



Tecnológico
de Monterrey



The Princeton Review's **2023** Undergraduate Entrepreneurship Survey
TECNOLÓGICO DE MONTERREY Supplementary Documentation

FOUR YEARS OF TEC 21 EDUCATIONAL MODEL (2023 update)

BRIEFING AND 2022-2023 UPDATE

In August 2019, after 5 years of research, design, planning, training, and testing, Tec de Monterrey launched Tec21, probably the most challenging project ever faced at a major university. More than 12,000 students initiated the adventure of a redesigned notion of higher education. Tec21 has been deemed as the “most revolutionary disruption” in the history of Tecnológico de Monterrey. This strategy represents a radical change in the way higher education behaves. The traditional semester, once erected on independent and often disassociated courses, transformed into a bundle of activities connected to the real world. Students develop competencies and learn to learn. Faculty become facilitators and mentors., the model initiated in August 2019.

In December 2019 World Bank’s International Finance Corporation published the Study Case “BREAKING PARADIGMS TO DEVELOP LEADERS FOR THE 21ST CENTURY - Tec de Monterrey: How a Top University in Mexico Radically Overhauled its Educational Model”, drawing conclusions about the model as reference for the future of education; more about the study on http://sar.itesm.mx/ranking_2023/WB_Tec21Study.pdf.

In **2022-2023**, the first generation of Tec21 graduated from Tecnológico de Monterrey 6,681 students.

THE FIRST AND SECOND YEAR (2019-2021)

In May 2020 Tecnológico de Monterrey successfully completed the first year of the new model ‘Tec21’, and by the end of 2020, **25,739** students were enrolled in 44 undergrad programs.

More than 3,000 faculty members experienced the new programs and least 80% of students expressed appreciation for the new model. Covid-19 contingency didn’t stop the continuity of the process.

More than 45 education related technologies were incorporated into the delivery of curricular programs, and 400 classrooms were adapted for new pedagogies with new equipment.

THE THIRD YEAR (2021-2022)

In August 2021, the 3rd Class enrolled with 11,796 students totaling more than 35,923 students in the country's 26 campuses experiencing this model. The 1st Class to be graduated under the Tec21 Model reached the 4th and 5th semesters.

The health contingency due to the COVID-19 pandemic – in 2020 and 2021 – did not prevent the training strategy of the Tec21 Educational Model from continuing to positively impact the student and academic communities.

During 2021, Tec21 Model already had 44 different undergraduate bachelor's degree majors, from all schools.

More than 7,000 faculty members taught at least one Tec21 new course during 2021. During this period a new "Accompaniment Model" for students was designed and implemented. Also, a new Competency Assessment Model for the new courses was defined and planned.

Integration of new educational technologies to enrich experiences of learning. Today there are more than 300 educational technologies to support the Tec21 Educational Model.

THE FOURTH YEAR: NEW OUTCOMES (2022-2023)

Up to now, 65,954 have experienced the new model and in June 2023, **6,681** students graduated from Tecnológico under the Tec21 model. During this year, the "Entrepreneurship transversality" or across the curricula approach for Entrepreneurship has been comprehensively implemented in coordination with the Tec de Monterrey's five schools.

Entrepreneurship Transversality: a dose of entrepreneurship in the classroom

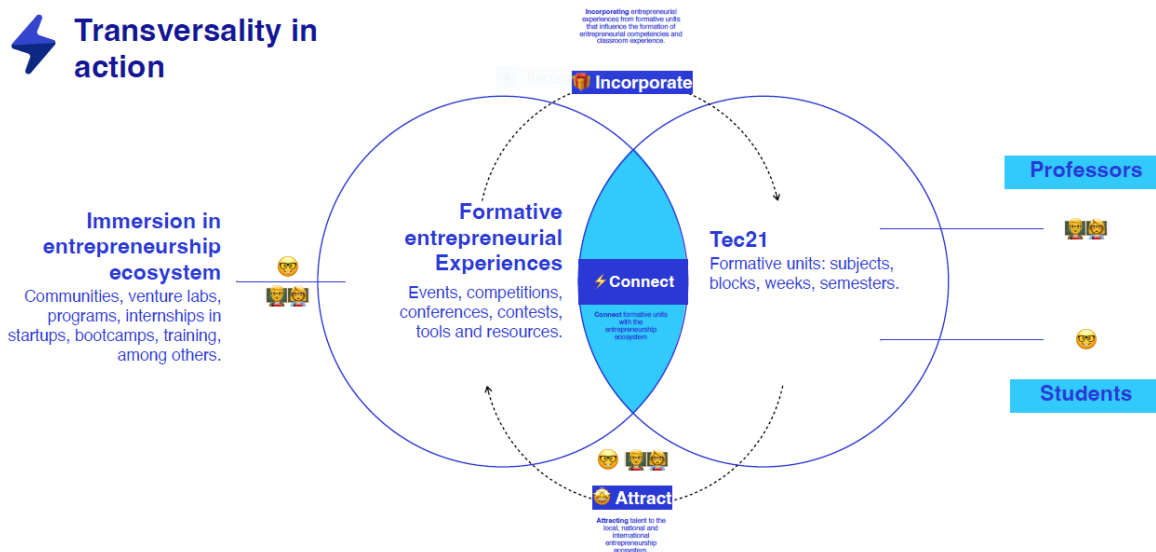
Tec21 model focuses on the development of competencies. The model includes two types of competences: disciplinary and transversal. Disciplinary competences represent the set of knowledge, skills, attitudes, and values that are considered necessary for professional practice. The *disciplinary* reflects the competencies corresponding to the general area of education of a disciplinary group (like electrical engineering or economics). In contrast *transversal* competences are those transferable to a variety of functions and tasks, they are indispensable for the good exercise of all professions and personal coexistence in any field (for example, ethics or innovation).

Entrepreneurship is considered disciplinary as well transversal. In Tec21 model, entrepreneurship is present in several ways:

- As disciplinary in different programs and courses offered by national schools (entrepreneurship for engineers).

- As transversal through the sub-competences of *conscious entrepreneurship* and *innovation* that are incorporated in various courses, regardless of discipline (for example, marketing research or architectural design)
- As transversal, through the offer of Entrepreneurship courses to any school (for example, Ideating & Prototyping course is managed by the Academic Department of Entrepreneurship and offered in several schools).

Course design is a joint effort between the Tec de Monterrey Schools and the Institute for Entrepreneurship Eugenio Garza Lagüera, who defined the **Transversality Strategy** as the series of activities that develop and strengthen the **entrepreneurial spirit** in all students and faculty. This guarantees that all students live curricular and co-curricular entrepreneurship experiences when developing competencies of this nature. Next figure shows how this strategy works:



This strategy has allowed different courses to incorporate a dose of entrepreneurship that organically lets students develop and strengthen their entrepreneurial spirit, even visualizing entrepreneurship as an alternative career path.

TEC₂₁ CONTEXT, BACKGROUND AND MODEL

TEC₂₁ CONTEXT

The Tec21 Educational Model encompasses the purposes of vision, defines and connects the players and components that participate in the teaching-learning process and leverages opportunities to offer students a world-class comprehensive education.

In this educational model, competencies are defined as conscious integration of knowledge, skills, attitudes, and values to address both structured and uncertain scenarios successfully. Competencies comprise both knowledge and procedures specific to the subject, and attitudes and values that make it possible to train professionals who participate in and are committed to society.

There are two categories of competencies in this model: disciplinary and transversal. Disciplinary competencies refer to all knowledge, skills, attitudes, and values deemed necessary for professional practice. Developing disciplinary competencies entails a gradual construction ranging from the fundamental to the final competencies of the subject. Transversal competencies, which are developed throughout the training process of any subject, are valuable for graduates' lives and directly impact the quality of their professional practice.

GOAL OF THE TEC₂₁ EDUCATIONAL MODEL

To provide comprehensive education and improve student competitiveness in their profession by strengthening the skills of the next generations to develop the competencies required to become leaders who will face the challenges and opportunities of the 21st-century.

TEC₂₁ EDUCATIONAL MODEL SEEKS TO DEVELOP THE FOLLOWING COMPETENCIES:

A) Self-knowledge and management:

It creates a personal and professional wellbeing project through responsible reflection and integration of emotional and intellectual resources.

B) Innovative entrepreneurship:

It generates innovative, versatile solutions in changing environments, which create value and have a positive impact on society.

C) Social intelligence:

It generates effective collaboration and negotiation environments in multicultural contexts with respect for and appreciation of the diversity of knowledge and people.

D) Commitment to ethics and citizenship:

It implements projects aimed at transforming the general environment and wellbeing, with moral awareness and social responsibility.

E) Reasoning to address complexity:

It integrates different types of reasoning to analyze, summarize and solve problems, with an aptitude for lifelong learning.

F) Communication:

It uses different languages and communication resources and strategies, in an effective, context-appropriate manner in professional and personal networks.

G) Digital transformation:

It optimizes solutions to problems in their professional field, intelligently incorporating state-of-the-art digital technologies.

Components of the Tec21 Educational Model

Challenge Based Learning

A pedagogical approach that actively involves students in real problem situations that is both relevant and connects them to their environment, which entails defining a challenge and implementing a solution.

Traditionally, undergraduate academic programs consist of a sequence of courses that compose the curriculum. By taking the curriculum courses, students learn the fundamentals, techniques and practical aspects associated with their professions. When students successfully complete their curriculum, the university certifies that they possess a certain level of development to satisfactorily perform in their professional careers. In this model, the core learning unit consists of the curriculum courses.

Tec21 Educational Model considers that students' learning during their undergraduate studies is focused on the relationship between the students, their professor, and their environment, where students develop disciplinary and transversal competencies, by solving challenges associated with actual problems and demonstrate their knowledge through various learning evidence. In this model, the core learning unit are the challenges. A challenge is a hands-on experience to expose students to a challenging situation in their environment to achieve specific learning outcomes. The challenges contribute to developing disciplinary and transversal competencies in students, as they individually and

collaboratively apply their knowledge, skills, attitudes, and values.

The Tec21 Educational Model seeks to deepen, integrate, and apply knowledge through different learning modules designed according to the requirements to solve the challenge and offered before or simultaneously with the challenge. In this document, the term 'module' will be understood as the organizational structure of the learning content that provides students with the theoretical and practical knowledge needed to solve a challenge.

Progression of Challenge-Based Learning Implementation

In the evolution towards an education grounded on Challenge-Based Learning of the Tec21 Educational Model, two initiatives seek to expose students to experiences that are closely related to challenges, and thus, develop competencies. i-Week and i-Semester are academic spaces that foster learning experiences outside of the traditional setting.



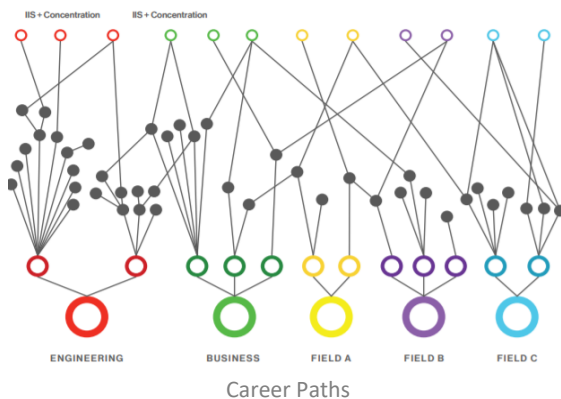
Flexibility

Within the framework of the Tec21 Educational Model, the flexibility offered to students presents significant options regarding what, how, when and where of their

graduate education process. These elements of flexibility are reflected in two major topics:

Curriculum flexibility

In contrast to a rigid curriculum, in a flexible model, students have different opportunities to make decisions regarding their education. In the Tec21 Educational Model, this flexibility in the curriculum is reflected in the implementation of the curricular path model for undergraduate programs.



Curricular Path Model

The Curricular path model gives students the chance to explore, focus and specialize throughout their educational process. Students may start their university studies by choosing a curricular field, to explore their profession and aspects of other undergraduate programs from the first semester, so that they may evaluate several alternatives before making a final decision. From the students' perspective, this model offers "few starting points and many endpoints."

Memorable University Experience

For training entrepreneurial leaders, with a humanistic outlook and international competitiveness, the Tec21 Educational Model offers students an experience that will

make their time at the institution one of personal and professional growth.

The LiFE (Leadership and Student Development) program contributes to developing transversal competencies and, in some cases, professional competencies. They form part of this growth experience that fosters the comprehensive education of students and obtaining a memorable university life. These are strengthened by giving students the opportunity to participate voluntarily, or in a structured manner, in sports, cultural and student leadership activity programs.

These programs offer different levels of participation, allowing students to decide, according to their interest and availability, whether to attend as spectators, enroll as students in special classes or workshops, act as organizers or be directly responsible for, or propose new activities within these programs.

These activities offer participants a means of learning and of developing competencies for life and for their professional development. Their purpose is to develop the different dimensions of individuals, address the diversity of their interests, assure that student life is consistent with institutional values, promote a sense of belonging to their alma mater and enrich student life.

Additionally, students have the opportunity to get involved in different activities to develop their entrepreneurial spirit, such as the Entrepreneurship with a Humanistic Outlook Challenge, which promotes innovation, opportunity identification, risk-taking and resilience development in students. The earnings generated by executing this type of project are used for social initiatives.

Inspiring Professors

Tecnológico de Monterrey has decided to update its educational model through a new approach to the teaching-learning process that recognizes the need to define a new faculty profile. To address this challenge, the institution has outlined five essential characteristics of their development.

Essential Characteristics of Tecnológico de Monterrey Professors

A) Inspiring

Professors are educators who are respected and admired by students and colleagues; they motivate and require students to give their best effort and satisfy their quality commitments, to benefit their learning and personal growth, representing a positive influence in their actions outside the classroom.

B) Up-to-Date

Professors are continually updating their knowledge in their areas of specialization and education, by continuously participating in academic and professional activities, to incorporate new content, pedagogical methods, and techniques in the courses they teach.

C) Connected

Professors actively and formally participate in their professional, entrepreneurial, academic, and social environment, by exercising their discipline or through collaborative networking, enriching their teaching activities and exposing students to how their knowledge is applied to real contexts.

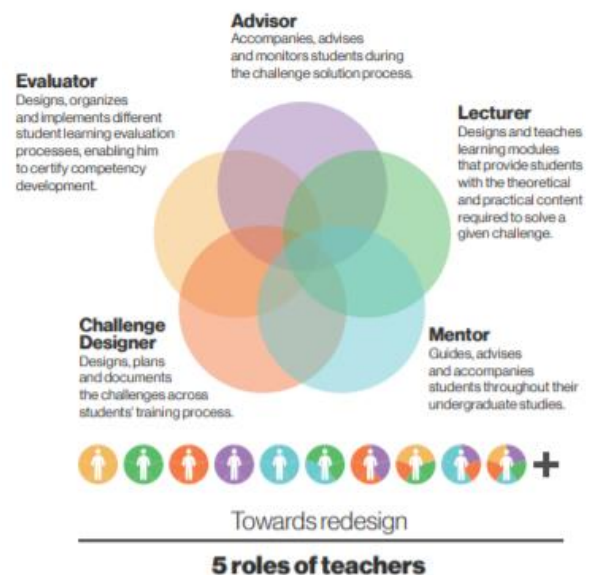
D) Innovator

Professors generate and implement original and diverse pedagogical strategies and resources, which are flexibly adapted to the

profile of their students, to facilitate learning, motivation, involvement, and developing creativity and an attitude of openness to change.

E) IT User

Faculty effectively incorporate technology as a tool for implementing, evaluating, and improving the teaching-learning process according to the context and resources available in their surroundings.



How are the key elements of Tecnológico de Monterrey's vision developed in the Tec21 Educational Model?

Leadership

A leader is someone who inspires change and influences the behaviors or activities of others so that they may work together towards a common goal.

At present, leadership education at Tecnológico de Monterrey complements theory with experience. Students are not expected to know how to explain leadership,

but rather, to a greater extent, they are expected to know how to experience and practice it. Considering the breadth of competencies that compose leadership, different practical educational components of Tecnológico de Monterrey contribute from distinct fronts to train students to be leaders. This training occurs, first, when the competencies associated with leadership are cultivated transversally across the curriculum. Second, extracurricular activities, in which students are actively encouraged to participate, substantially contribute to leadership skill education. Students may participate in student groups to organize activities such as seminars, congresses, and student body elections, where they gain awareness to lead their classmates while understanding that their ability to lead occurs when they respectfully and assertively managing their communication. Student activities provide an opportunity to lead, and to be led, given the governance of these types of groups.

Third, the different courses with ethical and citizen education components also play an important role in teaching leadership. Mainly, these experiences help students clarify and define their priorities in life and give them the chance to be agents of change, through different learning-service projects. Fourth, some activities and programs explicitly focus on leadership education, such as the i-Week and i-Semester initiatives. Lastly, students obtain experience within the organizational culture at Tecnológico de Monterrey, which is permeated by implicit and explicit principles such as excellence, entrepreneurship, responsibility, and teamwork.

Entrepreneurial spirit

At Tecnológico de Monterrey, the Eugenio Garza Lagüera Institute of Entrepreneurship

(IEEGL) is responsible for orchestrating its entrepreneurship design and strategy. One of its objectives is to develop and foster an entrepreneurial spirit in its students and professors and to support business creation and development. Developing an entrepreneurial spirit in students is supported across three lines of action:

Education to develop an entrepreneurial spirit

This line of action focuses on developing competencies associated with the entrepreneurial spirit:

identifying opportunities, obtaining resources for innovative solutions, quickly recovering from failure, and developing resilience. The following curricular and extracurricular activities help achieve this purpose:



- Entrepreneurial spirit with a humanistic outlook to be developed by all first-year students.
- Signature entrepreneurship courses.
- B.A. in Entrepreneurship (LCDE).
- Entrepreneurship activities as part of i-Week or i-Semester.

With the intent of fostering education to develop and strengthen an entrepreneurial spirit, the institution has a unique transversal curricular activity model, from the different fields of knowledge, with a humanistic outlook and global vision; entrepreneurial challenges and experiences, such as: Bus Challenge, Hackathons, Hult Prize, Business Model Competition, Santander Award for Business Innovation, Bootcamps, and participation in entrepreneurial activities with student groups, among others.

Ecosystem to encourage startup creation

Tecnológico de Monterrey provides a platform to support startup creation. This platform includes incubators, accelerators, technology parks, mentor networks, the INCmty Festival and the Network of Family Business Centers. This ecosystem offers five key services:

- Access to financing sources to develop businesses and make them more competitive.
- Strategic-technological observatories that provide information to foster innovative business ideas.
- Networking for entrepreneurs to build businesses thanks to Tecnológico de Monterrey's contact network.
- Support in patent and license applications for ideas generated by entrepreneurs and researchers.
- Mentoring service, where experts from Tecnológico de Monterrey help entrepreneurs develop their potential.

Promotion for high-impact business creation

Regarding new high-impact business creation, students are encouraged to participate in semester programs, summer programs, research stays and training camps to develop new businesses, working with prestigious organizations that help to identify and boost

companies that will deeply impact society as a result of the proposed innovation.

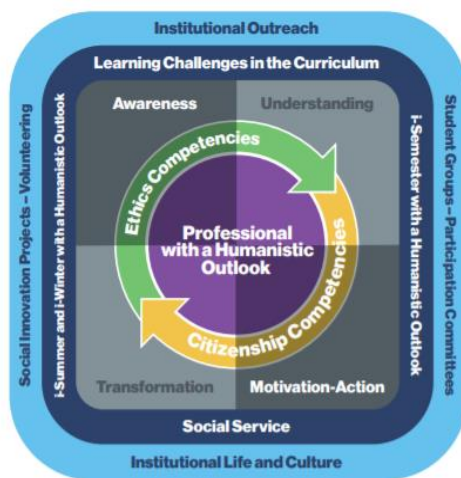
Humanistic Outlook

Empathy, to assume the consequences of one's actions, to show interest in and commitment to improving one's community and others, to stimulate a desire to carry out activities that entail a true social transformation, are all fundamental tasks to create a humane professional. This capacity implies developing a series of ethics and citizenship competencies to be deployed throughout the curriculum and student life, through four progressive dimensions. In the curriculum, such dimensions associated with a Humanistic Outlook are deployed through:

- i-Semester and i-Week challenges aimed at resolving a complex problem detected in a sector of society, which, by being addressed, will simultaneously enable disciplinary and transversal development of ethics and citizenship competencies.
- Disciplinary challenges that interweave different ethics or citizenship-related controversies, issues, and situations. Addressing such challenges will enable the student body to offer innovative proposals and solutions that, upon execution, will produce an authentic service to society. Such a perspective will guarantee that students complete 480 hours of social service, as required by constitutional mandate, provided in the General Law of Professions (*Ley General de Profesiones*).

In the scope of institutional life and culture or extracurricular activities, a Humanistic Outlook will be developed through:

- Student projects focused on promoting and increasing innovation, leadership, and social capital.
- Participation committees that seek to address the needs and demands of the university community and its surrounding environment.
- Volunteering programs to promote awareness, commitment, and social responsibility, which every university student must have.



The new Tec21 Educational Model seeks to develop the attributes that shape the profile of excellent professionals, i.e., individuals with a clear insight as to the limits and rights associated with the professional practice, the responsibilities that they will assume, and the duties and benefits that society expects them to fulfill as citizens and professionals. Ethical and citizen training under these terms must be understood to enable dialogue, peaceful coexistence despite differences, interdisciplinary nature, open responsiveness to one's feelings and those of others. In sum, it is training committed to acting in a way that gives a moral sense to professional work.

International competitiveness

One of the strategies for developing students' international competitiveness has focused on student mobility to offer a global educational experience. This allows them to define and reaffirm their values and principles, appreciate and respect sociocultural differences, be socially responsible for their actions, and promote an environment of peace and mutual respect. With internationalization, Tecnológico de Monterrey seeks to offer a higher number of students a world-class international educational experience and increase the presence of foreign full-time and exchange students on its campuses. This vision will enable them to identify the political, sociocultural, and economic factors that will give them the capacity to facilitate, mediate and resolve situations or disputes with solidarity and collaboration. This perspective contributes to forming the critical, forward-looking thinking required to be internationally competitive. The institution has entered into agreements with foreign universities in over 50 countries. In addition to study-abroad programs, there are programs to host international students. This way, international students contribute to creating a multicultural environment on campuses. International competitiveness implies that the competencies developed through our academic programs are appropriate for students to be competitive in the world. In this respect, internationalization is required, but is not sufficient, for students to achieve international competitiveness. Designing programs and profiles according to global standards and trends, evaluating programs and students with global instruments and organizations, monitoring international studies and rankings regarding employability, are just some of the mechanisms used to assure students' international

competitiveness, which is also being enhanced by hiring foreign professors.