analysis of Overarching Themes

In the following paragraphs, the researcher now presents each theme completed with their corresponding sub-themes divided by the different stakeholders involved. The analysis further made are based on the results gathered from these overarching themes and have been summarized to be then compared between them and obtain a broader conclusion. In order to accomplish this, the researcher opted to summarize the analysis of each overarching theme and perform a cross comparison between the seven summaries obtained.

MOTIVATION

	Motivation		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	Product creation	Students were mostly driven by their desire to create new products when they entered the bachelor program.
		Quality of life improvement	Most of them were also interested in improving people's live's through product creation, especially during their first semesters.
		Labor demand	A third reason students considered a motivation involves the actual labor offer. And very few chose to study design because they were looking at professions that they considered similar such as engineering and architecture.
	Professors	Students' motivation depends on their interest in the subject	Students motivation would very much depend on their interest and will to receive new challenges.
		Depends on the desire to pursue new challenges	They appear to dislike technical subjects.
		Lack of experience or methodologies should not affect their motivation.	Using or not a methodology shouldn't be a factor that has a negative effect on them.
Demand	Employers	Designers can feel frustrated or underestimate themselves.	Designers underestimate themselves and this makes them avoid working in the industry.
		Their motivation depends on how they react to adversity.	Designers can see the lack of knowledge or experience as demotivating or as a challenge to learn something new.
		Their motivation is affected when they obtain negative results.	They can feel frustrated when facing engineering calculus.
		Decision making processes are not considered a threat.	Most of the employers consider the design process not to be a threat to designer's professional development.
	Graduates	As students, they were motivated by the profession diversity and creative knowledge they could obtain.	When studying, motivation came in several ways such as huge fields of action the profession offers, experiencing the design process, and being able to integrate creativity to offer solutions to the industry.
		Those that do not use methodologies are not affected	Not following a methodology might become an obstacle for product achievement and innovation.
		Opinions on design processes in the industry are divided.	While 2 graduates do not consider this to be a threat to their development as professionals. Others have argued that the resources and support from the top management have a direct impact in the motivation of employees.
			Inexperienced bosses sometimes do not understand the importance of each stage of the design process. Decision making is oriented to numbers and results.
		Not using a methodology of design can affect a designer's success and innovation.	While half of the graduates sis not use methodologies at their work, they don't have a negative effect in their motivation.

Table 20 - 'Motivation' overarching theme.

Looking at the first overarching theme, motivation, we are able to see some interesting contrasts between each stakeholder's opinion regarding this theme, even between stakeholders from the same category (demand or supply side). For instance, we can see that from the supply side, student's main motivations to take the bachelor of design include product creation, that such products improve the quality of life of other individuals, and the labor demand that they believe exist for them as potential graduates in a couple of years. Professors, however, believe students' main motivations largely depend on their desire to pursue new challenges and on the interest of a subject or subjects in particular. At the same time, from the demand side, we can observe that graduates' perception of their motivation during their involvement in the bachelor program regards their interest in exploring new things and obtaining methods to develop creative knowledge, regarding product creation, diversity in processes and methods involve creative steps in any design process. Whereas employers perceive the motivation of industrial designers almost from a `how would they react` scenario at their workplaces, and as we can observe, their perception of designers' motivation is mostly negative, since they as employers most likely only observe how industrial designers react to a given situation at work.

There are, however, several key concepts that are worth highlighting. For instance, we observe how employers perceive design students as underestimating themselves and feeling frustrated and demotivated due to their lack of knowledge or experience in the field. And while we might argue this is normal for anyone that doesn't totally dominate certain subjects in their work field, the fact that they feel underestimated appears to have a considerable weight. From the researcher's perspective, we might argue that this lack of knowledge is what eventually develops in this underestimation, since designers might not consider themselves suitable or capable for conducting their work activities that they should be doing or at least have the knowledge of how to do so. We can also observe that a particular contrast is highlighted between what professors have said about the desire that students have to pursue new challenges while employers perceive designers frustrated and reactive to adversity. So, this leads to the thought that professors believe students working at the industry would feel motivated when facing new challenges, when they might feel overwhelmed and frustrated when facing them. In this sense we might ask ourselves: is the University offering students courses believing they will feel motivated in their new jobs

because they will pursue new challenges? Might professors have the wrong impression of what student's true motivations are? This might be the case at simple sight when we read this but becomes more intriguing when we move to the next theme regarding how designers visualize themselves and compare the results.

Another thing to consider in this analysis is the perspective of the stakeholders' towards the concept of motivation. Students, for instance, express the reasons for why they entered the bachelor program. These reasons were the ones that motivated them to study industrial design and we can argue that, in a way, they are correlated to how they visualize themselves as professionals. However the other stakeholders such as employers, mostly express how elements or aspects affect the motivation of design students. In a way, we are positioning ourselves from both the inside and outside of the student's perspectives. On one side, we can see the goals that students want to achieve and what they intend to make and transform once they graduate, but on the other side, we see what possible aspects affect their motivations. This is important to understand because if we look deeper to this context, we can discuss that at some point during their professional trajectory, either as students or once they start working in the industry, they appear to have a limitation that for some, not all, can be a point of decision for their profession in the future.

To put it in simpler words, on one hand we have arguments by students that show what were their main desires for becoming industrial designers, and on the other, we have stakeholders that can visualize students from an outer perspective and look at what elements or aspects affect their motivation. And what we can look from within a student's perspective is that their arguments (and sub-themes in the table) solemnly express the main goal or general concept of their desire. Students want to improve the quality of life of people through product creation but this doesn't appear to show how exactly might they achieve this. They mostly wanted to create products but ignore what steps and skills are necessary to make them. And we might argue that is normal for someone starting to study a bachelor program since that's why they study that career in the first place, to learn how to do so, but we also see how professors from the supply side and employers have argued that the lack of specific knowledge on topics involving product design such as engineering and technical subjects affect them somehow negatively. This is a strong evidence that the

lack of knowledge of such topics is not only present in new bachelor students but with experienced ones as well. Having said this, we can argue that while design students have the will of creating products and improving peoples lives, they still lack some skills or methods to do so.

If we adopt this argument, we can ask ourselves, does the students' lack of skills make them feel underestimated, thus demotivated? According to employers, this is the case for some designers. Students can either look at new challenges as an opportunity to grow, or as a demotivating experience. For those that look at new experiences as a good opportunity for learning, there is not much we can discuss since we don't know more about them, nor what kind of challenges they are willing to adopt as new opportunities and which ones not. However for those that do not adopt the lack of knowledge as an opportunity, we see that interest plays an important role on their decision, and this is highlighted by professors arguing that students tend to dislike certain subjects or topics, and that depending on how much interest they have on them will eventually lead to them feeling motivated or not to pursue these new challenges.

We could easily argue we have reached a point where discussion becomes cycled if not for the fact that we are dealing with the fact that students underestimate themselves due to this lack of knowledge, as mentioned in the overarching theme table. In fact, employers have also argued that students might feel frustrated when facing engineering related subjects. And another interesting flag is how graduates have argued that not following design methods such as methodologies, can become an obstacle for innovation and product development, which is one of the reasons that design students were willing to study the bachelor program in the first place.

VISUALIZATION AS DESIGNERS

	Visualization as designers		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	Working independently	Many, but not all students, visualized themselves working independently in the future.
		Creative work	Some where very specific in the areas of interest such as fashion design, jewelry, and packaging. Other particular cases show interest in prototyping areas, software handling and continuous improvement.
		Leaders and teamwork	A large amount had their mind in creative positions and show interest in becoming heads of a design team. Many students highlighted their visualization as team working.
	Professors	Many seek for design departments or packaging	Not many students want to work in manufacturing companies. They usually look for design departments or packaging.
		Not previous research done	Student's don't usually do a proper previous research about the workplaces they could apply.
		Designers are not very excited to work at the manufacturing industry	Few students are excited, depending on their profile. Their impression of working in the industry change as they study and grow. They mature with time and their goals change as well.
Demand	Employers	Curiosity	Designers are curious of learning how a product is made in real life. They feel satisfaction when they look at a finished product that came out of an idea in paper.
		Rapid adaptation	The reflect fear to the unknown but quickly adapt.
		Engineering knowledge is necessary	A profile of a designer which is more into arts and crafts does not feel enthusiast to take part in the industry.
	Graduates	Visualized themselves as product designers	When graduates were studying the bachelor program, they view themselves as innovative product designers, or working in R&D constantly proposing ideas.
		Require engineering knowledge as well as economic and technical aspects.	Now that they work in the industry, the know every proposed design has its economic and technical limitations, and that the design process involves much more activities to become successful.
		Interdisciplinary profession	They also realize they do not work alone and many of them end up working in areas that are not related to their profession. They also see themselves as the "glue" of the projects because they get involves in all the areas of the manufacturing process.

Table 21 - 'Visualization as designers' overarching theme.

Let's analyze this overarching theme focusing first on the findings made form the supply side. Observing the way in which students visualize themselves as designers once they graduate, we can observe there are particular aspects that we can say stand out from other professions. In the first place, we see how the focus on becoming a creative individual maintains itself as argued in the previous overarching theme. Here, however, we see at more specific activities with what designers identify. These include fashion, jewelry, packaging, prototyping, and software handling. We also see that may students see themselves working independently or in creative positions where they are heads of a design team or in a position of leadership. They also appear to have a clear understanding of the importance of teamwork, and while they have not argued that they look for teamwork when working independently, we can assume this is the case since dealing with leadership is strongly related to teamwork. By hand to how designers visualize themselves are professors that similarly argue that students seek for design areas such as packaging or other departments, which is expected from a design student since these are areas of expertise they have known and developed during their bachelor studies.

Interestingly, however, is how they highlight two major topics: how design students do not make previous proper research of the potential workplaces they could apply, and how they are usually not very excited to work in the industry, specially then concerning product manufacturing. We can look back and think this last argument is justified by the profile that each individual student has, and while that is right, we cannot deny this is also alarming somehow to the profession of design, at least in this scenario. The researcher defends this argument because of the fact that product manufacturing is an essential step for industrial design. Since design is not limited to product aesthetics, the process of conception of every object is, in part, the responsibility of the industrial designer, as recalled by Flores (2007) during the literature review, and the fact that students are not willing to immerse themselves in that field of design is, from the researcher's perspective, a possible sign of a misconception of how the profession is normally carried out in the industry, or even of the objective of the profession itself. This would make a lot of sense to the second highlighted argument of professor towards students not conducting a previous proper research on the workplaces they could carry out their profession. Might students consider the profession of industrial design in a particular way and take that idea for granted? If so, is the Uni-

versity or professors somehow responsible of this? The lack of research seems to be quite evident for becoming a sub-theme on this topic, if so, what is the University doing to attend this problem? Now, what is the demand side's position in this topic?

Employers have interestingly argue that they visualize designers as being individuals with a strong curiosity of learning how a product is made in real life. They are also described as having the ability to quickly adapt to the unknown, even when they might reflect some fear at the beginning. These appear to be normal behaviors of anyone that has recently started working in any workplace, since they are faced with unknown colleagues, processes, rules, and topics that many might not even be slightly familiar with previously. We can see that both employers and graduates have argued that design students lack of engineering knowledge as well as other skills such as economic or financial aspects within the process of product development, and technical aspects as well. However, graduates have made very interesting arguments that, while they do not justify the ignorance of such knowledge, they do provide some insight as to what to expect from students once they enter the labor world.

Graduates have argued that contrary to when they studied the bachelor program, once they start working in the industry, they begin to become aware of the different activities that guide a successful product creation during its conception. They also seem to realize that the profession is more interdisciplinary as they might have imagined, since it is interesting to see how graduates see themselves as the "glue" of the projects due to the fact that they are present in the areas of the manufacturing process of any product. However if they were not familiar with these steps or activities, it means that either they have little or no knowledge of them previously. Again, we observe a similarity between the visualization that graduates had when they were studying and students's visualization where they argue they visualize themselves proposing ideas and being innovative and creative, yet they seem to be strained to that small portion of the entire development plan and process of any product creation. In other words, there seems to be the idea that as designers they will only be creative individuals in organization proposing ideas and even working in R&D, but do not mention or even consider involving in the manufacturing process of design. We can even assume this includes their own designs. Almost as a clear and well established limit

between the activities of what an industrial designer should do, and the activities where he must get involved for the product to become successful during its conception.

We can summarize our analysis in the following table and can move forward to see the next overarching theme, perception of an industrial designer.

PERCEPTION OF AN INDUSTRIAL DESIGNER

	Perception of an industrial designer		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	Idea generators	Students mostly saw designers as people who generate ideas and work with other professionals to achieve a product development.
		CAD / software modellers	Important individuals in a company due to the tasks they perform. They believe they can also establish themselves independently with good quality of life and good salaries.
		Underestimated important individual	Focused in aesthetics, innovation, and manufacture. Dedicated to improve people's quality of life. They use technological tools to achieve designs.
			Some students believe there are few opportunities to grow inside an organization since they think they are individuals who are not taken much into account by other professionals.
		Sucess	Acquaintance designers seem happy and active with their jobs and appear to have big chances of success.
		Limitations	Time seems to be a negative aspect expressed by relatives working as designers, since they argue over the extended working hours left during their days. Also, they claim that industrial designer share a competitive market.
	Professors	Multidisciplinary individual, wider vision	Students have a wider vision of how to solve problems, are more aware of the existing design methods and address problems in a multidisciplinary manner.
		Avoid exploration	They tend to avoid exploration once they feel comfortable with their first good idea.
		How does employer's see them: aesthetics, creative, 3D modelers and conceited.	Organizations look at designers as generators of aesthetic attributes in product manufacturing. They look at them as creative people expecting new outcomes when introduced in manufacturing processes.
			Employers are not aware that designers are able to find the basic problematic and try to solve it instead of only redesigning or changing existing designs.
		Design as a key activity	Many employers ignore what industrial designer are capable of doing and some do not value the work an industrial designer does. They believe other professionals are capable to do the same thing. However, design is becoming more accepted because designers usually work with other professions.
Demand	Employers	Creative individuals	Designers are creative and restless individuals. They offer a solution to ehe client's needs. They face problems differently and explore different proposals.
		Problem solvers, focused on aesthetics	Considered irreplaceable professionals, multi-faceted and critical. Their ideas are more realistic and have very well developed their aesthetic composition abilities. They understand the sense of urgency.
	Graduates	Problem solvers	Industrial designers are capable of giving solutions to necessities in the industry through the creative stage of product design.
			They perform valuable activities that are unknown to many and are capable of industrializing themselves.
		Product designers	Positively speaking, they are multidisciplinary professionals and each are capable of becoming the best at what they do.
			Negatively speaking, there is necessity of engineering knowledge still and they are underestimated professionals.

Table 22 - 'Perception of an industrial designer' overarching theme.

We have talked about the motivations that an industrial design student has for becoming an industrial designer and how they visualize themselves in the future. We have also seen the comparison that graduates made from them as design students and how they become more aware of the different processes and activities they need to stick to once they begin working. In this overarching theme of perception of an industrial designer we will analyze the idea that the different stakeholders have towards an industrial designer per se and we'll see in what ways might these arguments and sub themes relate or mismatch with what has been previously argued.

Beginning with the supply side, we observe a similarity between what has been previously argued by this stakeholder in regards to creativity and product creation. Students mostly perceive industrial designers to be people who generate ideas and work in teams in organization to create products. We begin to see how they also argue that they perceive them as software modelers or CAD working individuals. And we see how in contrast with the previous overarching themes, this is the first indication that we have of how students believe product creation is accomplished by designers in the work field. However, this time we are presented with the evidence that students perceive designers as underestimated yet important individuals. Right from the start this overarching theme has confirmed a relationship regarding the same subject between an individual from both the demand and supply sides: the perception of designers as underestimated individuals. And this situation is expressed by the idea that designers are not taken into much consideration by others in their workplaces. It's important to highlight that this sentiment was not expressed by all students, and we might even think that the acquaintances that students have in the industry expressed this argument to them, however as we can observe, they actually focus in other aspects they perceive from their work. Industrial design acquaintances play an important role in the perception that students might have towards an industrial designer, since they are a direct reference of the image they perceive themselves in the future. And in this overarching theme we observe two different perceptions expressed by them to students. The positives of working in the industry, and the negatives. Positive aspects include designers feeling happy and active in their jobs with big chances of success, while negatives include overextended working hours and a considerable competitive market. However there is no expression of their acquaintances towards them feeling underestimated or having few growth opportunities in the industry.

We continue to analyze the sub-themes and arguments done by professors and we find that professors mostly perceive designers as multidisciplinary individuals with a different view on problem solving. Based on their experience of working with students, and in this particular case however, they perceive design students to avoid exploration and feel comfortable with the first design ideas they have as their proposals. While this argument steps aside for a while for referring specifically of design students, we can't deny it presents us with an interesting scenario where there is a lack of research for further exploration during the study of designs. To avoid further exploration in a profession where proposals are key for developing robust and justified concepts to an organization (in this case within the university), tells us that either there is a lack of interest for research or a stagnation in a comfort zone from students in their projects. In this sense, we might be facing a clear mismatch between the perception of exploration of proposals within the stakeholders of the supply side. From the researcher's perspective, this argument is a contribution to the university as an opportunity to reflect and explore the practices that are common within the bachelor program in order to help professors establish a clear meaning, importance, and exemplification of what can be considered a robust and well justified proposal exploration in the design studios of the program.

However, moving forward with this analysis, we now find ourselves in a direct comparison between what two stakeholders from opposite sides argue towards perception. To begin with, let's analyze how employers perceive designers, versus how professors believe employers see them. As we can see in the overarching theme table, employers see designers with three major attributes: as individuals that are creative, problem solvers, and focused on aesthetics. They argue that designers face problems differently than other professionals and are capable of offering clients solutions to their needs. In fact, if we look in the arguments that they do towards industrial designers, they all seem to be very valuable and positive. They even describe designers as irreplaceable professionals. Non of these arguments lead someone to believe designers are underestimated individuals in organizations. By the contrary, they appear to be highly valuable individuals with strong acceptance in their workplaces. If we compare these arguments with how professors believe employers' perceive designers, we can see there is a strong contrast. Professors believe employers see designers as creative individuals with a strong focus in product aesthetics. They

also believe employers look at them as individuals capable of developing new outcomes to existing problematics in their design processes. However, what is quite enlightening is that they believe employers are not aware of the potential that designers have to find the main causes of design problems and only offer redesign solutions. This is a strong contrast and makes no sense with the perception that employers have towards designers. If employers are expressing their positiveness on how designers are irreplaceable and problem solvers, why would professors argue that employers don't see them as such?

After analyzing this information, the researcher came to the conclusion that he might be facing two major mismatches and a potential delicate scenario. In the first place, there is a clear mismatch on how industrial design students believe industrial designers are underestimated since, as we can observe, employers from the demand side have expressed a positive perception towards them, contrary to the belief of students thinking they are not taken into account in their workplaces. Secondly, this mismatch might be occurring at the same time between professors and employers as argued in the previous paragraph. However, even more delicate is a third scenario the researcher needs to consider a possibility. And this has to do with how students might consider themselves underestimated because professors have, directly or indirectly, given them reasons to believe this is the case. For the researcher, this is a strong argument to consider, but he cannot deny the facts that are shown in the analysis of the data obtained from the participants. If this were to be the case, then this evidence presents itself as another strong contribution, at least to be considered, to the researcher's organization, in this case, the University.

As for the last stakeholder, graduates, there seems to be a match between how they perceive industrial designers and how the rest of the stakeholders do as well. This is because, aside the mismatch previously argued, graduates have the idea of designers being problems solvers and product designers. They are in fact industrial designers themselves and know the applications of the profession in their corresponding work places. However once again there appears to be the perception of designers having the need to learn or improve other skills such as engineering. Positively speaking, however, we see how they are aware of offering creative solutions to design problems, and becoming multidisciplinary professionals. In the following table, the researcher

has summarized his analysis and we can now proceed to the following overarching themes which focus on the abilities and skills that stakeholders believe designers have and develop.

ABILITIES THAT DISTINGUISH INDUSTRIAL DESIGNERS

	Abilities that distinguish industrial designers		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	Creativity	Among the most important skills that distinguish designers from other professions are creativity, innovation, and teamwork. Other skills include problem solvers, material handling, empathy, effective communication, and determination.
		Teamwork	Interpersonal skills that designers develop during their studies include teamwork, having an open mind, resources and time management, and creativity.
		Problem solving	
		Materials handling	
		Technical skills	The technical skills that distinguish designers are materials handling, sketching, research, 3D modeling, prototyping, and technical drawing interpretation.
	Professors	They are adaptive individuals.	Positive differences that professors consider between designers and other professionals include being adaptive, become easily empathic to situations, have more sophisticated perspectives over the problematic, constantly look for new ways to solve problems, and not follow patterns.
		Disorganized.	Negative aspects consider to be informal and disorganized when compared to others.
		Teamwork	Among the abilities that designers must have, the most important one is teamwork. Others include leadership, creativity, problem solvers, and sales knkowledge.
		Designers lack the ability to ground their ideas and establish relationships.	Abilities that designers lack of are establishing relationships with other professionals, ground their ideas, and have costs knowledge.
		Improvements in the program that benefits student's skills	The use of different design methodologies in their studios, interdisciplinary work, rapid prototyping, better CAD tools, and having experienced professors at hand.
Demand	Employers	Outside the box thinkers	Designers are seen as outside the box thinkers. They are sometimes considered as individuals with "crazy ideas".
		Lack of hard work	Young designers are not willing to explore and embrace problem constraints. They lack engineering knowledge as well as real industrial processes.
		Focus in aesthetics	Many individuals see designers as people that only make good drawings. They make beautiful designs but not functional. The lack of engineering knowledge made designers more dependent from other areas.
		Costs and marketing	Costs, business, and marketing are skills that designers currently lack. Costs become critical when making proposals to clients based on the budget they have.
	Graduates	Creativity	Designers are focused to solve problems in creative manners. They develop creativity and the ability to express their ideas.
		Analytic capacity	They have the knowledge on how to use different methods for product development. They become very observative and are capable of detecting client's needs.

Table 23 - 'Abilities that distinguish industrial designers' overarching theme.

When we talk about the overarching theme of abilities that distinguish designers, we are referring to this skills that stakeholders consider an industrial designer has or will develop when becoming one. This is important to clarify since the next overarching theme we will be analyzing is the one referring to skills demanded by the industry, and in order to avoid any possible misunderstanding, the researcher opted to clarify this before striating the analysis.

Looking at this overarching theme of abilities, the first thing we can notice is how straightforward it appears to be in comparison with the previous ones. And we can observe this in the subthemes from every stakeholder. Each party is referring to specific skills that can be easily identified and compared between them. This is a great advantage to the researcher, and reader, since identifying a match or mismatch makes it much direct in this manner.

From the supply side, a variety of skills and abilities were mentioned, especially by students. And if we first analyze students' responses, we can group them in five major abilities: creativity, teamwork, problem solving, materials handling, and technical skills in general. All of them come with no surprise since these are skills that designers identify with, such as creativity as previously argued in the other overarching themes, and are also developed during the bachelor study of design. As a professor of the bachelor program, the researcher can see why students mostly identified these abilities, especially materials handling and technical skills. Throughout their bachelor studies, students are trained to work with different materials that are commonly used for product creation and prototyping such as wood, metals, and plastics. They are also trained to master 3D modeling software for product representation and digital prototyping, and in their creative studios they tend to work independently or in teams to solve simulated or real life design problems. So in this sense, these skills or abilities that students express seem to align well with what they normally learn during their bachelor program, thus making them completely believe these are the abilities that distinguish their profession from others.

Professors, on the other hand, have argued on different characteristics they perceive from industrial designers. While this stakeholder shares the ability to teamwork with students, professors have argued that designers are very adaptive individuals. According to them, designers can easily become empathic and unique in the way in which they look to solve design problems in their en-

vironments. We can argue this is a quality that has previously been argued by employers, since they agree that industrial designers tend to face problems differently from other professionals and like to explore proposals. Professors have also commented in the improvement they perceive the bachelor programs has made to benefit the students' skills and we see how this not only includes technical skills such as modeling and prototyping tools, but also interpersonal skills such as interdisciplinary work. This is something beneficial for students since it tells us that professors are aware of the importance for students to learn how to properly perform teamwork and learn from other disciplines as well. It also puts in evidence learning methods that are comparable to today's standards, since professors can identify what are the main improvements in a modern program that were not present in previous ones. However, they also argue that designers tend to be disorganized and still lack certain skills such as establishing relationships with other professionals, among other technical skills such as costs knowledge.

If we look at the sub-themes and summary of arguments from the demand side, we face a similarity between what employers and graduates say towards designers in the sense that they believe that they have a unique analytical capacity and are creative. To consider them outside the box thinkers tells us that employers normally face problems and (maybe) are used to apply well known methods they are familiar with to solve an issue and sometimes these methods are not as efficient as they were in other scenarios or simply haven't consider other possibilities and then industrial designers show them different ways in which problems can be attended. This can also be considered a valuable characteristic by employers in their organization since it shows that designers are identified, among other professionals, to have that ability, which makes them unique and very useful when employers need to consider new alternatives to a given problem. They do, however, consider designers to lack in skills or knowledge over topics such as costs and marketing, and have argued that, especially young ones, are not willing to perform major exploration to problem constraints. If we take a step backwards and recall the overarching theme of motivation, we can see a similarity between these arguments and how the demand side had argued on designers' frustration and reaction to adversity. Since they are referring to young designers in particular, being practitioners or recently employed ones, we can deduce that they are still used to a modus operandi they have been working with during their studies. Not only that, when analyzing

the information we have just argued, there are several other aspects that the researcher needs to establish since they begin to create more strength, or contrast, to previous arguments and we can start looking at a few patterns as well.

First, we know that the demand side considers designers as creative individuals. This has been argued several times in previous overarching themes, but in this case, they have referred to them as individuals who think outside the box. If we recall the literature review on industrial design, Homburg, Schwemmle and Kuehnl (2015) argued on the importance that design has to companies since it enables them to make products that can differentiate themselves from their competitors. They have also argued that designers are irreplaceable individuals inside organizations. If they are so valuable, why do students believe they are underestimated individuals? Is the lack of certain technical skills what makes students perceive them that way? Is the lack of interpersonal abilities such as not being able to establish relationships as argued by professors somehow influence on them to feel underestimated? Or does this has to do with was previously argued in the last overarching theme that professors influence on how students perceive designers? In any way, not only does there appears to be a clear mismatch between how students believe they are considered as to how they are truly seen by employers, but an urgent need to attend this subject if this influence indeed comes from within the supply side.

SKILLS DEMANDED BY THE INDUSTRY

	Skills demanded by the industry		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	Creativity	Students believe the most relevant subjects they learnt and will use in the industry are 3D modeling, materials workshops, and design studios.
		Teamwork and leadership	Other relevant subjects they believe they'll use are technical drawing, ergonomics, and product sketching.
		Software skills	They believed the industry demands mostly experience, software knowledge, creativity, teamwork, and efficiency at work
		Proactive	They also believe that companies demand good leadership skills, and being able to work under pressure.
		Able to work under pressure	They argued that if they were to hire designers they would look at skills such as creativity, work experience, proactivity, good communication, teamwork, and drawing and 3D modeling skills.
		Previous work experience	Other skills they would look after would be prototyping, marketing, empathy, compromise, and the ability to work under pressure.
	Professors	Should focus on functionality.	Students focus in the aesthetics of products and not in their functionality, leading employers to believe the profession has a low priority in the organization. The designer must be verbally accurate when communicating his ideas.
		Innovation	Employers want designers to not question their processes, but if they do so, they realize designers are always looking for new ways of innovation in their companies.
		Highly demanded subjects: creative and technical	Professors consider creativity studios and technical skills such as prototyping and ergonomics to be essential from the subjects students learn to be used at the industry.
		Technical and personal skills designers should have and improve	If they were to employ designers, they would expect them to be good at prototyping, sketching, team-working, proactive, creative, problem solvers, and have good interpersonal skills such as verbal communication, among others.
			Some skills designers should improve are knowledge on mass production, mathematical, and manufacturing techniques, as well as business management and analysis skills.
			Among the personal and interpersonal skills they should improve are teamwork, research, and persistency, as well as good visual and verbal communication.
Demand	Employers	Adaptability	Designers should be open minded and organized individuals.
		Multidiscplinarity	They must have good interaction with other professionals and areas.
		Teamwork	
		Software skills	They should have 3D modeling and CAD abilities.
	Graduates	Problem solvers	Graduates argue that organizations are surprised by how designers usually solve problems and consider this to be of great value.
		Interdisciplinarity	If a designer cannot express his/her ideas, the company won't be able to new business opportunities.
		Misconception	Designers are underestimated by engineers.

Table 24 - 'Skills demanded by the industry' overarching theme.

We've previously seen what skills and abilities does each of the four stakeholders believe an industrial designer has that distinguish them from other professionals. In this overarching theme we explore what are the specific skills that the supply and demand side participants believe are demanded and necessary to have specifically when working in the industry. Similar to the previous overarching theme, this one seems to present the data straight forward, so identifying similarities and mismatches will be presented in a direct manner.

We begin by looking at the sub-themes obtained by students and see that six skills highlight from the comments they made. With no surprise, creativity takes the lead, followed by teamwork, leadership, and software skills. These skills have been previously mentioned by the same stakeholder in previous overarching theme and there's not much we can add when we consider that industrial design is a creative profession. However, students also believe that designers should be proactive, efficient, and able to work under pressure in organizations. For students to believe this is a good sign that they are aware of the importance of being proactive and efficient at their workplaces. What is interesting also is to now that these perceptions were not previously mentioned by students in other overarching themes. However, being aware of them tells us that students perceive they have acquired these abilities along their bachelor studies and are certain that when working in any company this is what employers, and the organization, will demand from them since in order to have them quite present, it is most likely that they face with scenarios during their studies where they need to be proactive and work under pressure with their projects or during any teamwork. There are other abilities they argue are demanded as well such as modeling skills and software knowledge that match with their perception of those skills a designers should have. Also, it's interesting to know that students believe that having a previous work experience is a necessary skill to have to work in the industry. This might be the result of them having to work during their professional practices during an entire semester as a mandatory subject during their last semesters of the bachelor program. And while this skill highlighted enough to be considered in the analysis as a sub-theme, it doesn't seem to have an influence over students in a way in which they might feel that the lack of them would be a limitation for their professional development. However, the researcher might argue that previous working experience can be of

value for employers since they might infer students have some knowledge on the working processes in real life.

In regards to professors' findings, we see that not only they argue on technical and interpersonal skills but add other skills as well that have not been presented in previous overarching themes. These include the ability for designers to focus on functionality and be verbally accurate when communicating ideas. The rest of the skills appear to have been previously presented and discussed without any further issues. However, there are two aspects that are worth discussing. The first one is their perception of employers believing the profession of industrial design has low priority in the organization due to students' focus on aesthetics of products. From the perspective of the researcher this is a misconception from professors towards the demand side. After discussing how employers perceptive and consider designers in their organization, the researcher can argue against this claim. As we have seen in previous themes, employers consider designers as creative individuals and problem solvers that have a sense of urgency and attend the problems presented through different perspective, thus calling them outside the box thinkers. There are indeed arguments and statements of employers towards the lack of engineering knowledge and focus of aesthetics from industrial designers, however they have never argued that this lead to considering design as a low priority profession.

The demand side, on the other hand, considers designers should be open minded and problem solvers (which they have somehow argued they were by being outside the box thinkers), multidisciplinary (which they have also argued on designers being adaptive individuals), and have technical and interpersonal skills such as teamwork and CAD modeling abilities. In support to employer's arguments, graduates have commented on how organizations are surprised by how designers attend and solve problems and how they consider this to be of great value. There appears to exist still a misconception of the profession by engineers towards designers according to graduates. And after looking at the arguments and sub-themes from this and previous overarching themes, the researcher believe this most likely has to do with the aesthetic focus on product design or lack of engineering knowledge as well.

Yet, going back to the misconception that professors have towards the perception of employers, for the researcher this aspect signifies a huge opportunity area for the organization, as well as another contribution for further practice and study, since changing the mindset of an entire stakeholder, in this case professors, will take time and involvement between them and the demand side to learn from each other's perceptions and opinions.

This misconception, or mismatch, reflects an idea that professors have towards the demand side that they might have shared, willingly or unwillingly, to students. Professors seem to share this misconception between them and when shared with students, this might have a psychological impact in them. While the researcher cannot simply declare this is the main cause for students to feel underestimated, we can't denny this would open the possibility to be so. We might also believe that acquaintances might be the ones influencing on students through their comments of how working in the industry is, but if we recall their arguments in the third overarching theme, perception of an industrial designer, we see there are no arguments expressed by them regarding this topic. We also see a direct connection between students and graduates sharing exactly the same misconception of underestimation, and this makes sense given that graduates were in fact once students of the bachelor program. This tells us that, is this assumption is true, this misconception might be occurring quite some time. Having said that, again, if true, this scenario presents itself as an opportunity to self reflect in current practices from the supply side. Specifically by professors, to understand how they influence in students perceptions and beliefs, and also as an opportunity to discover what new practices and modern perceptions do employers have towards the supply side. Discovering that their perceptions and ideas towards designers is different from what professors believe it still is, would represent a significant improvement in this supply-demand relationship, and each of the stakeholders.

DESIGN PROCESS AT THE INDUSTRY

	Design process at the industry		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	Similar to that taught at the University	Research, concepts generation, prototyping, and tests.
		Focused in mass production	Focused in mass production, sparing resources as much as possible.
		Research, design, prototype, and test	Similar to the process used at the University
	Professors	N/A	N/A
Demand	Employers	A much more complex process than the one taught at the university involving aspects such as finances, clients, strategies, and marketing decisions, among others. It varies from organization to organization.	Reception of client's needs, development of design concepts and proposals, selection of materials and best alternative.
			Production, assembly and verification / evaluation of design.
	Graduates		Strategy and vision stage, determined by market tendencies. Design process. Decision making of the most convenient design. Development, finance, and marketing. The process takes around 1.5 years.
			Clients get in contact with sales to discuss their needs. Then this is sent the design team to develop a proposal. The design process begins and once done the client makes a decision. Once accepted, fabrication plans are developed for manufacture.
			Customer interview, design proposal, proposal approval, quote development, quote approval, production.
			Market opportunity detection, project specification, product and process design, product review, feedback.

Table 25 - 'Design process at the industry' overarching theme.

Moving forward with the analysis of the overarching themes, we find ourselves now with the one corresponding the design process at the industry. This theme explores the perception that students have on how they imagine working at the industry is like, versus how employers and graduates argue the job really is. An interesting aspect of this overarching theme is that from the supply side it only involves students. This is due to the fact that since the study is an academic oriented one with a student focus, it enables a direct comparison exclusively between students and the demand side. What we can observe at first glance is indeed a major comparison between the simplicity of the sub themes and summary of arguments by students, and the detailed information given by employers and graduates. This makes a lot of sense, from the researcher perspective, since students have no, or little, experience working elsewhere. Their perception the design process present in the industry will most likely be influenced by the sum of experiences and knowledge learnt during their studies.

The most obvious evidence for this argument has to do with the first sub theme that appears to stand out in the table, where students argue that they believe the design process in the work field is similar to that taught at the university, and the most relevant steps they consider to be done by designers are research, concepts generation, prototyping, and testing. For the researcher, this makes a lot of sense and similarity to a design studio from the bachelor program. As previously presented, the bachelor program of industrial design consists of four academic years, and during each year students undertake two major design studios. These studios are considered to be the most relevant for their careers since it is where they learn design methodologies, their implementation, and apply their knowledge of the rest of the technical subjects to their design proposals. Research and concepts generation is, theoretically speaking, what they are focused to do during the first period of their studios, leaving the last phases for prototyping and testing. The prototypes are most of the time oriented to the materials subjects they are undertaking. For example, A fourth semester student would be undertaking Creativity Studio II as his main studio, and during that time he would also be undertaking Manufacturing Processes of Polymers. So his prototypes or design proposals will most likely be made of a polymeric material, since professors would enhance them to use the material they are learning to handle in that specific semester, a common practice that is done every year amongst professors and students. However, aside from the most

common steps they learn during their studies, they seem to identify design processes at the industry to focus on mass production. For the researcher, this is a good sign that students are aware that what they learn during their studies will be applied in a major scale in real life. They might not be aware of what other steps are taken in consideration for a successful development of design proposals, but they visualize their learning applied in a much greater dimension.

In contrast to their idea of how design processes are done, we have the demand side that shares exactly how they carry out their work. At first glance, we can observe we are talking about not only one but totally different and much more complex processes than those learnt at the academics. In an attempt to clarify how complex they were, we have both employers and graduates detailing their design processes both globally and specific, and even summarized we see there is a huge contrast in that we are now looking at very particular steps rather than a general global idea of how it might be as argued by students. In part we see a similarity on certain steps to be carried out expressed differently by each stakeholder but that represent the same, or at least similar, concepts. For instance, we have students arguing on testing, whereas employers and graduates can express this step as verification of design. Yet in most cases, there is a huge contrast between both sides in regards to the design process.

We can summarize and compile similar steps to give us an idea of how different organizations begin their design process. The most notorious similarity in the first steps is the acquisition of data from the clients. During this step, organizations try to obtain as much information as possible from clients to understand and discuss their needs in order for designers to have a much better understanding of the client's scenario and develop a proposal that is fitted to their necessities. Parallel to this step, we have other arguments that state that the design process begins by identifying market opportunities. These organizations manufacture products that are oriented to specific populations, rather than specific clients. In any case, this step seems to be somehow aligned to the beliefs of students towards the design process, since their first approach is expressed as research. We might argue then, that both demand and supply sides are aligned in the beginning of the process. The demand side then continues the development of a design proposal. This proposal will take in consideration certain specifications that were determined when talking to clients

or during their mark research. In this stage, organizations develop design concepts that will most likely be presented to clients or discussed in the design departments for improvements. In a similar fashion, students also believe the next step of the process is precisely concept generation.

Up to this point, the researcher finds this to be a positive match to the idea that students have towards the process in real life. However, when moving forward, we begin to see how new and different steps are introduced in organizations by the demand side. We can observe that in some cases, once the most convenient design has been approved or selected, some industries develop quotes and budgets for the clients. These quotes are then presented to clients and if approved, the design team can proceed to manufacture the designs. In the case of students from the supply side, we see there is no mention of these steps. In the mind of the researcher, this is a critical aspect that needs to be addressed. We might think that budgets, quotes, and things related to costs are handled by different departments aside design in organizations, however for industrial designers, handling costs is crucial for many reasons. In the first place, it allows users to limit the selection and quality of materials for each project. It also helps develop accurate incomes for the organization and the stakeholders involved in the process. It finally allows the industry to rank the sales cost of their products and compare those costs and quality with their competitors. It is important to clarify, that the researcher is not saying that students never learn to handle costs during their studies. Since the beginning of their careers, students undertake subjects such as materials handling and prototyping were they need to learn how to calculate the amount of material needed for their projects, and develop costs. However, for many projects, demonstrating the costs and sales price for their proposals is not always required. And while the researcher is well aware of this, he needs to see the facts in the statements of the supply side to prove this. In other words, there appears to be a lack of attention to the importance of costs and prices from students from the supply side, a practice that is present in real life projects in the demand side.

We can finalize the design processes in the industry with fabrication, reviews, and testing of the products. In some cases, feedback is received, either from the clients or from other members of the organization. We might argue that the equivalent to this step in the industry would be testing from the students position. So we can agree that this final step is somehow relative to students as

well. Of course, we must also add that the design process in organizations tend to last longer that in the academics. A graduate specifically argued that the process usually takes around 1.5 years to accomplish, which is way longer than it would take students to perform their projects in just one semester.

After comparing the steps that students believe are present in the industry to those that are actually performed there by the demand side, the researcher can conclude that students, in general, have a similar notion of how the design process is performed in real life. They present their ideas in a general manner, but is totally understandable that they don't know how each industry or organization perform their own process. In fact, in many cases, they shouldn't know, since it's common for companies to protect their internal processes as industrial secrets. However, it is also clear there is a gap in the sense that topics such as budgets and costs are largely omitted by students in their belief towards the design process itself within the industry. In a general manner, the researcher concludes that because students have a general perception of similar actives that the industry presents, these may not be considered critical mismatches. However, the fact that students do not take in consideration the financial aspects of projects in a design process, is a critical mismatch and we can consider it as a big problem that needs to be seriously attended and reflected on at the University.

REASONS TO LEAVE THE ORGANIZATION

	Reasons to leave the organization		
Side	Stakeholder	Sub-themes	Summary of arguments by participants
Supply	Students	- Better job offer	Better job offer, lack of professional development, establishing their own company, not being happy with their roles, abusive treatment.
		-Lack of professional development.	
		- Bad working environment or practices	Finding something they feel passionate for.
		-Not feeling passionate about their job.	Monotony at work, extended working hours, dishonest activities.
		-Not happy with their roles	
	Professors	Lack of professional development, and other reasons.	While professors mostly believe that the designer's lack of professional development would be the main reason for leaving their jobs, other reasons include low income, loss of interest, long working hours, monotony, and lack of use of design methodologies.
Demand	Employers	Better salary	Two employers argue their designers usually leave the company for a better salary.
		New challenges	Designers look for new areas in where to develop themselves.
		Professional growth	Professional growth opportunities
	Graduates	Variety of reasons	Personal and professional growth, new challenges, bad working habits, economic reasons.
			3 out of 5 employees considered leaving their company. From these, one left because she felt there was no professional growth in the organization for her.
			2 out of 5 employees do not consider leaving their organization.

Table 26 - 'Reasons to leave the organization' overarching theme.

Finally, we get to analyze the last overarching theme from this study. The theme regarding the reasons to leave the organization explores what would be the main causes for industrial designers to leave their actual workplaces from the perspective of the different stakeholders. Students, for instance, are currently not working in the industry, but share their reasons for why they believe they would abandon their work to find another one. In the case of professors, they express their beliefs on why would industrial designers leave the organization, in an attempt to see if their perspective is in accordance to the rest of the stakeholders. For employers, this question refers to the tangible reasons for designers at their companies to truly abandon their jobs. Not only are we exploring a possible belief or scenario of why they would leave but rather the real reasons why designers at their workplaces have left. Finally, graduates also express the reasons why they would personally leave their companies, similarly to students. However, because they are employees in the industry, they might share different information that can be useful to compare between the opinions of both sides.

When we observe the overarching theme table, at first glance we see there is a variety of reasons present for this subject. However on close inspection, we realize many of these reasons are similar between stakeholders. From the supply side, to begin with, students have argued that would mostly change their workplace for a better offer. This translates to better salaries and benefits. Other reasons, however, include a lack of professional development, bad working environments and practices, as well as not feeling happy or passionate about their jobs. Professors, on the other hand, have argued that the lack of professional development would be the main reason for designers abandoning their jobs, more than better job offers as students have commented. However they both seem to agree that monotony, extended working hours, and lost of interest in the work would also have a significant weight to take this decision. We might argue then that both stakeholders from the supply side match in their beliefs over this topic, having, however, a small mismatch in the order or priority for the main reason, being a better job offer from the students' perspective, and a lack of professional development from the professors' perspective.

Moving to the demand side, employers have argued that three main reasons were the ones that drive industrial designers to abandon their workplaces. In the first place, designers leave their

organization for a better salary. Followed by this, they leave looking for new challenges and professional growth opportunities. In the case of graduates, they appear to share the same reasons but have added that bad working habits would also influence their decision. If we compare both sides there seems to be a similarity between the reasons that would drive designers to leave, against the reasons that employers have known to influence their designers to leave. In this sense, the researcher considers this comparison to be more of a match than a mismatch between both sides. His main observation during this analysis is the priority that each stakeholder considers to have more weight upon their decision. Students and employers appear to be aligned to their reasons because a better salary or better job offer seems to be their top priority, whereas professors and graduates have leaned more towards a lack of professional growth to be the main reason.

This match between graduates and professors and employers and students is somewhat intriguing to the researcher since it would make much more sense to have graduates prioritizing the economic offer and aligning with the reality of their employers. It also raises questions that might be considered as opportunities for further exploration. Why do professors and graduates share the same belief in contrast to students and employers? Are the professors' beliefs influenced by what graduates have commented to them of their workplaces? Is the academics truly aware of the tangible data from the industry, or based on the opinions of former students (now graduates) and make assumptions and conclusions based on this influence? These and other questions might represent an open window for the university to validate their data and perhaps expand their sources of information in order to have a better understanding of the situation that future designers would face when start working, and improve their practices as well.

4.6 Chapter Summary

In this chapter, the researcher presented and discussed the individual template analyses where each theme was compared between both the demand and supply sides. Before conducting the analysis, however, the researcher presented the reader with a clear step by step example of how the overarching theme tables came to be in the study. This was critical to understand how the sub-themes and codes were extracted and grouped from the participant's respondents and also served as a guide to the reader of how the raw data from the questionnaires was handled with the use of Template Analysis. On the other hand, the researcher also presented the reader with the connection that each stakeholder has to the study, and their relevance in the overarching themes analyses. The interpretations of the template analyses were presented by the researcher in an individual manner, with evidence from summary of codes from direct quotes that helped validate the researcher's interpretations from the original questionnaires.

As we have seen with the overarching themes, much can be argued from the analysis done in each of these individual templates. However, when we observe the whole scene, we can clearly see several mismatches that strongly highlight themselves and key points that we might consider critical to attend in order to improve perceptions from the supply side. Looking at the similarities, we have that both the supply and demand side agree on aspects regarding knowledge, skills and abilities that designers should have, as well as those that distinguish them from other professions. They also agree on other subjects such as reasons for designers to abandon their organization, such as a professional growth and job offers. However, there are some mismatches that have been found during this comparison and looking at them through a holistic lens, we find that such mismatches appear to be the result of misinterpretations, majorly coming from the supply side.

Having obtained valuable data with the critical analysis of each of the core themes in this study, it is time to develop a conclusion from these findings and involve the organization, as previously argued in Chapter 3. In the following chapter, Chapter 5: Actionable Research, the researcher will present a comparison of the summary of analysis from the overarching themes, as well as

the results of what the involvement with his organization resulted in, and how he moved forward with the results obtained due to this involvement. Consequently, conclusions to these analyses are not meant to be done in this chapter, rather continue their discussion in the next one.

Chapter 5: Actionable Research

5.1 Chapter Introduction

Having reached this point in the research, it is important to mention what value the study has to the researcher and how it enhances change in his professional role. At the beginning of the research, for instance, the researcher had no idea of the general perception that students had towards the local industry, neither the nature of knowledge they had towards it. However, after the analysis from the core themes, it became obvious that several mismatches existed. For instance, while students may have the idea that designers are underestimated, the results have shown this is not the way in which employers regard them. Among the rest of the findings shown in the previous Chapter 4, all of these aspects have helped the researcher to have a much broader understanding of what the expectations from each group hold towards industrial design, the bachelor program, and even the different stakeholders themselves.

With all the data acquired from the analysis of the templates, in this Chapter the researcher discusses the results in the context of his organization. As argued in Chapter 3, the most convenient way to ensure a major degree of involvement with the organization is by discussing it with the actors responsible for the academic program.

5.2 Summary of Analyses Comparison

In the previous chapter, the researcher gathered the results from the analysis of the entire questionnaires from the different stakeholders and arranged them in tables with sub-themes and codes, following the Template Analysis method. These were identified in the study as the overarching themes, and while each theme was analyzed individually in Chapter 4, in this section, the researcher will now presents his conclusions of these analyses as a whole. Furthermore, since the study is constructed with a student focus, the researcher considers relevant and useful to identify the impact and influence that other stakeholders might have to this particular stakeholder. This contribution to the University can help it understand how the mindset of students are influenced and change over time during their bachelor studies.

In order to make the analysis more efficient, the researcher constructed a table with the summary of analyses from the overarching themes. This became critical to perform a good comparison between the results since each theme involved large amount of information in their individual analysis. To do this, the researcher first arranged the themes vertically in a table. Next, he proceeded to organize his conclusions towards the analysis previously done, always maintaining the robustness and critical information so the analysis could be done in a trustful manner. Of course, during this analysis, the researcher used the information from the previous chapter as well as the summary presented next.

Summary of analyses	
Motivation	Contrasts were found even within the same side of the supply-demand chain. Employers perceive design students as underestimated individuals that get frustrated when lacking knowledge or experience. Professors believe students pursue new challenges and employers perceive students react frustrated to adversity. Does the students' lack of skills make them underestimate themselves?
Visualization as designers	Students visualize themselves as creative individuals specializing in similar topics such as jewelry, packaging and prototyping. They also see themselves independently working and in positions that require strong leadership. They don't seem to do much research of the profession and their potential working areas. This leads the researcher to believe that students might consider what they learn at the university for granted as what the profession is and avoid further study. The demand side, however, look at them as curious individuals that, while they lack some engineering knowledge, quickly adapt to the unknown.
Perception of an industrial designer	From the supply side, students perceive designers as creative individuals that are also underestimated. Professors argued that designers are multidisciplinary individuals but tend to avoid exploration during their studies as students. The demand side consider designers as valuable and irreplaceable professionals. Professors have argued that employers are not aware of the potential of designers, but employers have argued the contrary, enhancing designers as valuable to their organization. This leads us to believe that professors are mislead in this belief, and that they reflect this to students, which in consequence feel underestimated. A huge area of opportunity to explore further.
Abilities that distinguish designers	From the supply side, students believe creativity, teamwork, problem solving, materials handling, and technical skills were skills and abilities that distinguish designers from other professions, whereas professors argued more towards adaptivity and facing problems differently. Employers consider designers to be outside the box thinkers and very valuable individuals. The researcher still finds it intriguing then that design students consider designers to be underestimated individuals when clearly the demand side express the opposite towards them.
Skills demanded by the industry	Students argue on similar skills to the previous overarching theme. Professors have added the ability to have good verbal communication for designers to express their ideas. They have also argued that employers take designers as a low priority in organizations but this is not the case from the demand side in any of their arguments. This aspect has been previously addressed in other overarching themes and the researcher considers a huge opportunity to explore further. There is clearly a strong misconception and its reflected in students and graduates, leading the researcher to believe that professors have in a way contributed to this misconception.
Design process at the industry	Students have little or no experience of how work is done at the industry. Their only reference is what is being taught at the university, so they believe this is the way it's done. Comparing their arguments vs. the demand side, there is a positive match between their perceptions and how work is done. However, the researcher seems convenient to focus in budgets and costs as opportunity areas for improvement.
Reasons to leave the organization	There is a noticeable match between the reasons that each stakeholder argued. These can be summarized as better offer, professional development, and growth opportunities. It is interesting how graduates and professors share the same priority, which differs from students and employers. This leads the question if professors are influenced by graduates arguments, rather than the industry per se.

Table 27 - Summary of analyses.

During this analysis, several aspects were highlighted that the researcher consider important to address. Broadly speaking, we are referring to important mismatches that, as we can observe, have the potential to affect the perception or perspective of some stakeholders towards others. However, before getting deeper in that subject, we can discuss the major findings.

One of the first thing we can notice is the sense of underestimation by students towards themselves or industrial designers in general. When we begin to look at the analysis of the overarching themes, during the first theme, motivation, this aspect became present as an interesting argument done by one stakeholder and raised some questions that might help us find some clues to understand its reasons. For instance, we asked ourselves if the lack of a skill or skills of an industrial design student was reason enough for them to feel that way. However, not much attention

was driven afterwards during the next theme analysis, visualization as designers since there wasn't any mention present towards this subject. It wasn't until we reach the third theme, perception of an industrial designer, where the researcher could notice how this aspect came to light once more and several other interesting aspects were beginning to emerge as well. These include how employers from the demand side actually perceive students and industrial designers as valuable individuals, and how, contrary to this fact, professors believe employers are not aware of the true potential of designers. At this point we still haven't seen any relation with the sense of underestimation from students coming from other stakeholders. However once we move forward to the skills demanded by the industry theme, we observe how once again this misconception emerges and is supported by professors arguing that designers have low priority in organizations. When conducting this analysis, the researcher couldn't help but wondered if this somehow had a relationship with the feeling of underestimation by students. And while this misconception comes from professors in the supply side, since the interaction of students and professors is always present during the bachelor studies, he had to ask himself if professors somehow influenced students in feeling underestimated. While the researcher is not arguing this is a proven fact, we can't deny it does raise some questions, for instance, have professors been somehow responsible for students feeling this way, providing students with wrong interpretations of the demand side towards them during their studies?

The following overarching themes then provide us a different view in most of their sub-themes and arguments. This is because, instead of finding critical mismatches between the supply and demand sides, the researcher can conclude that there is a positive perception from the demand side towards industrial designers. The arguments and sub themes obtained from the individual analyses of the themes do not textually describe similar results between stakeholders. Rather, much can be argued and interpreted from the perception that stakeholders have towards designers. For instance, in the overarching theme of abilities that distinguish designers, students have argued over skills such as creativity and teamwork. Employers, from the other side, have argued they consider designers to be valuable individuals. In this sense, it becomes clear for the researcher that the perception that employers have towards designers is generally a positive one,

hence, they are, generally speaking, satisfied with the way in which designers have responded to their needs in the industry.

However, there are also important arguments and sub-themes that the researcher considers should be taken as opportunity areas to improve. Besides the findings of professors' perception towards employers' considering design as a low priority, in these two overarching themes of skills that designers must have and demanded by the industry, we see how the demand side (and professors from the supply side as well) have argued on several skills they perceive designer currently lack and would benefit from acquiring or improving. Among them are knowledge on costs, business, and engineering topics, and in fact, students don't argue over these subjects. They have argued over creativity, problem solving and other technical skills they believe designers should have, but not regarding costs or marketing which, from the researcher's perspective, are essential topics they should at least consider when developing any design project.

Finally during the last overarching themes, the researcher can argue that the findings show a clear match in most of the arguments and perceptions between the stakeholders towards the subjects in question. In regards to the design process, for instance, students share their beliefs towards this in a rather basic way compared to the demand side which involve more steps and other departments that might directly or indirectly influence the process. However, the process described by students reflect a simplified version of the more complex steps directly described by the demand side. This evidences a positive outcome in the way in which students are taught this at the University and gives the researcher evidence to believe that students are well oriented in this topic. What this means for both the demand and supply side is that employers looking for potential design employees can be certain that those candidates will have enough knowledge to quickly adapt to their process since they would be in a way familiar to it at least in the most basic manner. This might reflect positively for organizations in several ways. First, they can be certain that, because the adaptation process would be relatively quick, the response time for the new employees to attend design issues with his coworkers would be much faster as it would be with a professional that does not have an idea of how the process might be done. Second, this quick adaptation and understanding might translate in economic savings for the organization due to a

quick response time during a design problem by the new employee and less resources spent for him to fully understand the modus operandi of the process in the company. While other benefits might surely be present, the researcher can only assume these to be just a few that employers might have when hiring designers. For the researcher to claim these as facts, however, further study and testing is clearly necessary in the local industry, leaving this topic open for further exploration.

On the other hand, there is the last overarching theme of reasons for designers to leave their jobs. In this case, the researcher also considers a strong match between the reasons that each stakeholder had argued, however is intrigued to learn that the priority of the reasons is different among stakeholders. If we recall the analysis from the previous chapter, we have students arguing that a better job offer is the main reasons for designers to leave their companies, whereas professors and graduates find professional growth to be the main cause. In actuality, the researcher considers there isn't much to argue towards this overarching theme results other than these matches between stakeholders of different sides such as students and employers, and the mismatches between those from the same one, like students and professors. There is however one interesting aspect that highlights if we consider what has previously been argued from the perception that professors believe employers have towards designers. This has to do with the assumption that professors are influenced by arguments they receive from graduates from the industry itself. If professors are indeed receiving more information from their ex-students, or if they are the only source of reference they have towards a specific industry or organization, then their beliefs and assumptions will be directly (and only) influenced by what these graduates have told them, rather than what they could acquire from an employer directly. This might appear to be a finding without much transcendence at first but on further inspection, it might sound logic with the previous findings and would imply the main source of information for professors from the industry are graduates, and not the industry itself. The researcher can argue this since there appears to be a similar scenario with other themes such as in the case of perception, where graduates have argued that designers are underestimated professionals and employers have commented on the opposite, based on their perceptions towards industrial designers.

We can observe there are many interesting subjects that stand out from all the data when it is more deeply analyzed and compared between themes. However, at this point, we might ask ourselves what is the perception that the organization has towards the data obtained. For the researcher, all of this information is clear and makes absolute sense to him since this analysis has only been made by himself. Yet, because Action Research is present in the study, there needs to be an involvement of the organization, as argued during the previous chapter. This involvement will help the researcher identify similarities or opportunity areas in the University, as it will be discussed later in the study. In order to do this, the researcher conducted a set of interviews with the academic year responsibles, in order to discuss the results from the data obtained from the overarching themes. Then, the results where compared and opportunity areas were identified based on the conclusion of such comparison, which are present in the following chapters of the study.

5.3 Presentation to the Organization

One of the biggest challenges the researcher faced when preparing the data to be presented to his colleagues, was the way in which the vast amount of information could be transmitted in a way in which no valuable information was omitted. In the same way, the researcher sought not to limit his colleagues' answers to specific questions, rather to explore deeper thoughts based on the data presented. Due to the nature of the study as being a qualitative one, it was originally intended to be presented personally at the University installations. However, due to the Covid-19 situation, this was impossible to carry out. For this reason, the researcher opted for virtual sessions with his colleagues, as the most similar way as with a personal interview.

After analyzing different ways in which the results could be presented, and because all the data shown in the main themes tables was relevant for the analysis, the researcher opted to show the results as they were obtained along with his interpretation. For this, he prepared a presentation divided by the main themes, along with the interpretation of each one of them. The presentation then was discussed between the academic responsible and the researcher first focusing on the data gathered by each theme and then as a whole. This was done in order to understand what every theme had given as valuable information and to have a final picture of the entire scenario after presenting the final theme without risking forgetting the initial themes presented to them. Alongside this the researcher explained how he was able to get to those themes, through the use of Template Analysis. The presentations were then undertaken as discussion interviews, where instead of focusing specific questions, the researcher and his colleagues could digest and discuss the vast amount of information and come up with relevant opportunities concerning how to improve the bachelor program based on the information presented in the main themes.

After the interviews were finished, the researcher then immediately gathered the information and performed a new Template Analysis. This was done as during interviews with each academic responsible, the topics, ideas, and concerns that came to light were detailed and there was a need to concentrate them in an orderly way. Also, this allowed the researcher to identify similarities be-

tween the topics in the same manner as with the questionnaires originally made to the different stakeholders. The next subsections show the results of each interview in a broad manner, along with a brief presentation of the academic responsible.

5.4 Presentation to the Organization Results

1st Year Academic Responsible

During the Interview with the first year academic responsible for the bachelor program, an extensive analysis was conducted between him and the researcher when the data was presented, and very interesting subjects, concerns, and opportunity areas were highlighted. One of the first arguments he made had to do precisely with an experience he was having with a group of students that are candidates for graduation, where they were designing a proposal for a real client and feel, in his words, ‘’scared and surprised” of all the requirements their design has to have in order to proceed.

It was one of his main concerns regarding the bachelor program as a whole. The fact that students were not being prepared to face real life industrial problems in the local industry. As a former director of the bachelor program, the interviewee is also well aware of other aspects that are not present at first glance and had to do more as an administrative issue in the University than in particular careers, and these can be highlighted further down. However, from the interview we can identify three very significant concerns that can be strongly related to the managerial problem, among others. First, the lack of linked-up projects between the university and the industry itself. Usually these kind of projects are given during the latter studio courses of the bachelor program. However, the first two years of the program these links between the design studios and the industry are basically non-existent. Second, the way in which the university is selling the bachelor program to the students will highly depend on how the students the seek for future activities. What this means is, since the beginning, when students have to decide what career they want to study, the way in which this career is being offered will have a tremendous impact on what students believe and want to dedicate themselves in the future. During the course of the program the university offers three specializations, which are packaging, automotive design, and design tendencies. As discussed, the reason why students tend to choose packaging as one alternative to dedicate themselves as industrial designers is because there is nothing more to offer them, and basically these are are the ones they know the most or at least have more knowledge than others,

since they have to choose between these specializations. Another great concern that was discussed during his interview was what he argued to be a bad filter mechanism for future design students. As a former director of the program, the interviewee has the advantage of being aware of practices that occur inside the university beyond the scope of the bachelor program. One of these practices is the admission process. In his arguments, for what he is able to witness, admissions program to not follow strict profile criteria for whom might be a potential student of industrial design. According to him, while there are admission exams and profile texts, it is very easy for a potential student to be in a program, because precisely the university makes it very accessible for them, since such strict criteria are not present.

Talking with the interviewee was quite enriching, from the researcher's perspective, because is someone that has years of experience in the field openly discussing problems he has been able to witness thanks to the fact that he has had the opportunity to be director of the program, and professor during more time than most of us have been in our workplace. Next, the researcher moved on on interviewing the second year academic responsible.

2nd Year Academic Responsible

The topics from the bachelor program relevant to the second year include Creativity Studios I and II, Product Sketching II, Manufacturing Processes of Metals and Polymers, Digital Modeling subjects, among others. After discussing the results with the interviewee, the researcher was able to gather several key points that were strongly highlighted during this interview. In fact, some of them were quite similar to those present during the interview with the first year responsible. One of the first concerns that came to light was the vision that students had towards what is industrial design per se. It was discussed how students usually have a limited vision of the career until they finally enter the industry. We can even argue they have an unreal way of viewing the profession, mostly due to not having previously had much, if any, contact with real-life clients.

One interesting topic that was discussed during the entire interview is the concept of 'how much industrial' really the profession is nowadays. Ironically, industrial design students don't think much about the industry itself. They tend to think of the products they work with as being designed commercially, rather than industrially. What the interviewee refers to is that design students visualize their proposals as products focused more on aesthetic, emotional, and conceptual feel rather than the manufacturing or technical aspects that they must have. In a way, as discussed, we as professors leveled down the design projects from industrial to artisan ones. The researcher strongly agrees with that comment. Two other highly relevant subjects came to light and these are in a way related to what was discussed previously. The first one is the lack of connections with the industry to develop design products. These types of activities allow students to experience what working in a real-life project is, and also to establish relationships with clients, talking to them in order to understand processes in their industry, among other things. However, the second issue is a very interesting concern that it is indeed widely visible in most of the projects we tend to see, but do not give much attention to, since we as professors use to evaluate the creative process and quality in the product itself. Students tend to focus only on high and/or middle high socio-economic levels of society. It is so common, that referring to this as 'mostly' would be almost incorrect to describe. In this sense, the second academic responsible exposed this problem as one that needs to be addressed urgently, since, in her experience, focusing only in

one socioeconomic level during their entire career, will avoid exploration from students during the research process in their studio subjects, and on the other hand, students exploring other levels will give them possibility to explore a wider variety of proposals to explore from.

3rd Year Academic Responsible

As a third year responsible, the interviewee supervises the subjects of Product Development Studio I and II, Laboratory of Prototypes, Materials Resistance and Simulations, among others. During the interview, concerns regarding empathy of students towards other organizations or individuals came to light. However, the most relevant concept that caught the researcher's attention was how students didn't value the opportunities they sometimes had in front of them.

During the conversation, the interviewee had the opportunity to express a particular case where she exemplifies her argument. As a professor of the subject of Product Development Studio I, the interviewee had been in charge of a project that involves a contest with a company dedicated to design and manufacturing of home improvement products. Due to confidentiality reasons, the name of the company cannot be mentioned in the research, however, after months of preparation and designing, the time came for students of the studio to show the client their proposals. At the end of the presentation, students received negative feedback from the company, arguing that their designs didn't match the criteria needed for developing any of the design proposals. One of the major observations that the interviewee professor could mention is how she notices that, at least in the specific studio subjects of her academic year, students tend to develop projects that allow total freedom of design. This represents a huge problem in the future, as she argues, because thanks to such freedom, students practically make minimal to no research when dealing with other design projects quite different from the previous one. One example of such project is a link between one of Monterrey's most renowned museums called MARCO, where students from 5th semester have the opportunity to develop conceptual objects (not necessarily products) and compete between them to be selected by the museum council to gain exposure in the museum. This, as argued during the interview, leads students to believe they can design with the minimal amount of information towards their customers or final users, and make them believe they can design practically anything according to their own criteria and beliefs. Both the interviewee and the researcher agree that this can lead to a huge problem not only during their bachelor studies, but also once they graduate since, believing they can trust their own criteria, design according

only to their thoughts and concepts without previously developing proper research for the needs, standards, limitations, and other aspects that may come in hand during the entire process.

4th Year Academic Responsible

Moving forward with the interviews, the researcher finally got to speak with the last academic responsible. In this case, the interviewee is a full-time professor that has been in the bachelor program of the University for three years. Among the subjects that correspond to the fourth year of the program are Advanced Design Studio, Selective and Modern Studies of industrial Design, and Interdisciplinary Design Solutions. At the same time, during this period, students perform their professional practices. That involves staying one semester working in an organization to acquire experience as candidates to obtain the degree of industrial design. This is the last year where students undergo any classes before moving to the next and final semester dedicated exclusively on the development of their thesis.

During the interview, several similar concepts came to light that share similarities with previous professors. However, the greatest similarity was with the third academic responsible. This may have been because students from both years had been working in the same design project for the company previously mentioned. However, the key subjects that were discussed were the way in which students used their criteria to perform certain steps during their creative processes and even during their research whenever they need to develop interviews to understand what their main public is looking for. An example of this is when students need to develop questionnaires or interviews to obtain data they can use for their projects. The usual problem is that students tend to interview other people that have similar cultural and socioeconomic strata as they do. So if they are expected to design anything for a population of a different strata than theirs, these products may not match the expected characteristics that users are looking for. These may be price, materials, and even colors and forms that do not match their life-styles. Another important aspect is the way in which students are normally quite dependent on what professors usually tell them to do. In a way this might sound obvious since the professor serves as a guide for the learning process of the student. However, this may not always be the best practice, since this might lead to students always expecting professors to lead the way even in activities where they must show a degree of independence. An example of this is regarding the expected number of proposals during the creative process of any project, since students usually ask professors if a certain amount

of sketches are enough to show their ideas. In reality, there is no definite number of proposals to get to the better solution. Students may undergo twenty, fifty, or even hundreds of sketches before getting to a fitted solution.

5.5 Concepts Extraction from Results

Having reached this point, we can observe that the discussions between the professors of the academic years and the researcher led to interesting concepts and even conclusions from the responsible' perspectives as to what major issues can be improved through action in the bachelor program. However, the subchapter previously presented only embraces a small amount of data that was discussed during the interviews.

In this case, because the interviews were made live between the researcher and the academic responsibles, the researcher obtained the data verbally from the responsibles and during this process he needed to write down the information in order to perform further analysis. As in previous scenarios, and because the researcher has worked well with the established method of data analysis, once the discussions were performed, the researcher opted to once again use the method of Template Analysis to organize the arguments arising from the interviews. However, in this case, the method was used slightly different since the amount of data was relatively small compared to the one for obtaining the overarching themes, and the intention of this new analysis was to obtain key information that might lead to identifying opportunity areas in the actual practices within the bachelor program. Because of this, and in order to avoid confusion for the reader, the researcher opted to first identify the information he wrote from the interviews themselves and classify them as arguments and other relevant data in a table divided by four columns, which corresponded to the academic responsibles, as shown in the following example:

Data obtained from academic responsibles			
1st Year Academic Responsible	**2nd Year Academic Responsible**	**3rd Year Academic Responsible**	**4th Year Academic Responsible**
Students get surprised of the requirements they need to consider in real life scenarios.	Students usually have a small vision of what the profession is until they get to work in the industry.	¿How much are students really investigating when it comes to labor opportunities?	Students believe they are designing for themselves.

Table 28 - Example of arrangement of data obtained from the academic responsibles.

As previously done with the stakeholders' questionnaires from the overarching themes, the researcher now examined the responses and data obtained from the interviews with his colleagues and arranged their arguments in the following table:

<table>
<tr><th colspan="4">Data obtained from academic responsibles</th></tr>
<tr><th>1st Year Academic Responsible</th><th>2nd Year Academic Responsible</th><th>3rd Year Academic Responsible</th><th>4th Year Academic Responsible</th></tr>
<tr><td>Students get surprised of the requirements they need to consider in real life scenarios.</td><td>Students usually have a small vision of what the profession is until they get to work in the industry.</td><td>¿How much are students really investigating when it comes to labor opportunities?</td><td>Students believe they are designing for themselves.</td></tr>
<tr><td>Context of the firm can affect their motivation depending on the activities they make.</td><td>Contact with the client is practically non-existent.</td><td>They (students) need to have more empathy towards their final users.</td><td>They (students) live very different realities to their clients.</td></tr>
<tr><td>Students misinterpret the profession because they are not being adequately guided to where they can/will exert as designers.</td><td>Ironically, an industrial design students doesn't think in industrial projects. They tend to like more commercial designs.</td><td rowspan="2">They (students) have a very different concept of what designing for different groups of people means (cultural and socioeconomic).</td><td>Interviews are always done to the same group of people that share similar cultural and socioeconomic status and interests.</td></tr>
<tr><td>The University sells one product and they are receiving another product (product design).</td><td>The design program is more oriented towards the aesthetics of the products.</td><td>They (students) don't visualize how work is outside the University.</td></tr>
<tr><td>Lack of experience in every level. Beginning from a local perspective, if they are not prepared for the local industry, how can they be prepared for an international context?</td><td rowspan="3">More links with the industry and clients are necessary. Back in the day we used to have more visits to factories and plants, and speak to the people that were going to be considered our clients.</td><td rowspan="2">They (students) don't take advantage of the opportunities they have when faced with new challenges in their studio projects.</td><td>They (students) don't get involved with other departments, only focus with design areas.</td></tr>
<tr><td>Students' filters are not done properly during the admissions procedure.</td><td>They (students) don't make enough research to their potential workplaces, neither to the profile these workplaces are looking for.</td></tr>
<tr><td>Focus more on the lacks of what each student show in order to filter them adequately.</td><td rowspan="3">They (students) don't like technical topics. The second studio of this year covers more of these aspects.</td><td>They (students) believe their proposals must be accepted.</td></tr>
<tr><td>No proper research is made by students during their studio projects.</td><td>We went from focusing our attention on the industry to artisanal projects.</td><td>They (students) are used to getting told what their projects must have to become presentable for clients.</td></tr>
<tr><td>More link up with the industry is needed.</td><td>Students don't like to research in their studio classes.</td><td rowspan="3">Lack of independence from what the professors tell them to do next.</td></tr>
<tr><td>Students should be confronted with ore challenges that they currently are during their studies.</td><td>They need to have more variation in projects involving different socioeconomic and cultural status.</td><td rowspan="3">They (students) are used to have a lot of freedom when designing in their studios. An example of this is the project from MARCO museum.</td></tr>
<tr><td>They tend to prefer packaging (as an example) because there are very few options to offer them, from the vast possibilities that an industrial designer can cover.</td><td>They need to be challenged in their studio classes to get to know different needs of different people.</td><td rowspan="2">They (students) need to develop maturity when receiving feedback.</td></tr>
<tr><td>No information regarding ex-students is available at the moment. There is no reference from them.</td><td>Redesign projects are not considered in the study plan.</td></tr>
</table>

Table 29 - Data from interviews with academic responsibles.

Similarly to the previous concept extraction method used in Chapter 4, the researcher then simplified the information from the table by identifying the core concepts from each argument or data obtained from each interview. In the following table we can observe the result of this from the previous row example:

Core concepts obtained from academic responsibles			
1st Year Academic Responsible	**2nd Year Academic Responsible**	**3rd Year Academic Responsible**	**4th Year Academic Responsible**
Confusion from real life scenario.	Lack of vision	Lack of research	Lack of empathy

Table 30 - Core concepts from interviews with academic responsibles example table.

Having finished identifying all the concepts from each academic responsible, the resulting table is presented as follows:

Core concepts obtained from academic responsibles			
1st Year Academic Responsible	**2nd Year Academic Responsible**	**3rd Year Academic Responsible**	**4th Year Academic Responsible**
Confusion from real life scenario.	Lack of vision	Lack of research	Lack of empathy
Motivation subject to interest	Lack of communication	Lack of empathy	Lack of sensibility
Misguided information given to students	Dislike for industrial projects	Lack of empathy	Avoid exploration
Misleading academic program	Aesthetics oriented program		Lack of vision
Lack of professional experience	Improve links with the industry	Lack of motivation for new challenges	Un-involved with different professions
Inefficient filters			Lack of research
Attention to student's skills		Dislike for technical subjects	Selfish requirements
Lack of research	Misleading of purpose		Dependence from professors
Industrial links improvements	Lack of interest to research		Dependence in guidance
Lack of challenges / comfort zone	Involvement / empathic projects	Excess of freedom	
Lack of vision	Need to challenge		Immaturity accepting feedback
Lack of data for comparison on graduates' development	Lack of relevant projects to the program		

Table 31 - Core concepts from interviews with academic responsibles.

Now, the researcher could easily group similar concepts just as he previously did when studying the overarching themes. Looking at the table as a whole, we clearly see punctual concepts that are present in several occasions within the interviews. As the reader can also observe, there are several concepts that can easily fit within the same classification, so to speak. Examples of this are lack of research and lack of interest to research, which both clearly indicate research as their main attention. Lack of empathy and immaturity accepting feedback are more challenging to relate but at the end, they can both refer to the ability to become empathic toward others, as well as avoid becoming selfish.

In total, the researcher could classify these concepts into four groups: empathy, misleading information, research, and link up to the industry. These groups were then reclassified as opportunity areas by the researcher because they represent subjects that clearly need to be attended by the organization for improvement. Also, because the researcher has previously used the concepts of themes and sub-themes, it might become confusing for the reader to manage another set of these terms for the rest of the study.

At this point, the researcher now not only has his conclusions towards the data obtained during the overarching theme analyses, but also the summary of discussions and concept extractions from the organization through the interviews made to the academic year responsibles of the bachelor program. With this information in hand, the researcher can develop a comparison between his conclusions obtained in the analyses comparison of the overarching themes, and the opportunity areas present in this chapter. This is hugely important because it enables the researcher not only to perform a much more robust conclusion towards the findings, but also complement any opportunity area with evidence from the data obtained and performed analyses. However, before doing this, the researcher will present in the following section his evaluations towards the opportunity areas previously mentioned.

5.6 Evaluation and Accompaniment of the Findings

In total, four themes were identified that, from the researcher's perspective, needed to be addressed by the organization. As previously mentioned, these were empathy, research, misleading information, and link-up to industry. What the researcher presents next is an analysis of these opportunity areas and his perspective towards the relevance that each one of the topics addressed represents to students, as well as to the organization.

Empathy

In the case of empathy, the concepts that were grouped in this opportunity area include those regarding lack of empathy and sensibility, excess of freedom, immaturity accepting feedback, selfish requirements, involvement with projects, motivation dependent on the interest, and need to challenge.

Empathy		
Data obtained from academic responsibles	**Core concepts**	**Relevance to students and the organization**
Context of the firm can affect their motivation depending on the activities they make.	Motivation subject to interest	Design involves many activities. Students should be aware of the importance that each activity has for a product to be successfully developed and can attend the final user's needs in an optimal manner.
They need to have more variation in projects involving different socioeconomic and cultural status.	Involvement / empathic projects	Such involvements might help students position themselves in other people's perspectives and understand that their needs might be quite different to theirs.
They need to be challenged in their studio classes to get to know different needs of different people.	Need to challenge	By challenging students, they are required to perform further research in different needs for different populations, learning more from them, thus enhancing their empathy towards their needs.
They (students) need to have more empathy towards their final users.	Lack of empathy	Students need to understand they are designing for other people, other populations, not for themselves.
They (students) have a very different concept of what designing for different groups of people means (cultural and socioeconomic).		Similarly to the previous argument, design students need to know the cultural and socioeconomic differences that each population might have in order to become more empathic when designing. This can reflect in their design proposals in different ways such as material selection, costs, and marketing of their product.
Students believe they are designing for themselves.		By understanding they are designing for another people or population, they will focus their efforts in improving their proposals and solutions based on their user's real needs and not in what they believe it good for themselves.
They (students) don't take advantage of the opportunities they have when faced with new challenges in their studio projects.	Lack of motivation for new challenges	Avoiding taking advantage to learn new subjects or processes can limit students to believe their way of designing is always the correct way.

They (students) are used to have a lot of freedom when designing in their studios. An example of this is the project from MARCO museum.	Excess of freedom	Through excess of freedom students may think they can always design their proposals as they wish and can lead to avoid considering important characteristics their designs should have.
They (students) live very different realities to their clients.	Lack of sensibility	Understanding different realities can help students become more sensible to people's true needs when product designing.
They (students) believe their proposals must be accepted.	Selfish requirements	Industrial design is multidisciplinary and involves constant modifications and improvements during the design process. Designers cannot become selfish when designing for other individuals.
They (students) need to develop maturity when receiving feedback.	Immaturity accepting feedback	Receiving feedback helps people improve their practices and become more sensible to listening other's needs, which is critical for design.

Table 32 - Empathy opportunity area concept arrangement.

We observe that within this opportunity area, the concepts appear to highlight a lack of sensitivity and awareness from students towards design projects, whether these are developed for a client or as an academic project. This is evidenced in several ways by what the academic responsible argued in regards to students when they offer design solutions without truly listening to the requirements of their clients. We can observe that the lack of empathy, for instance, is discussed through several practices that the academic responsibles seem to be aware of. For instance, we see how there is a need for students to focus their attention in their final users of their design proposals, instead of developing the designs based on what they like or consider is best for themselves.

This represents a huge change in the way in which students are used to work since it means that the interaction that students should have with their population/consumers is not being well conducted. We might argue that even though such interactions might occur, students are designing the projects based on what they apparently like more, instead of what their population truly needs. One of the problems this represents and that was discussed during the interviews was that because of this lack of closeness with their clients, students can loose sensibility to listen and understand the urgencies that their clients need. This might eventually lead to students believe their designs can have a higher degree of freedom than what they suppose to. If such practices continue, we might infer that students will eventually consider this as normal. This might explain why they believe their proposals should be accepted by their clients. Something that's worth mentioning is that at first glance, we might think that these attitudes rely totally on student's behavior.

Yet, if we begin to analyze the concepts further, we become aware of two important things. First, the fact that students are usually given excess of freedom by professors when learning from the corresponding subjects in their studios. Second, the fact that there is misleading information from the University towards students. So from one part, from the researcher's perspective, students may be getting used to regarding industrial design as a profession where freedom of aesthetic expression is more of a rule, leading them to even believe that their proposals should be accepted, even if they don't fit the criteria needed.

On the other hand, the way in which the program is offered to students, from the beginning as a career option to the subjects in general, might make them believe this profession is mostly focused on the taught subjects. This can explain their tendency towards deciding on areas of packaging, as previously seen in the responses made by students during the analysis of the overarching themes. If we analyze the concepts that correspond to the empathy theme, we find that most of them are present in the 3rd and 4th academic year. From the standpoint of the researcher this is huge, since this might evidence an evolution in the perception that students have towards the profession since the way they have perceived it from the beginning of their studies. In other words, has the academia been teaching students this lack of empathy since their first semesters?

While these arguments cannot be claimed as the absolute truth, the researcher considers they do influence in the way in which students advance towards their bachelor studies. If we recall how the bachelor plan is conformed in Chapter 2, students undertake several form exploration and creativity subjects, that are precisely their first four studios of their studies. However, during this time, students have virtually no contact with real life clients. It is not until more advanced semesters that they begin to interact with them during their studio classes or other subjects. It is then when this lack of interaction becomes evident and comes with no surprise, since if students never had this closeness with real clients, they might get used to work with such excess of freedom, even to the point in which they might think that this closeness is not necessary or has little relevance to their projects.

As we can observe, the relevance that this has to the organization and to students, from the researcher's perspective is enormous. On one side, it is important that students understand the rele-

vance that each step of the design process has to their proposals, including negotiations with clients and final users. On the other hand, it has been argued that students should be challenged in their studio classes for this same reason. In this sense, the researcher totally agrees since, from his perspective, as long as students are given excess of freedom in their design projects, this will always reflect in their practices. Finally, one of the most important aspects to consider is to enhance students to always be conscious that in most cases they will be designing for other people or group of people, and not for themselves. By doing this, students might develop a habit of profound research in their final users since they would know that before developing any formal design proposal, they would need to have as much information from their clients as possible.

Misleading Information

The second opportunity area to discuss right after empathy is the one referring to the way in which information is handled from the university to students. Next, just as with empathy, the researcher presents a table with the concepts from the discussions, and its relevance.

Misleading information		
Data obtained from academic responsibles	**Core concepts**	**Relevance to students and the organization**
Students misinterpret the profession because they are not being adequately guided to where they can/will exert as designers.	Misguided information given to students	If students are not aware of how they can exert as designers, they might only focus in what they've learnt during their bachelor program, this might enhance a lack of exploration and research, as well as a wrongful belief of the work opportunities they have as designers.
The University sells one product and they are receiving another product (product design).	Misleading academic program	Offering a different offer to potential students can lead them to believe their profile is adequate / a match for the profession, so to speak. During their bachelor studies, students may find it wasn't what they truly wanted and can loose interest in subjects that are highly important to industrial design.
Students' filters are not done properly during the admissions procedure.	Inefficient filters	Adequate filters might allow students to have a clearer perception of what they are about to study, as well as help them confirm or deny their assumptions towards studying the bachelor program.
Focus more on the lacks of what each student show in order to filter them adequately.	Attention to students' skills	Proper filtering of potential students will allow the bachelor program to have more accurate profiles of students in the program.
No information regarding ex-students is available at the moment. There is no reference from them.	Lack of data for comparison on graduates' development	Without a formal reference of their development as professional designers in the industry, the university has no point of comparison of the results of their practices during their bachelor studies.
Contact with the client is practically non-existent.	Lack of communication	If no communication is done with clients during any design process, students will have no constructive feedback form their proposals, nor a clear understanding of what their clients actually want. This might lead to excess of freedom in the proposals or delivering a result which is not compatible with the true needs of the final user.
The design program is more oriented towards the aesthetics of the products.	Aesthetics oriented program	If the program is oriented towards a specific characteristic, students might assume this is the most important aspect to consider when performing design proposals.
We went from focusing our attention on the industry to artisanal projects.	Misleading of purpose	A lack of attention to industrial projects will make students believe they, as potential designers, will mostly focus in product design.
Redesign projects are not considered in the study plan.	Lack of relevant projects to the program	A large part of projects in the industry include redesigns and improvement to previous versions of their products.

Table 33 - Misleading information opportunity area concept arrangement.

Looking at the opportunity area of misleading information, the researcher can observe several key points that considerably affect the professional development of students from the beginning of their bachelor studies. In the first instance, we see that from the beginning of the career, students are apparently receiving erroneous or misleading information about the profession to which they wish to enroll. They are receiving this information before enrolling to the program and we

can witness this in two ways: inefficient filters, and a distorted offer, so to speak, to students. We can observe that the first concept and data obtained from the interviews suggest students are not adequately guided towards the potential of the profession of industrial design.

On one hand, we have students that are about to choose their career and need to know more about it, such as working opportunities, and activities that they will learn during their studies, among others, in order to know what decision to take. Part of their research is naturally done in the university they wish to apply. During the application process, students must take admission exams that will help them, and the university, know if they are suitable candidates to study the program. And while this filter can be considered as very practical, according to the information obtained with the first year responsible, this is not always the case. We must not forget that as a former director of the bachelor program, and having many years of experience in the organization, he has been aware of many practices that occur inside the organization that normally most of the professors are not aware. If we remember his arguments during the interview, one of the biggest problems he argued normally occur in the student selection process was that the filters were not strict enough. It is not the intention of the researcher to say that students should not be given the opportunity to apply for this profession, however, the selection filters could be something to improve that is beneficial for both the university and students. On one hand, if the organization manages to adequately filter its students, the profile of graduates they would have could be much more in line with the profile of professionals they hope to obtain. Theoretically speaking, the selection filters fulfill precisely this function. However, if part of the problem currently has to do with this process in student registration, then this may be a practice which the university should explore to identify improvements in its practice. The researcher is aware that this would involve a much more exhaustive and specific analysis on the subject, thus leaving the door open as a possible contribution to the organization as a suggestion to explore the theme further by other researchers.

The other important aspect to highlight is the way in which the program is offered to students, and two interesting scenarios would come into play here: how the bachelor of industrial design is sold to new potential students and how the program is presented during their semesters once they

form part of the program. The first is related to what was previously discussed on student filters since, after looking at the information we have, we can infer that having a distorted idea of what the profession is, students might believe that is exactly what they wish to practice once becoming professional designers. On the other hand we have the way in which students are oriented during their studies throughout their classes. It is important to emphasize that if there is no self-directed research towards the profession, the work field, and the activities to be carried out, most of the learning and professional orientation that students will receive during their studies will come directly from their professors. This represents an enormous responsibility from this stakeholder towards the organization and students as well, since the influence they will exert towards them will undoubtedly be quite significant.

Going back to the bachelor program we find a strong relationship in the way in which information truly seems to impact students' perception of this profession. As previously argued, the fact that the career is being offered in a certain way to students where freedom is highly evident, is a strong evidence of a misled information to what the profession actually tries to accomplish. If we recall some of the literature from Chapter 2: Literature Review, we find Macias and Bribiescas (2011) discussing the skills that industrial designers should have, and while it was also mentioned by other authors that aesthetics is important, such as Ross and Wensveen (2010) and Shusterman (2000), the most relevant skills described by the authors actually focus in identifying new business opportunities in the market, and generating sustainable products, besides having interpersonal skills such as being able to work well in teams and 3D tools for design skills. However, these sets of skills appear far from having total freedom and focus in the aesthetics of the product.

Research

The research opportunity area clearly shows us a series of concepts that we will focus on next. The first if the lack of research as such, and this lack becomes present in various ways for students. First, it has been argued that students don't make enough research in their studio projects as well as in the labor field that exists for them. From the researcher's perspective, this can lead to catastrophic consequences, since if they have not carried out a proper previous research where to work, we can argue that designers will end up leaving their workplaces since it is not what they were expecting in the first place. This appears to be something quite clear that doesn't require any deep analysis to come to such conclusion. However, there are a few aspects that have to do with this and are worth observing further in this opportunity area.

Research		
Data obtained from academic responsibles	**Core concepts**	**Relevance to students and the organization**
No proper research is made by students during their studio projects.	Lack of research	Studio projects are the most important subjects for students, since they learn how to properly develop design projects and apply the learning techniques from other subjects. If no proper research is performed during their initial phases of their projects, the results will reflect this by offering a solution that might not attend the requirements of the true final users.
¿How much are students really investigating when it comes to labor opportunities?		Without a proper research for the profiles required, individuals might apply to any workplace and eventually leave their organizations because they realized that is not what they expected in the long term.
They (students) don't make enough research to their potential workplaces, neither to the profile these workplaces are looking for.		
They tend to prefer packaging (as an example) because there are very few options to offer them, from the vast possibilities that an industrial designer can cover.	Lack of vision	Industrial design covers much more than just packaging. But if no proper research is done (or enhanced to be done) students might believe they can only specialize in very few areas.
Students usually have a small vision of what the profession is until they get to work in the industry.		If no proper research is done of the work opportunities available or how a professional industrial designer carries out his activities in the industry, students might always assume they can exert their profession only by what they have learnt during their bachelor studies.
They (students) don't visualize how work is outside the University.		
Students don't like to research in their studio classes.	Lack of interest to research	In accordance with the first argument, proper research in the studio classes are hugely important, since they provide the student with accurate and robust information that is useful for their projects.
Interviews are always done to the same group of people that share similar cultural and socioeconomic status and interests.	Avoid exploration	Interviewing individuals that are not the potential population or ideal consumers will only generate false data for students, which they will then use as guide for their design proposals.
They (students) are used to getting told what their projects must have to become presentable for clients.	Dependence from professors	A lack of independence by students might lead to avoid further exploration from their part.

Lack of independence from what the professors tell them to do next.	Dependence in guidance	If students are always dependent in what they are told to do, they might only focus in achieving those activities and never explore other methods, or become autocratical of their own proposals and methods.

Table 34 - Research opportunity area concept arrangement.

We can see that according to what was discussed in the interviews, there is an evident lack of vision and interest for performing research by students. We can refer to this last aspect as the research performed in their studio projects, as well as investigating the work field and potential of the profession as well. This would explain why students seem to have a lack of vision of what they can accomplish as professional industrial designers. It was previously discussed that students have the idea that they can only exert in some areas of design such as packaging or jobs where they have to be constantly creative. In great part this is thanks to the information they have received during their studies. However, we see how there is a dependency by students towards their professors. During the interviews it was discussed how students are used to being told what exactly to do in the different stages of the design process. Even if they're working in a project where they have direct contact with the client, they don't seem to take advantage of this and carry out further research for their projects. Students seem to take for granted what professors tell them about their projects and this might even be carried out in other situations such as possible places to work. What this tells us is that students appear to become totally dependent of their professors.

This aspect was previously mentioned during the analysis of the overarching themes made by the researcher. However, during the interviews, the importance of challenging students comes to light. From the researcher's perspective, it is good that students trust their professors since this evidences a good harmony between both stakeholders during the bachelor studies of students. However, becoming too dependent on professors will cause students to avoid conducting research when needed because they will feel that they only need to do it when they are asked to do so, preventing them from developing or enhancing this skill, since instead of looking at it as a skill they can use in their favor in the future, they will see it as another step they need to accomplish in their projects.

If this is true, we would not only have to address the problem of promoting research in students, but making them much more independent from their professors as well. If students become more independent in their decisions during their projects, this would mean they will start developing their own motivation on performing these activities. Their vision of the profession would be much broader since they would investigate possible jobs or areas where they can dedicate themselves as designers, different speciality areas they didn't explore within the field of design, and even learn from topics and skills that have also been previously argued that students need to learn more from such as costs and budgets for projects. They would also enhance their ability to deal design problems directly with their clients and final users.

This leads to the researcher to many questions. Is this the result of inefficient practices by the academics in the bachelor program? Do students enter the program with that mentality, so to speak, or is it something they develop during their studies? Is this problem common in other places, locally or regionally? Is this a cultural problem? Naturally if referring to a regional or cultural problem we would be referring to something that goes beyond the limits of this research and that would require a deeper study to be able to answer this with certainty and tangible evidence. And while this is not the focus of this study, the researcher has to admit these topics result in a huge interest to continue investigating and considers this as a good opportunity area for future study. However, one thing the researcher believe should be addressed by the organization is reflect on its own practice to know if its actions have somehow influenced in this to occur. As academics, how could we improve for the benefit of our students? And, if we perform a change for good, how can we measure the impact that it will have on students and their profession? Undoubtedly, this represents a huge new opportunity for research and, given that thanks to this study the researcher was able to obtain data that serve as a reference for possible research of this nature, it would greatly benefit future researchers.

Link-up to Industry

Finally, we can explore the opportunity area of links with the industry and the bachelor program. We can observe many topics of interest from the researcher's perspective, and how the corresponding concepts relate to others in this analysis. First, we observe the urge to improve the links with the industry in the sense that students lack vision of how work is done in real life scenarios. Second, we can observe a dislike for technical and industrial projects, and if we consider that the bachelor program has been mostly oriented towards an aesthetics one with a considerable amount of freedom for students during their explorations, we may think there exist a link between both concepts.

Link-up to the industry		
Data obtained from academic responsibles	**Core concepts**	**Relevance to students and the organization**
Students get surprised of the requirements they need to consider in real life scenarios.	Confusion from real life scenarios	The problem with this comes by hand with a lack of research. However every industry has a different way of working. Through performing more links with industries, students may learn new professional ways in which design projects are done.
Lack of experience in every level. Beginning from a local perspective, if they are not prepared for the local industry, how can they be prepared for an international context?	Lack of professional experience	
More link up with the industry is needed.	Industrial links improvements	
Students should be confronted with more challenges that they currently are during their studies.	Lack of challenges / comfort zone	If students are not challenged, they can stay in comfort zones, so to speak, leading them to avoid further exploration in many cases and understand how processes are made in real life scenarios.
Ironically, industrial design students don't think in industrial projects. They tend to like more commercial designs.	Dislike for industrial projects	By hand with an issue of misleading information, industrial design as a profession focuses partly in product design but also in mass production. Many of the industries existing today work with this last aspect of design as well, which is why is crucial for students to visualize this aspect as being part of their profession as well.
More links with the industry and clients are necessary. Back in the day we used to have more visits to factories and plants, and speak to the people that were going to be considered our clients.	Improve links with the industry	An evident loss of link with the industry and real clients is occurring in the profession. This represents a huge risk for potential designers to truly understand the need of their clients for their projects.
They (students) don't like technical topics.	Dislike for technical subjects	For individuals to like or dislike specific subjects is not wrong, but industrial designers should be aware of how to properly attend technical issues that their proposals might have. Through real life experiences this aspect provides the designer to learn the benefits of understanding technical topics to communicate their ideas to others as well, for instance in other departments. In the same way, by involving themselves with other professionals, they get to understand the relevant aspects that these professions consider when dealing with design projects.
They (students) don't get involved with other departments, only focus with design areas.	Un-involvement with different professions	

Table 35 - Link-up to the industry opportunity area concept arrangement.

When we observe the data obtained from the interviews with respect to this opportunity area, a few concepts immediately stand out that seem to be of key importance. The first one has to do with a lack of motivation or interest over certain topics related with the industry itself such as industrial projects, and an apparent stagnation from students to know more about the labor field of their profession. The second one has to do with a lack of links with local industries. We have already discussed the need for students to be challenged in their studio classes and, as we can observe, this concept seems to have relevance once again in this opportunity area. Part of the importance for students to have challenges in their projects is to induce exploration and research in subjects they have little or no experience at all. It forces them to explore different methodologies and methods in the creative process while trying to solve their design problems, and more importantly, challenges eventually will give them independence because they would have known how to react and do in situations where they have little knowledge due to previous experiences.

Similarly, by challenging students, the university will avoid them to enter in a possible comfort zone. We can start looking at how this aspect relates with the topic of independence that was previously discussed. At the same time, when avoiding such challenges, we can observe the consequences that this could have in students as was discussed in the interviews: confusion when facing real life problems, getting used to being told what to do and becoming dependent, and a visible dislike for industrial projects and technical issues. This caught the attention of the researcher since they are concepts that were previously discussed in the study but came to light thanks to this results from the interviews. We can ask ourselves then if the lack of challenges and links with the industry have influenced in the disliking of industrial projects and topics. That is, students, unaware of different industrial subjects or having the perception that their career is only focused in product designing, consider that it is not necessary to learn more about the industry and rather feel more attracted to product design with which they can relate more as they are constantly experiencing it during their studies.

This opens two interesting possibilities: On one hand, it evidences a tendency for a profile of a student focused in product design rather than in industrial design. That is, with greater affinity to the development of concepts of products rather than to their production and manufacture. On the

other hand, it puts in evidence what has been previously discussed towards the distorted information given to students that will apply to the bachelor program as well as to those that are currently undertaking it. In other words, their orientation towards liking a more aesthetically and conceptual style of design and their dislike for the industrial part on product creation would be a reflection of how they have been guided during their bachelor studies.

Finally, while most of this appear to point to the perception and attitudes of students it appears that professors and the organization have also influenced significantly in all this situation. We can observe this even in several comments done by the academic responsible such as that students are used to being told what to present even to clients and that they are not adequately guided to where they can perform themselves as designers. These issues could have been largely the result of misguidance from the professors to students since the beginning of their bachelor studies. Looking at the concepts of this last opportunity area more questions arise that are worth reflecting on, such as whether the dislike for technical subjects can be lessened through education and practice? How could the supply side reduce the confusion from real-life scenarios that design students experience within the university? How could we, as academic professionals, guide students to become more independent and self aware of the importance to perform adequate research in their field?

5.7 Chapter Summary

At the beginning of this chapter, the researcher presented a summary of analysis comparison from the overarching themes and results found using the method of template analysis in the previous chapter. He then presented the way in which the information was presented to the organization, which after analyzing the different options to perform this, he found that the most efficient way to do so was through the academic year responsibles.

In total, four academic year responsibles form part of the bachelor program. Each one corresponds to two continuous semesters and is responsible for ensuring that the courses given in every subject complies with the requirements from the organization in regards to time, quality and topics. The interviews were made virtually and individually and thanks to the information gathered from them, the researcher could extract the key concepts once more using template analysis.

With this method, he was able to extract four opportunity areas that are present in the academia and that from his perspective need to be addressed in order to improve the processes in the program and the profile of students in the organization. These were identified as empathy, misleading information, link-up to the industry, and research. The researcher conducted an individual analysis from each one of them and shared as well the relevance of such opportunity areas that they have towards students and the university. In the next chapter, the researcher will present the analysis of the findings that have emerged during the study.

Chapter 6: Analysis of the Findings

6.1 Introduction

Throughout the previous chapters of this study, we have seen how the researcher has carried out a series of analyses from the data obtained by the four stakeholders in the supply chain: students, professors, employers, and graduates. In this chapter, the researcher starts with a global analysis of the findings made during the discussions with the academic year responsibles and the individual findings where the overarching themes came to highlight. He will then continue to focus in a subject that he considers is extremely relevant and useful for the organization that is to compare and understand the way in which the stakeholders and sides from the supply chain exert influence towards students and also how the mismatches present in the chain influence them as well in their profession.

This information will become quite useful to present his findings and relevance to the supply chain present in the university. It is worth mentioning that at the end of the chapter, the researcher will provide as well his propositions on how to attend opportunity areas that have been found in the analysis, as well as his justification as to why he suggest these attendances to be done in such a way, in compliance with providing contributions that can be used in practice by the organization. Finally, the researcher finds it convenient to present the reader with a framework of the journey he took during this studio as a way to encompass this entire trajectory.

6.2 Analysis of Results and Influence on Students

So far through out this study, we have seen the analysis of the data obtained through the interviews with the academic year responsibles. The arguments and concepts extracted from the interviews have helped the researcher identify four opportunity areas that were possible to obtain using the method of Template Analysis. In this section, the researcher will conduct a brief comparison between the summary of analysis obtained within the examination of the overarching themes, and the opportunity areas identified from the new data presented from the analysis of the interviews. This comparison is intended to give robustness to the analysis since not only will it help the researcher find similarities between his conclusions and the conclusions obtained from group discussion interviews, but will also complement the data presented so far.

In the following table, the researcher has organized the key points extracted from the analysis made in the overarching themes section from the previous chapter (left side), and a summary of the conclusions and key points gathered from the interviews and discussions with members of the organization from the previous section (right side):

Summary and key points of individual analysis of overarching themes	Summary and key points of analysis and discussion of results within the organization
One of the main subjects that came to light during this analysis was the sense of underestimation from the industry towards industrial designers from the perception of design students. The demand side actually has a positive perception towards industrial designers. Employers consider designers as valuable and irreplaceable individuals, in contrast to students arguing being underestimated.	From the discussions of the data presented to the organization, the researcher identified four opportunity areas that could improve the practices performed by the university to attend potential mismatches between the demand and supply (industry and academics). The first opportunity area, empathy, highlights a need for students to have more sensibility in their client's needs. There appears to be also a need for students to be challenged in their projects through learning and researching properly on their population they are designing for, avoiding an evident excess of freedom by their part in the decision of their proposals.
According to the demand side and professors from the supply side, some of the skills that designers would benefit from enhancing include knowledge on costs, business, marketing, and engineering subjects.	In the case of the second opportunity area, misleading information, this seems to occur within the university in two ways: how the program is sold to potential students and how students receive information throughout their career in their classes. The researcher finds this problematic since confusion could arise between students once they are undertaking their studies. If the university is offering the career as one focused in the aesthetics and concepts for product designing and left the industrial and manufacturing parts aside, then there will most probably be more mismatching between the profiles expected and the profiles delivered in the system.
There seems to be a positive match between what design students believe the design process is in real life and how it actually takes place in the industry. The researcher believes this enables potential working candidates of industrial design to quickly adapt to specific design processes.	The third opportunity area has to do with the lack of research performed by students. The importance this has to students, from the researcher's perspective, not only has to do with their projects in general but with the lack of research of the work field and potential of the profession itself. Once of the most intriguing findings during this analysis was a clear dependency from students towards their professors. Students seem to completely rely on what professors tell them to do. This not only enhances students to avoid exploration in their fields, but generate a stereotype, so to speak, of what an industrial designer can do (and how it is perceived) based on what they only learn within their studies and from their mentors.
Due to the similarities in the way in which professors believe design students are perceived in the industry, among others, and the comments given by graduates, the researcher argues there is a possible direct connection between how professors influence students, because of how graduates influence professors.	The last opportunity area, link up to the industry, shows an evident need for students to have a closer contact with the industry during their studies. There is an evident dislike for industrial projects and technical subjects from students and in regards to this, the researcher questions if the lack of enough link ups with organizations is somehow related to this, since students are mostly used to conduct their design projects with an excess of freedom without involving real life clients.

Table 36 - Summary of individual findings and organizational discussions.

Naturally, these key points presented in this table do not show the extent of the analyses made in each section, however it does help the reader have a general overview of the conclusions, key concepts, and data obtained from them and see the general contrasts between both analyses. Looking at the information presented, it is hard to identify at first glance how both analyses may be related between them. In fact in some cases, they appear to have contrasting results. An example of this is how it was concluded that there is a clear match between the perception that students have towards the design process and how it is done in real life. In the analysis made by the researcher we could clearly see how students argued over what they believed were the different stages of the process that were usually handled in companies, and we see how in actuality, each organization has its own process. However the processes do not differ that much between them and students have argued over the process in a similar, yet very simple way of looking at them. We might believe this finding contrasts with the ones from the interviews where the researcher has argued that a lack of proper research of the profession from students would lead to results

that do not align with certain requirements or a lack of vision of what the profession could offer to professionals.

However, the researcher does not consider that these types of contrasts generate a significant impact to the study since, from his perspective, they mostly offer punctual data that was previously discussed. Instead, what he considers is more useful is to identify a possible influence between the stakeholders (or key actors) towards students in the study. For instance, one of the most interesting topics that came to light for the researcher during his individual analysis was how students described being underestimated within the industry when the evidence shows that in reality this is actually the opposite. The researcher finds this intriguing because is a contrast that could transcend in the way in which future students could also perceive the industry. If students keep considering they are underestimated over the years, we could deduce that their motivation will keep diminishing. Similarly, these findings could provide the organization with valuable information they might use during future studies to improve their practices.

Now that the researcher has clarified this, we can stop for a moment and reflect on what we have gathered so far with these new opportunity areas. We can think of two major concerns that immediately appear in this analysis. The first one has to do with research itself. We can observe now how important it is for students to conduct adequate research in their fields. Failing to do so results in severe consequences that we can observe such as a lack of sensitivity and empathy towards their clients and their requirements. The excess of freedom given to students has also had its particular outcomes such as students believing this is the most common path to take when dealing with design challenges. On the other hand we have the way in which students have been misguided by the university during their bachelor studies since the beginning of the program, and the consequences, as demonstrated previously, are not visible at first sight during their first semesters, but are evident as they advance in their careers.

Misguidances in the bachelor program are presented in several forms in the results analyzed. First, we have the way in which the bachelor program is taught to students. This refers to the ways in which academics have taught the students in regards to how to attend design problems, focusing on the development of the product itself through aesthetics, creativity, and exploration,

and leaving aside guidance for proper research with client interaction, technical and manufacturing issues, and challenge to independently perform their own investigation and obtain efficient results with grounded data. Another way in which this is evident is in the academic offer that is currently presented by the University. As students go on learning the different areas and topics of design, other areas have been left aside or ignored. We are not referring, by any means, in a malicious matter, of course, rather the focus of the bachelor program evidently appears to lack attention to other areas that can enhance a proper match between both sides of the supply- demand interaction. In this case, those that have been evidenced by the data presented.

In the case of misleading information, we can see this actually occurs since the beginning of the program. Potential students of the bachelor program have a perception of this profession over which they will decide to study it or not. During the entire program, students will receive information from the university and their professors that will influence on how they perceive the career until, at least, something different presents to them. This is where real life experience plays a critical role. Students, by experiencing real problems, realize the differences that exist between how they learned about the profession and how they should actually carry those problems out. For many, this experience can occur suddenly with projects with real clientes, or as a surprise, to the extent of showing discomfort as we have seen according to the clarifications of the academic year representatives. For others, these experiences serve as part of their learning and maturation as professionals. From the researcher's perspective, learning how to adopt new scenarios will depend on the attitude and maturity of each student, as well as their interest in the subject. However, what is of interest for this study is to see the way in which this influences the mentality of students over time. What we can observe is a sudden contrast between the mentality of students against that of professionals working in the industry. We do not see a transition over time, rather a lack of skills that becomes evident in the later years of the program. This lack becomes evident since it hadn't had the opportunity to present itself previously during the beginning of the program because there isn't any interaction between students and real life clients in that initial stage. For the researcher, colloquially speaking, this resembles a bubble that slowly forms and explodes when students have to face real problems. What this means for the university and the industry is

quite alarming, since it evidences a lack of interaction between both parties that, theoretically speaking, should be present, at least, during the training of students in the bachelor program.

In regards to research, similar to the previous opportunity area, the researcher can argue that this is a delicate subject for the organization if in fact actual practices are causing a dependency from students towards their professors, resulting in a lack of research that could result in the problems that we have seen when facing problems with real clients. In this sense, the researcher could argue that students are widely influenced not by employers or graduates, but directly by professors. From the demand side towards students there is not a strong influence during their studies, as the problems they are dealing with real clients evidences the lack of research over the topics they are attending, their clients, and practices and processes that are present outside the university such as with manufacturing suppliers. This means a huge problem for students once they become graduates themselves. On one side, once they leave the university it represents a positive scenario since they will now need to make independent decisions in future projects as design professionals. Students, being graduates now, will have to make their own decisions, totally on their own, without the support or endorsement of their mentors or professors, which will undoubtedly make them grow as professionals. However, from the researcher's point of view, and based on everything that has been discussed over this subject, this independence will come too late for students, because in addition to these surprises they will met once they start working in the industry, they wouldn't have any guide or method on how to conduct proper research on their own.

Finally, in regards to links with the industry, the first critical aspect that highlights the lack of interaction with the industry is clearly the confusion that students appear to present when dealing with real life requirements. There are, however, other ways in which this lack of interaction directly affect students according to the evidence gathered. The first one is a lack of vision of the profession that exists outside the university, so to speak, due to an evident comfort zone. This comfort zone will reflect different attitudes that students can take such as apathy, a demand for their projects to be accepted, and a lack of motivation to research. By hand with this, there is also a dislike to embrace industrial and technical projects from their part and we have seen how the researcher relates this to a misguided information given to students from the university itself, as

previously argued. Once again, we can see how the university is the one that impacts students the most, however, the researcher considers the impact made is not the result of information given to students, rather for not transmitting or allowing the information to broadly reach students. In fact, from the researcher's point of view, in a more aggressive way of looking at this, contrary to transmitting misguided information to one stakeholder, in this case we are observing that through a lack of closeness with the industry, the university might actually act as a barrier to students' learning. Naturally, the researcher is not arguing this is intentionally made, however he does consider that in order to break this barrier, the amount of effort would be considerably greater, since it would involve a complete redesign in activities within the subjects of the entire study plan so this can happen throughout the entire bachelor program.

Now, although the analysis of the opportunity areas has already been presented in the previous section, in this section, the researcher can observe the way in which the findings directly influence students and the source from where that influence comes directly. Likewise, the information obtained can be used by the organization for future references, considering this as another contribution to the university. In a very summarized manner, the researcher can argue that in regards to empathy, students are mostly influenced by the industry, since they truly experience it once they graduate and become professionals, and by then they will be working with real problems and clients and their mentality will need to shift to a more empathic way of looking at the design projects. Looking at the concept of misleading information, it is the university who influences students the most. On one hand, there is the career offer that is presented to potential students and on the other hand, professors focus in teaching students on particular subjects but still there is minimal contact with real life projects in comparison to a full graduate. In the case of research, students are mostly influenced by professors as well, however in this case, it is not by performing certain actions towards students, rather a lack action towards them. Examples of this is the excess of freedom that was discussed in previous sections. Another way in which students are directly affected in relation to professors is their dependency towards them. Naturally, and as previously discussed, there is also the interest that each student has towards doing a proper research or not. However this topic in particular is one that goes beyond the limits of this study, which is not taken in consideration for this analysis. Similarly, link up with the industry (or lack of, in this

case) is influenced by the practices within the university. In this case, the researcher can conclude that this goes by hand with the way in which the career is offered to students, since it involves how the study plan is developed within the organization and the activities that each subject should have.

To observe this in a concise manner, the researcher presents the following graphic, which shows how each of the discussed stakeholder influence students from the bachelor program in regards to the opportunity areas and problems previously presented:

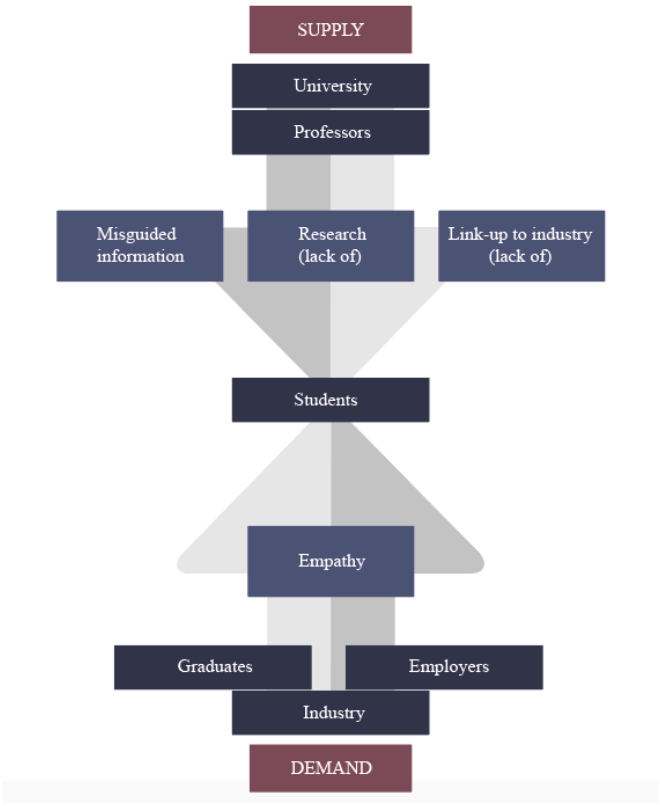

Figure 3 - Influence received from stakeholders regarding the opportunity areas.

This graph illustrates how students receive influence from both the demand and supply side in regards to the discussions made from the opportunity areas. However, it doesn't fully show the extent of the analysis from the data since to do so, it is necessary to integrate the results obtained from the individual analysis previously made by the researcher based on the overarching themes.

For this, the researcher developed the following graph which, similar to this first graph, only focuses in the first individual analysis previously made by the researcher:

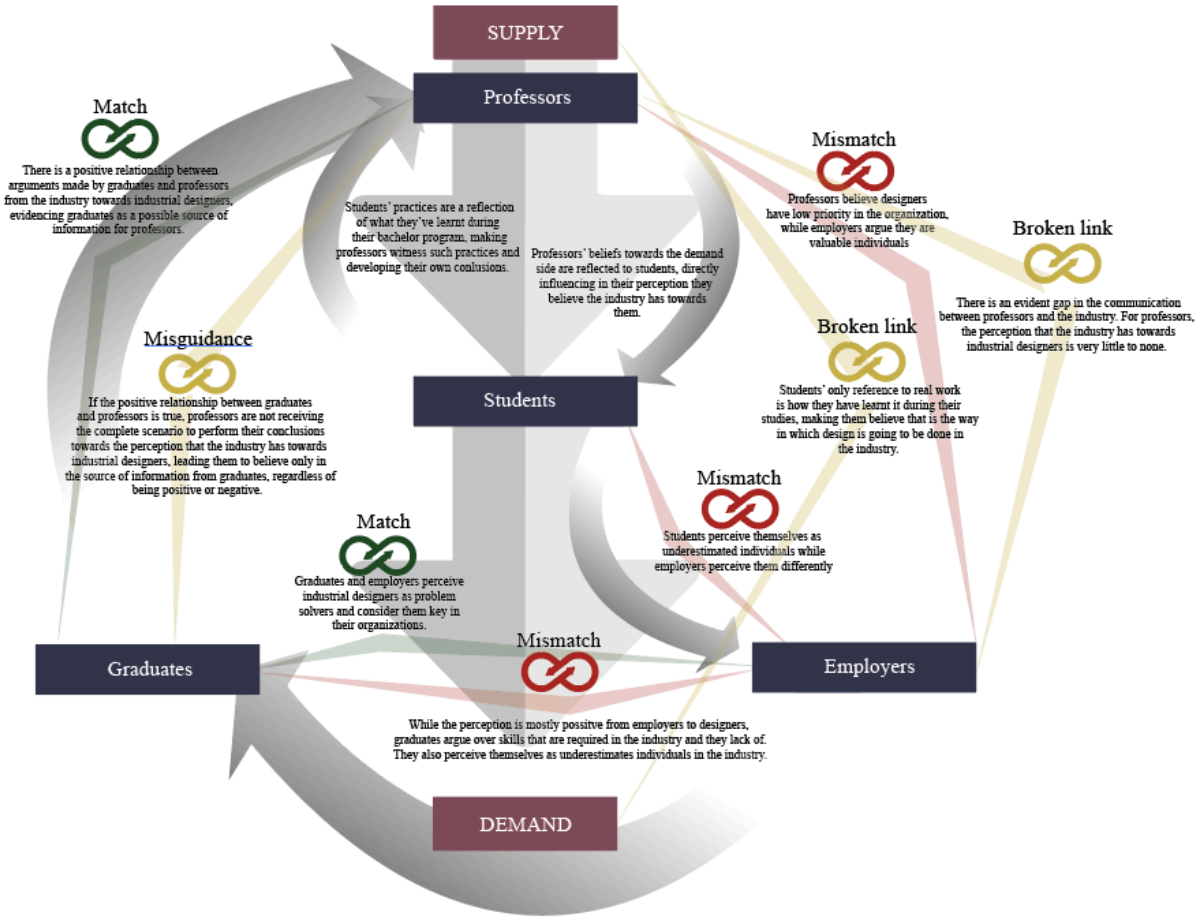

Figure 4 - Influence from stakeholders regarding the analysis obtained from the overarching themes.

Broadly speaking, what we are looking at in this graph is completely different and way more complex than the previous one. Contrary to the previous one, this graph illustrates mainly two important things: the first one is the flow in which each stakeholder appears to have relationships between them based on the findings from the overarching themes, and the second one are relevant key points that could be considered matches, mismatches, or potential opportunity areas labeled as broken links or misguidances, that are occurring in the supply - demand chain and could benefit from attending them in the organization. However, before getting into detail with this new graph, and in order to perceive the entire scenario from both analyses (individual and group

discussions), the researcher decided to develop the following illustration in an attempt to merge both graphs and give his final conclusions towards it. By performing this, the researcher ensures that no information or relationship between the stakeholders is left behind for its analysis:

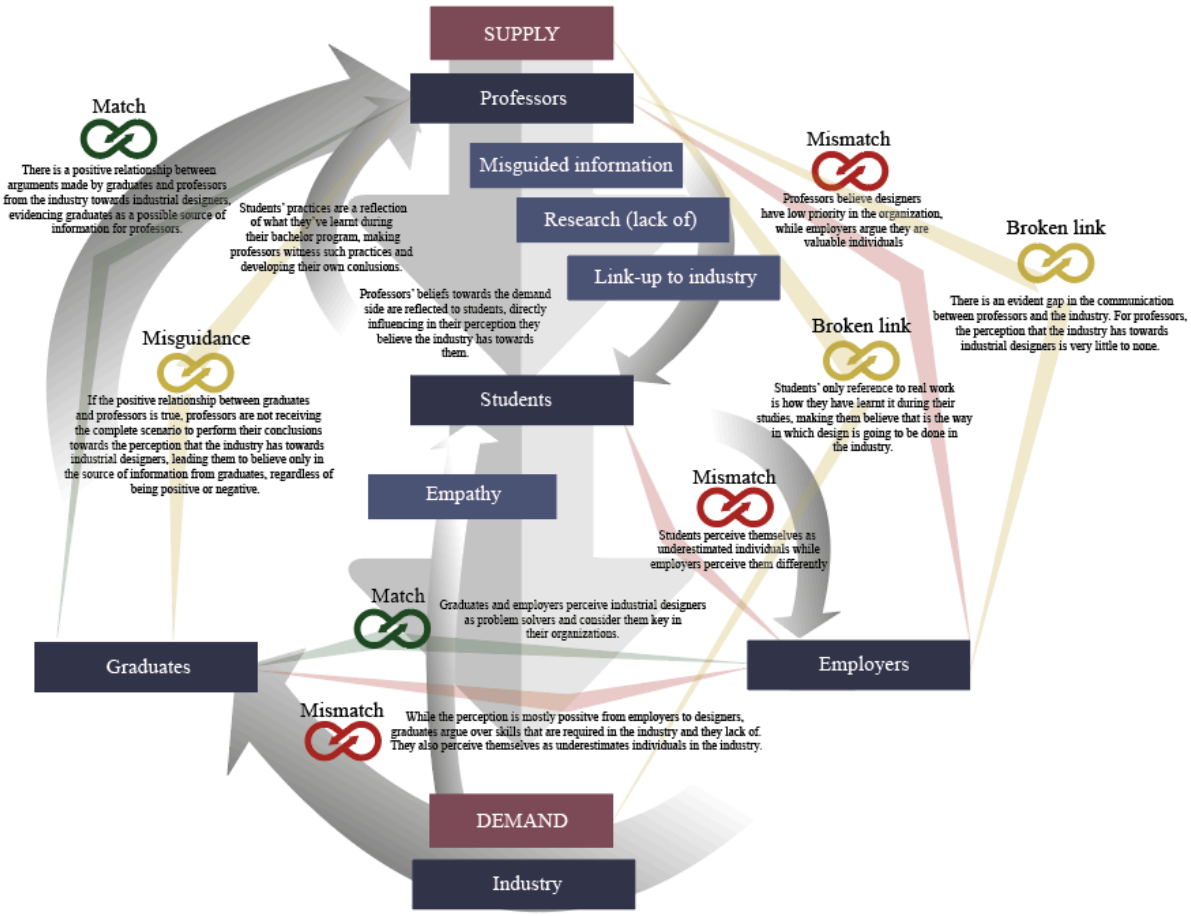

Figure 5 - Merging of stakeholders' influences.

What we have now is a complete integration between both analysis. However, before moving forward, it is important to punctuate two important aspects. The first one is, that the illustration present is completely based on the results obtained from the previous analyses, and second, that since the researcher has previously done an extent analysis on each of the concepts that are present in the graph, these will not be deeply analyzed in this section, rather, the integration and

interaction of the different stakeholders and their influence towards students and the supply-demand chain is the point of interest at the moment.

To understand how this graph is arranged, we could start by looking at the supply side. The first thing to notice is that students are placed in the center of the graph. This is because, as it was previously argued, the focus of attention in this analysis is to understand the different influences that this particular stakeholder receives, and how this ultimately affects the entire chain. We know that the chain moves in one direction, going from the university to the industry, indicating the flow that exists between institutions and the industry, where the former ones provide the later ones with professional individuals that will work in the different organizations. Professors, being at the top of the graph, are naturally an essential player in the formation of students. In this relationship, we can observe two main actions forming part. On one hand, we see a natural flow going from professors towards students were most of the influence is received by the later stakeholder. On the other hand, professors receive the reflection of such information directly from students. If we observe this interaction at simple glance and do not consider the rest of the stakeholders' interactions, it would become quite easy to arrive to rapid conclusions regarding how students respond to different scenarios when working with design projects and throw all responsibility of their behavior and incorrect way of working and dealing with design problems. However, thanks to the extent of the analysis done in this studio, we know this is not the case since there is much more going on behind this. When students finish their bachelor studies or have the opportunity to work in the industry, it becomes their first realistic interaction with it. Generally speaking, and as argued during the overarching themes analysis, employers have a positive perception of design students, up to the point they have argued they consider them quite valuable and irreplaceable. Yet, at the same time, they perceive them as underestimated individuals, in the same way students do. In fact, if we recall the analysis on the overarching themes, graduates share this perspective as well. This mismatch seems to be shared amongst students, employers, and graduates. However in the case of professors, we have seen something different, and that is the way in which they BELIEVE designers are perceived in the industry, not how their design students are ACTUALLY SEEN within the industry by employers. In fact, this and other arguments and analysis made from this stakeholder (professors) enables the researcher to conclude

that professors in fact have no direct contact or communication with the industry. This is stated in the graph as a broken link between both stakeholders. Yet, when moving forward with the analysis, the researcher found that graduates and professors shared similarities in some arguments, letting this as evidence that, at least in theory, the information that professors are getting from the industry (regardless of how small or big it is) comes directly from graduates, not employers themselves. And since professors are the major source of information for students, the researcher can argue that it is possible that since professors have the idea that the industry perceive designers in such a way, they most likely, one way or another, transmit this information to students, affecting the perception that this stakeholder has from the industry directly. Of course, the researcher is well aware that in order to claim this statements as an "absolute truth", so to speak, it would require more studies on its behalf and further analysis that goes beyond the aims of this thesis. Yet, he is certain that this information will be relevant for future researchers on this topic and quite useful for the organization, establishing it as a contribution for the university.

What we can finally see in the graph are two major aspects that, from the researcher's perspective, not only affect the perception of students towards the profession of design, but also influence on their mindset as future industrial designers. The first one, presented as the second broken link in the illustration, refers to the minimal approach that students have with the industry during their bachelor studies. The second one is how, because of this, since their only source of information from it comes directly from the university, their empathy and sensibility they should have towards clients, final users, and populations, is directly affected during their studies but represent a drastic change for them once they graduate and become professionals. The researcher considers this to be extremely important to highlight for several reasons. First, by missing out the opportunities to interact with real problems and clients, students will maintain their ideas and perception of what the profession is during every academic year and won't be able to develop more interpersonal skills that involve becoming more empathic and sensitive to other people's needs, which is a crucial skills that industrial designers should have. Second, as time passes, this perception with which they are living during their studies will become stronger with time, since technical and methodological skills learnt at the university will make them more experts in those skills in an individual manner. This means, in other words, they will most probably improve their way of

working in an individualistic way, adding new skills they would most likely adapt to their known way of working. Finally, it puts the students from the university in a huge disadvantage in regards to other industrial design professionals that might be well aware of the importance that empathy means to their profession, a subject that in the eyes of the researcher is of key importance for the university to acknowledge and attend as soon as possible.

As the reader can observe, with this amount of information and evidence, it becomes inevitable to ask ourselves the extent that the actual practices and data affect the entire supply and demand chain we have been discussing in this study. In the next section, the researcher will present his analysis over this topic, based on the elements of supply chain management and what value can it give to the organization.

6.3 Relevance to the supply chain in the study

Having reached this point in the study, the researcher finds it relevant to reflect how his work has relevance to the demand-supply chain that appears to be present within the organization. At the beginning of this study, in Chapter 2: Literature Review, the researcher clarified how the supply and demand chain (as well as stakeholder theory) guided this research. Hence the importance of now presenting what does all the findings means to this integration in the supply chain, and how it affects it in this relationship between the industry and the organization.

To better understand the connection between the supply chain and academic methods in the university, one the schemes the researcher considers adapts well with the study is the representation of the supply chain presented by authors Basu and Wright (2008). In it, the authors identified a physical flow of sourcing and supply towards clients, coming directly from suppliers. At the same time, there is an information flow coming from the clients (the demand side) to suppliers. In the manufacturing industry, suppliers receive the raw material, manufacture their products, pack them, and distribute them to clients, while these send back information to suppliers regarding their demands, production plans, schedule times, and other relevant data that can help suppliers attend their requirements better. This simple but useful scheme is represented in the following graph:

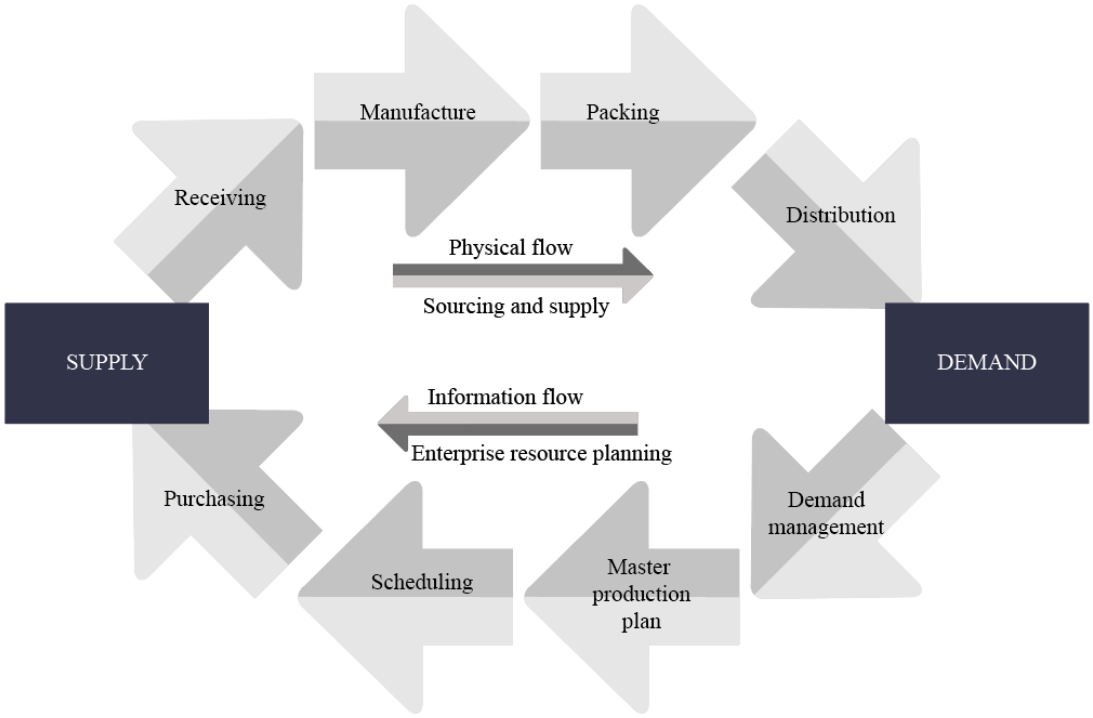

Figure 6 - Supply chain management according to Basu and Wright (2008).

Now, something to have in mind before proceeding is that this scheme is alined with the necessities of a manufacturing industry. The supply chain is a scheme that from the researcher's perspective, can be implemented to any interaction between a client and supplier. In the case of the academic industry, this is no different. However, because this study attends a particular bachelor program within a particular university, the researcher will present his adaptation to the supply chain in accordance with the study, based on what has been previously presented. The first thing is to ask ourselves what elements do we have as those that correspond to the supply side and which ones to the demand side. We know that the supply side, in this case, is made up of professors and students, while the demand side are the actors within the industry that in this study are employers and graduates. Each one of the, similarly to the traditional supply chain scheme, is responsible for performing a seat of activities that are essential and unique depending on their position in the chain. As Basu and Wright (2008) argue, the objective of the supply chain is to provide the best value to the cliente, making sure that the links within the chain are well planned and managed, hence the importance that this means to any industry where the chain is implemented. On that basis, it is relatively simple to identify which activities or links are present in the

chain for the case of this study. Starting with the supply side, if we look at the traditional model, we find that the supply first receives, then manufactures, packages, and delivers. Naturally we cannot refer to these steps textually if we are talking of students, however we can argue that these steps are somehow similar in the chain that represents the academics in the study and the traditional scheme. In the academics, specifically the organization, the university receive potential design students. These students undergo a process of learning which, theoretically speaking help them create a specific profile of a professional designer to offer solutions that the industry need them to accomplish. From the demand side, the industry should communicate its suppliers their requirements for the kind of professional profiles they require. In this way, the flow of information from demand to supplier and the physical flow from university to industry is carried out. Having said this, we can start reorganizing the information available in a supply chain specifically for this case, which the researcher has performed in the following manner:

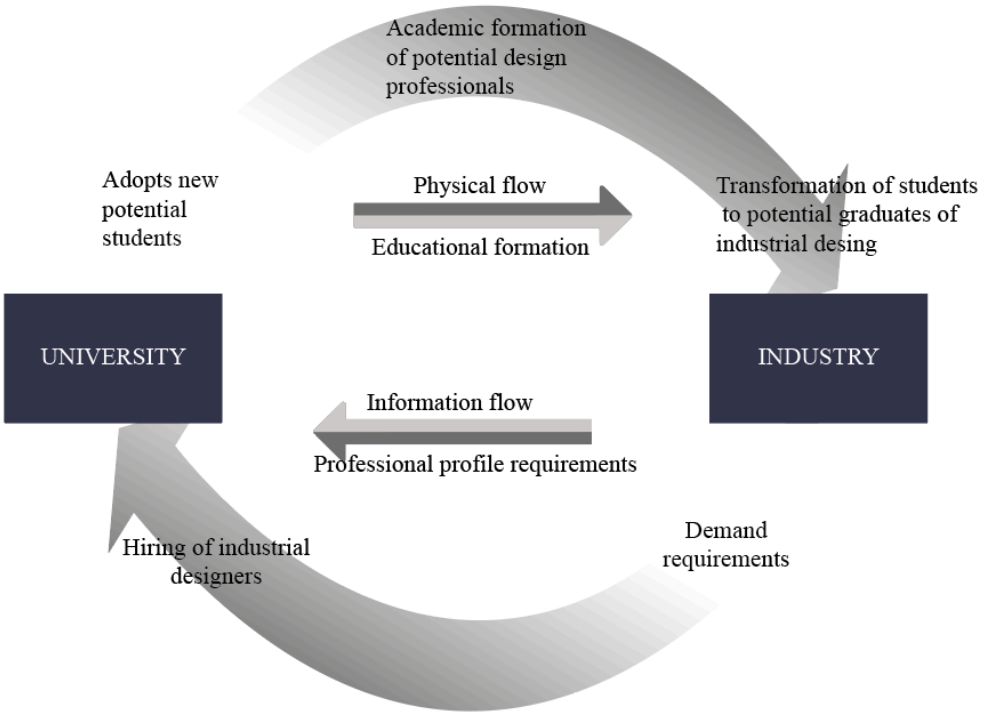

Figure 7 - Supply chain management between the industry and academics in the study.

We can see that the adaptation to the supply chain in this case is relatively simple, and at some point obvious, since, in theory, the scheme should work adequately in that way. However, this illustration shows the chain in a fluid manner without detailing any possible incidents that might occur within the process, which we know are present thanks to the analyses made by the researcher both individually and with the organization members. It is important to also emphasize this since what the reader can witness how the entire chain is affected.

Among the first relevant issues that were highlighted in the analyses were the broken links that exist between the demand and supply. These are mostly present in two ways: first, because of the lack of communication between professors and employers, and second, because of the reference that students have towards the real world, coming from the information given by professors to them. Now, if we compare this last schemes of the supply chain against the illustration from the previous section regarding the influences to students, we can observe a similar flow that occurs between the different stakeholders. This flow starts from the supply side (university) to the demand side (industry) as it is naturally expected. However, we also see a failure in regards to the information flow that according to the supply chain is required by the supply side to guarantee a good "product" delivery to the demand side. This failure represents the broken link of communication between professors and employers:

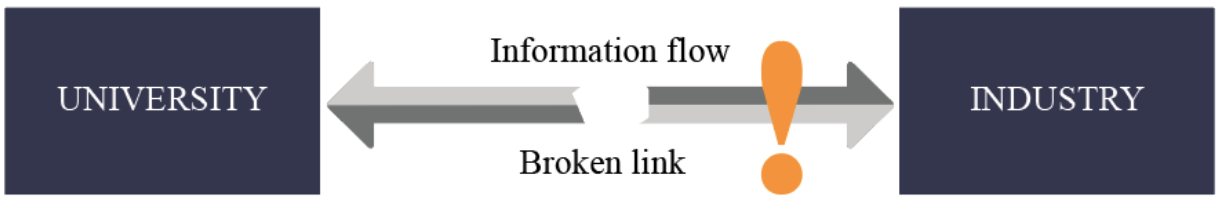

Figure 8 - Information broken link in the supply chain.

At the same time, something interesting happens that is not visible at first glance y that is the flow of information that the supply side (in particular professors) is receiving, comes from two main sources. The first one are students themselves. If we recall the illustration from the previous section, the researcher argued that professors are witnesses of the practices made by students as a reflection of what have they learnt (and how) during their bachelor studies. We cannot forget that this includes the lack of works or closeness with real projects, as it has been previously discussed. Similarly, there is the possibility that external information most likely comes from graduates towards professors. Having said this, the reader can have a much clearer outlook of how the information isn't flowing as it should but also allows him to see how the information that professors are receiving becomes cyclical. Professors realice that students are mismatched with requirements from real clients until they are working with those clients in real life. It is only logical to argue that if students haven't had any contact with real life scenarios and problems, it is only natural that their designs and proposals are not in accordance with real life requirements. We might argue that for them, this is not necessary something unknown, but definitely incomplete, since dealing with real problems involve more subjects, methods, and consideration that when not introduced to previously will only reflect in a potentially large mismatching between both stakeholders. Now that we have seen how information flows (or not) within the supply chain, the researcher can be more precise on the complete scheme of the chain for this particular case. Because of that, and to demonstrate how each stakeholder forms part in the chain and the information flows among them, the following illustration of the supply chain has been performed:

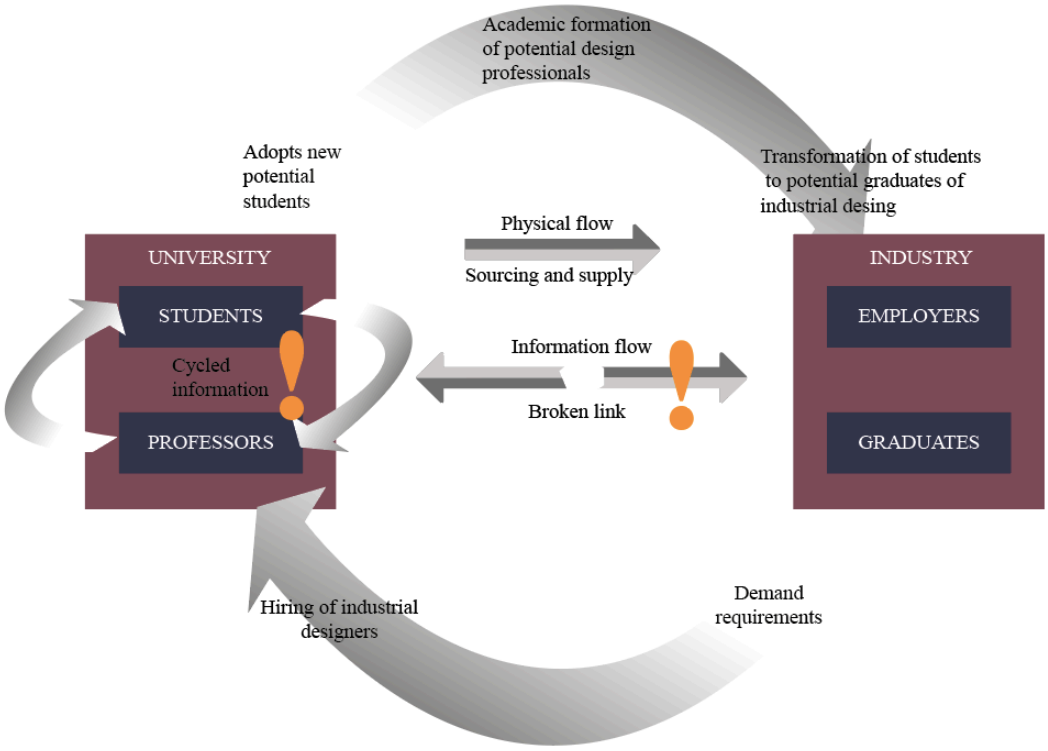

Figure 9 - Supply chain management broken link of communication.

At this point, it becomes more than obvious that amongst the main opportunity areas in which the bachelor program of industrial design can benefit are the improvements of the interactions between the industry and the academics. Thanks to the flow analysis within the supply chain, we can observe how at the same time there is a clear need to break free from this “cycled” information that professors receive from their students exclusively. We must not forget that if this problem is not attended, a whole community of students will be potentially affected, since new generations enter and leave the program during each year. Professors, on the other hand, are more likely to stay longer periods of time as part of the university. This means that there is a higher probability for different generations of students to receive information from the same professors within the program, hence the need to improve the communication and information handling practices in the program, as we have witnessed in this and the last sections.

6.4 Attending the Supply Chain in the Organization

Having this information and evidence at hand, we should now ask ourselves: in what ways can the university attend these problems from within? There is no doubt that at this stage it has been evidenced that both students and professors from the supply side should experience improvements and changes for this flow to occur in a more efficient manner. Before continuing, however, the researcher must clarify that trying to solve the problems directly that have arisen as a result of this study would involve an extensive amount of time and work involving the organization and industry in general, which goes beyond the limits of this study. However, he can argue that with the evidence found and analyzed, the organization now has more evidence of the importance that attending such problems would mean for it. In this aspect, the researcher, through his study and analysis, provides the organization with a tangible tool that can be used as evidence to improve its practices with its stakeholders and the industry. Also, because this study has a student focus, the gap corresponding to the cycled information is not further discussed in this study. The researcher is well aware that according to the findings, this problem needs to be attended, which is why he leaves this as a window for further research to potential future researchers.

However, one aspect he considers valuable for the study and as another contribution to the organization is how, based on his criteria and analysis performed, the study plan can improve in regards to the opportunity areas that were previously found. This is because he considers such findings to be quite valuable since first, they derived from an extensive analysis which is shown in this study, and second, the data obtained for such analysis was obtained through the involvement of the organization, which in this case were the academic year responsibles. It is worth mentioning that the researcher will not provide a set of punctual outputs over the improvement of each subject, rather an analysis of how such areas can improve practices within the bachelor period. In this way, he considers the results to be of much more value to the university since being a study program that changes and evolves every determined amount of time, providing puntual outputs could make the data and contributions become obsolete when the new study plans are implemented. However, because the study plan is the current media or tool, so to speak, by the univer-

sity to transmit knowledge to students, te researcher's criteria in this analysis will inevitably be affected by the actual study plan.

One of the major challenges the researcher deals with is the extension of time present in the physical flow that goes from the supply to the demands side. Recalling the bachelor program offered at the University, this consists of 9 semesters, or 4 academic years and one half year for the final Thesis project. This represents a considerable challenge since on one hand, there is a wide margin of time and variety in subjects where to implement improvements between both supply and demand. On the other hand, the study plan introduces more complex topics as it evolves each year and we shouldn't forget that as time goes forward, students will also require higher levels of maturity and analysis in their later semesters of their program, compared to the first ones. Because of this, the researcher considers necessary to know in what measure should each improvement be prioritized in comparison with others as students move forward with their studies.

Because of the time it takes for students to acquire an ideal profile of industrial designers in their studies, the researcher considers that changes and improvements in the supply chain should go in accordance with this aspect, which is why he proposes that any improvements made to the bachelor program should be done throughout the academic years and not in specific periods or semesters only.

As previously mentioned, the entire bachelor program of industrial design consists of 9 semesters. Naturally, each semester has specific subjects where particular topics are undertaken. Some subjects are dependent of a sequence that students must undertake in order to advance, which is the case of the design studios, while some others aren't. At the same time, some are mostly theoretical while others are highly practical in essence. Fortunately there exist research tools that allow studies to identify priorities when dealing with several entities. This is the case of pairwise comparison charts, or PCC's. Pairwise comparison charts allow researchers to identify which topics they are dealing with has more relevance or is more critical to attend or consider than others. In this way, priorities can be identified in different systems, designs, or characteristics that products or services should have. In other words, it is a practical tool to identify which attribute or attributes should be given priority. In pairwise comparisons, whenever there is a comparison of

entities, the one that is selected to be of higher relevance or importance receives one point, whereas the other one receives none. Then, points from each entity are added and compared to one another. The entity with the highest score is considered to be the most important aspect to attend. The researcher decided to implement the use of PCCs to identify which opportunity area should be of more interest to the university in convenience to the academic year of the bachelor program.

Looking at the first academic year of the program, the researcher can argue that during this time students acquire the bases for future subjects and the bachelor program in general. This is specially noticeable in subjects such as introduction to industrial design, geometry, and sketching basics. At the same time, their design studio is focus exclusively in form exploration. What this tells us in a general manner is that students receive a large amount of information and theory regarding basic design skills. They do develop physical projects, however they are mostly focus in learning techniques on how to explore forms, how to develop technical drawings, and how to represent their ideas through sketching. Because of this, information transmitting is primordial and research is promoted through tangible exploration from students towards their projects. In their morphological studio, for instance, in order to obtain the final form proposal, many mockups of exploration of forms are created. Links with the industry are practically non existent. The similar can be argued regarding empathy, since students haven't had real closeness with real life problems. Now, the researcher presents a comparison between each opportunity area and identifies which one has more weight and relevance to attend:

Empathy vs. Misguided information. In this case, the researcher considers that properly delivering information to students during their first academic year is critical for several reasons. First, it is crucial that students know the objectives of their career. What exactly are they going to learn during those 5 years, what expectations can they have, and what profile is expected for them to acquire as designers. Empathy in students is naturally an important aspect to attend, however the researcher considers to attend the misguided information as a priority in order to avoid potential problems in the future such as lack of interest and others as discussed previously. In this case, misguided information receives one point, whereas empathy receives none.

Empathy vs. Research. In this case, the researcher considers research to be more important. Not only because it is a period where students learn the basics of the bachelor program, but also because research is key for students to conduct proper closeness with other users, designers, and clients (thus enabling students to develop empathy). The researcher considers that if students do not conduct (or know how to conduct) a proper search in their projects, generally speaking the results could be compromised since the data obtained might not be the most adequate for the study.

Empathy vs. Link-up with industry. In the case of empathy vs. link-up with the industry, it is important to remember what has been previously discussed in regards to the importance for students to have closeness with the industry to improve their empathy towards real users. This allow students to have a better understanding of their true needs and allow them to design their proposals in accordance to those needs. In the same way, the enhancement of such closeness should enable their empathy to improve towards others. In this sense, enabling a link-up with the industry becomes more important for students during this period.

Misguided information vs. Research. In this case, the researcher considers that attending misguided information is more critical. If we recall the discussions made with the academic year responsibles, there were clear arguments towards students being misguided by the university. Another reason to prioritize misguided information in this early stage has to do with the fact that students must always remember to have clear knowledge of what exactly they need to perform their research of, for what purpose, or what objectives they must attend in their projects before performing the actual research on them.

Misguided information vs. Link-up with industry. For this case, the researcher still considers misguided information to be more critical than establishing a direct link with the industry during this stage of the program. If students do not understand the potential or reason to be of their career, establishing a direct link with the industry in their projects could either create confusion on them for not understanding properly the relationship between the industry and their activities or make them believe they can only focus in activities related to a particular industry as future designers.

Research vs. Link-up with industry. In this last comparison, the researcher considers research to be a more critical aspect to attend during this period. Once again, without a proper guide or proper vision of the career from students prioritizing a link up with the industry without first promoting research of the profession might lead to potential confusion in the subject.

After assigning the values to each comparison between the opportunity areas, the researcher presents the following pairwise comparison corresponding to the first academic year:

1st Year	Empathy	Misguided information	Research	Link-up	TOTAL
Empathy	-	0	0	0	0
Misguided information	1	-	1	1	3
Research	1	0	-	1	2
Link-up	1	0	0	-	1

Table 37 - Pairwise comparison of opportunity area's attendance priority from first academic year..

We can see how in first instance, attending the opportunity area of misguided information has the highest priority, followed by research, enhancing a proper link up with the industry, and finally empathy. It is worth arguing that even though the link up with the industry and empathy have gained the lowest ranks, this doesn't mean they shouldn't be attended, it does imply, however, that the organization should focus in a major effort to attend those with higher rank value. Naturally relating students to projects with the industry will help them become more comprehensive of how things are done in real life, however during these first semesters, the researcher agrees it is highly important for students to receive more adequate information of their career and be enhanced to perform proper research within their studies to improve in the aspects previously discussed. On one hand, students will become more aware of what they'll learn during their bachelor studies and how they can develop themselves as industrial design professionals, and on the other hand, by enhancing proper research to students, they will become more aware of the importance that this step has to do not only for their projects but also for their goals and objectives as potential designers.

In the same way, each academic year has a relevant impact in the formation of students and is only natural to assume that as they grow in their formation as designers, so is the complexity of subjects, projects, and challenges. Because of this, this pairwise comparison will change every academic year according to this argument. This will allow the researcher and the university to know how convenient it is to attend each opportunity area accordingly to students' formation and maturity as professionals. It is worth reminding the reader that part of the criteria for assigning the value to each opportunity area has to do with the academic subjects and objectives of each class during this period. To have a clearer idea of how each academic year is conformed, the reader can review the bachelor program available in Chapter 2: Literature Review.

For each of the following years, a pairwise comparison chart was also made. For the reader's ease, the researcher decided to compact these arguments and justifications for assigning values to each entity in the table shown below. This allows the reader to see the value assignation faster and more organized without losing robustness on their justification. First, the researcher arranged the opportunity areas that were going to be compared in the same order as with the first pairwise chart, on the left side of the table. Then, on the right side, the researcher presents his justification and criteria used for assigning the value to each opportunity area. The following table exemplifies this using the information presented for the comparison chart previously made:

First Academic Year	
Opportunity areas comparison	**Researcher's argument on value assignation**
Empathy (0) - Misguided information (1)	Students should first and fore most have clear knowledge what the objectives, expectations, and profile of the career are and are expected for them as industrial designers.
Empathy (0) - Research (1)	The appropriate research methods are key to develop good research and closeness with users and clients since the beginning. If badly executed, the results can become compromised.
Empathy (0) - Link-up (1)	Based on the results from the analyses, industry influences empathy in students. Having closeness with the industry could help students become more sensible and have a better understanding of real life needs of their clients.
Misguided information (1) - Research (0)	Before conducting any research, students should learn the proper methods and reasons to do so. The university must communicate such methods and objectives to students primordially.
Misguided information (1) - Link-up (0)	If students don't know the potential of the career, a premature link to the industry might confuse them or make them believe they would only focus their studies in a particular industry.
Research (1) - Link-up (0)	Students should have a proper guide and vision of the career in order to avoid confusion of the application of industrial design in the work field.

Table 38 - Researcher's arguments on value assignation. (first year).

As the reader can observe, the summary of arguments made in the previous paragraphs are presented in a much compact manner to read and have maintained their robustness of their meaning. Following the same method, the researcher presents the value assignation of each opportunity area and the pairwise comparisons of each academic year next. Since the first year has already been performed, the following tables and PCCs correspond to the second, third, and fourth academic years:

Second academic year pairwise comparison

Second Academic Year	
Opportunity areas comparison	**Researcher's argument on value assignation**
Empathy (1) - Misguided information (0)	Students undertake their creativity studios where they begin to design for specific populations or try to attend specific problems. Also, they undertake subjects that allow them to properly present their proposals to potential clients. The researcher considers empathy to be primordial to attend since during this time students will have their first encounters with real clients.
Empathy (1) - Research (0)	Both opportunity areas are extremely important during this period. Because of the first encounter with real clients, students need to become empathic, but also proper research needs to be addressed not only during their studio classes but other as well, since students begin to learn methods that require assembly skills, as well as software modeling, materials handling, and testing. However, these are topics that students will always be dealing with during their studies, whereas empathy requires to be enhanced in order for students to become aware of its importance for the future. Thus, the researcher considers empathy to be a priority.
Empathy (0) - Link-up (1)	Based on analyses previously made in the study, the researcher considers that link up with the industry has more weight. This will allow students to have not only their first glance of industrial and design processes and enhance empathy, as previously argued, but also real applications of the different materials they have learnt so far in the material handling subjects.
Misguided information (0) - Research (1)	Based on the subjects and topics that students undertake during this period, the research considers research to be the area of opportunity that has major priority for attendance. Students begin learning design methodologies and have enough knowledge towards material handling at this stage. In order for them to use the data obtained from clients and proper application of materials and techniques in their proposals, students must develop adequate research of the data they obtain and experimentation with the materials to obtain innovative results.
Misguided information (0) - Link-up (1)	In this case, the research considers link up with the industry to be more important during this period. Proper information is indeed crucial for students, however during this period, based on the importance for students to become more sensible with users during an early stage as discussed in the findings previously, it is worth for students to give priority to close encounters with clients and users in order to obtain real useful data for their proposals. Also, enabling them to have this encounters since the beginning will help them understand better how to perform future encounters during their later semesters.
Research (0) - Link-up (1)	Both areas have strong importance to attend. However, in this case, the researcher considers link up to be primordial. Students' research methodologies can be undertaken side by side in their design studios and other subjects with their experience in the industry. In fact, new methodologies are peached during each academic year. Yet the experience they will have with the industry cannot be replaced by other activities.

Table 39 - Researcher's arguments on value assignation (second year).

2nd Year	Empathy	Misguided information	Research	Link-up	TOTAL
Empathy	-	1	1	0	2
Misguided information	0	-	0	0	0
Research	0	1	-	0	1
Link-up	1	1	1	-	3

Table 40 - Pairwise comparison of opportunity area's attendance priority from second academic year.

Third academic year pairwise comparison

Third Academic Year	
Opportunity areas comparison	**Researcher's argument on value assignation**
Empathy (0) - Misguided information (1)	During this period, students undertake product development studios, business strategies, product distribution, and prototyping subjects, among others. Within these subjects it is expected for them to perform tests and document their findings for their design proposals. Because of this, the researcher considers that misguided information is a crucial aspect to address during this period. Wrong information can result in bad prototyping practices or steps in the process, for instance.
Empathy (0) - Research (1)	For this case, the researcher considers research to be the opportunity area with major priority. During this period, students undertake subjects that involve knowledge on product distribution, packaging, and testing. Thus, adequate research in these subjects can improve their skills related to them. Another important aspect to consider is that during this period, students can get involved in subjects they need to improve such a costs and budget for design proposals.
Empathy (0) - Link-up (1)	Since, as previously argued, during this period, students get involved with more complex aspects of design manufacturing and distribution, the research considers link up with the industry to be key in improving their knowledge towards these and other related industrial processes.
Misguided information (0) - Research (1)	Students during this stage get more involved with complex projects that require deeper analysis for proper selection of materials, processes, and techniques for their proposals. From the researcher's perspective, this implies they need to become very well at performing research in their projects. At this stage, students are more aware of the benefits and potential that industrial design represents for the industry. The researcher considers research to be primordial for the better development of students.
Misguided information (0) - Link-up (1)	The researcher considers link up to be a more important opportunity area to attend during this time. This is because based on the subjects that students undertake, and a higher level of closeness they have with industrial projects, providing a closer link with the industry will enable students to understand how important each step of the design process is for a successful product development.
Research (1) - Link-up (0)	From the researcher's perspective, both opportunity areas are extremely important during this stage. However, considering that students will undertake professional practices during their next year and due to the fact that their subjects focus on performing more complex activities than in the previous year, improving research abilities in students is a priority.

Table 41 - Researcher's arguments on value assignation (third year).

3rd Year	Empathy	Misguided information	Research	Link-up	TOTAL
Empathy	-	0	0	0	0
Misguided information	1	-	0	0	1
Research	1	1	-	1	3
Link-up	1	1	0	-	2

Table 42 - Pairwise comparison of opportunity area's attendance priority from third academic year.

Fourth academic year pairwise comparison

Fourth Academic Year	
Opportunity areas comparison	**Researcher's argument on value assignation**
Empathy (1) - Misguided information (0)	In this case, the researcher considers empathy to be more important. Because students undertake their profesional practices in the industry during this time, they need to become more sensible to what each client or user needs from them. The information they will receive from the industry will be the most realistic for them to work with.
Empathy (0) - Research (1)	In this case, the researcher considers research to be more important to attend. As it was previously discussed, the experiences students undertake during their time in the industry enhances their empathy towards clients needs and requirements. However besides being in their professional practices during this time, students must undertake other subjects that require extensive amount of research such as advanced design studio, selective, general, and modern studies of design that require investigation for properly delivering their projects.
Empathy (1) - Link-up (0)	One of the biggest episodes that occur during this time is that students enter the work field through their professional practices. In there, they will learn stages of the design process and how to interact with coworkers and clients. Link up with the industry, in principle, in inevitable during this academic year. As it was previously discussed, such link enhances empathy on students. However they not only need to attend their professional practices, but also other subjects from their program where they interact with different professions, such as in the case of interdisciplinary design studio. Because of this, the researcher considers empathy to be the opportunity area to have more weight in this case.
Misguided information (0) - Research (1)	Research is expected to have robustness and solidity in the classes that students are undertaking, such as in advanced design studio. The researcher considers research to be of major importance.
Misguided information (1) - Link-up (0)	The researcher considers misguided information to be more important to attend for this case since not only the link up is performed automatically during their professional practices, they also are in a stage where they are about to graduate and the information they gather during their studies and professional practices will most likely influence future decisions they may in the future.
Research (1) - Link-up (0)	Because students undertake their professional practices during this time, link up with the industry is experienced inevitably. At the same time as previously mentioned, students are required to perform a high level of research within their classes. Because of this, the researcher considers research to be of higher importance to pay attention.

Table 43 - Researcher's arguments on value assignation (fourth year).

4th Year	Empathy	Misguided information	Research	Link-up	TOTAL
Empathy	-	1	0	1	2
Misguided information	0	-	0	1	1
Research	1	1	-	1	3
Link-up	0	0	0	-	0

Table 44 - Pairwise comparison of opportunity area's attendance priority from fourth academic year.

6.5 Pairwise Comparison Conclusions

As the reader could observe, using pairwise comparison for each academic year allowed the researcher to identify which opportunity areas are more critical to attend given the academic year period. Before moving forward, the researcher considers two important aspects that are worth recalling. The first one is that as students advance in their studies, so does the level of complexity of their projects and skills that they acquire. During the first academic year of their studies, students undertake subjects that introduce them to topics that are the bases for more complex ones as they advance in the program. The second one is that while some opportunity areas have been highlighted as priority to attend in the PCC's, this doesn't mean the rest of the opportunity areas shouldn't be considered during that academic period. From the researcher's point of view, it only means the university should focus a higher effort on improving more those that are shown as priority and still maintain attention to the latter ones in parallel.

When we look at the results of the PCCs as a whole, we can observe that during the first academic year, the attention towards delivering proper and adequate information to students is a priority, followed by research in their subjects. A link up with the industry maintains low priority while the least attention is focused in empathy. During the second year, this appears to totally flip around, giving priority to linking up students with the industry and enhancing empathy as well, followed by proper research performance. The third and fourth year show similarity in their primordial focus, which is research, leaving as the last priorities to attend link up with the industry and misguided information. This information can be graphically expressed in the following manner in the supply chain:

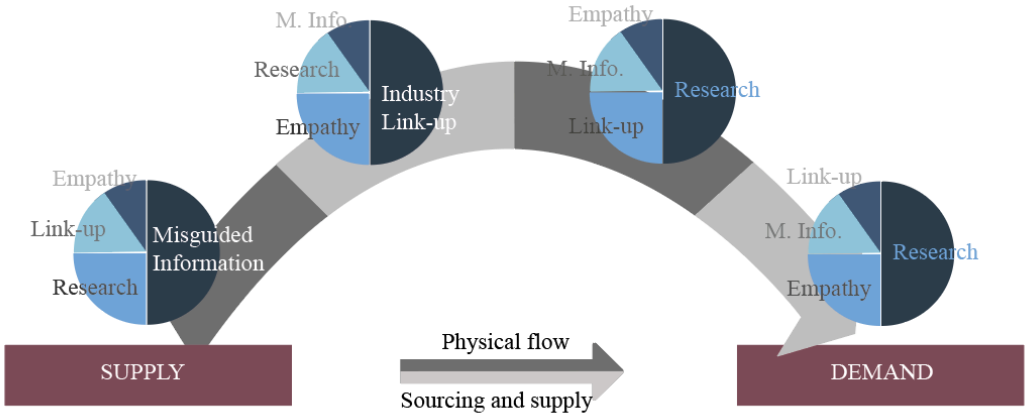

Figure 10 - Pairwise comparison of opportunity areas attendance priority.

Now, what does this information tells us and how can it be used by the university to improve its present state? To understand this, first, the researcher considers important to look at the entire scenario as a whole. The justification and arguments for the assignation of value of each opportunity area in every PCC has been already discussed in the previous section. They were influenced on the relevance that the subjects, activities, and skills that are present during each period. To understand this in a much clearer manner, we can look at the PCC from the last academic period of the program.

We can observe that the opportunity area of link up with the industry has received the least value, even though during this period, students are very close to graduating and they undertake their professional practices, which involves them to work in the industry as if they formed part of the demand side. However it is precisely because of this that link up with the industry showed the least value of the four opportunity areas. During his period, the link up is inevitable. Students actually must undertake this activity as a requirement to graduate. In comparison, we observe the rest of the subjects from the program to focus in other activities that require extensive investigation from students, and also involvement between industrial design students other students from different branches of design in subjects such as interdisciplinary design studio. What all of this tells us is that the link up with the industry will be something they automatically will experience, so the university should not focus most of its efforts in involving students with different indus-

tries since they will have to do it anyways. However it should focus in enhancing empathy and improving research on them since these aspects will: a) Be necessary for students during this period since they are expected to perform extensive research for their projects., b) get involved with different disciplines of design that might not always share the same opinion towards design proposals, and c) empathy enhancement can be useful for students during these interactions not only internally with other design branches but also within their professional practices.

In accordance to this, first year students are expected to learn the basics of their career but also need to understand the true potential of their profession. The efforts the university should focus during this period should not only allow students to develop the technical skills that are required for the profession, as it has been doing so, but also permit new students to understand what they are about to learn, what they can expect to do, and what professional options will they be able to have as professional designers. Also, from the researcher's point of view, if students are quickly (and mostly) introduced to the industry it might give them some glance of what they might expect from the profession, but without proper information of their relevance to the industry, they might develop confusion and overwhelming on subjects that they still haven't learnt. Hence attending the opportunity area of misguided information is a priority for the university before any proper involvement with the industry takes place.

During the second academic year, however, it is interesting to see the contrast between the results from the first PCC and the second one. However it makes total sense when we begin to observe the subjects that students undertake during this period, especially their design studios. The creativity studios from the third and fourth semester introduce students to design methodologies which involve research and closeness of potential users. Thus, we can see how improving link up and empathy strategies might help students enhance their abilities to become more comprehensive and sensible with their users. On the other hand, during this period, students might be more aware of the potential of the profession, allowing them to get closer with the industry without the risk of developing confusion towards it, rather as a complement to their learning. Finally it is during their third academic year where students are also required to perform analysis and research but contrary to the fourth and final year, during this time, they are expected to use their criteria

on the most appropriate propositions they develop during their projects. Examples of this are materials and processes selection in subjects such as laboratory of prototypes, and problem detections in their design studios. Because of this, it comes to no surprise that research is an area that shouldn't be taken lightly during this period, giving it priority to improve. Followed by research, we see link up as the second priority to attend during this time. The researcher considers this to be a good opportunity for them to prepare for the next academic year where they will be focused during long periods of time inside the industry.

6.6 Brief Overview of the Study

Having reached this point the researcher is well aware of the extent that was required to get from the start of identifying a managerial problem, to addressing it through an active methodology such as AR and data capture and interpretation such as TA. It certainly was not an easy path. Because of this, the researcher considered relevant and useful to present this arrangement of steps in a synthesize manner so readers and the organization can see how each step encompass the entire scenario of this study.

The implications of this can bring benefits to the organization. To understand why, let's rapidly summarize from the beginning of this study to where we are standing at the moment. We identified a managerial problem and established a methodology to follow to try and address it. We identified the key actors of this study and used Stakeholders Theory to guide our study. We obtained data and used methods for data analysis such as Template Analysis to understand in a broad manner the different perspectives of the different stakeholders. We understood the relevance that this relationship between the stakeholders has to the organization as a supply agent, so to speak, for the industry. Finally, we also presented and discussed the results of our findings to the organization and from such discussion concluded interesting results that helped us find opportunity areas we could attend in the bachelor program. These were then compared with the initial findings done individually by the researcher and through an extensive analysis, the mismatches and flaws in the flow within the supply chain were found. Finally, pairwise comparison charts were used to identify the priority of attendance of the opportunity areas within the bachelors program.

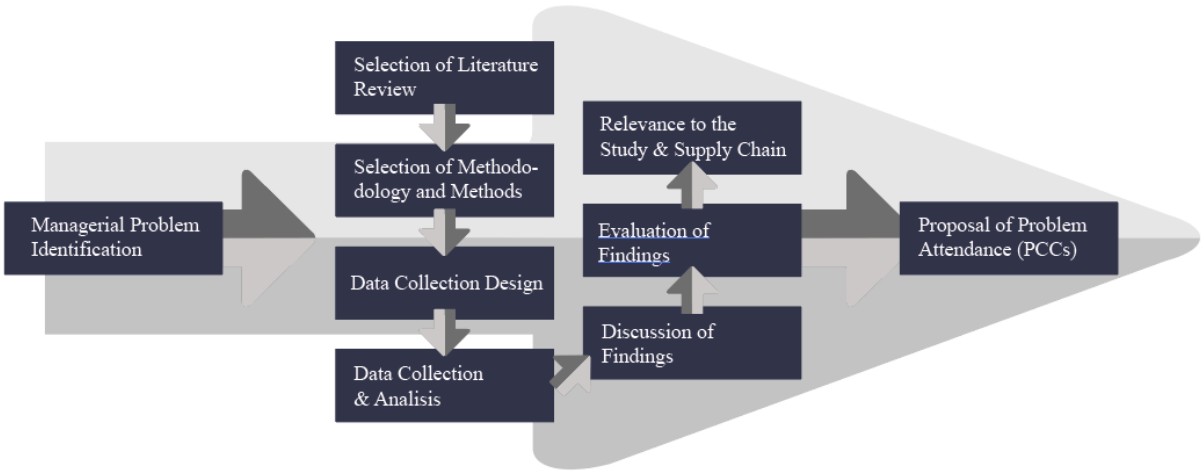

Figure 11 - Brief overview of phases of the study.

Broadly speaking, we can establish the following steps the researcher took for developing this study as follows: Identification of the main problem, identification of relevant literature for the study, selection of type of research (qualitative vs. quantitative), selection of methodology and methods used in the research (AR, TA, PDSA Framework, etc.), identification of the key actors and the side they correspond to (based on stakeholder theory and supply chain), selection of data collection methods, design of data collection methods, data obtainment, data analysis, AR with the organization through data discussion, conclusions on the findings, analysis of conclusions, relevance to the supply chain, attendance to the supply chain through pairwise comparison charts, conclusions on results. As the reader can observe in the illustration, each of the steps played a crucial part in the development of this study. One of the most intriguing aspects for the researcher is the results that triangulation in analysis can bring to research in general. Broadly speaking, there are considerable amounts of methods that could be used to develop this study, yet thanks to the proper selection of them, the researcher was able to extract the problems present in the university, how each of their actors play an important role in those problems, and develop a useful proposal of where and how the organization can begin to address those problems. In the

following and final chapter of this study, the researcher will deepen on his reflections towards the study and the paths he took to obtain these results.

6.7 Chapter Summary

In this chapter, the researcher presented a comparative between the analysis he made individually with the information obtained from the overarching themes, and the discussions he obtained when presented the data to the organization. He identified the ways in which both the supply and demand sides influence on students in the university in regards to the opportunity areas found through the analysis of the discussions. One of the most interesting aspects he discovered is the way in which the industry influences empathy towards students through lived experience. In the same way, he developed the analysis to understand how each stakeholder influenced students and it was during this analysis and the relevance with the supply chain where he could clearly identify the areas where there is a clear flaw in the chain and the organization should attend.

Since the study is performed through a student focus, the researcher is well aware that there are areas shown in this chapter that require strong attention within the organization. However, even though this, he focused his attention in a way in which he could contribute to the organization without loosing the mentioned focus. For this, he developed a series of pairwise comparison charts where he could compare the opportunity areas in regards to the level of priority that, based on his experience and study plan presented in previous chapter 2, required more attention during each academic year. Finally, he presents the reader with an overview of the study, which shows the start of the research from the conception of the organizational problem, to the relevance and attention of the supply chain in the university.

In the next and final chapter, the researcher will present his reflections towards the study, limitations, opportunity for further research, but most importantly his contributions thanks to this study.

Chapter 7: Conclusions

7.1 Introduction

In this Chapter, the researcher will present his final reflections on the study.

He begins by detailing the contributions that this study offers to practice and literature. Then, the researcher presents the attendance to the management problem as well as the research questions.

The second use of PDSA cycles is also being described in this chapter, along their benefits of use. The researcher then continues to discuss the data validation in the study, and extends the chapter with the opportunities for future research.

Moving forward, the limitations that the researcher had to face during the development of this study are also highlighted, since if any other researcher is interested in continuing the line of investigation, they might find them useful to know of and to consider for their own cases. In the final section of this chapter, the researcher presents his final reflections, both from a professional manner as well as a personal one.

7.2 Contributions

Contributions to Practice

There are several contributions to practice, knowledge, and literature throughout this study. To begin with, this study offers insights to a problem that is present within the organization, specifically in the bachelor of industrial design, and offers guidance to attend the problems within through exemplifying in what ways and areas can the organization improve in order to mitigate the problems. The study has contributed to the organization with robust data, analysis, and evidence, over the mismatches and their causes present between the university and the industry, and has provided as well information regarding the practices that have lead to influence over the specific stakeholders involved in the study. It offers as well an explanation to the current mindset of its stakeholders in regards to the other set of stakeholders, and finally, it offers the data and the methods used by the researcher for the organization to understand where to concentrate its efforts for improvement. Because of this, the researcher considers the study to offer practical contributions to the industry of academics.

Another way the study has contributed the organization is in amplifying any data available regarding the organizational climate and its relevance in the influence of the performance of its stakeholders. With this information in hand, the organization is able to contrast the existing and new data with similar studies if it intends to, and analyze the possible variants depending on its future interests.

The research also offers a triangulation of data acquiring and analysis. From the researcher's perspective, this is one of the biggest contributions the study offers since the triangulation with the methods and methodology applied to higher education program improvement has not been previously performed as it was done through this study. On one hand, through method triangulation, the researcher obtained the data from the participants through questionnaires, and further obtained more refined data from interviews with the academic year responsibles. On the other hand, the data analyzed in the study was first performed through Template Analysis, analyzed,

and further used pairwise comparison charts to obtain tangible value to offer to the organization through data analysis triangulation.

The actions involving triangulation within the study are several. First, we have the use of the methodology and methods applied in a higher education research. Action research allowed the researcher and the organization as well to have closeness with each member of the supply chain directly and indirectly through the data obtention and discussion of results. This involvement was key for the identification of the opportunity areas that were further analyzed throughout the study. PSDA cycles allowed the researcher to framework important steps in the research and deepen his analyses. Template analysis permitted the researcher to extract the core concepts from the data obtained in order to simplify the information gathered and conduct deep analysis without loosing robustness. The extensiveness of the analysis performed in the study gave result to the identification of influences, critical mismatches, and potential opportunity areas to attend within the supply chain. Finally, pairwise comparisons have allowed the researcher to prioritize attendance to the opportunity areas previously established through data discussion. Also, through this study, the researcher has contributed in utilizing supply chain along the different methods previously mentioned for the means of improvement. In this sense, the researcher can argue that the study offers a methodological contribution through triangulation.

Lastly, a series of small contributions to practice have been presented in the different sections of this study. These are also present in Table 45 in this section. They include valuable information that the university can use on its behalf for improvement in its practices or as references for future researchers for their studies. In regards to them, the researcher finds it useful to reflect on the value that these findings represent for the organization. The university, as any other organization, undertakes considerable amount of work, involving a large group of people, divided into many departments, each with specific tasks to fulfill. Trying to attend all the issues that potentially arise every semester or academic year would undoubtedly mean a huge effort from all of its staff. With the new information provided through this study, the university will certainly have a solid start reference to attend the existing problem and expand it to other applications.

An important aspect resulting from the contributions to practice is how any potential change within the university can maintain itself sustainable. This means how once any changes embedded to the bachelor program will maintain themselves in the organization without the need of the researcher or individual involved in the implementation of such changes to be present.

Blasinsky, Goldman, and Unutzer (2006) argued sustainability is focused on the continuation of practices or programs that were implemented in organizations, communities, or systems after their initial implementation ended (Wiltsey et al, 2012). In relation to the contributions, the researcher considers two important aspects where to focus if referring to maintain sustainability. The first one is the importance for stakeholders and the organization to understand their place, influence, and involvement within the supply chain, and the second one is the applicability of the triangulation methods used in the study for future research and actions for improvements.

In regards to understanding the position of each stakeholder within the supply chain, the researcher proposes introduction and reinforcement of supply chain in the university to the existing academia members and newcomers, as well as clarified objectives during the learning period. This could be achieved during each semester's initial and final meetings with the program professors. During these meetings, the program director exposes the organization's vision and objectives of that period, involving new projects, discussion of students' performance, and potential areas of improvements in particular classes. During these periods, it is expected that professors from the entire program assist to the meetings to understand what projects and important dates and details should be considered in the semester. Because of this, the researcher finds it an excellent time to reinforce the supply chain and its applicability within the organization to the rest of the professors, so they can periodically consider their relevance and importance of influence in the chain and stakeholders. This would in principle enhance reflection and commitment by the academia towards their practices as stakeholders within the chain.

The second aspect has to do with any actions for improvement that might occur within the bachelor program based on the findings that the study provided, as well as the opportunity areas attendance that the researcher proposed during the last sections. The different ways in which sustainability can be achieved with these changes, as suggested by the research, is through revisions to-

wards the actions, as well as revision of results over time. Revisions of the actions with the academia might become relatively simple since this could be achieved through meetings, project descriptions, project authorization by the department that involves the industry, or review of activities with the head of the bachelor program during determined periods in order to ensure compliance with the established changes. A second way to achieve this is through measuring results over time and compare them to the data available in present times. This could mean comparing results of skills developed by students undertaking the subjects and activities with these changes to those that haven't, for instance. However, this is obviously a long-term measurement method. It would take several years to see how students undertaking their bachelor program have responded to challenges in the industry they work with. Not only do researchers have to wait for them to undertake the four years of their program, but they must also consider some time for students to work in the industry and gain experience and practice to see how they have responded. Yet, as far as this method may appear impractical, it is not an impossible outcome to accomplish. For instance, one way in which future researchers can achieve this, would be to reach out to their local industry, present their studies and expectations from them, and work in collaboration to verify how designers respond to their environment with the new experience gathered during their bachelor studies.

Contribution to Literature

Besides the contributions to practice, it cannot be denied this study also offers contributions to literature by extending the sparse literature relating the supply and demand. The researcher considers the demonstration of applicability of supply chain analysis for the improvement of academic programs to be of great value.

Previous work involving supply chain in the education sector have been done, hence trying to involve this theory with the academia is by no means reinventing the wheel. For instance, examples of these include the case of Tunisia's education system, where author Sourour Ramzi's (2018) shows an attempt to evaluate the efficiency of the country's education supply chain with data envelopment analysis (DEA) method, which is a technique used for decision making measurement. However, the aim of her study was to improve the relationships between basic, secondary, and tertiary education levels to improve the quality of the whole education system in the region. Another example is the work by Ozlem Bak and Véronique Boulocher (2013), where the authors claim the benefits of using consultancy as a teaching tool to improve the linking between industry and supply chain education. In this case, the authors employed case study methodology and existing literature on consultancy module challenges and aimed to assist supply chain educators through consultancy module development. Yet, the set of methods used in this study has not been present in previous ones regarding supply chain management, nor focused on course improvement, to be more specific. And even more, specifically addressing the profession of industrial design. Because of this, the researcher can argue this as a unique methodological contribution.

Another contribution to actual knowledge is the findings regarding the influence exerted from stakeholders to students. Understanding this is not only hugely important for the organization but also for other universities as well, since are traditionally guided by the same purpose of providing potential professionals with specific skills to the industry. One of the most interesting findings regarding this topic is that professors were in fact the stakeholder that had major influence over students, whereas the industry exerted influence of empathy through experience, as discussed in the findings.

Making knowledge of this enables the university and other ones to understand the degree of responsibility present within their own practices. Now, having presented all the contributions present in the study, the researcher can arrange them in the following table:

<table>
<tr><th colspan="4">Contributions of the study</th></tr>
<tr><th>Methodological</th><th>Practical</th><th>Knowledge</th><th>Literature</th></tr>
<tr><td rowspan="3">The study has involved triangulation in data acquiring and analysis through the application of different methods such as questionnaires & template analysis, as well as pairwise comparison charts.</td><td>The study offers insights of an existing problem that is present in the university, as well as guidance to attend it through exemplifying ways and areas the organization can improve to mitigate the problem</td><td rowspan="9">The study has shown the influence exerted from stakeholders to students. It has shown that professors play the most significant influence directly over students, whereas the industry influence in their empathy through experience indirectly.</td><td rowspan="9">The study offers contribution through expanding the sparse literature regarding the supply chain in higher education.</td></tr>
<tr><td>It offers a clear and wide picture of the current mindset that each stakeholder has to each other.</td></tr>
<tr><td>It offers the organization with the data and methods to understand where to concentrate its efforts for improvement.</td></tr>
<tr><td rowspan="3">It has contributed utilizing supply chain and the different mehotds mentioned above to improve a study plan in the academics.</td><td>The study has given the organization the mismatches that are present within it as an opportunity to reflect and act towards improvement.</td></tr>
<tr><td>The study has given the university evidence that points out towards a strong influence from professors to students in regards to their feel of underestimation from the industry.</td></tr>
<tr><td>It has given the university evidence of the erroneous perception that professors have towards employers in regards to the way in which these perceive industrial designers.</td></tr>
<tr><td rowspan="3">The study’s methodological contribution is unique in that there is no similar study utilizing the same combination of methods and techniques to address the supply chain in the education industry.</td><td>The researcher has offered evidence for improving the selection filters of the bachelor program and leaves the door open for further research on this topic for future researchers.</td></tr>
<tr><td>The information provided in this study can be used by future researchers as references for their own studies.</td></tr>
<tr><td>The information provided in the study can be used by the organization for specific improvements in their design courses.</td></tr>
</table>

Table 45 - Contributions of the study

7.3 Attendance to the Management Problem and RQ's

Recalling the managerial problem, this was identified as a potential mismatch in perceptions and expectations between the supply side of industrial design programs, consisting of individuals involved in academic programs such as instructors and students of the bachelor program of the University who are potential employees of the industry, and the demand side, consisting of graduates and the employers of these potential industrial designers. The researcher performed the study based on the methodology of Action Research in an effort to not only gather, analyze, and present data and conclusions, but to take all of his findings and discuss them within the organization to understand how to attend the problem.

In his quest, he initially found interesting contrasts between both the demand and supply side, but not as he expected. In fact, it was only through a deeper analysis that he could conclude that while there are indeed considerable mismatches between both sides, there are also significant matches in their perception towards aspects of the profession itself. Discussing these results with the organization was crucial to understand that the problem was generated within the institution as a result of the actual educational practices that professors have been doing in the Bachelor of Industrial Design's subjects. After looking back to all the analysis and results, the researcher can finally conclude that the managerial problem was the result of mismatches in the educational practices in the bachelor program of industrial design. In other words, the existing mismatches occur because students have not been faced with enough experience of true industrial work during their educational practices, and the evident communication problem that has been previously argued.

The limitations and extension of this research are acknowledged, emanating especially from an environment of constant change as is the case of universities. Each semester seems to be a new chapter in a constantly evolving state for students as they move towards the achievement their degrees. Despite constant change we can conclude that the data analysis and conclusions present in this study are valuable for the University because they are the results of its own practice.

At this point, we can finally argue that we have enough data and analysis to attend the research questions that we presented in the initial chapters of this study:

RQ 1 What are the perceptions/expectations of professors and students about the effectiveness of industrial design programs offered by University of Monterey?

RQ 2 What are the perceptions/expectations of industrial design employers and employees about the effectiveness of industrial design programs offered by University of Monterey?

RQ 3 How can sustainable action outcomes that address any differences in perceptions/expectations between the supply of and demand for programs be achieved?

Based on the entire data, evidence, and analyses, the researcher can present now his conclusions. Regarding the first and second RQs, we now have a clearer understanding of the whole situation and can identify the differences between the demand and supply sides. However, while we might imagine both the supply and demand sides as being organized with the same values present in each of their stakeholders, in actuality we have observed that from the supply side there are really significant differences between them, which lead to further mismatches once students enter the work field.

Regarding the ways the supply side perceives the effectiveness of the programs offered by the University we can see that there is an evident need (and identification from the academic responsibles) to improve students' knowledge, skills and abilities for research, independence, and proactivity in general. From the researcher's perspective, in regards to subjects that address creativity, aesthetic, and other branches that industrial design covers, professors and students do not seem to complaint or highlight any sign of lack of abilities regarding these subjects. As a matter of fact, these appear to be more of a match between both sides of the chain, since employers have also argued that industrial designers are creative and valuable individuals in their organizations. So, summarizing the perception of both sides towards the technical effectiveness of the program, this seems to be in good condition. However, improvements in analytical abilities of the supply side (students) are evident since the effectiveness of the design program in the University seems to have failures in these topics.

Being an associate professor of industrial design at the University, one of the greatest advantages that the researcher has is access to the entire academic program. Associates professors not only contribute to attending the academics by imparting subjects to students but also are responsible of specific administrative tasks. After discussing his position as a doctoral student with the program director, the researcher was assigned the task to supervise the development of the program for when the next version became available. Usually there is a five-year period that each program lasts. By now, the program should have been changed. However, due to external factors such as the pandemic and close times, this had to be delayed further to the end of 2021, meaning that most probably the new academic program would be available by mid 2022 or even 2023. However, at the time being, this doesn't stop the researcher getting ahead and looking for improvements that will be tangible in the new program.

7.4 Second Use of PDSA Cycles and Benefits

If we recall during Chapter 3, the researcher argued the importance of involving his organization in accordance with the Action Research methodology requirements. He recalls how during the creation of the seven overarching themes the PDSA Cycle of continuous improvement could explain the cycling process of data gathering, analysis and action from it. Now, having developed the themes he could once more apply the cycle, however this time the involvement with the institution became the starting point for what was yet to develop from the discussions with the academic responsibles.

However, now the researcher began by planning the presentation to the organization, which as we already know, had to choose between the most viable alternatives and opted to do so through the lens of academic responsibles. Once they were identified as the starting point for moving forwards, discussion of the results and through that discussion, the arguments obtained were analyzed through a new TA in order to identify the opportunity areas that were convenient to attend. By this, the researcher has developed a fourth cycle in the PDSA model as shown:

Fourth PDSA Cycle			
Plan	Identify the most efficient way to discuss the results (overarching themes) to the organization.	Do	Discussion of overarching themes with the organization.
Act	The analysis, with the use of TA method, provided the researcher with four new themes, which were identified as the opportunity areas.	Study	The researcher used TA method to analyze the arguments and discussions with his colleagues.

Table 44 - Fourth PDSA cycle.

Now, having established the opportunity areas, the researcher analyzed them and argued over the importance of their attention. During this time, he was able to identify in what ways do the dif-

ferent stakeholders influence on students and could develop a complete graph to identify how information flows within the supply chain, the influence that each stakeholder had towards students, as well as the mismatches present within the interaction of the stakeholders. Finally, the researcher identified the relevance that his findings had towards the supply chain and was able to identify the critical points where the chain had its major flaws. He performed a set of pairwise comparison charts for each academic year in regards to the opportunity areas that need to be addressed in the organization in order to understand the degree of importance and relevance of these areas in contrast to the level of experience from students throughout their studies. The researcher now presents the reader with a fifth PDSA cycle occurring at the end of this study.

Fifth PDSA Cycle			
Plan	Initial organization and analysis of the data (four opportunity areas)	Do	Identification and illustration of relevance of opportunity areas to students, identification of influence from stakeholders towards students, identification of mismatches within the flow of information in the supply chain
Act	Performance of pairwise comparison charts to identify the degree of relevance of each opportunity convenient for the organization to apply to improve practices.	Study	Analysis of data and graphs developed in regards to relevance with the supply chain.

Table 45 - Fifth PDSA cycle.

In the end, as we can observe, the PDSA cycles in a very broad manner summarized the entire process of analysis and results generation in this study. Going from the way in which the data were handled to the pairwise charts generation. In a way, as well, these PDSA cycles add to make evident how the researcher got the organization involved in a cycle of learning and improvement. Through out the entire research, we can see evidence that the PDSA cycle was used on several occasions by the researcher. Its relevance in the analysis of data and the establishment of steps to follow was crucial during this study. In the first place, it allowed the researcher to identify the different steps required to move forwards in an orderly manner through out the data analysis. Be-

cause the amount of data to be handled with the questionnaires was enormous, using the PDSA cycle helped the researcher establish limits on when to start the next cycle without losing guidance of the position that he had during each particular phase of the analysis.

However, its major significance comes as being the learning outcome in the Action Research methodology for this study. While using PDSA as the AR framework, the researcher was able to conduct analysis in an orderly manner and study the results obtained during each cycle that allowed him to take action for the next one. It allowed him to perform action and create knowledge thanks to the outcome of that action. This was especially evident when used during the discussion of the results with other members of the organization, as well as the outcome of the pairwise charts as a reflexion of the extend of the study and the willingness to use a tangible tool that would bring a social benefit for others.

As a conclusion towards this learning tool, the researcher hopes other researchers will benefit while using his methods for research in education and generate not only a deeper knowledge of their own institutions, but tangible and valuable change within them as well.

7.5 Data Validation

The following aspects were considered during the development of this research. These aspects strongly support the validation of the researcher's analysis, interpretation, and data.

1. The methodology and methods used in this study have been briefly explained and exemplified in regards to how to use them by the researcher, as well as referenced bibliographically.

2. The amount of questionnaires used by the researcher in this study allows him to have a broad amount of data in regards to opinions and valuable comments by the participants.

3. Before applying the questionnaires to students, the researcher made sure no redundancies were made between the questions.

4. The interpretations made by the researcher are supported by direct quotes made by participants during the research, which are kept in the questionnaires.

5. The use of triangulation in the research, involving several methods, for instance going from Giorgi's (1982) approach to analysis and Template Analysis.

6. The data results were presented and reviewed by both the researcher and the organization, as well as discussed and reviewed by the main supervisor of this Thesis.

7.6 Opportunities for Future Research

In regards to this study, the researcher identifies several opportunities for the future. Before moving forwards, however, he must clarify that the proposals presented in this section are presented only as such and should not be considered as present implementations that are actually taking place. rather, these are areas of opportunity he considers viable based on his findings and methods used in the study.

First, and as previously argued, one opportunity that this study offers is being used by other researchers to continue this field of study or as an example for developing other similar studies within and outside the university. This includes the data gathering methods, and triangulation of data analysis. One of the biggest advantages that universities have is that they usually have professors dedicated to research. This allows the organization to adopt the present data and results and continue with the study.

A second opportunity area has to do with the organization to reflect in its own present practices. As the reader could observe, the results present in the study show there is much to improve in regards to the communication that exists between the academia and the industry, and within the stakeholders from the university (professors and students). Reflecting on these practices would undoubtedly mean a huge advantage for the organization as a university since it would help it identify its flaws, propose improvements, and maintain its stakeholders well improved and up to date in regards to their bachelor programs and professions.

Another opportunity for future research is the development of a potential model or framework for similar future studies based on the methodology followed in this study. This model could be used as the base for other researchers who are interested in the subjects expressed here or that need to improve links or interactions between their own supply chains. Researchers from other fields might take advantage of the model and adapt it to study their own fields as well. Suppliers, clients, manufacturers, and other stakeholders alleged to future researcher's industry can be considered as individuals involved in their own supply and demand chains and researchers might

obtain their conclusions based on their own data handling and analysis. Such model could include measure tools where actions implemented could be measured, validated, compared or refused between their own hypotheses or propositions.

Finally, another opportunity for the future is the adaptation and implementation of the methods and methodology followed in this study to other professions to obtain their own results and perform a comparison between the practices of different programs. What this would mean for the university is enormous, since it would not only help it find the opportunity areas from each bachelor program, but also find practices in certain careers that would potentially show better results than others. These practices could then be adopted by other programs and measure their effectiveness within their own results.

7.7 Limitations

During the development of this research, it is important to mention several limitations that the researcher had to face and others that will be present in the future.

The first limitation refers to those findings within the study that go beyond its limits. As it is well known by the reader, since this study was developed with a student focus, not all of the issues surrounding the findings were addressed. These include potential methods to improve communication between professors and the industry, as well as potential methods in which professors could transmit the information from the industry to students, as the evidence suggested in the previous chapter.

The second limitation that the researcher considers extremely relevant has to do with time itself. In this matter, the researcher needs to emphasize several points. First, it's important to consider that as time goes by in the university, so does student's educational and experience trajectory. Contrary to an industrial company where many of their members can focus on specific projects for long periods of time, inside the university time is a limitation for the development of many things. At first, the researcher pretended to focus in establishing changes in specific subjects from the study plan. However, at the present moment, the plan is undergoing modifications that will affect complete subjects, to the point where some of them will in fact be eliminated. Hence, he realized that any change towards specifics subjects was potentially in risk of become obsolete after a certain amount of time. Because of this, the researcher considered more valuable to focus his findings and proposals to the program in general, instead of every specific subject, since the program itself maintains its essence throughout time. This means, that even if the bachelor program suffers major modifications of its determined subjects, the bases of the program will always be present during the first academic years, as well as the focus on the professional practices and further research during their last periods, making the findings of the researcher to be much more adaptable and mitigating obsolescence from the study in regards to the academic plan.

One of the most relevant limitations of (and beyond) this study is the ability to measure the immediate effects that any changes made within the program will have for design students, as well as the demand side. While the researcher is confident that the opportunity areas and mismatches will be mitigated over time, it is difficult to maintain a constant evaluation of periodical results and analysis. Considering that students take approximately five years from their start of their bachelor program to their graduation, then we need to add more time to clearly see the effects that they will have once they begin working in their workplaces. During this time, many things that are out of control of the researcher (and potential future researchers for this area of study) might occur; for example, professionals who were directly related to the study might come and leave an organization, leaving it unfinished. Personal and professional priorities for the organizations and individuals involved might change over short periods of time, once more leaving future research incomplete. Also, the ability to maintain discipline in any potential change applied becomes quite challenging, without mentioning that different professors might have different approaches for their subjects.

Finally, although the issues discussed above have been presented as limitations they do not detract from the contributions of this research, but should challenge and inspire stakeholders to find new solutions to problems. It should be our habit to seek continuous improvement in our field of work, profession, or field of study as researchers.

7.8 Final Reflections

Much has been learned during this study. From a very personal and professional view, the researcher was able to understand many things as well as achieve many others, all thanks to a cycle of continuous learning and improvement of the study. Learning has been accomplished in many different ways because not only has the researcher learned more about his workplace than meets the eye, he has also been able to learn how to efficiently apply the methods used in this research for future studies he and others might conduct. The findings that this study provided to the researcher makes him reflect in the practice that every day are done in his organization. Having reached this point has undoubtedly been quite satisfactory for the researcher on one hand, however on the other, the study has exposed a series of aspects that, as the evidence suggests, need to be attended in order to improve organizational practices in the university.

First, it presents us with a scenario where the supply and demand sides from the supply chain requires major interaction. The university offers a huge study field for potential students. Knowing the proceses of every bachelor program would undoubtedly mean an enormous amount of time, work, and effort for any researcher, not to mention the data obtention from each one. However, thanks to the analysis and findings in this study, the researcher has exposed evidence of practices in one of its programs, that is industrial design, that require rapid attention. This exposes the possibility of other programs to be in similar situations without the university being aware. On the other hand, we can realice the importance and potential that research for improvement in educational systems have. With this study at hand, the university can start questioning further internal practices from each area. In regards to industrial design in particular, the researcher is satisfied on one hand to have found this valuable data and flaws in the supply chain, but on the other, is worried knowing that industrial design is a profession that requires a disciplined interaction between designers and users or clients to guarantee a successful product launch.

In regards to the way in which the study plan is structured, the researcher finds huge potential for improvement during the initial stages of the program. First, regarding the communication that

exists between the university and students. Also, based on his findings he believes that approaching the industry during an early stage in the program will allow students to broaden their vision of the profession of industrial design and the range of possibilities that it can offer them. On the other hand, there is no doubt that communication between the university and the industry is amongst the most alarming aspects for the researcher. From his perspective, in order to improve this, the university would have to change its modus operandi quite significantly to improve in that area, since not only does the closeness to the industry should be made by students, but also by professors, as the evidence has shown. The illustration from the supply chain from the organization shows a clear failure in this area. It basically tells the researcher an evident lack of interaction between both sides of the chain. Therefore, it comes to no surprise that the supply chain works with what it has at hands at the moment. And while this research has a student focus, this doesn't mean the researcher cannot argue on a set of proposals that might serve as reflection as for the organization:

1. In order to improve the links between the academia and the industry, the university can increment guided visits to companies and industrial projects from an early stage of the program. Especially in the design studio subjects that correspond to the second academic year. If we recall this period, students start learning design methodologies used in the industry that require high quality in the data obtained from the final users or clients to guarantee good quality products.

2. Invite external professionals from the industry to the university to understand their processes better and establish links with them from an early stage of the program, once again especially during the second academic year where the researcher proposes a strong link-up with the industry and research as well.

3. The creation of a committee by professors to identify needs in the industry. This could be a huge advantage for the university since on one hand it would enable the necessary communication between the academia and the different industries to plan and understand real projects. And second, it would stimulate direct communication with the industry. This would then, theoretically speaking, reflect in the information that is transmitted from professors to students.

4. The creation of a committee or community service by students from higher semesters that have already undertaken their professional practices where they can serve as guides or mentors for future generations through conferences or interviews to new or intermediate level students.

5. The creation of a subject within the bachelor program dedicated to enhance research of the different industries present locally. This would enable students to widen their vision towards the work field as industrial designers.

6. The creation and implementation of a tool or system that would help the organization and the academia to measure the potential matches between the requirements of the industry and internal practices in the university, amongst others.

There are many ideas that could be argued over these topics, and as the reader can observe, some are very specific and others are presented in a much ambiguous manner. However, whichever the case, it is thanks to the information gathered that we can know what areas specifically to attend to improve the mismatches with the industry.

One of the most revealing aspects the researcher considers this study has is the way in which the different stakeholders influence students, both within the supply side with the information that professors transmit to them, as well as the industry regarding experience and generation of empathy through real work. However, it is worrying to know that it manifested as a contrast between what we might call an inadequate practice within the organization and real practices within the industry. In other words, it is worrying that students need to be influenced by the industry to develop the necessary empathy instead of being influenced within the university to acquire an empathic profile which is adequate in the work field. And while the pairwise charts have enhanced the other opportunity areas, the researcher considers empathy to be one that should not be omitted through practice as well. Moon (2018) has already argued over the importance of discipline in the supply chain and described that one of the most effective mechanisms to promote it is that each member in the chain complies with the quality standards it is intended to have. Similarly, the researcher considers critical that the implementation of any improvement within the organization goes by hand with a level of quality such that guarantees its optimal function.

Alongside all this, from a personal point of view, this research has helped the researcher become aware of important aspects present in his institution. In the first place, the importance of enhancing good communication with students. As a professor of the bachelor program, he is aware of the importance and advantages that a good communication with them can bring. These include understanding their perceptions towards specific topics, and helping them solve any issues they might have along their educational progress. Second, it gave the researcher the opportunity to demonstrate new ways to improve communication between individuals, not only in a practical manner but also in a tangible one, where data could be synthesized, studied, and be present for developing any possible improvements in any workplace.

Finally, from a very personal perspective, the researcher feels grateful for being able to have the opportunity to conduct this study. This has undoubtedly enhanced his research skills and permits him as well become more in depth connected with those individuals with whom he works each day. Surely, this will not be the last time he will make use of the methods learnt, since the industry of education is an ever changing one and always seeks continuous improvement. And for that same reason, to be inside an industry of constant change and challenge, he feels quite fortunate to have had the opportunity to perform such research in such a challenging environment.

Appendices

Appendix A: Student's Questionnaire Questions

Question 1: What were your main motivations that drove you to study the bachelor of industrial design?

Question 2: When you entered the bachelor program, what was the general perception you had of an industrial designer, and what is the perception you have of it today?

Question 3: How well do you know the entire study plan structure offered in the bachelor of industrial design program at the University of Monterrey?

Question 4: Where do you expect to be working as an industrial designer once you graduate?

Question 5: If you were to work at a local manufacturing company, how do you visualize yourself there as an industrial designer?

Question 6: What is your general perception of working at a local manufacturing company as an industrial designer?

Question 7: Do you know anyone/have relatives that are currently working in the manufacturing industry as an industrial designer?

Question 8: What comments have you received from your relatives working as industrial designers in the manufacturing industry about their jobs?

Question 9: What abilities do you believe you'll develop (or have developed) during you entire bachelor program as an industrial design student at the University of Monterrey?

Question 10: Generally speaking, what key skills do you believe distinguish an industrial designer from other professionals at their workplaces?

Question 11: From the skills you mentioned, which ones do you consider to be the three most important ones, and why?

Question 12: How do you believe/expect the design process is done at a local manufacturing company?

Question 13: Which subjects do you believe are the ones you might use the most when working as an industrial designer at a local manufacturing company, and why?

Question 14: Which ones do you think are the local manufacturing industry demands in actuality when hiring an industrial designer?

Question 15: If you were to hire industrial design graduates at your organization, what technical knowledge and personal skills do you expect an industrial designer to have in order to fulfill the profile you normally seek when hiring designers?

Question 16: If you were to voluntarily leave the manufacturing company you are working at as an industrial designer, what would be the main reasons for doing so?

Question 17: Is there any particular comment you would like to express regarding the topics addressed in this questionnaire?

Appendix B: Professor's Questionnaire Questions

Question 1: Subjects currently teaching

Question 2: Years of experience in the manufacturing industry

Question 3: Position and responsibilities held while working at the manufacturing industry.

Question 4: Area(s) of expertise as an industrial design professor.

Question 5: What is the general perception you have of the current industrial design students compared to when you were studying the bachelor program and how do you think they should address the design problems that may present at the local manufacturing industry?

Question 6: What major differences can you tell an industrial design student has compared to other students you have worked with at the University?

Question 7: From the time you were a student of the bachelor of industrial design program up to this day, what major changes you consider have been done in the study program that have benefited students to understand the demands of the local manufacturing industry?

Question 8: Do you think employers of industrial design graduates consider design to be a key activity at their organization or as an activity that can be replaced by other professionals they hire?

Question 9: What are the main skills /abilities you believe an industrial designer should have while working at the local manufacturing industry'

Question 10: Based on your experience as an industrial design professor, what skills/abilities do you think an industrial designer currently lack of once they graduate based on the demands of the local manufacturing industry?

Question 11: In what ways do you believe the skills / abilities an industrial designer has affect the perception employers have towards industrial designers?

Question 12: How well do you know the entire study plan of the bachelor of industrial design program at the University of Monterrey?

Question 13: Which subjects from the study plan do you consider to be highly related to the demands required by local manufacturing organizations hiring industrial design graduates?

Question 14: Generally speaking, what perceptions do you believe / have knowledge of that industrial design employers have towards them?

Question 15: Do you believe the lack of knowledge or experience of a particular subject of an industrial design graduate affect their motivation as employee of the local manufacturing industry? If so, in which ways?

Question 16: If at a local manufacturing company the design methodologies of Design thinking or Human Centered Design are not used in their design process, do you believe the lack of use of such methodologies have a direct effect on the motivation of industrial designers working at that organization?

Question 17: Based on your knowledge of the decision making process at the local manufacturing industry, do you consider it to be a threat to industrial designers for their career development? If so, in what ways?

Question 18: If you were to hire industrial design students in your organization, what technical knowledge and personal skills do you expect an industrial designer to have in order to fulfill the profile you normally seek when hiring designers?

Question 19: What skills would you seek in industrial designers to improve in order to become more qualified for the type of job you're offering them?

Question 20: Have you get the students involved in their classes with organizations dedicated to product manufacturing in Monterrey? If so, please explain.

Question 21: Which do you think are the most common reasons for an industrial designer working at the local manufacturing industry to abandon their jobs?

Question 22: Have industrial designers expressed to you their perceptions of what working at a local manufacturing industry would be like before they start working?

Question 23: Is there any particular comment you would like to express regarding the topics addressed during this questionnaire?

Appendix C: Industrial Design Employers' Questionnaire Questions

Question 1: Please mention you place of work, position, for how long have you been working in the company, and main responsibilities.

Question 2: How familiar are you working with industrial designers at your organization?

Question 3: What is the general perception you have of an industrial designer and how do you think they should address the design problems that present at your organization?

Question 4: Do you consider design to be key at your organization or as an activity that can be replaced by other professionals you have hired?

Question 5: What major differences can you tell an industrial designer has compared to other professionals you have worked with at your organization?

Question 6: What are the main skills/abilities you believe an industrial designer should have while working at the local manufacturing industry?

Question 7: Based on your experience as an industrial design employer, what skills / abilities do you think an industrial designer currently lack of once they graduate based on the demands of the local manufacturing industry?

Question 8: In what ways do you believe the skills / abilities an industrial designer has affect the perception employers have towards industrial designers?

Question 9: What perceptions do you believe / have knowledge of that other industrial design employers have towards them?

Question 10: Do you believe the lack of knowledge or experience of a particular subject of an industrial designer affect their motivation as employee of the local manufacturing industry? If so, in what ways?

Question 11: Could you please explain in detail the design process of a product that is used at your organization?

Question 12: Do you normally use the Design Thinking or Human Centered Design methodologies at your workplace? If not, do you believe this to have a direct effect on the motivation of your industrial design employees?

Question 13: Have you ever considered the decision making at your organization to be a threat to industrial designers for their career development?

Question 14: What are the most common reasons for an industrial designer to abandon their jobs at your organization?

Question 15: Have industrial designers expressed to you their perceptions of what a local manufacturing industry would be like once they start working with you?

Question 16: Is there any particular comment you would like to express regarding the topics addressed during this questionnaire?

Appendix D: Industrial Design Graduates' Questionnaire Questions

Question 1: Please mention you place of work, position, for how long have you been working in the company, and main responsibilities as an industrial designer.

Question 2: What were your main motivations that drove you to study the bachelor of industrial design?

Question 3: What was the general perception you had of an industrial designer while you were studying the bachelor program?

Question 4: Based on the perception you had of an industrial designer as a student, what major differences you believe are most noticeable now with your experience as an employee working in the local manufacturing industry?

Question 5: While studying the bachelor, how did you visualize yourself working as a graduate in industrial design?

Question 6: What was your general perception of working at a local manufacturing company as an industrial designer?

Question 7: What key skills/abilities do you believe distinguish an industrial designer from other professions?

Question 8: In what ways do you believe the skills an industrial design graduate has affect the perception employers have towards industrial designers?

Question 9: How is the design process done at your local manufacturing company?

Question 10: Have you considered leaving the company?

Question 11: Do you normally use the Design Thinking or Human Centered Design methodologies at your workplace? If not, does this have a direct effect on your motivation as an industrial design employee at your workplace?

Question 12: In what ways do you believe the lack of use of such methodologies affect industrial designers at their workplaces?

Question 13: Have you ever considered the decision making at your organization to be a threat to your career development? If so, please explain.

Question 14: If you were to voluntarily leave the organization you are working at as an industrial designer, what would the main reasons be for doing so?

Question 15: Is there any particular comment you would like to express regarding the topics addressed during this questionnaire?

Appendix E: “Motivation” Theme Supporting Evidence

Direct quotes made from students validate this interpretation:

’My main motivations that helped me decide to study industrial design are that we as designers have a huge working field from where to choose and we can also improve the environment of where we live through innovation and creating products that become beneficial to society.’ (1st year student of the bachelor of industrial design program direct quote that validate the researcher’s interpretation).

‘(Industrial design) is a profession that doesn’t limit you to only one product or motive, rather you can create great new things.’ (1st year student of the bachelor of industrial design program direct quote that validate the researcher’s interpretation)

As years went by during their studies, they become aware of important topics in the profession of industrial design such as the use of technological tools and design methodologies and the focus given to motivation is observed through the use of the design methodologies that are employed during most of their studio subjects and how extended the labor field can be with this profession, as supported by a student from 4th semester, who said that she ‘always liked to see how things were created and considered this career to have a very ample labour field’ (4th year student of the bachelor of industrial design program direct quote that validate the researcher’s interpretation).

Graduates consider the lack of use of methodologies not a reason to affect a designer’s motivation but relevant for designer’s success and innovation at their work. Professors also believe the lack of use of methodologies does not affect the designer’s motivation, rather it becomes affected depending in the designer’s interest to the subject attending and their desire to confront new challenges. This is supported from the opinion of a professor of the bachelor program on the subject who argued that ‘it (motivation) depends a lot of what is the job profile / description, and what is the profile of the candidate. Quite often the source of disappointment is the lack of precise defin-

ition of what each side is looking for. But, in general, if the candidate is good enough but lacking in certain areas that the employer is capable/expert, sometimes the candidate is trained in those areas' (Professor of the bachelor of Industrial Design Program's direct quote that validates the researcher's interpretation).

Appendix F: “Visualization as Designers” Theme Supporting Evidence

Direct quotes made from students validate this interpretation:

‘I hope to work in a creative area of a big company and then open my own.’ (4th year student of the bachelor of industrial design program direct quote that validates the researcher’s interpretation)

‘I would like to work in a design firm and then open my own business’ (3rd year student of the bachelor of industrial design program direct quote that validates the researcher’s interpretation)

An important aspect is highlighted in common by graduates and employers and that is the need to obtain engineering knowledge, as argued by an employer: ‘Due to the lack of engineering knowledge (...) designers are more dependent from the rest of professionals (engineers) for product release’ (Employer of industrial designers’ direct quote that validates the researcher’s interpretation). And while this topic is argued by these stakeholders, it was not perceived by students who wanted to have their own design firms, such is the case of one graduate who argued that he ‘visualized (himself) in a big company with other designers making research and innovations to the products. (He) wanted to work in a toy company or have his own toy company.’ (Industrial design graduate direct quote that validates the researcher’s interpretation).

Appendix G: “Perception of an Industrial Designer” Theme Supporting Evidence

The general perception each stakeholder had towards an industrial designer had in most cases the similarity of identifying them as problem solvers. This is supported by arguments done by students of the bachelor program such as ‘my general perception of an industrial designer that works in a manufacturing company is that of someone in charge of proposing ideas for creating products, renders, or other objects that that company develops.’ (1st year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation)., as well as individuals that ‘work in the design concept of a product and is in charge of the quality in finishes of that product (3rd year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation). Other students have also argued that their perception of an industrial designer is that of an individual that ‘works in a big mass producing company in Monterrey’ (2nd year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation).

However its notorious the difference an industrial design professor has compared to that of a student, whereas professors look at designers as multidisciplinary individuals focused in problem solving, students focus themselves in skills they perceive from this profession. This is consistent with what an industrial design professor commented, arguing ‘I think they (industrial designers) have a wider vision on how to solve problems, more methods and methodologies as well as tools to do so (...) (People) still think that other professions can do the same task designers do. They need to work closer with industrial designers in order to obtain overwhelming results .’ (Professor of the bachelor of industrial design program direct quote that validates the researcher’s interpretation). Also, in this section, the perception of how students visualize designers working in the manufacturing industry is shown. For instance, one student argued that ‘many times other professionals are prioritized in a company due to the lack of knowledge that industrial designers have.’ (1st year student of the bachelor of industrial design program direct quote that validates the researcher’s interpretation)

Appendix H: “Skills that Distinguish Industrial Designers” Theme Supporting Evidence

Direct quotes described by students of the bachelor program:

‘Creativity, dedication, patience, imagination, tolerance, effort, and innovation’ (1st year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation).

‘Adaptability, creativity, innovation, and patience.’ (1st year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation)

‘Dedication, responsibility, creativity, work under pressure, and ability to solve problems.’ (2nd year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation)

‘Creativity, empathy, curiosity, and innovation.’ (4th year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation)

Besides these arguments, other stakeholders such as professors from the bachelor of industrial design program consider industrial design to be a profession where individuals tend to be more unorganized yet compromised with their responsibilities. One professor of the bachelor program argued that ‘design students tend to be more unorganized but hard workers. They are always looking how to make things differently, they don’t follow a pattern, rather always look for other methods or ways. They are more informal but more compromised, they want to be ‘’part of a family’’, not work established hours.’ (Professor of the industrial design program direct quote that validates the researcher’s interpretation). As a professor of this career, the researcher strongly supports this idea, especially in the freedom that design students have towards accomplishing their projects such as freedom in their working time, the use of electronic devices as tools for communication and inspiration such as listening to music while working in the classroom.

Appendix I: “Skills Demanded by the Industry” Theme Supporting Evidence

In regards to the skills that industrial designers should have demanded by the industry, we can observe that all stakeholders expect designers to perform well in teamwork. Adaptability, proactivity, and technical skills are also important skills argued in the comparison. Several arguments made by students from different semester supports this, such is the case of a student who argued that ‘creativity or the feel for giving solutions to problems distinguish a designer and these are fundamental skills in order to be hired by someone. As a designer you are used to generate proposals, generally speaking. You may be able to give solutions to problems that are not necessarily of design’ (4th year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation). Others have simply presented the skills they believed were demanded by the industry, as in the case of a student that argued that ‘teamwork, acceptance to criticism, research, critical thinking for problem solving, creativity, and innovation’ (4th year student of the bachelor of industrial design program’s direct quote that validates the researcher’s interpretation) were those she felt were the most relevant.

From the researcher’s point of view, as well as for other industrial design professors, the ability of students to effectively communicate to others their ideas is an extremely important aspect. As innovative individuals and idea generators they develop sketching and modeling abilities to show colleagues and clients proposals that simulate real products. In regards to this topic, one professor argued that ‘if an industrial designer does not have the ability to communicate his/her skills to an employer and if the employer does not have the capacity to ‘read’ those abilities in the design candidate, then they will only see in the designer the physical abilities or the materialized projects that the designer has done instead of seeing the potential leader they may have in front of them. So it is very important to show the design student how to show their portfolio and resume to the employers to make the proper impact.’ (Professor of the bachelor of industrial design program direct quote that validates the researcher’s interpretation).

As a former employee in the local manufacturing industry, the researcher understands the value and significance of this ability at the moment of a design or redesign of a product. An effective communication of ideas helps clients and designers spare time, and misinterpretations that can lead to reworks and may as well lead to wasteful costs.

Appendix J: “Design Process Done” Theme Supporting Evidence

Another detail discovered in the data was the perceptions that students have towards the design process done at the manufacturing industry and how it really works. While in most cases they believed it was similar to the way they were taught at the University, as argued by two 3rd year students whom, one of them said that she ‘doesn’t believe it is that different as how it is taught at the University.’ (3rd year student of the bachelor of industrial design program direct quote that validates the researcher’s interpretation), and the other one considered the process as ‘using Design Studio Methodology as learnt at the University’. (3rd year student of the bachelor of industrial design program direct quote that validates the researcher’s interpretation)., Others were aware that other processes and aspects were considered. This is validated from several arguments by students such as one 4th year student who argued that ‘after reaching a final design, orders for materials are organized in order to produce the prototypes and begin production.’ (4th year student of the bachelor of industrial design program direct quote that validates the researcher’s interpretation),

Graduates and employees are familiarized with the process and while some work at different organizations, their process is similar in several steps or activities that are not mentioned by students. Examples of these steps include building strategies based on market tendencies, market opportunity detection, customer interviews, product finance, proposals approved by clients, production supervision, among others. This is supported by one industrial design employer who described the process at his work to be as follows: ‘The client approaches the sales department, where information is filtered and passes to the design department that uses this information as references to enhance the exploration and generation of the proposals. Sketching is done and filtered to develop a 3D model and render to see how the real product might look like. Afterwards, the client either accepts the proposal or makes changes and the design department works based on those changes in order to develop fabrication drawings. .’ (Employer of industrial designers’ direct quote that validates the researcher’s interpretation).

Appendix K: "Reasons to Leave the Organization" Theme Supporting Evidence

According to industrial design employers, 'designers leave the organization for better job offerings (salary and benefits).' (Employer of Industrial Designers' direct quote that validates the researcher's interpretation) This is consistent with the opinion from the rest of the groups. In fact, some of the reasons several groups gave appear to be consistent such as bad working environment or practices inside the organization.

Professional development also seems to play an important aspect that designers consider when deciding to stay in a company or leave. One professor from the bachelor program believed that 'doing a repetitive and/or unfulfilling job without a prospect of career progress.' (Professor of the bachelor of Industrial Design Program's direct quote that validates the researcher's interpretation) was a reason for designers to abandon their job. We could argue that professional growth or development goes by hand with performing activities that are related with the profession of industrial design.

Students, however, also consider the passion for their work to be an important aspect to consider in this case. This is supported from the following quotes made directly by students. A second year student argued that he would 'leave (her) work for one were (she's) happier and get a better job offer.' (2nd year student of the bachelor of industrial design program direct quote that validates the researcher's interpretation), while another one argued that she would abandon her job because 'it is not something I am passionate about or have excess of work.' (4th year student of the bachelor of industrial design program direct quote that validates the researcher's interpretation). Other students argued that 'having time to do what they liked the most and establishing their own businesses' (4th year student of the bachelor of industrial design program direct quote that validates the researcher's interpretation) were reasons to voluntarily leave their organizations, as well as performing activities with 'lack of creativity, opportunities, and new

projects' (3rd year student of the bachelor of industrial design program direct quote that validates the researcher's interpretation).

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