

CASE STUDY

INNOVATING FROM WITHIN

The Creation of a New Interdisciplinary Degree for the University of Miami's Next Century



REVOLUTIONIZING THE UNDERGRADUATE EXPERIENCE

Julio Frenk, President of the University of Miami (UM) since 2015, had an ambitious vision as the university was approaching its 100th anniversary in 2025. A physician and scholar who served as the Secretary of Health of Mexico and the Dean of Harvard's T.H. Chan School of Public Health, President Frenk's sense of public service and improving communities was deeply rooted. He wanted his tenure at UM

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Julio Frenk President University of Miami to be courseshifting, leaving the institution better equipped to serve its students and its community for the next century. He took a scientific approach to analyzing the education landscape and the realities that UM's graduates would face when they left campus, identifying a number of trends that would motivate big changes

at UM, including: (1) advances in cognitive science that showed how people learn best; (2) development of new technologies that enable interactive and engaging pedagogy; and (3) rapid changes in the labor market. To respond to these realities, he led an in-depth campus-wide development process to identify the strongest needs and opportunities to address in the university's next 100 years. This process culminated in a strategic plan, The Roadmap to Our New Century, which includes the New Century initiatives, initiatives that set the foundations of what a reimagined undergraduate degree could look like. The New Century initiatives would position UM as a leading institution in responding to the realities disrupting and impacting higher education.

The city of Miami was an ideal setting for a university in transformation. The media was abuzz about Miami during the COVID-19 pandemic; tech startups and venture capitalists were moving to Miami, citing the lack of state income tax, good weather, and innovative culture. But those who have long called Miami home tell a different story: it's always been a place with a special energy, and what the media calls "the Miami moment" is more like a movement.

The collaboration spanned disciplinary boundaries. Here, Capri LaRocca, Minerva's Director of Experiential Learning discusses concepts for the Design Challenges, which connect directly with the community and employers in the city of Miami.

One of the most global cities in the United States and a bridge to Latin America, Miami has long been a city that brings together people, cultures, and ideas. "There is something about this city, and something about this university, that once it touches you, it doesn't go away, and it draws you back," describes Michele DeStefano,

Professor of Law and Larry Hoffman Greenberg Traurig Business of Law Chair at the University of Miami and a born and raised Miamian. Derin Ural, Professor in Practice and Associate Dean of Student Affairs at the School of Engineering and also from Miami, reflected on what it means to be a part of the university during a time of national attention: "The movement is reflecting on academics. We're seeing this push for new, exciting programs - it's pushing our university to try new things." These faculty, seeing big changes in their city, were uniquely positioned to take leadership roles in building something new for the institution, the city, and UM students.

CREATING A MOVEMENT FOR INNOVATION

By early 2021, as the campus adapted to the pandemic while the city around it boomed, the New Century project kicked off with a novel approach: to use some of UM's most innovative faculty to redesign the learning experience, from a curricular as well as pedagogical perspective. President Frenk and Provost Jeffrey Duerk came up with an idea for a cohort of Academic Innovation Fellows. They turned to the Deans of the colleges and other academic leaders for nominations, then hand-picked innovative faculty members who would

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> design and build a new undergraduate degree program. The program would be tightly tied to durable skills demanded by employers of the present and future and enable graduates

to create social change. The new program would be piloted, assessed, and then the successful teaching and learning practices could be infused to the rest of the institution. Because the faculty fellows would be from diverse backgrounds and academic fields, no one department on campus would have ownership of the New Century program; it would be a truly integrated, campus-wide movement of innovation.

Provost Duerk had been a key collaborator in the ideation phase and took the lead in driving the

project, tapping faculty members known for their innovative approaches on campus. As the President and Provost envisioned an interdisciplinary program, they selected an intentionally interdisciplinary group: the <u>12</u> <u>members of the first cohort of</u> <u>fellows</u> in Fall 2021 spanned art history, communications, engineering, law, business, education, and medicine. Their first objective was to design a new accelerated, interdisciplinary, and

hybrid academic program, which, if successful, could pave the way to a full interdisciplinary educational incubator. President Frenk described the thinking behind this approach: "The strategy was, forgive me for the medical 4

The creation of the Innovation Fellows, a group of faculty and administrators from multiple disciplines, was an important ingredient contributing to the success of the IT&D program. This enabled the quick integration of the program into the university. The fellows were selected by the President and Provost based on their track record of innovative teaching. The design phase cohort included 12 fellows. An additional eight fellows joined the team in Spring 2022 to build the IT&D courses and launch the program to students. metaphor, but to avoid the immune response to innovation." President Frenk thought of the fellows as distinct from a traditional university committee, but rather "an aggregation of likeminded people" who would transform the campus culture from within.

The group of fellows was eclectic, but had commonalities. Many had professional experience beyond pure academia, and were known on campus as creative educators, community leaders, or both. They were intentionally picked due to their backgrounds and experience which included:

A focus on pedagogy and student

experience. The fellows think of themselves as educators with a mission of preparing their students effectively for their lives and careers. Several fellows had been involved in course and program design or were known for pushing boundaries to try new pedagogical approaches. For instance, lecturer Lokesh Ramamoorthi, who teaches software engineering and cybersecurity, noted that his students were increasingly looking to become entrepreneurs and have social impact. He thus adapted his courses to equip his students with critical thinking and people skills, rarely taught in engineering courses, that would be crucial for their future careers.

A history of looking beyond

disciplinary silos. In addition to industry experience, many fellows had backgrounds in multiple disciplines, or even explicitly worked to bridge disciplinary silos. Professor DeStefano, a lawyer with a background in marketing, sees it as her professional mission to bridge business, entrepreneurship, and law, and founded LawWithoutWalls, an international and multidisciplinary think tank of lawyers, business professionals, entrepreneurs, and students to innovate at the intersection of their industries and hone new mindsets and skillsets.

Recognition as innovators and

trailblazers. As the fellows would be creating something totally new, the fellows selected were those with experience innovating in education and those that took leadership roles. Professor Ural, a fellow later named the Academic Lead for the new program, is a civil engineer who developed the first Master's degree in emergency management in Turkey after earthquakes destroyed homes and communities there due to improper infrastructure. After joining the faculty of UM, she drove an initiative for active learning across departments and earned the 2021 Innovation in Teaching Award.

PARTNERING FOR INNOVATION: DESIGN PHASE

President Frenk knew this initiative would have better chances of success if UM could find an education partner with deep expertise in interdisciplinary curricular design integrated with technology-enabled platforms and pedagogy. President Frenk had visited the Minerva Project headquarters when he first became president of UM as he was exploring innovative higher education models, and followed their global partnerships ever since. Known for using an evidencebased approach to transform undergraduate education, building Minerva University from the ground up and then partnering with other institutions globally to transform their programs, Minerva Project had the experience to make the New Century vision a reality. Minerva's know-how in designing higher education programs from scratch alongside their focus on learning science, use of technology to enable best pedagogical practices, and approach to developing durable skills, were perfectly aligned with the objectives of the New Century initiatives. President Frenk explains, "There were a lot of large changes happening even before the pandemic, and the founding of Minerva is one of those. One thing I love about Minerva is the fact that it was deliberately created with an idea of translating

some of those advances in our understanding of the way humans learn into specific programming." Minerva, in turn, appointed inhouse academic leaders to become the innovation fellows' counterparts and lead the development process. These included Scott Wisor, a professor of philosophy used to questioning everything, and Maia Averett, a mathematician with a background in curricular innovation and advocacy for underrepresented groups

"I don't think this program would be where it's at if it had been only developed in one school."

Michele DeStefano

Professor of Law and Larry Hoffman Greenberg Traurig Business of Law Chair University of Miami The teams consistently engaged in healthy debate, assessing each aspect of the program to ensure it supported the strategic vision, while being realistic enough to implement. The new program's director, Derin Ural, Professor in Practice and Associate Dean of Student Affairs at the School of Engineering (below left) helped support the Academic Innovation Fellows — including Michele DeStefano, Professor of Law and Larry Hoffman Greenberg Traurig Business of Law Chair (below right) — throughout the design and development process.

teamwork. Professor DeStefano explained, "For professors, there's a feeling of ownership in putting together a class. It is our creative endeavor." But the Academic Innovation Fellows set this aside to forge a new path of multidisciplinary collaboration. "We formed a good chemistry of understanding each other coming team members, the groups met to design the academic model, the major, learning outcomes, and the student experience, respectively. The team met twice a week for six weeks, once with their working group and once all together. To put into practice the principles of the program itself, Minerva Project created and facilitated

> a process based in design thinking methodologies to collaboratively develop each of the four pillars of the program. Six weeks is rapid for new program development. "It was an extremely quick sprint. We had a tight timeline but creativity loves constraints," said Capri LaRocca, Director of Experiential Learning at Minerva Project, who led the student experience working group. The final product of the working groups was a proposal



in STEM. The Minerva and UM faculty would collaborate over the coming months to design an interdisciplinary and experiential program that would meet the needs of UM and its students.

While departmental structures in higher education are often perceived as an obstacle to collaboration, the objective of the New Century Initiatives was to intentionally nurture collaboration between departments by providing dedicated funds for integrative interdisciplinary research and encouraging cross-departmental from different perspectives," said Professor Ramamoorthi. "Research upon research shows that diversity is the key to creative thinking and creative problem-solving," adds Professor DeStefano. "I don't think this program would be where it's at if it had been only developed in one school."

The fellows were organized into four working groups to design each component of a new degree program that would center on the themes of innovation, design, and technology. Led by Minerva Project that could be presented to governing bodies on campus in order to be approved for launch.

The process was inspirational for both the UM fellows and Minerva collaborators. "I have found in working with the professors from other disciplines a lot of joy, a lot of fun, and a new way of approaching problem-solving," said Professor DeStefano. The administration expects to bring additional cohorts of multidisciplinary faculty fellows into future design projects.

DEVELOPING AND DELIVERING A NEW PROGRAM

A COLLABORATIVE APPROACH

Minerva collaborates with partners through a three-phase process. The outcome of the first phase is a comprehensive design plan, which acts as a blueprint for subsequent phases. Phase II centers on preparing the institution to launch the new program, and Phase III is the ongoing delivery of exceptional learning experiences, via the Forum™ hybrid platform. The new undergraduate degree program, <u>Innovation, Technology,</u> and <u>Design (IT&D)</u>, launching in Fall 2022 in its pilot year, is a totally new way of learning at UM. What makes it stand out are four main features:

Transdisciplinary. Not only was the program designed by fellows spanning multiple disciplines, it is taught by faculty from many departments. Moreover, the curriculum itself is built on learning outcomes that focus on fundamental concepts that transcend disciplines and can be applied in many contexts. Students take transdisciplinary courses at the intersection of technology, business, engineering, and design, such as "Computing and Digital Solutions for the Future," "Globalization and Society," and "Ethics, Equity, and Responsibility." Nearly 40% of program credits come from handson design challenges, summer internships, and a capstone project.

Accelerated. Unlike traditional degrees, the IT&D can be completed in three years, thus reducing cost to students and enabling them to graduate with a lower debt burden. Students who prefer a four-year program can do a year of study abroad. The accelerated nature of the program combined with the experiential and workforceintegrated components mean that students can enter and be successful in their careers immediately.

Experiential. The curriculum is organized around eight design challenges with industry partners that students complete each semester in order to apply their learning to real-world problems. Professor Ural underscored the significance of students having the opportunity to do design challenges from day one until they graduate. Students will learn by "identifying problems, working together in groups, solving those problems, creating prototypes, creating processes. It will be unlike any other undergraduate program we have," she described. Professor DeStefano similarly contrasted IT&D to traditional degree programs: "A lot of times in school, we're learning by reading, by thinking, and by writing about a problem. That's not what this is. This is learning by doing it." The program encourages iteration and "fail fast" methodology so that students have three years of handson innovation experience when they actually enter the workforce. Professor Ramamoorthi explained, "When they

KEY PROGRAM ATTRIBUTES

Transdisciplinary



- Faculty from diverse colleges and departments
- Curriculum focused on developing durable skills that can be transfered to multiple contexts
- 40% of credits devoted to practical application of learning





- Students can earn a STEM degree in three years
- Reduced cost and faster career entry when compared to typical four-year programs
- Study abroad in an optional four-year plan

Experiential



- Eight Design Challenges centered on real-world problems
- Practice with a range of designthinking and innovation methodologies
- Hands-on project work emphasizes
 risk-taking and iterative improvement

Workforce-Integrated



- Deep connection with local, national, and international organizations
- Design Challenges co-created with industry partners
- Early and frequent interaction with potential career pathways and employers

do these design challenges, they might succeed or they might fail, but the lessons learned from each one keep on building up. So by the time they complete the degree, they have seen enough ups and downs that they are not scared to take risks."

Workforce-Integrated. The design challenges are curated so that students work alongside employers solving real problems. The influx of startups, funding, and innovators to Miami make it a stimulating environment with an abundance of opportunities for students. Unlike traditional approaches to employer collaboration through internships, industry partners and employers were brought into the program development itself from the beginning. Several have already agreed to host design challenges so IT&D students can hack on real problems. Professor Ural, as program lead, spoke with

many of these partners alongside Provost Duerk: "Industry partners approach us with job opportunities, and understand the future of the type of graduate they would like to hire. Having them be part of the conversation has been incredibly important." Professor Ramamoorthi explained, "There's always a gap between industry and graduating students. The students feel that they are not taught well enough for industry, and the industry partners feel that we should be giving additional training to the students. The students are not ready to work immediately. We really want to minimize the gap or remove the gap altogether." Professor DeStefano echoed his sentiment, saying "If you look at research studies about what are the skills that our future needs, it's creativity, it's curiosity, and it's leadership. In simple terms, that's what we're doing. We're creating leaders of the future: adaptive

The team met twice a week for six weeks, once with their working group and once all together. To put into practice the principles of the program itself, Minerva created and facilitated a process based in design thinking methodologies to collaboratively develop each of the four pillars of the program. Here, Minerva Academic Director, Scott Wisor, works with Nathaniel Deyo, one of the University of Miami Innovation Fellows.

> and inclusive leaders who are going to have the skillsets and mindsets to tackle challenges that don't have fixed, set answers." Employers from many industries already expressed eagerness to work with IT&D students and hire IT&D graduates. One company notably asked if they could start working with students immediately and another sent a list of ideas for design challenges the day after meeting

with Professor Ramamoorthi.

To summarize, the program approach can be described as "expanding what we mean by a classroom," said LaRocca. Getting personal attention and access to top faculty from the very first semester, including some from the business and law schools that rarely work with undergraduates at all, is unique. The courses use the innovative work of the program faculty and Minerva's Fully Active Learning™ pedagogy, an alternative to traditional lectures in which students actively and experientially participate in class, so that students learn more effectively and build relationships with their peers and professors. The university also began building an Innovation Hub for



the program, a physical space in the College of Engineering that includes 3D printers, computers for modeling and rendering, and other tools.

Wisor emphasized that students will be prepared to face uncertainty and unfamiliar challenges. "When these students go out into the world, they're already going to have a lot of shots on goal in terms of thinking about how to solve problems. When they encounter the next problem, they'll say, 'Oh yeah, I remember how to do this, because I've done this six or eight other times.' So they're going to be ready for whatever comes at them, even if it's in a totally new area."

OVERCOMING CHALLENGES: POLICIES, PROCEDURES, AND SILOS

Despite the glowing response from industry partners, the launch of IT&D was not without challenges internally at UM. The innovation process was tested when it came to policies, procedures, and silos that simultaneously hindered the program and helped it evolve. To be approved, the proposal for the new IT&D degree program had to pass through faculty senate committees, facing healthy scrutiny along the way from academics eager to see the evidence that such a unique program would work. The proposal addressed three core questions:

Assessment of the program. The

program is the result of a unique interdisciplinary collaboration between the faculty in Engineering, Communication, Law, Business, and Arts & Sciences and learning science experts at Minerva. Given the breadth of the collaboration, the faculty senate had questions about how to assess rigor outside of traditional disciplines with their long-established metrics. To address this concern, the program hired a doctoral student in Education to do ongoing evaluation of program and student outcomes.

The accelerated three-year degree.

While the accelerated nature of the program has undeniable financial benefits for students, the standard undergraduate degrees at UM are four years, and the governing bodies needed a reason why this one needed to be different. The proposal was revised to explain the accelerated nature of the program, which includes a demanding course load and summer work, to demonstrate that students were completing a full undergraduate degree. The fellows also added an optional year of study abroad for students who prefer a four-year degree.

ADDRESSING ISSUES AS THEY AROSE

Problem

Effective assessment across disciplines

Accelerated path to a STEM degree

Internal competition for students

Solution

Hire doctoral candidates from the School of Education

Compress the standard course load into three years, with an optional fourth

Focus on "undecided" admits, who have not declared their majors

The Innovation Fellows addressed problems head-on, bringing them to the table and coming up with solutions collaboratively. Professor Lokesh Ramamoorthi, pictured here, highlighted the importance of adaptability in the innovation process.

Internal competition for

students. The demanding nature of the program necessitated that strong students be admitted, and faculty from other departments expressed concern of losing top students. In response, the team developed a recruitment plan

applicants would be recruited for the program at the time of their application.

The program went through three rounds of edits from the General Welfare and University Curriculum committees. The fellows advocated for their project around campus,

> showing their colleagues the excitement of what they were creating. By the time the final faculty senate vote came, the program had letters of support from the Deans of every school on campus, as well as numerous faculty and campus leaders. The final vote approved the program to launch in Fall 2022.

> Professor Ural expressed, "The program brings about a lot of new facets to undergraduate education. It's been a process where we have had to explain to the governing groups what it is we are trying to do, why it is different, how it will work, and why it will succeed." Professor DeStefano saw the approval process as actually a benefit to the program development by helping the fellows avoid groupthink. Having to explain the program and

convince others on campus "helped us grow and helped us pivot," she said.





INSTITUTIONAL TRANSFORMATION BEGINS WITH THE FIRST STEP

As the IT&D program launches its first cohort in Fall 2022, the fellows, the Minerva team, and the UM community are eager to see how students react to the program. Referring to a recent campus visit where he met upperclass engineering students, Wisor shared, "The students we

The program will serve as a testing ground for a totally new way of teaching and learning at UM, making the fellows, the Provost and President, and the first IT&D cohort undoubtably members of the "Miami movement." Hiring a doctoral student to evaluate the program in its first year, as

"While they're inside the university, new careers are being created, and existing ones are being disrupted and transformed. We need to adopt an open architecture, which is the idea of education for life."

Julio Frenk President University of Miami

spoke to, without much prompting, said they wished they had more hands-on, experiential learning, and were ready to move on from the 'old school, lecture and test' approach." The new IT&D students, in contrast, will engage with real-world problems and the city of Miami from the start. mentioned earlier, is a nod to President Frenk's "clinical trial" approach and a way to demonstrate the program's success to the university's governing bodies. Professor Ramamoorthi reflected on the trajectory of innovating from within: "All of us were doing changes in our own courses. The academic innovation fellows removed that silo. It's a first step in the right direction. The cost of not trying is standing in the same place."

Once the IT&D program is established, UM hopes it will be the first of many projects associated with the New Century Educational Incubator that will fundamentally shift the institution. "Our students are graduating into the most dynamic labor market in history," explained President Frenk. "While they're inside the university, new careers are being created, and existing ones are being disrupted and transformed. So the idea of a front-loaded model, where you load content and then you send them into what we call the real world, is completely obsolete. We need to adopt an open architecture, which is the idea of education for life." Through the academic innovation fellows, the University of Miami has built a framework and a culture of education innovation that will have impact for years to come.

The University of Miami campus acts as a hub for exploration across disciplines and for interactions with the broader Miami community.



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VIDEO SERIES

For more insight into the Innovation, Technology, and Design program and the process to create it, view our short documentary videos:

"Innovation Fellows" (01:41)

"Immersive Experiences" (02:09)

"Interdisciplinary Skillsets" (01:58)

