

# DESIGNING A NEW CURRICULUM: COMPETENCY-BASED ON DESIGN EDUCATION

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## ABSTRACT

Competency-based learning is oriented to educate by the implementation of challenges where students must demonstrate that they have achieved and generated knowledge through the development of applied skills.

Design education has been significantly transformed in the last ten years thanks to the integration of new perspectives and seeking a more forward-thinking vision. This shift is motivated by the recognition of Design's desire to develop a most responsible approach.

In response to the need for a curriculum renewal based on competencies and a future-oriented vision, this paper outlines the process of creating a Competency-Based Learning curriculum that has been designed over five years framing the Tec21 "Design Programme," which reflects an approach to shaping the future of design education in Mexico.

*Keywords: Curriculum renewal, design education, competency based learning, educational innovation, professional education*

## 1 INTRODUCTION

The need to design a new curriculum arises from the constant change where the current world is subjected. The requirements to be constantly updated to avoid the obsolescence of academic programmes and to be at the forefront of educational models, generated a concern about how to design new curricular plans that are aligned with the macro, meso and micro global trends, and with the prevailing need to offer professional level studies to students who seek to be prepared for the challenges they will face upon graduation.

Design schools are in constant evolution of the new epistemic stances as well as the pragmatic approach that they must consider when implementing a new pedagogical model.

## 2 DESIGN EDUCATION

Design Education is a concept complex to explain, in a classic educational point of view, it demands that there is a design practice related to a pedagogic strategy in which students and teachers are enrolled into a design project studio to arise their conceptual, procedural and attitudinal skills in order to solve a design problem and develop a strategic and innovative solution by creativity. But recently the concept had to expand according to the challenges in which the planet lives and the current ways of thinking that constantly evolve.

The designers in training will be using tools and design processes that will be focused more in solving responsibility and impact problems through social innovation and transitional strategies to embrace a sustainable and regenerative future [1].

### 2.1 Context

Formal Industrial Design education was founded based on the historical necessity of having products that may cover the several human needs trying to be produced by iterative manufacturing processes and developing an aesthetic code that bonds with the emotional necessities of the users. Nowadays the design schools are more concerned about the human factors and leading into an era in which the Design is a solution to critical problems that have to be solved by future designers.

Many universities have migrated from Industrial Design denomination to only Design, giving opportunity to various manifestations that not necessarily end in tangible products but can be extended

to all those products that do not contain a materiality. They are teaching more topics related to sustainability and social innovation where technology is the constant in the equation.

In an exercise carried out by UNESCO between 2005 and 2014, educational centres from different levels and from different countries were studied to determine which are the elements that guide education towards a sustainable approach within learning spaces.

The main findings in this study were that a sustainable development pedagogy must be given through collaborative learning, community participation, remote learning and with a focus on research. With this, it is proposed to trigger the development of social leadership among students with the intention of implementing projects among the communities [2].

Meyer & Norman propose that Design education should broaden its perspectives as a discipline of relevance and impact on the planet. Apart from the learning of the design process, there must be a lateral extension towards disciplines of basic, social and natural sciences. This integration of other sciences does not displace the artistic approach that has always defined design, on the contrary, these new visions will potentiate the designer's capabilities [3].

## **2.2 Competency-Based Learning**

The present day Design schools should aim for a pedagogical approach that goes beyond the mere construction of products in laboratories. Instead, the focus should be on developing students' abilities to make decisions in uncertain situations [4]. This involves providing students with a variety of tools, techniques, and methodologies to effectively communicate their ideas and construct innovative solutions. By doing so, Design schools can guide students in achieving the optimal versions of their solutions.

The adoption of Competency-Based Learning in Design Education is not a recent concept. Its purpose is to create opportunities for empowering the classroom and fostering interactive participation among students, moving away from a passive educational model. The teachers are focused on bringing better learning experiences by applying the theoretical knowledge in “challenges” designed by a trainer partner who is an external entity allied to redirect the educational process towards the attainment of proven proficiency and the practical utilization of knowledge and abilities in real-life contexts. These challenges help to build secure and reliable assessments that are focused to map the competencies and accomplish them by outcomes that the students will be building at an individual pace in different levels of mastery [5].

According to Tecnológico de Monterrey, a competency is “the conscious integration of knowledge, skills, attitudes and values that allows one to successfully face both structured and uncertain situations and that may involve higher order mental processes”[6].

The students must demonstrate the development of disciplinary and transversal competencies in order to accomplish the challenge which is the center of the educational efforts. The main objective of a competency is to integrate conceptual, procedural and attitudinal knowledge aimed to consolidate the learning process depending on the area of study.

The career disciplinary competencies are focused to shape the professional profile of students enrolled in a particular programme, starting from the major stage of their curricular programme. These competencies are integral to the acquisition of knowledge, skills, and attitudes that orient a competent professional in their field of expertise [7].

In a study conducted by a group of teachers from the Singapore University of Technology and Design, the authors explore through qualitative research guided by interviews to Design educators from different countries, the importance to integrate theoretical and practical knowledge framing recent competencies that are developed by current Design schools during the COVID-19 crisis [8]. The study identifies several key competencies necessary for Design education, including empathy, creative research skills, collaboration and teamwork, communication, leadership, and responsibility.

The importance of integrating competencies on the Design educational models goes beyond traditional academic learning, enriching the hard and soft skills development. This model promotes practical learning, exposing the students to experiences linked with training partners, such as external organizations and companies, that promote the leverage of these competencies on the innovation and creative processes to solve Design problems with a fresh perspective. This approach ensures graduates are prepared to address reigning and future challenges bringing impact solutions.

### 3 TEC21 EDUCATIONAL MODEL

Tecnologico de Monterrey is a private university founded in Monterrey, Mexico and is constituted by several campuses along the country. In 2012 there was an institutional statement to transform the educational model in order to bring new tools to teachers and students framed by the new challenges that were scaffolding due to the profile of the new generations with the aim to train 21<sup>st</sup> century professionals [9]. It is in 2019 when this new educational model starts to be taught in the classrooms and brings new structures and goals to be accomplished.

The Tec21 educational model offers new possibilities for the curricular structure, empowering the students to make decisions all along the eight semesters that conform their programme. It is based in four key components [10]:

- Challenge Based Learning
- Customization
- Memorable Experience
- Inspiring Professors

### 4 CREATIVE STUDIES

The necessity to offer undergraduate introductory programmes was aimed by Tecnológico de Monterrey in order to concentrate common multidisciplinary knowledge areas freshmen students. In the case of the School of Architecture, Art and Design, "Creative Studies" is the name of the programme.

The Creative Studies programme offered by the institution spans over two semesters and focuses on designing and producing projects and multidisciplinary solutions for various professional fields. The primary objective of the programme is to help students develop skills related to handling various creative languages aimed to solve innovative projects. These skills enable students to be better equipped to handle challenges and solve problems in their respective minor and major fields.

Creative industries are a significant contributor to the economy, making it crucial for students to develop skills related to creative topics.

The Creative Studies year programme is structured as follows:

- **Elective courses.** Provide students the flexibility to explore specific areas of interest and broaden their knowledge and skills beyond the core curriculum.
- **Area courses.** Essential curriculum courses that will provide the core perspective of the Creative Studies introductory programme. The main topics are:
  - a. Creative Methodologies
  - b. Research Methods
  - c. Arts & Design History
  - d. Applied Creativity Project Studios
- **Tec Weeks.** Immersive week courses where the students develop specific competencies to strengthen their commitments to ethics and citizenship.
- **18<sup>th</sup> Week.** It is the final week of the semester and is oriented to be a reflective ending moment in which the students will be analysing their progress and how they are developing their competencies.

After the students finalize the introductory Creative Studies phase, they will start their selected major programme where they will complete their programme [11].

### 5 TEC21 DESIGN PROGRAMME

The Design programme at Tec21 was structured considering the new roles that the designer must face in future challenges, focusing on themes of regenerative design, social innovation and a dynamic strategic approach to solve the wicked problems.

The term "Industrial" was removed from the name of the programme to offer a wider range of possibilities to the Design practice and not limit it to the pedagogical guidelines of the discipline or the type of product that can be developed. The epistemic approach is more holistic and seeks to develop solutions based on project didactics from the pragmatic perspective.



Figure 1. Tec21 Creative Studies Stages [12]

The educational model is made up of two semesters of Creative Studies, two semesters of the Major Programme in Design (Focus) and four semesters of the Minor Programme in three study areas (Specialization):

- **Product Design.** Seeks to strategically and innovatively develop physical products through research, 2D and 3D communication, and validation oriented to study people and their social and cultural environment, as well as the planet in pursuit of its regeneration.
- **Design & Technology.** The exploration of new modalities of use of new technologies and intelligent materials is proposed with the intention of serving the human being focusing on the well-being of people and the planet.
- **Visual Design.** Explores to design and develop graphic and visual communication products whose configuration can be analog or digital, starts from the strategic study of the user experience through interfaces that allow them to have immersive experiences.

Introductory Program	Major Program	Minor Program
	Architecture	
	Digital Arts	
	Design	Product Design Design & Technology Visual Design
Creative Studies	Communication	
	Musical Technology & Production	
	Educational Innovation	
	Spanish Literature	
	Journalism	

Figure 2. Design Programme

There are four disciplinary competencies that must be accomplished by the students, in synthesis, they are a simplified version of a Design process resume in 4 steps. The idea is that the student develops his soft and hard skills by understanding every phase in a project and realizing that there is a different level for each competency to achieve the highest range after they finished the 8 semesters programme.

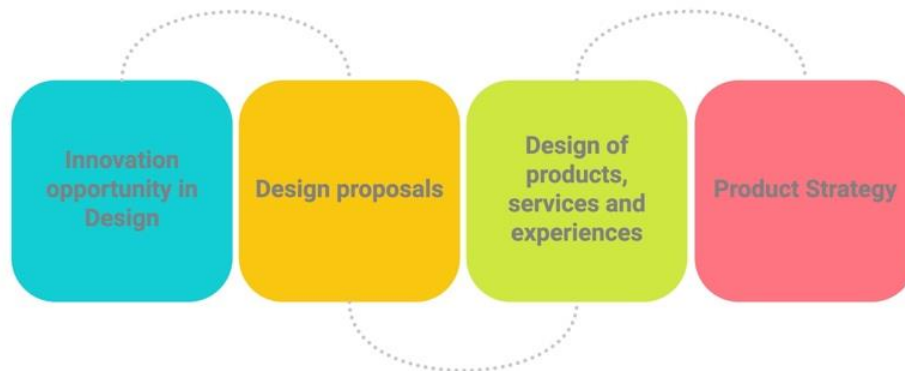


Figure 3. Tec21 Design Programme short name competencies

### Major Competencies

1. Define innovation opportunities, applying design methodologies, centred on the person and their context.
2. Conceptualize design proposals based on the functional, constructive, expressive and sustainability requirements of the project.
3. Design meaningful, high-impact products, services and experiences.
4. Design the implementation strategy of the product, service or experience in public and private contexts.

### Minor Competencies

#### Product Design

5. Develop design strategies in organizations that respond to business, institutional and community challenges in a local and global environment.
6. Design new avenues of innovation by strategically managing the design process for products, services, and experiences.

#### Design & Technology

7. Develop strategies that generate technological products, with a humanist vision and responsibility.
8. Design viable technological products that are committed to the expectations of stakeholders.

#### Visual Design

9. Design experiences and visual interfaces that respond to specific user needs.
10. Direct multidisciplinary creative projects focused on the development of graphic, digital and interactive products.

The new perspective of the Design School at Tecnológico de Monterrey is focused on preparing students for current and future challenges in both local and global contexts, where Design plays a key role in addressing issues that impact the status quo of individuals and the planet. Competency-Based Learning will enable students and teachers to engage in environments that facilitate the application of knowledge in real-life situations.

## 6 CONCLUSIONS AND FUTURE DIRECTIONS

The new Design schools have become strategic incubators for creative and artistic expression, with a high level of technological exploration, a sense of sustainable responsibility and a look towards social innovation. Design schools must direct their approach through community participation between students, teachers and society.

Technological exploration is crucial to be available to guarantee that the tools and instruments are always updated and ready to be applied, the Designers must become agents of change and see themselves as people who live on a planet that still has hope.

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