



CASE STUDY

Breaking Paradigms to Develop Leaders for the 21st Century

Tec de Monterrey: How a Top University in Mexico
Radically Overhauled its Educational Model

December 2019



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ABOUT THE CASE STUDY

Expanding access to quality and affordable education is a central element to eliminating extreme poverty and promoting shared prosperity. In developing countries, private education providers play a critical role in the delivery of education, skills, and training that is affordable and relevant to the needs of the labor markets. IFC's education practice is developing several case studies that showcase success stories in the IFC education portfolio around scale, skills, innovation, and affordability. The case studies highlight how IFC clients have contributed to meeting IFC's strategic goals in education for (1) developing skills and enhancing employability of graduates and trainees, and (2) increasing reach and impact at all levels of education.

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ACKNOWLEDGEMENTS

A special note of appreciation is extended to Tecnológico de Monterrey, for sharing details about their university, in particular Salvador Alva, David Garza, Juan Pablo Murra, Román Martínez, Ignacio de la Vega, María Elena Vázquez, Pascual Alcocer, Renato Ramírez, Hugo Garza Medina, Rodolfo Rubio, and Jessica González de Cosío Contreras.

In addition, IFC would like to thank Profesor: Francisco Colorado Córdova and the students who participated in the Coppel challenge, Andrea Madrigal Flores, Alexandra Ruiz Venegas, Mauricio Crespo Navarro, and Raúl Bravo Inda for sharing insights about their experience.

Special thanks to Aliza Marcus for communications advice, Leticia Crentsil for copy editing, and Irina Sarchenko and Scholastica Graphic Design for the creative design.

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Universities had been static for hundreds of years and some were saying that the predominant industrial model of educating people with limited personalization and highly specialized tracks could soon become obsolete.

Relevance: Rethinking the Role of Universities in the 21st Century

It was 2012 and there was a sense of restlessness among students. The world was rapidly changing, education was at an inflection point, and students had changed too. Primary and secondary schools had been incorporating modern pedagogies. The first generation of students that grew up with Google were now entering universities. From a very young age, these students had on-demand access to information anytime, anywhere. Knowledge had been democratized as it never had before—over the entire course of civilization. There was a new generation of students that wanted more from educational institutions—and they had little appetite for outdated learning methods.

They were not the only restless ones. Society was scrutinizing the value of higher education and parents were starting to ask, “Is higher education worth it?” Educational models once considered successful were being replaced because they were not as effective in the face of technological innovation. For instance, [Coursera](#) was offering access to the best professors from top universities, and [Minerva](#) was offering an innovative university concept focusing on high selectivity, global rotations, and faculty teaching remotely by leveraging a learning management system.

David Garza, then the Dean of the [Tecnológico de Monterrey](#) (“Tec”) flagship campus in Monterrey, Mexico, shared the warning signs he was seeing around the world with Salvador Alva, the newly appointed President of Tec.

Universities had been static for hundreds of years and some people were saying that the predominant industrial model of educating people, with limited personalization and highly specialized tracks, could soon become obsolete. Major universities like Harvard, Stanford, and MIT were discussing

the return on investment for students and creating new academic models, including space redesign for 21st century learning, and a renewed use of technology in the classroom.

The New York Times warned about the “[Campus Tsunami](#),” where online education had the potential to dramatically disrupt education like it had done to many businesses. But it could also open up new opportunities—“pushing universities higher up the value chain, away from information transmission...” and into “a complex, social and emotional process” of deeper learning.

Against this backdrop, Alva asked the Board of Trustees, “What kind of a legacy do you want to leave?”

Tec, a private, non-profit university, was founded by entrepreneurs in 1943 and it had many strengths. It had long enjoyed a good reputation as a top-quality institution in Mexico and in Latin America. In 1950, Tec was the first foreign institution in the world to receive accreditation from a U.S. body, a significant validation at the time, and

several other accreditations followed from the U.K. and EU. By the year 2000, it had 26 campuses, in 20 states, and more than 64,000 undergraduate and graduate students. Tec had no market issues and was financially sustainable but the threats, as discussed above, and opportunities to serve new generations of students were starting to emerge. As a result, in 2012, the Board declared a new mandate—“To significantly elevate the quality and relevance of education by developing better students, better faculty, and better programs.”

In pursuit of this new mission, Alva, the former president of PepsiCo Latin America, traveled to Davos and attended the World Economic Forum. At the event, Alva was surprised to learn that there was a shortage of global leadership to solve the world’s toughest challenges for humanity, economic growth, equality, and sustainability for the 21st century. And yet, the Ivy League universities were discussing financial problems, research, and lack of government interest—not what needed to be done to prepare students with the competencies they would need to solve complex problems in the future. Alva told them, “Universities need to adapt to a world with new problems and students with different needs.”



SALVADOR ALVA, PRESIDENT

As a result of this experience, Alva decided that he would position Tec to help fill this global void with Tec students. Building on the Board’s mandate, Tec developed a new vision for the 21st century — *“To develop leaders with an entrepreneurial spirit, and a social purpose, who are internationally competitive.”*



“Universities need to adapt to a world with new problems and students with different needs.”

—Salvador Alva

“ Tec developed a new vision for the 21st century—“To develop leaders with an entrepreneurial spirit, and a social purpose, who are internationally competitive.” ”

History of Entrepreneurship and Innovation

Monterrey, Nuevo Leon is in northeastern Mexico, about 200 kilometers (150 miles) from the U.S. border. It is considered the industrial capital of Mexico and its citizens are characterized by an entrepreneurial culture that dates back many generations.

Tec was founded in 1943 by a group of local business people who were concerned about a shortage of engineers and middle managers to support and enable Mexico's nascent industrialization. Tec was established to form the "type of professional required to build a modern society and economy." Requests from other business owners with similar concerns across Mexico led to a national expansion, which today consists of 26 campuses.

Since its origins, Tec has had strong connections to the business community. Today, about 450 of 510 members of its Board of Trustees—close to 90 percent—are leading Mexican business people from around the world. These relationships with business have led to a culture that forms students with entrepreneurial strengths. Further, for more than 75 years, Tec has been a leader in innovation. It was the first university in Latin America to connect to the Internet and was among the first to create a virtual university in the mid-1990s. Entrepreneurship and innovation is in Tec's DNA and the evidence is in the results.

In 2018, a study by [QS World University Rankings Intelligence Unit](#) found that 41 percent of Tec alumni went on to start a business. They have generated 2.8 million jobs and generated an economic value of US\$223 billion, equivalent to 19 percent of Mexico's yearly GDP. Further, the [Princeton Review and Entrepreneur Magazine](#) ranked Tec "Number 8" in its survey of Top Schools for Entrepreneurship Studies 2020. It is the only school outside the U.S. to be listed.



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Tec21: Redesigning an Educational Model for a Changing World

Diagnostic

In 2013, Alva appointed David Garza as Vice Provost of Undergraduate Education. Alva told Garza, “Take six-months and use it as a sabbatical to learn from other institutions and imagine how to educate leaders for the 21st century. Do blue-sky thinking, come back with a dream and I will help you implement that dream.”

When he returned in 2014, the process of modernizing Tec began with a small team. “We started with consultations with students, faculty, alumni and employers.” Roman Martinez, the Vice Rector of Educational Transformation explains, “The responses collected from more than 5,000 stakeholders were clear and strong.” Students wanted a greater connection with the real world and sought more flexibility. They said,

- The education was good but students questioned why certain things were taught, because they perceived a disconnect between the lesson and relevance to the world.
- Learning was superficial and short term in nature. The focus was on memorization for the exam and passing the subject. Students then forgot parts that lacked relevance.
- Student work was isolated—without real support from colleagues and professors.
- Students most valued learning opportunities outside the classroom that were experiential or involved a practical question that needed solving. It was especially effective when they connected with organizations beyond the campus.

- Students wanted more flexibility. They wanted learning to be more customized to their interests. They wanted to break traditional structures of schedule and spaces, and they liked working in groups.



ROMAN MARTINEZ, VICE RECTOR
OF EDUCATIONAL TRANSFORMATION

“The responses collected from more than 5,000 stakeholders were clear and strong. Students wanted a greater connection with the real world and sought more flexibility.”

When Alva spoke with alumni he asked, “What was the most transformative experience of your university years?” The majority said study abroad, or opportunities to gain valuable work experience. They also found value in establishing relationships with people of different backgrounds, through cultural and extra-curricular activities. The last area they mentioned were the academic components. “So many of these activities have been optional, but I realized that they are critical in preparing students for life, and we had to focus more on it.”

They also consulted faculty and gathered more than 2,000 inputs. Questions included—“What competencies did you (faculty) personally develop in students? What should be maintained? What was not necessary? What should evolve? What are the new trends? How should current events be reflected in teaching? Martinez explains, “We asked faculty about their own career development—What was effective? What should be changed? What inspired them?”

They also consulted employers and Tec’s Advisory Boards. Tec asked about the competencies they sought in their new hires. What were their current and future needs? What was the role of the university? Martinez explains, “They said, ‘We need more linkages and collaboration. The university should

not steer the content of teaching solely on what academics believe is important.” Employers were also demanding graduates with more multi-disciplinary abilities, and this was growing in importance over specialization. They also sought graduates with practical life experience.

Benchmarking

With a clear understanding of the needs of its internal and external stakeholders, and a map of its internal processes, Garza and a core team went on to conduct an extensive benchmarking exercise. They visited 34 top universities around the world including Harvard, Massachusetts Institute of Technology (MIT), and Oxford and found very interesting initiatives. But they were most inspired by some institutions that were innovating such as [Singapore University of Technology and Design](#), which was doing breakthrough challenges, [Technion Israel Institute of Technology](#) had a strong connection between business and the university and an interesting approach to research, and [University of Melbourne](#) in Australia had a flexible degree-earning trajectory. These consultations allowed the team to analyze trends and identify interesting innovations and best practices.

According to Juan Pablo Murra, Vice President for Development and External Affairs, some of the key takeaways from the benchmarking exercise were, “First, it is about the faculty, the students, and the curriculum. Second, the way you admit, and grant scholarships is crucial. Third, how do you inspire and transform faculty so that they understand they are not conveyors of content, but the developers of competencies, and providers of inspiration for students, so that students can become a better version of themselves.”

Some institutions told us, “I wish I could do this, but it is going to be very difficult given the academic structure.”

The design team was starting to get a sense that the new educational model would be focused on dominating competencies—not just grades. Tec defines competencies as the integration of knowledge, skills, attitudes, and values. It would be driven by a philosophy of personalized feedback and continuous reflection, fomenting self-knowledge and



JUAN PABLO MURRA, VICE PRESIDENT FOR DEVELOPMENT AND EXTERNAL AFFAIRS

“ A key takeaway from the benchmarking was “how do you inspire and transform faculty so that they understand they are not conveyors of content, but the developers of competencies, and providers of inspiration for students, so that students can become a better version of themselves. ”



The organizational structure was changed to align academic areas and operational areas. Now, the “National Schools” would have greater influence than the campuses.

self-esteem. Professors would have a refreshed formative spirit and would evaluate the process and academic quality to measure results. Tec would foster a culture of continuous improvement. It would require a commitment at the individual and collective level and would recognize merit. It would be supported by a portfolio of evidence, collegiate processes of revision, predictive systems and be adaptive.

Salvador Alva reflected, “The conclusion scared us all—the formative model of the best university in Mexico, and arguably in Latin America, would have to change radically. We were going to transform the lives of our students.” He added, “We were going to organize Tec in a process that was oriented towards its students. “The students would be the center of focus and the reason for the learning process.”

Change Management

Fortunately, Alva knew a bit about change management. Seventy percent change efforts fail, but he knew that effective persuasion and a long-term, multi-step process rather than a singular event, were keys to success.

Capturing his decades of experience in the corporate world, in 2011, Alva had published a book about organizational

change called *The Admired Company: The Recipe*. There he outlined his methodology for a transformation model that allows organizations to align critical elements of the Vision, Organization, and Culture, or “VOC.” He used this methodology to guide the change management process at Tec. Essential to his strategy to change mindsets was, “communication, communication, communication.” They encapsulated the approach in the Strategic Plan 2020.

Vision: They started by announcing a new strategic vision for 2020, “To develop leaders with an entrepreneurial spirit, and a social purpose, who are internationally competitive.” Murra explains, “It’s not about educating the next wave of professionals that will serve Mexican companies. It’s about a new experiential model for educating leaders that will support our communities and our broader society.”

Organization: When Alva arrived, each of the 26 campuses had a Campus Director with decision-making authority and financial control. Alva quickly concluded that to achieve consistent delivery of quality, Tec needed to transform itself into a single academic institution, “Un Solo Tec,” with a presence in 26 different cities. Tec was restructured to eliminate vertical silos of power and the structure

was changed to align itself by academic areas instead of operational areas. Now, the individual faculties, or “National Schools,” would have greater influence than the campuses. To manage the change, funds and procurement were centralized, and leadership was rearranged.

Since the focus was now on creating processes that were oriented toward student priorities, power was shifted to the national schools. Tec empowered professors who were the main actors in the process of value creation. Alva adds, “When faculty realized that they had the power, and that they were being prioritized, it was easy to convince them that we were moving in the right direction. We also increased salaries—and we now pay faculty about 30 to 56 percent more than the average higher education institution in Mexico.” It pays a premium for classes taught in English.

When Alva arrived, there were many people in leadership positions who were of retirement age and preferred the status quo. But his challenge was to develop new leaders for the future. Many retired, and without the constraints of tenure, over the course of five years, about 30 percent of staff left the institution, another 30 percent changed positions, and about 30 percent were external new hires.



DAVID GARZA, RECTOR

“The new educational model was “completely different from the curriculum updates we did every five years because we were changing HOW we educated students. It would be multi-disciplinary, incorporate real-world problems, and collaborate with external partners—and it would require faculty to play different roles.”

Recognizing that student tuition “is not our money,” Alva set out to find ways to increase productivity. Tuition is an average of about US\$11,000 a year, which is very expensive in Mexico, compared to the cost of public education. Over a period of seven years, Tec continued to increase the use of technology and prioritized strengthening faculty over operational functions. Today, Tec has about 7,400 total faculty members, of which about 78 percent are adjunct professors, and 22 percent are full time.

Culture: In the summer of 2015, still uncertain about what the final product would look like, Garza announced that Tec was designing a new educational model that would be more engaging for students. It would be characterized by interactive learning experiences, it would have more flexibility, and it would be supported by inspiring faculty members. Garza explains, “It was completely different from the curriculum updates we did every five years because we were changing *how* we educated students. It would be multi-disciplinary, incorporate real-world problems, and collaborate with external partners—and it would require faculty members to play different roles.”

Developing a new narrative about the new educational model required Alva to invest a lot of time with professors. He explained to the faculty, “I understand that Tec is the best university in Mexico, and probably in Latin America, so why change?” But he emphasized, “We either change or we become obsolete, we are big, and we are the incumbent. It’s not about whether we want to change, but how fast we will change. Then, they brought in experts in marketing, consciousness and an organizational psychologist to motivate and inspire the faculty and staff.

Murra explains what followed, “There was a major cultural shift that was focused on classical, hard-core strategic planning and prioritization. We looked at the differentiators and then we established 10 Key Performance Indicators (KPI’s). We also developed mechanisms to measure how well we live the behaviors that are enshrined in Tec’s five organizational values.” Tec would take the pulse of progress in organizational

health surveys. Alva explains, "If people are excited and happy and feel comfortable working for Tec, everything else will be taken care of." He added, "We started offering incentives to the leaders of the organization based on the effectiveness of changing the culture on two dimensions: developing the transformational elements for the institution and developing the human side."

Financial Feasibility

In 2014, the leadership team was deciding whether the new model was a "go" or "no go" because they did not know whether it was economically feasible. The first set of economic models forecast a 50 percent increase in costs, and it was quickly rejected by the Board. The leadership team continued to adjust the model. The Board agreed to a model that increased costs by 15 percent.

Concept

In 2018, the design of the new educational model was ready. Tec reinvented the concept of undergraduate education in Mexico in many ways. The new model is completely student-centric. It gives students a great deal of flexibility and allows them to curate their path to a degree and specialization. It offers "competency-based education," where students take on challenges of the caliber that consultancy firms typically handle. It promotes a style of teaching that is akin to mentoring. It leverages cutting edge technologies and develops critical personal competencies.

The model would deliver these disciplinary and cross-cutting competencies through four pillars: challenge-based learning, flexibility, a memorable university experience, and inspiring professors. These elements would prepare students to become leaders who are capable of facing the challenges of the 21st century. Each component of the Tec21 Model is discussed in the following chapter.

Value Proposition

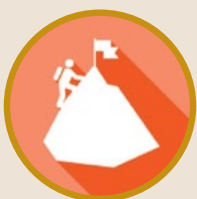
Tec is betting that its new educational model will enhance the value proposition for students and parents. It is already the number one university in Mexico in employability and according to [QS World University Rankings® 2020](#), Tec was ranked number 52 in the world, with 95 percent of graduates accepting job offers within 12 months. The new educational model will improve the quality, depth and breadth of their learning and better position Tec graduates with the disciplinary and cross-cutting competencies they need to be a driver of change in society in the future. Its graduates will become leaders and start companies that will lead the world in solving problems. The value paid for tuition would pay off in returns for society because Tec students are better prepared not just to navigate the 21st century but to actually lead transformations in the 21st century.

Accreditation

Some institutions believe that accreditation could be a barrier to significant change, but Tec found that there were many myths. Tec holds several accreditations from around the world, including accreditation in the United States by the [Southern Association of Colleges and Schools](#). This had allowed it to attract foreign students and was a status that it wanted to maintain.

Nevertheless, for its new educational model, Tec wanted to brainstorm without constraints. David Garza told the team, "Let's work on the design first without worrying about accreditation for the moment. That helped us to have a lot of flexibility and thinking about what the model should look like. When we got to the point that we needed to define the guidelines for the curriculums, we started to look at our accreditation requirements to take decisions on what is mandatory for accreditation and what we wanted to pursue."

THE 4 PILLARS OF TEC21



**CHALLENGE-BASED
LEARNING**



FLEXIBILITY



**MEMORABLE
UNIVERSITY
EXPERIENCE**



**INSPIRING
PROFESSORS**

He added, "One of the interesting things we found is that there were many myths. Some schools would say 'We cannot do this because of the accreditation' and I said, 'Please show me where in the accreditation it says that it is not possible.' When they returned, they found that the accreditation did not limit our proposal—so it was possible—and that happened more than once."

Martinez added, "Most of the accreditation bodies already have a quality model based on evidence of competencies or learning outcomes, which was completely consistent with our model. Changes in the way of living the curriculum do not normally need to be explained in the registry or in the documentation for accreditors. In the accreditation processes we have recently experienced, the educational model has been discussed without a problem."

Changing Faculty Mindsets with Pilots

The key to success was buy-in from the professors. Tec is a large and dispersed institution with professors across many campuses, many of whom did not have contact with each

other. Even though Tec previously had national standards, the reality was that the implementation of earlier models had been very different across campuses. In 2015, Tec launched a "National Faculty Meeting" to align and manage the change. The intent was to connect professors from the same discipline so that they could network and start to develop national projects. It also served as a vehicle to communicate the results of the 2014 diagnostic. They told faculty, "The signals are very clear—we have to transform our educational model," Martinez said.

At this forum, the leadership team announced the broad strokes of the new educational model and explained that it would be an incremental transition over several years. This initiative would not be like the reform of the 1990's which was more top down and required a rapid response. Martinez explains, "We could have all the technology, better infrastructure, and a better economic model, but without the active engagement from professors it would all be worthless." Time and relationships were essential.



Aware that the scale of change would be dramatic, the leadership team decided that rather than sending a managerial communication to the entire university, a grassroots method of cultivating peer-to-peer buy-in would be more effective. The strategy was to do pilots, and then have faculty present their successful experiences to their colleagues.

Martinez adds, “We were nervous about the announcement but fortunately it was largely well received. As to be expected, some faculty members were deeply skeptical and approached Martinez saying, “What you are proposing is crazy! It’s not going to work! Roman, see things differently.’ But I told them, you have not fully captured the underlying premise. There is a pilot coming up—give it a chance and let’s talk afterward.”

After the model was approved by the Board in 2014, the leadership team was aware that the scale of change would be dramatic, and they decided that rather than sending an administrative communication to the entire university, that a grassroots method of cultivating peer-to-peer buy-in would be more effective. The strategy was to do pilots and then have faculty present their successful experiences to their colleagues.

Tec developed a series of transition initiatives and began with a week-long pilot called “i Week” (“i” stands for innovation) and later scaled it up to “i Semester.” Garza explains, “We held a call for proposals. Any professor could participate in the challenge design teams.” The first pilot ran 1,600 projects concurrently. “i Week” required the entire institution, students, and faculty to mobilize at the same time. All regular academic activity was suspended, as students picked from a variety of challenges that were designed by faculty from different disciplines and implemented in partnership with outside companies, NGOs and governments.

David Garza reflects on that initial week, “There was a lot of excitement. In the past, students would say they did not understand why certain topics were relevant, but now they could see connections between disciplines. The students said they had never worked so hard in one week—and they asked for more! They liked it so much that they didn’t want to go back to the traditional classroom.”

Juan Pablo Murra adds, “Even though the pilots were not perfect, the students were very happy with the challenges and you could see their abilities shine through. But what really surprised us, is that the faculty was even more happy than the students! Garza added, “The faculty was elated—they were so proud of their student’s achievements—they

had not imagined that students could achieve so much in one week! They spoke like parents who see their child walk for the first time!” The partner companies were also very excited and asked about how they could continue working together. That was when we confirmed that this was the right track and we expanded the experience to a full semester.”

Tec started to have early adopters and supporters, but the challenge was to scale up the pilot for the entire curriculum, for all the disciplines, across all 26 campuses, which was a daunting task.

After the “i Week” pilot, Martinez heard back from the initial skeptics, “They came back and were transformed. They said, ‘Roman now I understand, and I’m sorry I didn’t believe in it before but after having lived it, now I understand. It will be a lot of work. It’s the future, I identify with it, and it’s what I want.” After that exercise, there were a wave of converts who became evangelizers.

The experience was a bold move for the university. Martinez emphasized, “If we had not given ourselves a long-time horizon of five years, perhaps we would have encountered greater resistance. The leadership team recognized that it would take time to implement and the benefits have been very good.”

Curriculum Redesign

Competency-based learning is not new, but it has been more widely used in technical education rather than at the university level, and it required a change in culture for professors. In 2017, all the National Schools embarked on the full curriculum re-design process. The entire curriculum would have to be designed from scratch, because now faculty had to co-design, co-teach, engage with outside development partners, and change their pedagogy to be effective.

The curriculum redesign was led by the individual schools so they would determine the formative end goal for each program. But a key challenge was adapting the curriculum to a new model, which has many inter-disciplinary and multi-disciplinary elements. This required the control schemes of each of the schools to be broken.

Tec designed working groups and workshops with 250 professors from all the schools. There was leadership at the level of each school, at the level of each program, and for cross-cutting issues. In addition, national guiding documents on the challenge-based learning methodology, competency development, and evaluation, among others, were developed to assist faculty members. Planning the new curriculum and developing content for the first semester was expected to take six months, but it ended up taking a full year. It was the most delicate and demanding part of the process.

Martinez explains, "It was challenging because we had to dissuade professors from defending their special interests in their study. We told them, start with a blank page and start to design based on the technical and cross-cutting competencies for the challenge. There was a lot of debate, a lot of discussion, and back and forth and a lot of learning. We broke a lot of mental schemes. It took two years of construction for all the programs, and we are still working on the gaps."

Maria Elena Vazquez Lira, Dean of the School of Business for the Western Region explains, "The faculty are learning how to give up teaching some areas that they love because



MARIA ELENA VAZQUEZ LIRA,
DEAN OF THE SCHOOL OF
BUSINESS FOR THE WESTERN
REGION

“ The faculty are learning how to give up teaching some areas that they love because it is not relevant to the challenge. This has been a very painful experience for the faculty, but they are doing it. ”

it is not relevant to the challenge. This has been a very painful experience for the faculty, but they are doing it." She added, "One mistake we witnessed in the first few weeks, was that they were trying to squeeze in a lot of content that is normally delivered over the course of a semester into a five-week block. But it is a learning journey and they are recalibrating for the next block."

Student Assessment

The new model also required substantive changes to student evaluations. In the design of each learning unit, Tec had to identify learning objectives and assessment methods for both the disciplinary and seven cross-cutting competencies. Assessments can include a combination of exams, activities, deliverables and presentations. Ignacio de la Vega, Dean of Undergraduate Business School (the second largest School at TEC with about 17,000 students and 1,500 professors) and the EGAD Business School said, "The faculty were aligning the activities and the evidence they needed to observe, and we ended up with a complex matrix of competencies to document. The faculty found it very difficult to identify evidence of 7 competencies and 21 sub-competencies for 30 students in five weeks and this will require some adaptation in the future. We see Tec21 as a large entrepreneurial educational venture that will require ongoing adjustments."

Faculty Support

Around two years into the Tec21 design, faculty members started to come forward asking for additional support. Murra recounts what they said, 'I have been teaching the same way for 25 years, and I need help to learn to teach the new way.' At that point, Murra explains, "it was a different type of conversation, and it became about training faculty on how to identify a challenge, on how to develop a challenge as a learning pedagogy, and how to identify and assess the competencies in students." David Garza led the task of developing Tec21-ready faculty and set up Centers for Faculty Development and Educational Innovation (CEDDIE). Any faculty member could get assistance in designing a challenge or incorporating the use of technology.



The essential elements in changing mindsets were the national professor meeting, “i Week”, “i Semester” and leveraging professors to themselves become agents of change.

Transitions

In August 2019, Tec fully implemented the model for the first cohort of freshmen students and over the next three years, it will extend Tec21 to incoming classes to reach the entire university student population. As with all changes, there were early adopters, there were people that always oppose, and there were people in the middle observing both sides. There is still a small segment of faculty that is skeptical and resistant. As of December 2019, some faculty members who teach advanced level courses have not yet

implemented the model but those will be incorporated in future semesters until the model is fully implemented.

The essential elements in changing mindsets were the National Faculty Meeting, “i Week”, “i Semester” and leveraging professors to themselves become agents of change. Faculty leaders, department chairs, and regional deans played an important role in changing the culture. Four months into full implementation, the leadership team believes that about 80 percent of faculty have bought in.



“What we learned is that this generation is highly talented, comes with a high level of ambition, and a clear purpose to transform our societies and the planet. They have a completely different mindset about the workplace. Tec21’s competency-based model fits very well with what they’re looking for.”
—Ignacio de la Vega

Tec21: General Characteristics of Tec's New Educational Model

Cross-Cutting Competencies

The foundation of the new educational model would rest on the cross-cutting competencies students would develop. Tec began to analyze the competencies that it was imparting. Murra explains, "We were already developing highly technical, competent professionals, and we emphasized ethics and citizenship, leadership and entrepreneurship capabilities. We maintained these competencies from the prior model, and built upon them, adding more competencies that leaders for the 21st century will need." Tec established seven cross-cutting competencies, summarized below, which are embedded across all the disciplines.



1. Self-Awareness and Self-Management: Builds a personal and professional wellbeing plan throughout life, through responsible reflection, and the integration of emotional and intellectual resources.



2. Innovative Entrepreneur: Generates innovative and versatile solutions in changing environments that create value and have a positive impact on society.



3. Social Intelligence: Generates environments that are effective for collaboration and negotiation in multicultural contexts that are respectful and appreciative of a diversity of people, knowledge, and cultures.



4. Ethical and Citizenship Commitment: Implements projects oriented to the transformation of the environment and common welfare with an ethical conscience and social responsibility.



5. Reasoning for Complexity: Integrates different types of reasoning in the analysis, synthesis and problem solving, with a disposition for continuous learning.



6. Communication: Uses different languages, resources, and communicative strategies effectively and in the right context, in interactions in different professional and personal networks, with different purposes or ends.



7. Digital Transformation: Optimizes solutions to problems in a professional field by incorporating intelligent and timely digital technologies that are at the vanguard.

In a world that will be more automated and robotized, students need new tools. These competencies will be essential to lead in the 21st century. Today, these competencies are integrated into the curriculum for all the professions. Once students develop these competencies, they will be positioned to successfully manage uncertain conditions.

THE 4 PILLARS OF TEC21



1. CHALLENGE-BASED LEARNING is an experiential learning pedagogical approach. It actively involves the student in solving real-world problems that organizations are currently encountering.

When starting a challenge, a professor will impart technical knowledge needed to solve the challenge. Students analyze the issues, consider application of the theories, and explore and debate the virtues of possible solutions, as they engage with other students and a team of faculty members. They hear other perspectives, test hypothesis, and develop a proposal, which students present to outside development partner organizations. In the process, students develop deeper learning, cultivate team work, communication, and leadership competencies. They refine attitudes and build good citizenship values. With each challenge, students live a memorable experience, which stays with them for life.



IGNACIO DE LA VEGA, DEAN OF UNDERGRADUATE BUSINESS SCHOOL AND THE EGADE BUSINESS SCHOOL

“We are confident that challenge-based learning will also continue to boost our employability results tremendously—and that the demands and needs of the companies are addressed more easily by Tec graduates. It creates a virtuous cycle—which is also part of the model.”

At least three professors, ideally from different disciplines, are engaged in the entire process from design to evaluation. During the challenge, they provide guidance to students to ensure that specific disciplinary and cross-cutting learning objectives are achieved. Professors act as advisors, providing guidance and reinforcement of lessons. They document and evaluate the process a student's learning journey to certify acquisition of competencies. Professors also mentor students, providing advice that accompanies students across their careers.

To develop real-world challenges, Tec establishes formal arrangements with outside organizations called “Development Partners,” which can be a company, a non-governmental organization, a research institution, or a government institution. Given Tec's origins, the composition of the Board, and Tec's own network, the university has very strong connections to the business community, and Tec maintains relationships with many CEOs of large companies that represent a very large part of gross domestic product (GDP) of Mexico. Tec has formal arrangements with more than 1,000 organizations including Amazon, Cemex, Femsa, Heineken, IBM, Nestle, Siemens, and Unilever, among others. Those relationships are important because their people help feed ideas into the design of the challenges and they provide valuable feedback and comments.

Challenge-based learning offers many benefits for all stakeholders. Students are highly motivated, engaged, and have a sense of accomplishment. It better prepares students for life and it makes Tec students more competitive in today's world. Development partners benefit too. They get to experience the caliber of Tec's talent up close. De la Vega adds, “We are confident that this will also continue to boost our employability results tremendously—and that the demands and needs of the companies are addressed more easily by Tec graduates. It creates a virtuous cycle—which is also part of the model.”

A Challenge Contest

In August 2019, the School of Business launched the first major challenge across all 26 campuses with [Coppel](#),



"Learning through the challenge was much more exciting because you are working for a real company with real problems—it's not just something that somebody made up and that makes it very interesting."—Alejandra Ruiz Vanegas

one of Mexico's largest retailers that serves low-income populations. The first challenge was structured as a competition. (See the video [here](#).) Freshmen students in the first five weeks of the semester were confronted with the following challenge: *How to make Coppel a better corporate citizen, while redesigning its business model with a specific eye on millennial behavior.*

About 4,000 students working in about 750 teams participated in the challenge. Alejandra Ruiz Vanegas, a freshman, remarked, "Learning through the challenge was much more exciting because you are working for a real company with real problems—it's not just something that somebody made up and that makes it very interesting."

Vazquez Lira explains, "To respond to the challenge, students needed to understand how to build business models and what is the value proposition. They needed to understand the company and the retail industry and analyze megatrends." Professor Francisco Colorado prepared

students so that when they started the challenge and visited retail stores in low-income areas, they had very specific knowledge required to apply to the case. He prepared them with the tools to understand key business elements so they could ask the right questions when they were interviewing customers, managers, and observing details.

To respond to the challenge, students had to understand the needs of the customer, their living conditions, and even what types of houses people live in. Ruiz Vanegas added, "The majority of us had never been to a Coppel store. It showed us the realities of Mexico and different standards of life." They also had to understand Coppel's salary structure and how it compares to the rest of the community.

Throughout the challenge resolution process, students developed competencies such as critical thinking, complex analysis, consensus building, and emotional intelligence. Raul Bravo Inda, a freshman explained, "Maybe there is a problem for the company in the external world and you

need to adapt and have good teamwork to find a solution very fast.” Andrea Madrigal Flores, a freshman also explained, “We adapted to changes all over the project—changing focus, changing the presentation from English to Spanish, and team work.” Bravo Inda added, “We learned how to communicate with each other in a diverse environment.”

Professor Colorado wore many hats. He was a teacher, a guide, an advisor, a mentor and in other classes, a tutor. He provided students feedback on shorter intervals. He explains, “We were reviewing the way that they were progressing in the project. They got feedback once a week in groups based on their deliverables.”

Then it was game time. Each group of students presented their proposal to the regional teams. The challenge was so successful that Coppel flew one team of finalists from each region to its headquarters in Culiacán to give a final presentation to the executive team and some members of the Board. The company was excited to hear ideas that they had never heard from their own employees, even if these included paying higher salaries, fixing environmental practices, and changing the approach to selling to low income people. They were so impressed that one person from Coppel commented, “Why should we hire sophisticated consulting firms when we have Tec students?”

Madrigal Flores explained, “Putting the knowledge and practice together at the same time makes it really stick in your brain, we are not learning for the exam and forgetting about it later. The challenge experience really gives us a head start in getting a job because we are learning how a company really works. While others may have the knowledge, they don’t know how to apply it and we do. We can bring value to a company faster.”

Reflecting on the experience where about 4,000 students invested about 45,000 hours over five weeks, inside and outside the classroom, Professor Colorado said, “The quality of the proposals for the company was really high. I was very nicely surprised that all the solutions added value for the company. They were so good that we decided to make a compilation of all the solutions, and we presented it to the company.”

As far as grades, students were assessed on the deliverable and the presentation to Coppel, and specifically, how well did their proposal solve the problem, while incorporating all the disciplinary knowledge they gained in the course. About 75 percent of the assessment was in the technical rubric and about 25 percent was based on cross-cutting competencies, including how well they participated and integrated with their teams. For other subjects in the semester block, students also take exams.

De la Vega remarked on the results, “What we learned is that this generation is highly talented, and comes with a high level of ambition and a clear purpose to transform our societies and the planet. They have a completely different mindset about the workplace. Tec21’s competency-based model fits very well with what they’re looking for.”



2. FLEXIBILITY offers the student significant choices in the process of professional formation in the areas of what, when, where, and how. These elements are reflected in the curriculum and in learning experiences.

Career Selection

In the past, students arrived at the university with dreams, but sometimes these were grounded in broad generalizations or an opaque understanding of their chosen career. Prior to Tec21, the typical model of academic programs in Mexico and in many other countries in Latin America was very rigid, vertical, and specialized in one area. Students needed to select their program in the first semester and there was little flexibility to explore different options. For instance, at Tec, out of 54 courses in the business school, students could only pick 6 electives. Students could change programs, but the structure was more rigid and more difficult to change. Sometimes, this resulted in students selecting careers that were not a good fit and also had cost implications for parents if only a few credits were transferable.

With Tec21, students embark on a three-stage journey of “Exploration” (1st to 3rd semester), “Focus” (4th to 5th semester) and then “Specialization” (6th to 8th semester). During the exploratory phase, students select one entry point from six

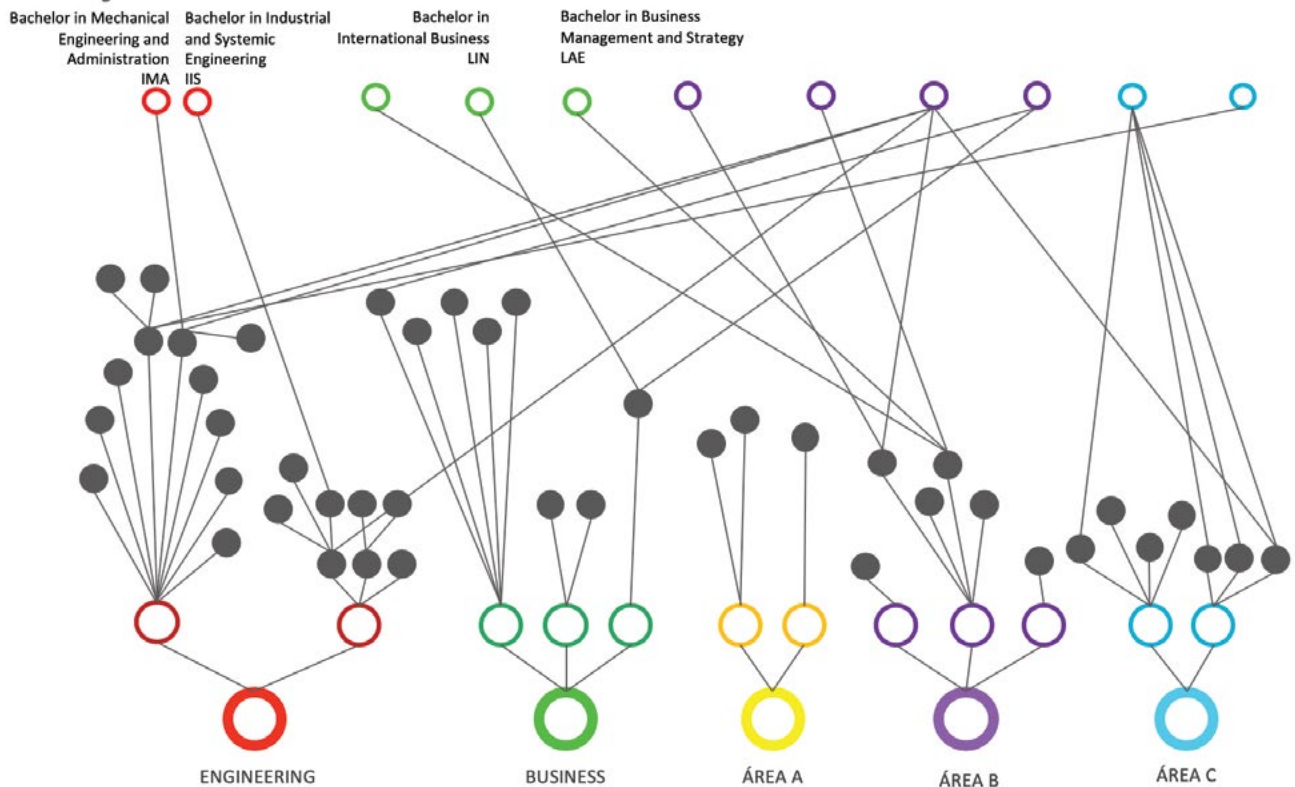
broad educational categories: Built Environment, Creative Studies, Health, Social Sciences, Business or Engineering. Students are exposed to information and challenges that will provide them with a panoramic view of that career stream and will help them to confirm or reject their inclination toward a particular career.

During the Focus Phase, students will deepen their understanding of the subject. At this stage, students need to declare their chosen major from 44-degree programs and provide the academic administration with insights about their specialization interests so that resources can be adequately planned. In the specialization phase, students can pick which subjects they want to concentrate on from more than 50 focus areas.

To give students more time to explore different career options, Tec introduced a concept called "Pathways," which it adapted from the University of Melbourne. With this new structure, the student can now select courses that appeal to them from across multiple disciplines in any category. It allows students to have a dynamic and flexible experience, to explore different areas, and to customize their professions.



Pathways



At each stage, students are exposed to development objectives that are required by that profession’s competencies. This gradual approach allows students to be better positioned to take informed decisions in selecting a career that best suits their passions, aptitudes, and dreams. Mauricio Crespo Navarro, a freshman, explains “With Tec21, we get to taste a little bit of everything, and at the end of the day, we can be really sure that we’re choosing the career that we want, and I think that’s something very positive.” At graduation, a student will earn a degree in their discipline and can earn an additional specialization.

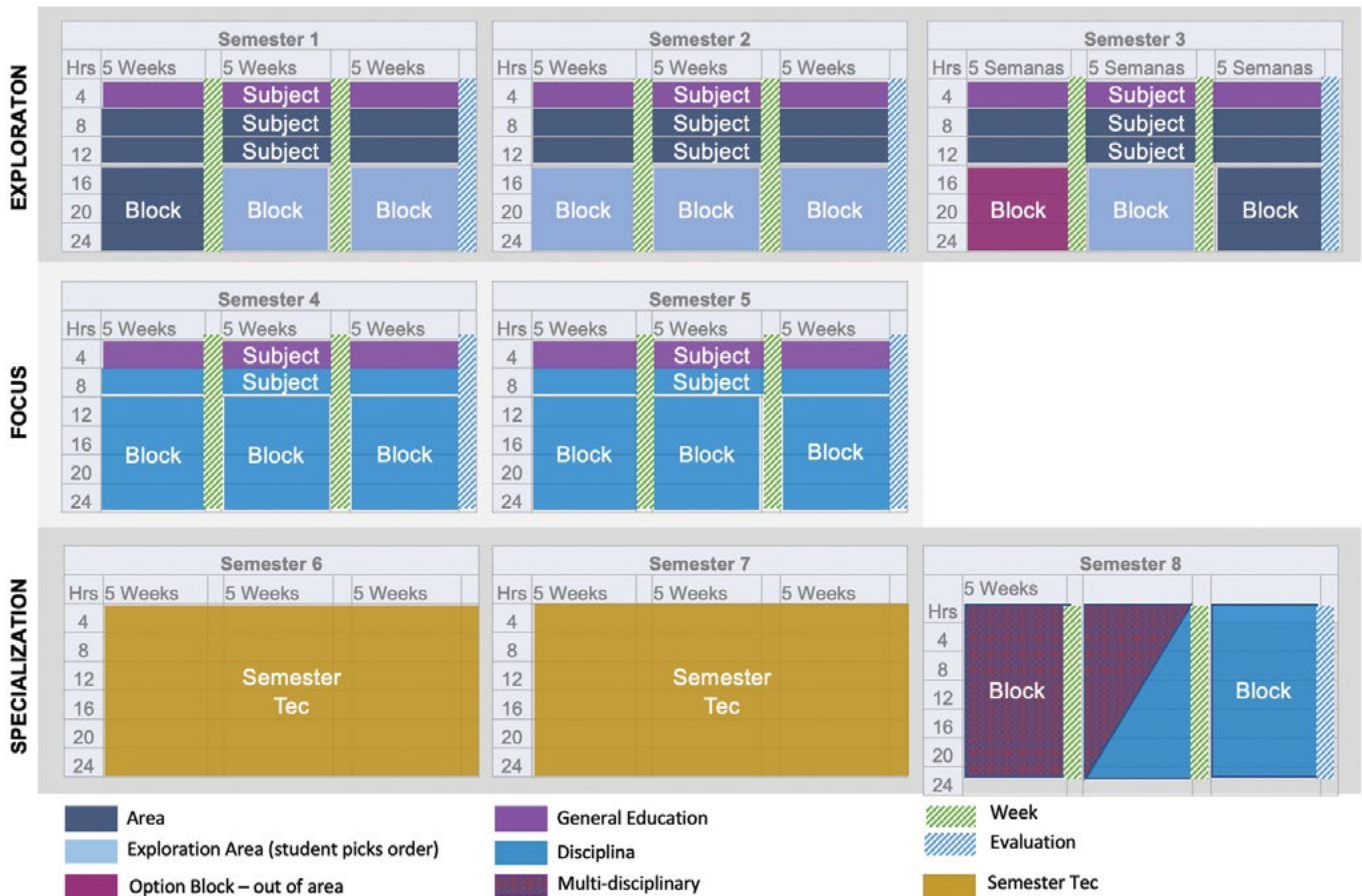
Structure of the Semester

To further promote flexibility, Tec broke up the traditional semester scheme into smaller increments or learning modules that incorporate theory and practice in shorter “subjects” and longer “blocks.” These can last 5, 10, or 15 weeks. Professors cover core concepts about a discipline through theoretical classes, laboratory experience, workshops, and seminars.

After every five-week cycle, (for the first five semesters) students experience “Tec Week,” which is an intensive experience where the entire community stops their daily activities and all students participate simultaneously in an immersive experience, which they select, and which promotes multi-disciplinary learning and strengthening of competencies. Tec Weeks integrate real world experiential learning into the curriculum to reinforce career and life competencies. Students can choose between discipline related, entrepreneurship, and social purpose. These experiences help develop career and personal development competencies. Tec Weeks can occur up to 16 times over the course of four years.

In the sixth and seventh semester, when students are specializing, the Tec Week experience is expanded to last an entire “Tec Semester.” In a Tec Semester, students have more options to acquire more in-depth learning experiences that require more time to develop. They can pursue professional practicums, a concentration, or incubate a company. At this stage, students may also opt

STRUCTURE OF THE SEMESTER





In August 2018, Tec introduced the first “Hologram Professor.” Students could see a full body image of the professor projected onto a screen in a classroom. This enabled Tec to simultaneously connect more than 160 students, from five campuses across the country, to one professor.

for a semester abroad to gain international experience and be exposed to another cultural environment.

Flexible, Interactive and Technology-Intensive, “FIT” Courses

With 26 campuses across the country, sometimes there were small groups of students interested in a course but there was insufficient demand at one campus to justify hiring another professor. Vazquez Lira explains, “Sometimes an expert in a certain discipline would be physically located at a distant campus, but by leveraging technology, we could extend that specialized knowledge to all campuses through the FIT course approach.”

To be able to offer the course that students wanted affordably, Tec piloted connecting students with Zoom video conferencing technology. Then it raised the bar. Starting in

August 2018, Tec introduced the first “[Hologram Professor](#),” pioneering the incorporation of Star Wars like technology and bringing it into the classroom. Students could now see a full body image of the professor projected onto a screen in a classroom. This enabled Tec to simultaneously connect more than 160 students, from five campuses across the country, to one professor. (See the video [here](#).)

The flexible approach satisfies students, produces economies of scale and generates productivity gains because it groups all these students in one class instead of teaching in small groups of two to four students. Even though the main driver is innovation in education, the approach is also very good for financial results, because on-line learning generally increases tuition revenues by increasing the number of students without proportionally increasing costs.



3. A MEMORABLE UNIVERSITY EXPERIENCE

incorporates traditional extra-curricular activities into formal personal and professional growth experiences to offer an integral educational experience that will be

valued for life. Salvador Alva explains why this is important, “When we asked students and alumni ‘What is the role of the university? Is it to educate you for a career or for life?’ The resounding response was to ‘prepare you for life.’” The leadership team was surprised by the number of alumni and employers that remarked that extra-curricular activities were essential elements in forming well rounded students. “At that moment, we realized that we had focused primarily on the academics, but we needed to reinforce the humanistic dimension to prepare them for life,” Alva added.

In response, some activities that were previously extra-curricular activities became part of the curriculum through the living campus. As part of Tec week and beyond, students have the opportunity to participate in social, cultural, and leadership activities such as building a house

for a low-income community in the mountains, sports, robotics, hackathons, Hult Prize, and “INCMty—Tec’s annual entrepreneurship festival, among others. Students can also participate in international exchanges with over 500 universities on five continents. For these life experiences, students must be physically present—it cannot be done online.

These programs offer different levels of participation, allowing students to decide, depending on their interests and availability, whether they function as organizers who are directly responsible, or join as spectators, or they register as students in classes or special workshops. Students are free to make proposals for new activities and programs.

These enrichment activities respond to the diversity of student’s own interests and allow students to push the boundaries of their comfort zones and try new things, all while developing different dimensions of the person. The experiences add a wide array of cross-cutting competencies (such as resilience, communication, and citizenship) to the student’s competency arsenal and promotes a sense of community across the university, connecting students across disciplines and expanding the



“What is the role of the university? Is it to educate you for a career or for life?” The leadership team was surprised by the degree of alumni and employers that remarked that extra-curricular activities were essential elements in forming well rounded students.

student's friendship and their future professional network. Martinez adds, "We now recognize that through those activities you are developing competencies and we are recognizing that with credits."

Mentors, a Critical New Component

To help students navigate the university journey, which can often be filled with many questions, Tec modernized the student services model. Today, students have access to advisors in the following key roles:

1. An Academic Advisor, who guides students with decisions related to the curriculum.
2. A Student Success Mentor, who provides guidance, not just academically, but in helping with all aspects of career and life.
3. A Peer Mentor, who is an advanced semester student that has gone through experiences with Tec and who can help students to adapt during the first year.

Most of these activities and benefits are covered by student tuition. Currently, these mentors increase costs by about 11 percent more than the previous model, but Alva sees it as an essential investment and Tec is looking for ways to generate more productivity to compensate.



4. INSPIRING PROFESSORS: As David Garza and the team were developing Tec21, they were inspired by a famous ancient Chinese quote by Xun Kuang, "Tell me and I forget. Teach me and I remember. Involve me and I learn." The

challenge was to reformulate the role of the university professor from lecturer to a more complex, active, and multi-dimensional role, which required professors to change habits and work as part of a team with faculty from other disciplines. This was radical, but necessary thinking, because professors now needed "to prepare students for jobs that do not exist today, using technologies that have not yet been invented, to solve problems we don't even know are problems yet."

In response, Tec redesigned the role of the professor into five categories.

1. Lecturer: Designs and imparts technical and practical content needed to resolve a challenge.
2. Challenge Designer: Designs, plans, and documents challenges along the process of student formation.
3. Advisor: Accompanies, advises, and provides follow up for students in the process of resolving the challenge.
4. Evaluator: Designs, organizes, and implements different processes for evaluation of learning for students, which should permit the certification of the development of competencies.
5. Mentor: Orients, advises and accompanies students in their careers.

The professor must construct diverse learning experiences in a natural environment, conducive to active learning to capture the attention and cultivate the interest of the student. This will position the student to commit themselves to the learning opportunities, both inside and outside the classroom.

To accomplish this, Tec outlined the essential characteristics that the new professor profile must assume. Professors need to be connected and interested in students. They need to be inspirational and admired by students and colleagues, so they can motivate students to meet their potential by giving their best effort for learning and personal growth. Professors must have intellectual vitality, constantly renewing knowledge in their area of specialty, through continuous participation in academic and professional activities. This enables professors to keep the curriculum fresh, up to date, and relevant with current events, developments and innovations.

The faculty must continually innovate pedagogical strategies, and adapt to the profiles of students, to facilitate learning, motivation, involvement, and creativity. They must effectively incorporate technology as a tool for challenge implementation, improving teaching and learning processes, and evaluation.

1 Richard Riley, US Secretary of Education.

Inspiring professors also means attracting new talent to the university. De la Vega explains, “At the business school, in one year, we hired 75 new faculty members in strategic disciplines that are diverse and have an increasing international profile. We also wanted to attract young global researchers with high potential for teaching, research, and development. We also increased our cadre of women faculty. Further, this year, 30 percent of new hires were international faculty.” De la Vega himself, who has over 30 years of teaching experience in more than 25 countries at top schools like IE Business School and Babson College, and who has a deep experience in management and leadership positions in industry, government, non-profit and academia, was hired in 2017.

Tec also wants to attract more high-profile international professors. It wants to diversify the student experience. To that end, De la Vega and the Business School introduced

“Leadership Voices,” which is a program that brings leaders such as CEOs, business people, and entrepreneurs from large or multi-national companies into the classrooms to co-teach with faculty over four or six sessions.

Alumni

As part of the strategic plan 2020, Tec wants to be a highly connected university with the market and with society and especially with its 300,000 alumni. In the last two years, it strengthened a national structure to organize them. Tec now has a platform for engagement and connection with alumni. They can volunteer to teach a class and mentor students and take continuous education courses. Murra explains, “We have ramped up our engagement with alumni in the last four or five years and it’s crucial for Tec21. Now that we’re starting to prepare for Tec 2030, the concept of alumni has shifted because you are a student for life.”



The challenge was to reformulate the role of the university professor from lecturer to a more complex, active, and multi-dimensional role, which required professors to change habits and work as part of a team with faculty from other disciplines.

Making Entrepreneurship as Second Nature as Doing Math

Given Tec's history and its close ties to the business sector, for decades it has embedded the cultivation of entrepreneurial competencies in the curriculum. Tec wants entrepreneurship to become as second nature as doing math. All students are exposed to an immersive entrepreneurial ecosystem starting from day one. Students from all disciplines are required to create a company at some point in their academic journey. While not everyone will legally incorporate a company, everyone does participate in a project that generates revenues.

Through Tec's own Institute of Entrepreneurship Eugenio Garza Lagüera, students are immersed in entrepreneurial competencies formation: identification of opportunities, crafting solutions, operating in an uncertain world, and building resilience. It helps students to create a business through four steps: (1) "Discover" what kind of a business to start, (2) "Launch"—business model development support, (3) "Growth"—professors provide mentoring and coaching and (4) "Scale up" which helps large companies to formalize before going to financial markets. Anyone can use the services of the Institute, even people outside Tec.

Tec has been doing "entrepreneurship challenges" for many years but with Tec21, it created clear competencies and integrated it into the Tec Weeks. Students projects need to meet two criteria. They need to (1) have a conscious social purpose—it cannot be just about the student or about making money. It has to promote ethical behavior, take care of the environment, give knowledge, and promote prosperity, and they need to (2) to propose a truly innovative concept. This philosophy aligns very well with new generation of students, who have embraced integrating corporate social responsibility into the heart of the corporate strategy. Every year, more than 10,000 students participate in an entrepreneurial challenge in their first semester.

Clearly, Tec has the right formula to prepare students with an entrepreneurial mindset. In September 2019, a team of students from Tec formed a business called Rutopia and they won the 2019 Hult Prize. The challenge was "Can you build the foundations of a venture that will provide meaningful work for 10,000 youth within the next decade?"

Hult Prize is considered "the Nobel prize for students" tackling the United Nations Sustainable Development Goals. Students from more than 1,500 university campuses in 121 countries participate annually. Rutopia won a US\$1 million for the company.



Rutopia

Tec de Monterrey



Rutopia is transforming indigenous youth into successful tourism entrepreneurs.

It is a network of communities that enables travelers to get to the hidden paradises of México. It is an experience design methodology that gets indigenous communities ready to receive international travelers. And, It is a platform that exponentially increases their sales by exposing the experiences on the biggest OTAs like Airbnb.

We support indigenous community tourism projects to create and sell experiences online while generating a positive impact in the community. We do this by working with indigenous youth to integrate the services they can offer into an end-to-end, high-quality ecotouristic experience. We then ensure that these experiences are SAFE and effectively communicated.



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"If you walk the halls today, you find students immersed in an ecosystem that is transformed. Students are interacting more, and the quality of discussions is more interesting. There is a culture of innovation and a desire to continue learning."

Preliminary Results of the Implementation of Tec21

Proudly reflecting on the change that Tec21 has brought, Garza said it best, “If you walk the halls today, you find students immersed in an ecosystem that is transformed. Students are interacting more, and the quality of discussions is more interesting. There is a culture of innovation and a desire to continue learning.”

In August 2018, the EGADE Business School launched its first Tec21-ready Master’s Program. The Masters in Business Management (MBM) is a highly innovative program that is suited to early career professionals. The program, which is taught in English, implemented the challenge-based learning and skills-based design. It has been acclaimed as a highly innovative program and has received several global awards for innovation. One year later, Tec21 was fully launched for all degree programs, across the entire institution, to the entire freshmen class, on all 26 campuses.

Tec regularly monitors the pulse of the Tec community, seeking feedback through various formal survey instruments as well as consultations. For instance, the Business School offers “active listening sessions,” where students, faculty, and stakeholders can provide feedback on the model at drop-in breakfast sessions. Tec has gotten great feedback via this channel. It also created “academic communities,” which is a space for dialogue, suggestions, proposals, decision making and making improvements.” Overall, in the first semester of full-scale implementation of Tec 21, the indicators have been positive.

Increased Enrollment

As news about Tec’s new educational model has been disseminated across secondary schools, applications for

admission have grown at double-digit rates. More than 12,200 students enrolled across the country. Demand exceeded the admissions target by 800 new students, or an increase of about 8 percent. This shows acceptance in the market of the new educational model. In the future, to manage growth, the admissions process will be more rigorous, and some campuses will need to cap enrollment.

Majority of Students Satisfied

The leadership team found that most students are satisfied and value the Tec21 innovations. Students gave very high marks to the Blocks and Tec weeks, and were satisfied with the newly designed Learning Units. Several students expressed concern over the excessive work-load and this has served to review and calibrate the designs of the formative units.

Faculty Satisfaction

Faculty have also provided formal and informal feedback and have shared their experiences and expressed concerns. Faculty have the same concerns about the workload, but especially about the increased demand in time needed to implement the new model. This feedback is generating improvements in the implementation process, separate from the learning curve.

Drop Out Rates

The academic management statistics indicate that the student approval and the dropout rates are in the normal ranges and are comparable with those of prior generations.

The challenge-based model is not for everyone, and some students who are not self-driven will struggle with the new model. In the future, admissions will introduce new criteria to identify students who possess characteristics that will position them for success, which in turn, should continue to reduce the drop-out rate in the future.

Learning Outcomes Monitoring

Tec continues to do research on the outcomes, and as progress is made in the execution of the 2019 curriculum, information on the development of competencies (learning outcomes) will be available, which will allow Tec to more clearly identify the effectiveness of the educational model.

LESSONS LEARNED

Preparation Time

The demand from the market was so good that Tec admitted 800 more students than it had planned for, but it did not

have enough faculty to service the increased number of students. Vasquez Lira explains, "Leading up to the first day of class, we had invested a lot of time preparing and training the existing faculty. The training is very rigorous, but with the increase in enrollment, we had to quickly hire and train new faculty. The issue was that there was not enough time to fully train some of them. It is not the same as hiring for a traditional educational model. The new model takes time to comprehend and it requires a change in mindset. This is an area we are still struggling with."

Intensity

As discussed above, the level of intensity was high for students and faculty in some schools and majors and this is being recalibrated. Martinez explains, "That was a wake-up call. We needed to communicate more of the objectives of the change to the community of students and parents. By next semester there will be more balance."

Mistakes

Even in the midst of large scale and grassroots planning, Tec is such a large institution that it was impossible for everything to be perfect. There were some issues and some students were not totally satisfied with the experience, but Tec is listening, and the problems are being corrected. Learning from mistakes presents opportunities for the future.



"The training of faculty is very rigorous, but with the increase in enrollment, we had to quickly hire and train new faculty. The issue was that there was not enough time to fully train them. The new model takes time to comprehend and it requires a change in mindset."

—Maria Elena Vasquez Lira



In its first full year of Tec21 implementation, demand exceeded the admissions target by 800 new students, or an increase of about 8 percent. This shows acceptance in the market of the new educational model.



The larger enrollment is allowing Tec to rebalance its revenue model while spreading costs over a growing student base and keeping tuition increases in check.

Resources and Changes to the Business Model

Market

Mexico's gross enrollment rate in higher education is estimated to be 35 percent, which is below regional and OECD averages, leaving plenty of opportunities for expansion. Mexico's annual GDP growth rate has been slow but stable at an average of 2.41 percent between 1994 and 2019. This has allowed the educational sector to grow.

There are about 4.5 million students enrolled in higher education in Mexico. While there are about 1.7 million students enrolled in private higher education, Pascual Alcocer, the Chief Financial Officer estimates that "Only about 20 percent can pay for this caliber of educational service."

Growth Strategy

With the new educational model, Tec is seeing demand growing. In its first year of implementation of Tec21, it admitted 800 more students than in 2018. The larger enrollment is allowing Tec to rebalance its revenue model while spreading costs over a growing student base and keeping tuition increases in check.

Since its founding, Tec's growth strategy was to expand its physical presence to reach students across the country, but going forward the objective is to limit growth. Eighty percent of Tec students are concentrated in five major cities, and it is seeing a movement to larger campuses. Tec expects to limit its growth to 2,000 additional students, reaching about 60,000 students and maintaining a relatively stable number over the long run, while focusing

on student selectivity to attract top talent.

Target Audience

Tec is one of the few universities in Mexico that uses truly selective criteria to admit students. As it deepens its focus on attracting the leaders of tomorrow, it expects to become more selective and will add a new screening criterion to ensure that incoming students have characteristics that will position them to succeed with the new model. Tec is already recognized as a prestigious institution. Alva estimates that about "35 percent of its students are of Harvard caliber." It expects that scarcity and exclusivity will likely continue to increase its prestige and attractiveness and will strengthen the value of its brand.

Tuition

Tuition is differentiated across 26 different campuses. In 2018, the lowest priced undergraduate tuition cost about MXN\$92,000 (about US\$4,800), while the most expensive cost about MXN\$118,100 (about US\$6,150)² per semester. Tuition typically increases at about 5 percent per year, slightly above the 4 percent rate of inflation.

2 According to Reuters, the average foreign exchange rate for 2018 was MXN\$19.24 to US\$1.00



Tec21 has increased operational costs, which has changed the cost structure, yet tuition increases were contained to an average of about 6 percent between 2018 and 2019. It is expected to increase tuition about 1 percent next year.

The Tec21 educational offer is more resource-intensive and Tec had to hire more faculty members with higher level credentials. Tec21 has increased operational costs, which has changed the cost structure, yet tuition increases were contained to an average of about 6 percent between 2018 and 2019. It expects to increase tuition about 1 percent next year and keep costs under control by focusing on generating efficiencies, leveraging technology, and innovating in new-generation processes to deliver its value proposition.

Tec's tuition is considered high in Mexico, but it is significantly cheaper than in the U.S. Part of Tec's strategy is to continue to attract international students who find Tec's value proposition and the return on investment attractive.

Financial Aid

There are no federal student loans and there are limited student loans offered by commercial banks. Decades ago, Tec established its own student loan program. In 2018, Tec extended about MXN\$600 million (about US\$31 million) to about 12,000 students.

In 2018, about 45 percent of undergraduate students and 63 percent of graduate students received some form of financial aid that was based on need, talent, academic

talent, sports, arts, and leadership. For every dollar of general scholarships, about forty cents are loans.

Additionally, Tec sponsors the innovative "Leaders for Tomorrow" program, which offers a full scholarship, and in many cases also living expenses, to 200 students from very low socio-economic levels annually, for each enrollment class. There are currently 1,000 students who benefit from the program. The innovative program has garnered the attention of experts since it promotes social mobility for many students. Students with extraordinary talents are now getting an opportunity to flourish.

Tec21 Investments

Between 2012 and 2019, Tec has invested about MXN\$2.3 billion (about US\$110 million) to prepare 26 campuses and about 58,000 undergraduate students for the new model. These investments have been done in phases, starting with the transformation of spaces for all students across campuses, and preparations for the freshman class that arrived in August 2019. Additional investments to accommodate the next three generations of students are planned.

Facilities: Investments included reconfiguration of the physical spaces. The classrooms are larger and have more

open spaces. For instance, classrooms were joined to make them bigger. New modern desks and furniture that are conducive to working in groups, as well as working independently, were added. Areas where students can talk, and quiet spaces, were also developed. Spaces for faculty have been revamped. The library was upgraded to have a "learning commons."

IT Systems: Tec did a major overhaul of all its IT systems to align the business with the new model. Classrooms and common areas were retrofitted with new communications and IT systems. Large investments were made to expand broadband access. Further, all the changes in processes for the educational model had to be reflected in the IT systems. Tec had to completely change the registrar, learning management system, academic management, and student record IT systems.

Rebalancing the Economic Model

The new business model has a high operating cost and it has required a higher degree of investment. To rebalance the economic model, it has undertaken several efforts to make it sustainable. First, it increased revenues by decreasing the drop-out rate and capitalizing on its high demand. After three more years, when Tec21 is fully implemented across all cohorts, it expects to stabilize the number of students over the long run with about 2,000 more students.

Since Tec did not want to raise tuition much more than the cost of inflation, Tec embraced a strategy to generate efficiencies and savings. In the process of preparing for Tec21, the institution underwent a consolidation, eliminating some degrees, courses, and reducing the total number of semesters from nine to eight. Capital expenditures were significantly reduced for five years. It created a shared services center for all the administrative corporate back office functions (finance, human resources, and procurement) for all 26 campuses. The service center consolidation resulted in about US\$10 million in annual savings. "Other efforts such as consolidation, better leveraging technology and online courses, and eliminating some unprofitable areas generated about another US\$5 million in savings" said Renato Ramirez, Planning Director for Tec's Provost Office.

In addition, Tec is trying to do things differently as Alcocer explains, "We launched a program called LEAP, which is a program driving increased productivity, empowerment, and accountability, and we are driving automation in some areas." This should also generate additional efficiencies.

Revenues

In 2018, Tec's gross revenues for the university segment was US\$750 million. Revenues were up 7 percent from 2017, as a result of increased enrollment due to Tec21 implementation. About two-thirds of revenues were from undergraduate programs, while graduate programs brought in about five percent.

The most important undergraduate programs that drove revenues were Industrial Engineering, Business and Strategy Management, and Mechatronic engineering, and those represented about 14 percent of revenues. Lifelong learning (non-degree earning programs) such as executive education, general continuing education, short courses/ seminars or certificates contributed about 6 percent and this segment is expected to grow in the future. Tec has 10 online degree programs at the graduate levels. The schools with the highest growth in 2018 were Social Sciences, Medicine, and Engineering.



PASCUAL ALCOCER,
CHIEF FINANCIAL OFFICER

“ Tec has already generated US\$15 million in savings. In addition, “We launched a program called LEAP, which is a program driving increased productivity, empowerment and accountability, and we are driving automation in some areas.” This should also generate additional efficiencies. ”



For its 2030 strategy, "Tec will be the first institution that is focusing on entrepreneurship for human flourishing, which we define as the continuous developing of people—the intellectual, emotional, spiritual and wellness elements—to have a positive impact on the environment and society."

Vision 2030: Towards Human Flourishing

Even though Tec is in the midst of implementing its new educational model, it has already developed its new strategy for 2030. It will be focused on having a sense of purpose for life. Alva explains, “Tec will be the first institution that is focusing on entrepreneurship for human flourishing, which we define as the continuous developing of people—the intellectual, emotional, spiritual, and wellness elements—to have a positive impact on the environment and society.”

In the next 10 years, Tec will continue to be in constant change. Alva believes that his job is to adapt continuously to protect the future, to develop people, and to have the correct talent. He shared insights on his plans for the future, which will create new opportunities and provide new sources of revenues. The vision for 2030 is “Leadership, Innovation, and Entrepreneurship for Human Flourishing.”

1. The student will be at the center of enabling a sustainable world. The platform will continue to be experiential and customized learning. Tec will go beyond traditional programs to focus on new and different ways to bring more personalized education for lifelong learning. The concept of alumni will evolve since students will never stop learning.
2. Tec will balance education and research to foster each component with its own strategy. Since 80 percent of research today is done by companies, Tec will host research, innovation, and entrepreneurship and integrate it with education so that professors and students can collaborate. Companies can come to Tec to find an entrepreneurship ecosystem that will include funds, accelerators, mentoring, connections, and ideas, among

other things. They will have the tools and the systems, and open space offices that will foster collaboration and innovation, but it will not be run by any school.

3. Tec will be a catalyst for transformation of cities and communities.
4. Twenty percent of students will be international in the next 10 years.
5. Alva believes that “Tec does not need to produce everything. Universities that want to produce everything by themselves are going to die, so we are finding ways to acquire the same value with the use of technology. Forty percent of classes will not be taught by Tec professors. We will have partnerships with different universities worldwide and by leveraging technology, we will bring the best professors to Mexico—without them being physically present. “We are going to be the Netflix of education.” Alva said, referring to the lifelong learning vision in which the learning journey will be more personalized. He added, “Depending on the stage of life, you will be able to come and go from the university to acquire the competencies you need to advance in work and in life.” For this, Tec

foresees it will have deeper collaborations with other universities or institutions to add more value.

6. Tec is rethinking what it means to have a physical campus in the city and what is the purpose of a physical campus. Ten years from now, Tec will be living in open platforms that will help it to have an impact on many more students through Vision 2030.
7. Alva has a new vision for Tec's academic hospitals. He explains, "We have been doing it the wrong way. We've been repairing humans, but we want to focus on prevention, and well-being and longevity."
8. Tec is changing the governance. In mid-2019, it created a new role—the Office of the Future. It is changing the focus of discussions with the Board so that 70 percent is strategic, and 30 percent is operational. Today, it's the inverse. It is working to become more agile. It is proposing changes to empower more committees and the reporting to the Board so that it can move faster to reach its targets. Alva explains, "I need to send a message to the organization that we need to move even faster."

Alva believes that his job is to adapt continuously to protect the future, to develop people and to have the correct talent. His plans for the future will create new opportunities and provide new sources of revenues.







Tec21 is good for students, good for the future of the institution, and good for society.

Conclusion: From an Industrial Education to a Personalized Education

For David Garza, “Tec is an institution that has dared to change its “mindset” in its attitudes, behaviors, vision, and decisions. By fundamentally changing its educational strategy and positioning students at the center of everything Tec does, it is preparing its students to tackle some of the largest human problems.” Tec21 is good for students, good for the future of the institution, and good for society.

By giving students greater control over their career paths and involving students more deeply in their learning process, Tec’s students will develop even stronger technical competencies. They will also be critical and creative thinkers who are good at complex problem-solving, at working in multi-disciplinary teams, at adaptability, and at navigating ambiguity. Through all the complexities they have been introduced to, they will be good at framing problems, analyzing issues, connecting the dots and finding innovative solutions. Tec students will be better prepared for a complex and uncertain world.

For Tec, the educational reform has been a long journey and it has not been easy to introduce a new model, but Salvador

Alva is betting that its new educational model will ensure its role as a relevant player in society, whose responsibility is to prepare students for life, over a life time.

The sounds of student restlessness that had permeated classrooms in 2012 have been replaced with a buzz of students interacting with each other, with faculty, and with development partners. There is a lot of excitement about the future for Tec de Monterrey and its ability to influence emerging leaders in the 21st century. The Tec21 experience is cultivating a new generation of learners who are armed with new ideas and effective tools, and who are eager to make the world a better place.

Annex: Tec de Monterrey in Numbers

CAMPUSES



IN 2018

Number of campuses
26

Number of Mexican states
where Tec has a campus
20

STUDENTS



IN 2018

Total enrolled students
(excluding PrepaTec and
TecMilenio)

64,050

Total undergraduate students
enrolled

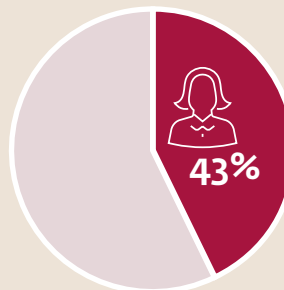
57,066

(58,782 in 2019)

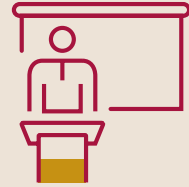
Total graduate students
enrolled

6,984

Percentage of female students



FACULTY



IN 2018

Total faculty
7,396

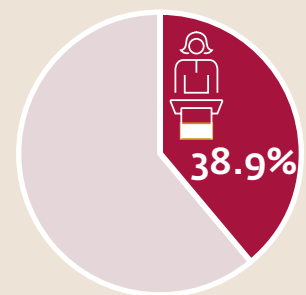
Adjunct faculty
5,739

Full-time faculty
1,657

Number of faculty with
graduate studies

6,585

Percentage of female faculty



(2018-2019)

DEGREE PROGRAMS



Programs offered for new students (undergrad programs)

IN 2018

61

IN 2019

45

Active programs based on new and current students (undergrad programs)

IN 2018

71

IN 2019

78

DEGREES



Total degrees granted

IN 2018

11,321

IN 2019

11,196

RESEARCH



IN 2018

Faculty involved in research

570

professors

External funding for research

MXN\$284.5M
(US\$14 million)

Strategic focused research groups

36

Undergraduate and graduate students participating in research activities

8,560





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