PROCESS OF IDENTIFYING AND CONSOLIDATING OPPORTUNITIES FOR DESIGN STUDENTS: A TRANSITION TO PROFESSIONAL LIFE

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ABSTRACT
In every professional training process, university students receive knowledge about activities specific to their study disciplines. Additionally, they are often exposed to professional practice in various ways, sometimes more intensively in particular fields than others, until they complete the curriculum established by the university. The case of the B.A. in Design at Tecnologico de Monterrey is no exception. Students start by undertaking projects under the full supervision of their professors and progressively become more independent until they reach a point where they must propose the project they will undertake and describe the entire methodology and management process as if they were already a freelance designer or a design studio. This research identifies the key elements that student designers develop before graduating to consolidate their first design opportunities. To achieve the primary research objective, a study was conducted with 43 students pursuing the B.A. in Design at Tecnologico de Monterrey who graduated during 2023 and 2024. A multi-case study allowed for determining the process these students followed in their final project course to identify their first professional opportunities and consolidate one in a real project. As part of the research, students presented various reports for analysis, including affinity diagrams and cross-data comparisons related to brand identity, strategic planning, opportunity identification, project management, design process, and communication. This approach facilitated a proposal process for product designers in professional start-ups.

Keywords: Higher education, professional insertion, design process, educational innovation

1 INTRODUCTION

1.1 Higher education in design
Formal higher education is generally structured through subjects or courses that students take throughout the training process, which is usually structured in time segments of quarters, semesters, or years. During these periods, the course topics are related to the professional disciplinary competencies of the degree to be awarded, plus topics involving transversal ("soft") competencies that complement the discipline's professional training. For design students at Tecnologico de Monterrey, professional training is guided by the TEC21 Educational Model [1], which focuses on employing experiential challenges that expose students to attractive and challenging environmental scenarios. This allows them to develop disciplinary and transversal skills. The teaching-learning process occurs through structural Training Units (UF, by its acronym in Spanish) which include subjects and learning "blocks" with conceptual, procedural, and attitudinal content, essential for academic and professional training. The UF durations vary between 5, 10, and 15 weeks, depending on the programme and the degree.
The training begins with an Exploration stage, which is followed sequentially by the Focus and Specialisation stages. Through these stages, students develop professional skills until they attain the independence necessary for their professional insertion. Thus, they begin by tackling challenges or projects with controlled variables, then they progress in competency development for decision-making power over some project aspects, until they can decide the type of challenge they will undertake and propose how to resolve it [2].

1.2 Professional competencies
Design as a profession interacts with multiple professional fields and encounters business demands for industrial or product design skills that change over time. Thus, the design education curriculum must be

tuned to current demands [3,4]. Some key skills are considered basic among design professionals, such as aesthetic literacy, ability to express oneself in design, creativity, ability to plan and integrate, engineering knowledge, computer application skills, ergonomics knowledge, and foreign language skills. These competencies are complemented by other soft skills essential in the areas or careers recognised within the "orange economy" (where culture, creativity, and commerce intersect) as proposed by Avalos Rodriguez et al. [5]: Communication skills, stress management, planning and organisation, personal intelligence, and social intelligence skills. Moreover, the design discipline has shifted from creating physical objects to addressing complex socioeconomic problems and promoting sustainability. Technological advances and the increasing complexity of social and economic issues have transformed design practice and theory, broadening the field of product design. This shift has led to the development of new design methods and more holistic and systemic approaches [6]. Notable are the essential competencies proposed by the U. S. National Association of Schools of Art and Design (NASAD) [7], which include the ability to design products and systems; the ability to use multidimensional design tools and technologies; knowledge of the history of industrial design and human factors; the ability to research, define, and communicate problems and solutions; the ability to communicate concepts and specifications in various media; and knowledge of professional design practices and intellectual property issues. In addition, NASAD mentions the importance of business practices and their relationship to industrial design, the ability to work in interdisciplinary teams, and the opportunity for advanced study.

Several authors agree that a key element is the university's effective connection with the economic environment [8] promoting beneficial partnership policies and suggesting multiple ways to improve the vocational training process, as well as increasing practical hours, supporting professional internships, and involving employers in the educational process [9,10].

However, although university education is a clear facilitator of professional insertion [11] that trains for many types of professional skills, it is difficult to identify those that impact the professional insertion of designers and transcend the specific disciplinary competencies.

1.3 Professional insertion and opportunities

Professional integration can be interpreted as the process and experiences through which designers enter the labour market and apply their knowledge and skills in the real world. This process involves transitioning from academic training to professional practice, where designers employ disciplinary capabilities and competencies. During the integration process, they may participate in internships, collaborative programmes with industry, international projects, and work in multidisciplinary teams to expand their experience and network of contacts. This way, future professionals can consolidate their training to practice the design discipline. The possible forms of professional practice presented by Tecnologico de Monterrey [2] are divided into two categories: one where the designer is an employee or worker in "manufacturing and service sector companies, design offices, research and development centres, innovation agencies and departments, advertising agencies, public or private organisations," and another where the designer is an entrepreneur or independent worker "developing social innovation projects, their own office offering design services or consultancy, as well as creating their own company, designing and manufacturing their own products." Such diverse opportunities are challenges because they involve very different approaches to the world of work. The first (employee) generates a project portfolio, job search, employment applications, etc.; the second (entrepreneur) must take risks, look for partners, and be even more aware to identify opportunities. [12].

According to Ulrich and Eppinger [13], there are various techniques to generate opportunities, which, although not directly considered for professional insertion, represent a panorama similar to that of new design professionals. One technique is to **follow a personal passion** to meet an unresolved need. Another method is **to make lists of failures**, annoyances, or frustrations you find in a period. There is also the technique of **extracting opportunities from capabilities** [14], yielding a competitive advantage by identifying something valuable, rare, inimitable, and irreplaceable. Another method is to **study potential clients** through user anthropology or consumer ethnography. Likewise, the possibility of **assessing the implications of trends** means being attentive to technological, demographic, and social norm changes in the environment. Another technique is to **improve on** the successful innovations of other companies. Finally, there is the possibility of **leveraging sources to** achieve the objectives you have in mind.

This research aims to document the application of a process that would facilitate the professional insertion of design students based on their last academic experience at the university and to identify the key tools impacting this process that will help them after graduation, as well as the future design students in the final stage of their professional training.

2 METHODOLOGIES

To achieve the main objective of this research, we analysed 43 students in the Bachelor of Design programme at Tecnologico de Monterrey who graduated in 2023 and 2024. The study examined the last Block subject in the curriculum [1], a ten-week course that prepared students for professional insertion. The teaching team divided the activities into two main challenges or projects. The first was that students had to create a design firm; the second was to find a real client and produce a product design project for that client. To meet both challenges, the students formed teams of two or three people and developed both challenges as design firm partners [12]. Four weeks were allocated for the design firm challenge and six for the second challenge, considering they had to identify the client and establish the first agreements during the first challenge. For the first challenge, the students received training in office management models, strategic planning, foresight, business models, legal aspects, and brand positioning, among other topics. For the second challenge (product design for a real client), topics taught included strategic opportunity identification, quotations, budgets, and contracts. Some topics the students had already covered in previous subjects were reinforced, such as the design brief [15], methodology, and the design process [14,16], among others. In this same challenge, the teams had to propose their work methodology and establish the sequence of activities to conduct the project, including a weekly progress report presented in class. At the end of the period, each team had to deliver an executive report on the project, make a presentation, and provide evidence of the client's satisfaction.

A multi-case study was performed using the students' reports, which included all the details of the activities and the technical report of the product design project [17,18], comparing the brand identities, strategic planning, opportunity identification, project management, design process, and communication. The multi-case study included an affinity diagram and cross-comparison of the data to determine the specific method the student teams followed in their projects.

3 RESULTS

Table 1 lists the cases or projects carried out by the students. The research revealed that the projects covered a wide range of areas, which reflected the needs and preferences of various segments of clients and end users. The most recurrent projects were oriented toward designing furniture, both for homes and offices, and merchandise displays. Also notable was the interest in packaging and interior design innovation, especially for restaurants and retail establishments. The techniques to identify opportunities varied and were adapted to the specific nature of each project and client.

The comparison of the cases resulted in five categories: (1) home furniture design, in which several manufacturing companies sought to design specific furniture for different spaces, such as sofas, coffee tables, and side tables, aimed mainly at upper and middle class families; (2) office equipment and furniture, in which projects aimed to design chairs, desks, and video call booths, focusing strongly on current trends and the needs of modern office workers; (3) merchandise and packaging displays, in which projects aimed to create innovative showcases and packaging for different markets, such as food and esoteric others, seeking to attract specific consumers; (4) interior design and interactive spaces for restaurants and museums, and the design of interactive spaces to attract and retain different types of users from children to young adults; and (5) an electronic technology and equipment category, where projects focused on electronic products, such as speakers that enhance the listening experience in enclosed spaces. Table 1's list of projects shows the diversity of the students' innovative approaches and solutions in multiple areas of design and manufacturing, highlighting the importance of market research and adaptation to current trends to meet the needs of different user groups.

Table 1. Cases and Projects Details

N°	Type of project	Primary client activity	Opportunity technique	User	Products or services
1	Home furnishings	Manufacturing and selling home and office furniture	Mine your sources	Upper-class families	Design of a couch for the living room
2	Packaging	Taco restaurant	Consider the implications of trends	University students who order food at home	Design of different taco packaging for delivery
3	Office furniture	Manufacturing and selling office furniture	Study customers	People in a waiting room	Design of chairs for the waiting room
4	Merchandise displays	Sales of fruits and vegetables	Mine your sources	Adults who go to the market	Design of a display for the sale of fruits and vegetables
5	Office furniture	Manufacturing and selling office furniture	Consider the implications of trends	Millennial office workers	Design of a booth for video calls or meetings
6	Home furnishings	Furniture, decoration, and comprehensive interior design projects	Consider the implications of trends	Upper-class families	Design of an outdoor serving table
7	Home furnishings	Manufacturing decorative home accessories	Mine your sources	Upper-class families	Design of a coffee table for the living room
8	Interactive spaces	Museum of Contemporary Art	Consider the implications of trends	Children	Interior design of the mobile museum
9	Office furniture	Design and manufacture of ceramic products	Mine your sources	Adult buyers of ceramic products	Design of a showcase to display and store ceramic products
10	Electronic audio products	Audio equipment manufacturing	Study customers	People who visit spaces with ambient sound	Design of a speaker for closed spaces
11	Home furnishings	Manufacturing laminated glass products	Mine your sources	Middle-class families	Design of a coffee table for the living room
12	Merchandise displays	Sale of natural and esoteric products	Study customers	People who buy esoteric products	Design of a display for scented candles
13	Home furnishings	Manufacturing home furniture	Study customers	Upper-class families	Design of a nightstand
14	Merchandise displays	Jewellery sales	Study customers	Young women	Design of a display for necklaces and earrings
15	Restaurant interior design	Pizza restaurant	Consider the implications of trends	Families and young people	Interior design of the restaurant and brand identity
16	Brewery interior design	Manufacturing and sales of proprietary craft beer	Study customers	Young people	Design of exclusive chairs for the brewery
17	Exercise machines for gyms	Manufacturing of gym machines and equipment	Compile bug lists	Young people	Design of various gym equipment
18	Office furniture	Public notary	Consider the implications of	Lawyers - notary directors	Designing desks for managers.

			trends		
19	Home furnishings	Manufacturing marble and other rocky substrates	Consider the implications of trends	Young middle-class people	Design of a coffee table for the living room
20	Lighting design	Manufacturing lighting fixtures for homes and offices	Study customers	Families and young people	Design of a line of lighting fixtures for the home
21	Packaging	Manufacturing medicines for animals	Compile bug lists	Veterinarians and livestock farmers	Design of a protective cover for medicine containers

Regarding the design process and methodology, all the teams proposed a structure that includes four primary stages: the first is research, in which the aspects inherent to the project are documented, such as the problematic situation, users, materials, and technical factors, among others. The second stage, generating solutions, involves ideating the design proposals, prototyping, initial validations, and parametric modeling. The third stage, manufacturing, includes the construction of a full-scale functional prototype, manufacturing validations, and market tests. The fourth stage, documentation and communication, provides for the generation of all the product's technical documentation, branding, graphic material, and planning future actions with the client. Notably, each team selected a set of methods for each stage, based on their experience during their studies, and identified those in which they found more value according to the nature of the project.

Regarding strategic planning, it was notable that although each team generated the mission, vision, competitive advantage, and strategic objectives for their design firm, some teams did projects that were not aligned with the characteristics of their firm. However, they did try to maintain the brand identity they had generated and adapted all the documentation according to their positioning strategy. The cross-comparison identified that the "Mine your source" technique was the most used in furniture design projects, both for office and home, followed by the "Consider implications of trends" technique. Regarding the relationship between the client's main activity and the opportunity technique, "Mine your sources" was predominant in manufacturing furniture and home accessories. "Consider implications of trends" was most used in interior design projects and the manufacture of office furniture. "Study customers" was commonly used in retail activities and manufacturing specific products.

4 DISCUSSION AND CONCLUSION

The study of identifying and consolidating opportunities for design students provided valuable insights into how educational practices can influence the professional insertion of designers. The structured methodology, incorporating elements such as brand identity, strategic planning, opportunity identification, project management, design processes, and effective communication, equips students with the necessary tools for a smooth transition into the professional field.

A key observation from this study was the emphasis on aligning opportunity techniques with the client's primary activities, which is significant in professional insertion. For instance, "Mine your sources" was prevalent in furniture design projects. This technique enables students to leverage existing resources and data, a critical skill when entering the market, where efficiency and innovation are paramount. Such alignment ensures that projects are market-relevant and enhances the students' ability to meet specific industry demands effectively. The frequent use of the "Study customers" technique in retail and product manufacturing projects highlights the need for a deep understanding of customer behavior and preferences. This technique equips students with the ability to design user-centric products that are more likely to succeed in the market. Such skills are invaluable for professional insertion, as they demonstrate a graduate's capacity to create products that meet real-world needs and expectations.

Furthermore, the experiential TEC21 Educational Model of Tecnologico de Monterrey, which emphasises practical challenges and real-client projects, is pivotal in preparing students for professional insertion. By engaging in real-world projects and applying learned techniques, students gain hands-on experience that bridges the gap between theoretical knowledge and practical application. This approach builds competency and confidence, making graduates more attractive to potential employers or better prepared for entrepreneurial ventures.

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