

2 Entrepreneurship education

The teaching of entrepreneurship is embedded in selected higher education institutions with formal and informal learning opportunities for students, researchers and alumni. Several universities have developed novel pedagogies to cultivate student's entrepreneurial mind-set. To continue with these practices HEIs should look to increase incentives for staff teaching entrepreneurial activities and to mainstream entrepreneurship education across curriculums.

What is entrepreneurship education?

The entrepreneurial mind-set is often considered a personal feature, which depends on personal and contextual factors. However, evidence and practice show that entrepreneurship is ultimately a skill that can be taught and learned (Saraiva, 2016^[1]). Therefore, if exposed to good practices and pedagogies, individuals can acquire entrepreneurial mind-sets. This can happen at a very early age and throughout lifelong training. Based on this perspective, many countries have introduced entrepreneurship teaching activities that range from primary school courses to lifelong learning activities (Gomes, 2020^[2]). However, it is at the level of tertiary education that entrepreneurship practices and pedagogies are blossoming internationally. Entrepreneurial education provides academic communities (i.e. teachers, staff and students) with a set of cognitive and transversal skills that are associated with starting and running a business, including cognitive skills such as finance, business plan development, accounting and human resources for example. The most important part, however, concerns transversal and non-cognitive skills. Entrepreneurship education is practical education that empowers students' mind-set. Entrepreneurship pedagogies and practices are designed to improve leadership, creativity, self-insight, self-efficacy or attitudes such as perseverance, risk-taking, pro-activeness and uncertainty tolerance, often understood as the entrepreneurial mind-set (Bacigalupo et al., 2016^[3]).

The large majority of individuals that engaged with entrepreneurship education in their tertiary studies will not create or run a business. Nonetheless, the entrepreneurial skills they have acquired during their studies will help them transition to the labour market after graduation. The transversal skills that characterise entrepreneurs can be useful in any career path, including in small- and medium-sized enterprises (SMEs), family firms and large companies where intrapreneurial individuals can generate innovation in businesses they did not create or run. In Slovenia for instance, entrepreneurship education has helped students integrate family-owned businesses (Box 2.1). In addition, entrepreneurship can also play a role in solving societal challenge and creating value for the public good (OECD/EC, 2015^[4]). Therefore, the outcomes of entrepreneurship teaching go much beyond start-up creation or science-based high-tech companies (Saraiva, 2016^[1]; OECD/EC, 2015^[4]).

Box 2.1. Entrepreneurship education in Slovenia prepares students to integrate the local labour market and family-owned businesses

In Slovenia, entrepreneurship education responds to different needs. While generating start-ups is always a popular objective, entrepreneurship training is also delivered in lifelong learning activities (such as GEA College, a private higher education institution that has a Centre for Vocational School, which delivers entrepreneurship courses). In addition, entrepreneurship education is tailored to prepare individuals who will work in local SMEs and/or take over a family business. Entrepreneurship education is also connected to digital research and teaching. For example, the University of Primorska's HICUP (Humans Interacting with Computers) Lab hosts a group of international researchers working on making digital resources more interactive and profitable for users.

Source: OECD/EU (2021^[5]), *Supporting Entrepreneurship and Innovation in Higher Education in Slovenia*, <https://www.oecd.org/cfe/smes/HEInnovate-Slovenia.pdf>.

Higher education institutions (HEIs) are playing a major role in entrepreneurship education adopting different approaches, contents and goals, depending on the audiences reached, their motivations, nature or stage of maturity for entrepreneurial ambitions or ideas (Bischoff, Volkmann and Audretsch, 2017^[6]). Entrepreneurship education has seen worldwide growth in HEIs for the past 20 years (OECD/EC, 2015^[4]). To support HEIs in all countries and regions to experiment with entrepreneurship pedagogies and

practices, the European Commission (EC) and the OECD have used the HEInnovate framework (more information in Chapter 1). According to the framework, entrepreneurial teaching and learning involve exploring innovative teaching methods and finding ways to stimulate an entrepreneurial mind-set. It is not just learning about entrepreneurship; it is also about being exposed to entrepreneurial experiences and acquiring the skills and competencies to develop an entrepreneurial mind-set.

Different approaches to entrepreneurship education

Entrepreneurship education can be very flexible and adapt to the different conditions of HEIs and their ecosystems. For this reason, there are many different pedagogical approaches. Students can be asked to create a business venture, brainstorm ideas about a potential venture and simulate the creation of a company during courses or extracurricular activities such as competitions or hackathons. It can also include courses during which students listen to an entrepreneur sharing success stories and challenges to venture creation (for more information, see Box 2.2) (Lackéus, 2020^[7]).

Box 2.2. Examples of different approaches to entrepreneurship education

There are different pedagogical approaches to entrepreneurship education used by universities. Lackéus (2020^[7]) has classified these into three different categories:

- Idea and opportunity creation pedagogy aimed at teaching students how to develop and seek new opportunities to act on new ideas.
- Venture creation pedagogy focused on the creation of a venture or new organisation. Universities using this approach focus on accompanying students in the creation of a venture, through mentoring, courses, accelerations and incubation programmes.
- Value creation pedagogy focused on the creation of value, which exceeds the scope of venture creation as it is a broader activity meant to create societal value in whichever form it can take (physical, economic, social or ecological).

Source: Lackéus, M. (2020^[7]), "Comparing the impact of three different experiential approaches to entrepreneurship in education", <https://doi.org/10.1108/ijeb-04-2018-0236>.

Entrepreneurship education in Latin American universities

There are many entrepreneurial universities in Latin America. These universities have built curricular coverage of entrepreneurship topics in formal education programmes, at the Bachelor of Science (BSc), Master of Science (MSc) or Doctor of Philosophy (PhD) levels, through mandatory or elective courses. The curricular coverage is often combined with a number of extracurricular learning opportunities, such as seminars, workshops, boot camps, summer courses, festivals or business idea competitions.

As discussed above, the regional trend reflects a global movement. Entrepreneurial universities worldwide have implemented dedicated resources and structures, such as entrepreneurship units, incubators or accelerators. These units, especially the accelerators, are a doorway for universities to connect with external players to build further innovation and entrepreneurship. This was also found to be the case in Latin American universities, which engaged in the current project. The 11 case study universities are - diverse. They operate in different ecosystems (predominantly urban areas but with differences in terms of size and accessibility) and their practices have different scopes and a different level of maturity (there are pioneers as well as relatively newcomers), different scopes, ambitions and goals. This section describes

experiences collected from our sample of HEIs dealing with entrepreneurship teaching and learning, both from a curricular and extracurricular perspective, together with mechanisms and infrastructures in place to support entrepreneurial projects.

This chapter analyses entrepreneurship education in selected Latin American universities and the different pedagogical approaches used. Such education includes courses covered in the curriculum but also extracurricular ideas designed to support the entrepreneurial mind-set. The chapter also provides an analysis on how entrepreneurial activities help connect universities with other players. Additional information will be included in Part II.

Entrepreneurship education is in the curriculum of case study universities

Case study universities consider entrepreneurship a core value. The concepts of entrepreneurship and innovation are part of their strategic mission along with sustainability and inclusion. These universities discussed their activities to be designed to promote leadership through entrepreneurship education.

Most institutions view themselves as entrepreneurial universities looking to train the leaders of tomorrow. The University of São Paulo, Brazil (USP) for instance, is investing in entrepreneurship education so that academics can become leaders, whether they operate in their own start-ups or work in SMEs or large companies. Some universities have gone even further by creating mandatory entrepreneurship courses for all of their students regardless of their choice of curriculum. For instance, Anahuac University in Mexico aims at training all students to become “leaders of positive action” and has reinforced its connections with multiple institutions and firms so that the courses offered to students and professionals enable a practical hands-on mind-set. The university offers leadership programmes for students to develop their entrepreneurial skills. More specifically, it runs a large-scale mandatory course on entrepreneurship for all of its undergraduate students, lasting 1 semester for approximately 1 500 students. Given the success of this particular course, the university plans to reinforce this mandatory part of the curriculum with two parallel courses in entrepreneurship, one dealing mostly with entrepreneurial skills and the other addressing topics such as “lean start-up” or design thinking. This example shows the inclusive commitment of the university to create positive action leaders, ensuring 100% of undergraduate students get curricular exposure to entrepreneurship, leaving no student out of this learning opportunity.

In the same vein, ICESI University in Colombia has entrepreneurship programmes to train the next generation of “leaders of the Pacific”, to support territorial cohesion in an important yet relatively impoverished region of Colombia. Entrepreneurship education courses aim to empower and stimulate students from all disciplines grow and acquire a risk-taking mind-set that would prepare them for the future. At ICESI, its business school Entrepreneurship Development Centre (*Centro de Desarrollo Del Espíritu Empresarial*, CDEE) has been offering entrepreneurship courses to all students of the university since 1985. The CDEE is the first such dedicated unit in Latin America created by a visionary dean who was also a Babson College alumnus inspired by Babson’s focus on entrepreneurial education. A diversity of pedagogical approaches is applied, including hands-on experience and real-life challenges. ICESI runs a Master of Science in Entrepreneurship since 2017, which lasts for three semesters and includes an integrating project conducted by students, which includes the training activities specifically focused on the Pacific region, mentioned above.

All case studies have a comprehensive approach to entrepreneurship education

Besides the focus on leadership, all 11 case study universities have a rather comprehensive curricular coverage of entrepreneurship, which provides them with national and international visibility. For instance, the Princeton Review lists the Tecnológico de Monterrey entrepreneurship undergraduate course top of its annual ranking, along with a very selective group of American universities.¹ This illustrates the long-

standing efforts of the institution, which started providing curricular coverage of entrepreneurship as early as 1978. Nowadays, the Tecnológico de Monterrey counts 200 professors of entrepreneurship, 30 of which hold a PhD degree in entrepreneurship. It offers a mandatory entrepreneurship course, which lasts for 1 semester, counts around 12 000 students and adopts an experiential-teaching approach, the development of prototypes and testing of business models, together with the preparation of business pitch presentations.

Siglo 21 Business University (Siglo 21) in Argentina runs entrepreneurship courses since 2014, with the possibility of obtaining specific credits in this area. The university also offers a Certificate in Entrepreneurial Skills, which are issued since 2017, and such courses attract about 3 000 individuals. Some of the dedicated courses, which in some cases are compulsory, include topics such as entrepreneurship development, university entrepreneurship, creativity and entrepreneurship, and digital tools for entrepreneurship, offering students a multidimensional approach to entrepreneurship. Furthermore, students are exposed to innovation and entrepreneurship through practical experiences, project-based learning, prototyping and addressing different sorts of challenges. All of these efforts provide them with an overall innovation- and entrepreneurial-focused learning experience, also shared in their final projects. To capitalise on its legacy and reinforce its ongoing initiatives as an entrepreneurial university, Siglo 21 is planning to launch a new entrepreneurship bachelor's programme in 2022.

Some case study universities have even created their own entrepreneurial competency model. At ICESI, in Colombia, all entrepreneurial teaching and learning activities, including curricular programmes and courses, are designed and implemented according to its own entrepreneurial competencies model. This model relies on a set of 13 dimensions that are considered critical for entrepreneurs and entrepreneurship. Inspired by the EntreComp Framework as developed by Bacigalupo et al. (2016^[3]), these dimensions are: vision of entrepreneurial career; self-confidence; flexibility; perception amplitude; decision-making; company management; goal orientation; action orientation; social sensitivity; conceptual thinking; empathy; entrepreneurial networking; and market orientation.

Box 2.3. The European Commission EntreComp Framework

The EC developed EntreComp, the European Entrepreneurship Competence Framework, in 2016 as a reference framework to explain what is meant by an entrepreneurial mind-set.

EntreComp offers a comprehensive description of the knowledge, skills and attitudes that people need to be entrepreneurial and create financial, cultural or social value for others.

EntreComp is a common reference framework that identifies 15 competencies in 3 key areas that describe what it means to be entrepreneurial.

The 3 areas and related 15 competencies are the following:

- *Ideas and opportunities*
 - Spotting opportunities.
 - Creativity.
 - Vision.
 - Valuing ideas.
 - Ethical and sustainable thinking.
- *Resources*
 - Self-awareness and self-efficacy.
 - Motivation and perseverance.

- Mobilising resources.
- Financial and economic literacy.
- Mobilising others.
- *Into action*
 - Taking the initiative.
 - Planning and management.
 - Coping with ambiguity uncertainty and risk.
 - Working with others.
 - Learning through experience.

Source: EC (2016_[8]), *EntreComp Europe - About*, <https://entreprcompeurope.eu/about/>.

A focus on science-based entrepreneurship

Among case study HEIs, those with faculties in economics, engineering and science have developed a specific approach to entrepreneurship to bridge science and business. For instance, Adolfo Ibáñez University in Chile runs tailored programmes for its business and engineering school graduates such as an MSc in Innovation from the business school, an MSc in Technology Entrepreneurship from the science and engineering school or an MSc in Sustainable Entrepreneurship. The Federal University of São Carlos (UFSCar) offers some Master of Business Administration (MBA) programmes with a focus on innovation and entrepreneurship, such as is the case of the Master in Business Innovation (MBI or MBA in Innovation) or the ITI Master in Business Administration (MBA in Information, Technology and Innovation for Business, with strong digital entrepreneurial contents). The science and engineering school offers technology-based entrepreneurship programmes. In addition, the university has a Start-up School for undergraduate students in engineering. The Start-up School offers classes in project-based learning, lean start-up or design thinking, with high levels of flexibility. Active learning and flipped classroom approaches are the most commonly used pedagogical approaches.² Students can complete their degrees by engaging in a practical entrepreneurial experience, which is recognised as an internship. University representatives consider this as the most promising and popular option for students and they estimate that, in the future, over 30% of students will opt for this choice giving them the possibility to start their own business (or attempt to start it) full time in one semester or part time in two semesters.

The Pontifical Catholic University of Chile (PUC) offers mandatory training in innovation and entrepreneurship to all students of their engineering school. Several other elective courses aim at teaching students about entrepreneurship and innovation such as an MSc in Innovation for professionals, or a minor or major programme in innovation. It is also common to find entrepreneurship courses that are taught jointly by a PUC faculty member and a guest entrepreneur.

Recognising the need to bridge research and innovation, case study universities offer entrepreneurship education to faculty members, researchers and PhD students, as observed in other international cases, such as I-Corps (Box 2.4). Entrepreneurship education in these cases aims to help researchers bring their scientific results closer to the markets and value creation. Researchers should achieve a better understanding of business opportunities as drivers for research activities, projects and outcomes. However, these curricular coverage efforts seem to be in general at an earlier stage of development, less structured and less able to be mainstreamed across different PhD programmes and students.

Box 2.4. Supporting entrepreneurs: The I-Corps programme

To transform a scientist into a scientist-entrepreneur, there is a need for appropriate education and training. There are many examples of start-ups producing services or products that fail to meet market demand. In some cases, a better definition of the service/product and some market research would have helped transform a failure into a success.

Based on this assumption, the National Science Foundation (NSF) launched the I-Corps programme in 2012. The programme awards principal investigators (PIs) a USD 50 000 NSF grant. Together with an entrepreneurial lead, generally a PhD student or a business mentor, students attend a seven-week course in which they are taught to identify business opportunities for their research and ways to exploit these opportunities. Academics (students and teachers) who develop a business idea may lack information about the way in which they should successfully implement it.

Through I-Corps, NSF grantees learn to identify valuable product opportunities that can emerge from academic research and gain skills in entrepreneurship through training in customer discovery and guidance from established entrepreneurs.

Source: Huang-Saad, A., J. Fay and L. Sheridan (2017^[9]), “Closing the divide: Accelerating technology commercialization by catalyzing the university entrepreneurial ecosystem with I-Corps™”, <https://doi.org/10.1007/s10961-016-9531-2>; US NSF (n.d.^[10]), *NSF Innovation Corps (I-Corps™)*, https://www.nsf.gov/news/special_reports/i-corps/.

Extracurricular activities to support the entrepreneurial mind-set

Mirroring an international trend, case study universities offer a large number and variety of extracurricular activities related to entrepreneurship education. These practices contribute to fostering an entrepreneurial mind-set in students. Extracurricular entrepreneurship education can take different forms: Lectures from alumni and guest speakers, seminars, workshops, roundtables, challenges, competitions, business idea contests, boot camps, hackathons, festivals, summer courses and online activities. Such initiatives are often open to all students from the university but also other national and international participants.

Dedicated entrepreneurship units, such as university incubators, accelerators or other bodies, play a critical role in the design and implementation of extracurricular activities. For instance, each semester, around 200 undergraduate students make use of the “design factories” of Pontifical Xavierian University (Javeriana). These factories aim to help test and prototype new products. The design factories have been involved in activities related to the COVID-19 response, such as new ventilator designs, solution prototyping or even patents, all originating from 16 different “factory” projects.

PhD students at the National University of Colombia (UNAL) at Manizales have the possibility to work with the Business Innovation Park *Parque de Inovacion Empresarial*, focusing their research on innovation and entrepreneurship. PhD students can also connect with the Knowledge Transfer Office of the university and several extracurricular learning opportunities. Additionally, local companies can share their challenges with PhD students and research groups, who are required to come up with a solution within three to four months.

The Javeriana organises the ZUMO+ incubation programme for creative and cultural industries. ZUMO+ is a twelve-week programme that accepts six teams for each edition and counts international mentors, namely from Canada and the United Kingdom. It helps creative and cultural entrepreneurs find appropriate business models and validate market opportunities.

Extracurricular activities offering access to entrepreneurial education can also be short term, taking place over a few days or a week. Short-term activities aim to raise awareness about entrepreneurship or generate new contacts and opportunities for visibility and fundraising to start-uppers. For example, the Technological University of Uruguay (UTEC) organises every year the so-called “Innovation Week”, which rotates across different cities. This event brings together students and local communities, addressing topics that are also adjusted to the specific context of each territory where the Innovation Week takes place.

The UTEC Innovation Week is a good example of an extracurricular activity that reaches out beyond the academic community and involves other HEIs and external stakeholders, including primary and secondary school students, women entrepreneurs, SMEs and family businesses.

For instance, *Universidad en tu Colegio* is a programme run by the UNAL Manizales Campus, through which entrepreneurs go to primary or secondary schools to tell their success stories and provide young students with new career perspectives. This initiative is already covering five sub-regions with ongoing pilot initiatives that include ideation and prototyping activities, reaching around 40 different schools.

Anahuac University has put in place several initiatives to promote entrepreneurial mind-sets and awareness for youth, involving primary and secondary education students, with specific content developed to address entrepreneurship for the millennial generation. This includes online content as well as a one-day workshop “Money to invest”, in which students can involve their families and engage in practical challenges.

The digitalisation of extracurricular activities supporting entrepreneurship

Extracurricular entrepreneurship education is also offered online. Since 2007, the University of São Paulo (USP) organises i“NN”, an online new-business programme. Over 15 years, the i“NN” programme has involved hundreds of students and spurred the creation of 90 new start-up companies. The USP offers other online courses in entrepreneurship, for instance on the Coursera platform, showing the potential of remote learning also in the field of entrepreneurship.

As in other domains, the COVID-19 pandemic catalysed the digitalisation of entrepreneurship education and many programmes have been converted into online sessions. Among the advantages of digital transformation, there is the possibility of involving international contributors and participants. Case study universities discussed the possibility of some of the innovations brought about by the pandemic becoming permanent in the future, possibly combining face-to-face and remote contents or components.

Feria 21, a large pre-incubation and networking opportunity organised by Siglo 21 since 2017, represents another example of swift digital transformation. Feria 21 brings together investors, start-ups, companies and local and regional government entities, also counting on the collaboration of university alumni (Club Emprendedores 21 with more than 3 000 members). Rather than discontinuing the event because of the pandemic, the university organised it online involving more than 800 participants.

Entrepreneurship education as a bridge to the university’s ecosystem

Case study universities have created a variety of infrastructures dedicated to providing entrepreneurship support to relevant stakeholders in their ecosystem. These include entrepreneurship centres, pre-incubation and incubation facilities, acceleration activities, technology parks, co-working environments, as well as partnerships with other players from the surrounding entrepreneurship ecosystems.

The strategic mission of universities defines their engagement

Several of the case study universities rank entrepreneurship very high in their strategic agenda. A good example of this is the Tecnológico de Monterrey. An impact evaluation, conducted in 2019 in connection

with the university's 75th anniversary celebrations, illustrates the institute's positive impact on its ecosystem. According to the evaluation, about 41% of the institute's alumni are entrepreneurs. They contributed to the creation of 2.8 million jobs. More recently, and showing the importance of "collaboration and engagement" for this university, the Tecnológico de Monterrey created and implemented an SOS Programme for SMEs during the COVID-19 pandemic. The programme helped 800 companies digitalise their business. The SOS programme involved students and professors of the institute who volunteered to mentor participating SMEs.

Another example of how central "entrepreneurship" can be in institutional strategies and activities is the Javeriana in Bogotá, Colombia. This university expresses a clear vision of its entrepreneurial role, with well-defined concepts, roadmaps, structured approaches and a strong organisational structure supporting these activities. This includes the Centre for Entrepreneurship *Centro Javeriano de Emprendimiento* and the Department of Innovation *Dirección de Innovación*, which together provide comprehensive support to all stages of entrepreneurial projects regardless of their level of maturity.

Universities as entrepreneurship hubs

Case study Latin American universities play tangible roles in the entrepreneurship ecosystems in which they operate. These universities are active in connecting their research to venture creation. For example, the USP in Brazil is connected to its ecosystem through different bodies and organisations. These include an innovation agency (AUSPIN), four incubators (one of them dedicated to social innovation), a technology park hosting 75 companies, a number of maker and co-working spaces and the INNOVA.USP space for innovation and entrepreneurship. INNOVA.USP alone has incubated around 600 companies, among which 7 unicorns (start-ups that achieve a capitalisation of USD 1 billion without being listed on the stock market) creating over 30 000 jobs.

ICESI in Cali, Colombia, has been playing an important role in stimulating research activities in the field of entrepreneurship through its entrepreneurship centre (CDEE). The CDEE interacts with the Global Entrepreneurship Monitor and the Colombian Ministry of Science, Technology and Innovation and has organised the Latin American Congress on Entrepreneurial Mind-sets since 1987.

The PUC, in Santiago, has an innovation centre that provides services to local and national companies to help them build an innovation culture. Leveraging this network of companies, the centre promotes knowledge transfer and entrepreneurship activities of the university. It is located in a building dedicated to innovation and entrepreneurship and designed by a Pritzker Architecture Prize laureate. This iconic building is right at the main entrance of the university campus, thus conveying a message both of the importance of entrepreneurship and accessibility to those from outside the academic community. The innovation centre allows interactions to take place between students, faculty members, companies and entrepreneurs, which should lead to new ideas and projects. The PUC received a large private donation to create the facilities that host the centre. The aim was to bring together students from all of the PUC's faculties and schools. The centre is governed by an innovation centre advisory board involving representatives from the local business community. The board's primary concern is that the activities of the innovation centre reflect the innovation needs of local stakeholders.

Universities take advantage of their multi-campus strategy to maximise their impact

Many universities take advantage of their multi-campus strategy to amplify their impact and engagement strategy. In different localities, they have the opportunity to connect with different actors, including local governments and business communities. In some cases, the localisation of a university campus explicitly relates to a regional development policy. For instance, the Tecnológico de Monterrey, which operates on 31 campuses located in 25 cities, is considered a key partner for local and regional governments.

Another example is UTEC which has well-established connections namely with chambers of commerce, SMEs, government and public agencies, as well as innovation and entrepreneurship networks established in the territories in which is located. UTEC operates “open laboratories” on three different campuses. These open laboratories are a sort of “fab labs”, places where local actors, including businesses, can create and test new ideas, and experiment with new digital machinery that allows for quick prototyping. UTEC has even developed a mobile version of open laboratories, inspired by a student ideas competition. The mobile version of open laboratories is a mobile home equipped with a variety of devices, such as 3D printers and drones. The mobile home travels across different locations and in doing so allows UTEC’s entrepreneurship education activities to reach different places, people and entrepreneurs of all ages and from a variety of communities, thus making a very positive contribution to inclusive entrepreneurship and territorial cohesion.

UTEC also focuses on social aspects of entrepreneurship. For instance, it promotes on its campuses programmes of entrepreneurship for co-operatives, a social innovation laboratory and co-operates with the social entrepreneurship platform ASHOKA. Among other initiatives, UTEC campuses have put in place *Arena Emprendedora*, a project aimed at dealing with gender balance by stimulating women’s entrepreneurial skills.

Universities as components of a dynamic ecosystem

In general, there is a symbiotic relationship between universities and their own ecosystems. This feature has been observed also in case study Latin American universities. Some universities are embedded in very dynamic ecosystems supporting high-end research, cutting-edge start-ups and technology development. The Federal University of São Carlos (UFSCar) in Brazil is based in the city of São Carlos, in the central eastern region of the state of São Paulo. São Carlos is Brazil’s National Capital of Technology, due to its high ratio of doctors per resident (1 per 180), while the rest of the country averages 1 per 5 423 (UFSCar, n.d.^[11]). The location of the very first incubator in Latin America, the city of São Carlos is active in research, innovation activities, patents and intellectual property. UFSCar is one of three important universities that belong to this São Carlos innovation ecosystem, which organises a number of science-related events on a periodical basis. Some of the key components of the São Carlos innovation and entrepreneurship ecosystem include three technological parks: FabLabs, Maker Spaces and Co-Working Facilities. Detailed progress reports show the outcomes achieved by both UFSCar and the surrounding ecosystem regarding entrepreneurial activities. Yet another example of being open to the outside world, the UFSCar library also operates as a community library and is seen as a meeting space.

The São Carlos ecosystem has developed some governance arrangements, without creating a central management authority, to avoid excessive planning and remain open to stakeholders. This governance generates an annual plan and events that offer many opportunities to involve new players (Report Sanca Hub, 2022^[12]).

Also due to its vibrant technological ecosystem, the UFSCar has accumulated a portfolio with over 200 patents, 20 of them with active licensing agreements that generate relevant income for the institution. Some of the patents have high societal impacts, namely those related to agriculture. The UFSCar innovation portfolio has leveraged several start-ups and some of them scaled up into global companies (e.g. NANOX, which provides nanotechnology surface materials with antimicrobial properties).

The pandemic did not break the linkages between universities and their ecosystems

All case-study universities were able to adapt their activities to the new context generated by the COVID-19 pandemic. Universities were forced to move entrepreneurship education online, sometimes providing teachers with specific training, on the use of online platforms and digital methodologies. In addition, universities focused their efforts on helping their local communities as well as companies, SMEs and

entrepreneurs in their networks face new problems raised by the pandemic. As already discussed above, several universities engaged with SMEs to help them develop digital tools to manage business activities. Overall, the pandemic somehow broadened the networks of universities concerning entrepreneurship and entrepreneurial activities, engaging more people, including international experts, through online platforms. Anahuac University in Mexico provides a relevant example of the “silver lining” impact of the pandemic. During the COVID-19 pandemic and under the sponsorship of Santander, the university organised a series of webinars, which provided training to over 3 000 SMEs, helping them overcome the business difficulties and challenges raised by COVID-19.

Capitalising on the expertise accumulated during the pandemic, several case study universities plan to move towards blended entrepreneurial approaches and activities, where face-to-face interactions are used when relevant and are complemented with online solutions and experiences. Blended approaches to entrepreneurship education and activities will allow the creation of larger networks (new ecosystems) involving regional, national and international partners.

The way forward: Some considerations to push entrepreneurship education to the next level

The 11 Latin American universities that contributed to this study provide the opportunity to discuss what the entrepreneurial and innovative university looks like in the context of Latin American countries. These examples prove that “entrepreneurship” has become an important domain for teaching, learning and engaging in Latin America. Institutional practices mirror this international trend. Entrepreneurship spurs innovation in pedagogies and practices, which are more flexible and open to different communities, including those outside the universities.

In the sample of case study universities, entrepreneurship education is central to the institutional strategy. Most case study universities offer entrepreneurship courses to stimulate an entrepreneurial mind-set and train students with skills and aptitudes that will help them become the leaders of tomorrow. Many of the universities involved in the study offer tailored courses in their faculties of economics, science and engineering designed to help students create new ventures. More rarely, entrepreneurship courses are more transversal and designed to help all students, regardless of their field of study, acquire an entrepreneurial mind-set (e.g. Siglo 21 and Anahuac University).

Many universities are also conducting interesting extracurricular activities such as festivals, hackathons and competitions, which offer an opportunity for students to stimulate their entrepreneurial mind-set while connecting to other local players such as mentors, companies and local authorities. Many of these activities are not only open to students but also to local entrepreneurs who wish to take advantage of the opportunities offered by the university.

Case study universities play important roles in their own ecosystems by providing incubation, acceleration services and collaborating with local institutions and established firms. Many of the case study universities have local innovation hubs such as the Tecnológico de Monterrey or UFSCar. Some are more focused on connecting impactful research to entrepreneurial abilities and training researchers to push their ideas to the market (e.g. PUC and ICESI in Chile).

Overall, the variety of approaches to entrepreneurship education and activities that were observed in case study Latin American universities mirrors an international trend. For example, similar institutional efforts can be found in European countries, which hosted HEInnovate national reviews (EC/OECD, 2022^[13]). These converging international practices offer the possibility of identifying some benchmarks and then some suggestions for case study universities, should they consider scaling up their efforts to promote entrepreneurship.

Curricular coverage of entrepreneurship

Based on information gathered in online interviews and interactions, case study universities and universities looking to strengthen their entrepreneurial agenda in the Latin-American region could consider a series of insights to improve curricular and extracurricular entrepreneurship education, as well as external activities connected with entrepreneurship. These include:

- **Increasing the number and outreach of mandatory courses in entrepreneurship**, to assure that all students, and not only those in business or engineering schools, get some curricular coverage of entrepreneurship-related topics and develop entrepreneurial mind-sets.
- **Promoting entrepreneurship and innovation education for PhD students** as a complement to their scientific skills. Most PhD students will develop a career outside academia and entrepreneurial skills may be useful to empower them *vis-à-vis* alternative career choices, including starting their own business or becoming innovators in existing organisations.
- **Connecting the different institutional experiences** would help promote curricular entrepreneurship education in Latin America. Collaboration among HEIs can make entrepreneurial teaching and learning both more efficient and more inclusive, going beyond the boundaries of business and engineering schools.

Extracurricular activities

Collaboration and specialisation could also feature extracurricular activities, which have the advantage of being more flexible and more accessible for motivated students.

- **Reducing fragmentation of extracurricular teaching and learning opportunities**. Case study universities presented a large, yet often fragmented list of extracurricular entrepreneurial initiatives. There is scope to improve the co-ordination and exchange of students across Latin America. In addition, the optimisation of activities may also allow further specialisation to more advanced topics and customised extracurricular activities to sectors or other specific needs.
- **Benchmarking extracurricular initiatives**. Taking into account the speed of evolution connected with the nature of entrepreneurial extracurricular activities, Latin American universities would benefit from sharing best practices and continuous benchmarking with ongoing international initiatives, assuring that the most innovative and effective approaches are identified and present in their portfolios.
- **Promoting outreach by hybridisation of their extracurricular activities**. Capitalising on the expertise developed during the COVID-19 pandemic, case study universities should be able to find a good mix between face-to-face and online interactions for entrepreneurial extracurricular activities. This would allow a broader outreach of entrepreneurship education and the possibility to involve contributions and content from experts, speakers or entrepreneurs located anywhere in the world.

Entrepreneurship education to connect to the needs of the ecosystem

By engaging with entrepreneurship, HEIs become more porous and accessible to external stakeholders. Hence, promoting entrepreneurship is also a way to promote collaboration.

- **Creating incentives for faculty and staff to engage in entrepreneurial activities**. Case study universities have been putting in place incentives for staff to engage in entrepreneurial activities and they should continue the implementation of these. More generally, universities across the region could consider generating incentives to stimulate the engagement of faculty members in entrepreneurship activities. These “incentives” could take the form of financial rewards, profit

sharing, spinoff or patent-related matters but, also, how the contributions made to such activities are considered when decisions are made in the recruitment or promotion of academic staff.

- **Connecting with other Latin American universities to share best practices about the way in which entrepreneurship helps universities connect with their communities.** The variety of initiatives put in place by case study universities to connect with their stakeholders shows the possibility of “federating” different experiences across universities and collecting good practices. This could improve learning from good practices and pave the way for joint efforts conducted by groups of Latin American universities supporting each other in promoting entrepreneurship in the sub-continent.
- **Generating additional resources through entrepreneurship and collaboration.** Entrepreneurial universities diversify funding solutions. A larger venture system could be able to respond to customised priorities and services. Such a funding mechanism should be able to cover the full spectrum of needs coming from entrepreneurs connected with universities in Latin America.
- **Increasing predictability and sustainability of funds allocated to entrepreneurial activities in the university.** As in other parts of the world, in Latin American case study universities, there is a need for sustainable allocations of resources supporting entrepreneurship activities. Sustainable and predictable funding would help to operate incubation or acceleration activities.
- **Improving intellectual property services.** The need for better intellectual property services was mentioned by different case study universities that do not have enough funding to hire legal services specialised in intellectual property development. Also in Latin America, entrepreneurial universities are confronted with bureaucratic obstacles when trying to develop intellectual property (patents, licenses and spin-offs). The administrative procedures required are lengthy and costly for universities that do not have dedicated staff.

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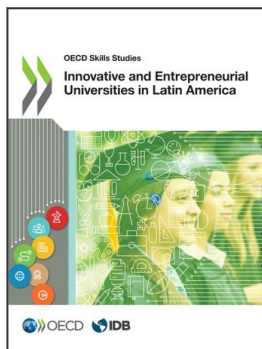
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Notes

¹ The Princeton Review is an education service company that produces a multidimensional ranking of HEIs to orient and support students in selecting undergraduate programmes (www.princetonreview.com).

² “Flipped classroom” refers to a pedagogical approach used to let students learn about a new subject at home to be followed by classroom discussion.



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