

## Chapter 5. Enhancing labour market relevance and outcomes through higher education

*This chapter examines the prevalence and effectiveness of key practices in higher education institutions and by employers in Mexico to support the labour market relevance and graduate outcomes of higher education. It also identifies the enabling factors that help facilitate the use and effectiveness of these practices and any barriers that prevent or hinder them. The chapter draws on literature and secondary sources, as well as data gathered through OECD workshops, interviews, phone calls and an online survey with higher education policy makers and representatives of Mexico's higher education institutions and employers.*

## Practices to support the labour market relevance and outcomes of higher education

Higher education institutions can use various practices or activities to enhance the labour market relevance and outcomes of higher education, alone or in collaboration with social partners (employers and trade unions). The success of these practices depends on their effective provision and implementation, as well as the degree to which students make use of them. The key practices to enhance labour market relevance and outcomes in higher education are listed in Figure 5.1, along with their main barriers and enablers in Mexico and their potential benefits.

The implementation of such practices can create mutually beneficial situations for all stakeholders. They can help students develop knowledge and transversal skills aligned with labour market needs, which enhances their employability (OECD, 2012<sup>[1]</sup>). Students also gain practical experience, build professional networks, and potentially gain mentors (Bozeman and Boardman, 2013<sup>[2]</sup>; Rampersad, 2015<sup>[3]</sup>). Better preparation and alignment with labour market needs often translates into better labour market integration (Tomlinson, 2017<sup>[4]</sup>).

Higher education institutions can benefit from the input of social partners regarding the design, delivery and evaluation of programmes to ensure that they are aligned with the current and emerging needs of the economy (OECD, 2012<sup>[1]</sup>). An increase in positive labour market outcomes for graduates can enhance an institution's reputation and help attract students. Some practices, such as continuing education, provides not only education and training to the wider public, but also an additional stream of funding.

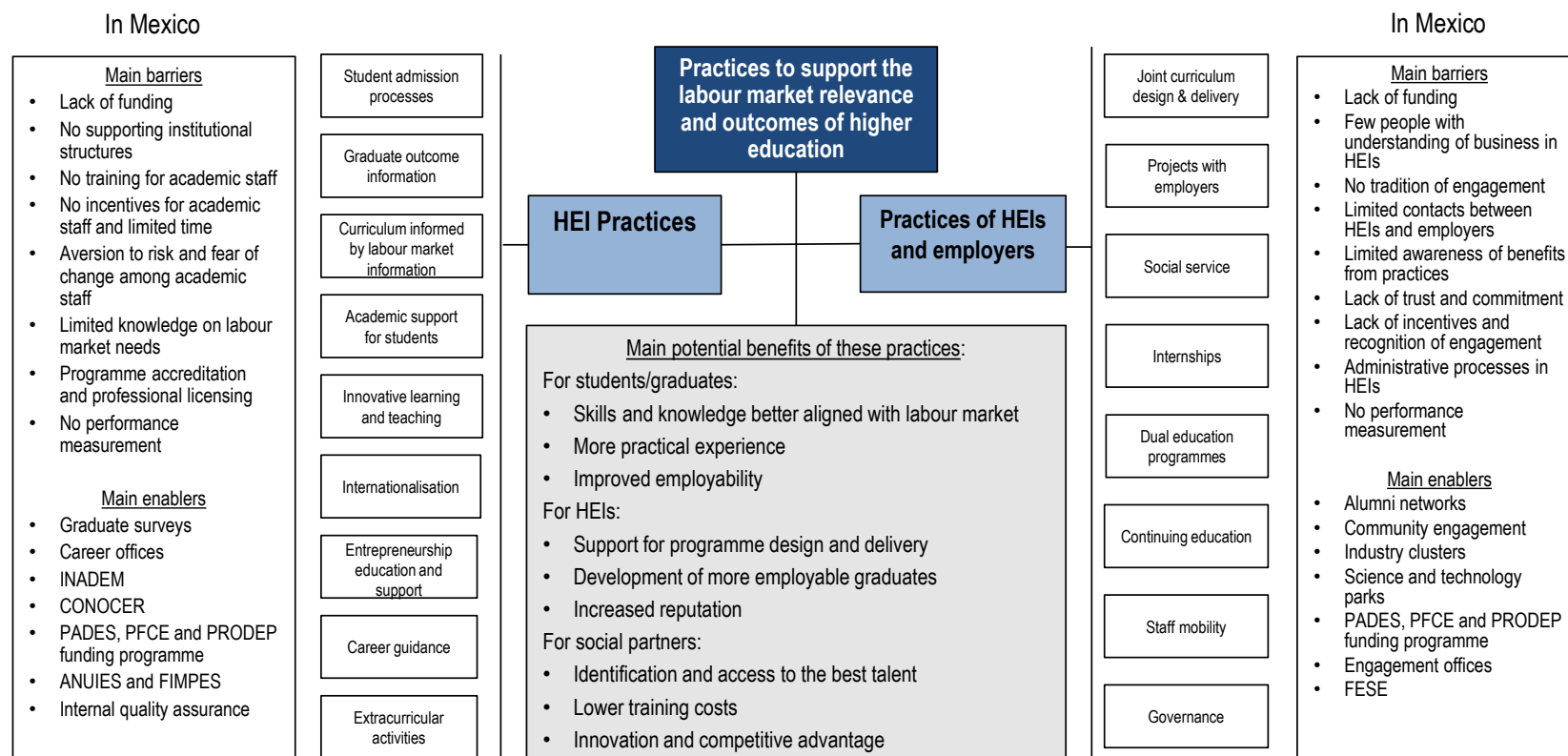
By collaborating with higher education institutions, social partners can help ensure skills alignment by influencing the education of prospective employees. These practices also help employers build relationships with students, which facilitates the identification, recruitment and integration of graduates who fit their needs (Centre for Career Management Skills, 2009<sup>[5]</sup>), while lowering hiring and training costs. This direct access to qualified graduates brings key problem-solving capabilities to the workplace (Rossano et al., 2016<sup>[6]</sup>), raises employers' brand profile (Van der Sijde, 2012<sup>[7]</sup>) and improves their competitiveness in knowledge-intensive labour markets.

### *Practices to support the labour market relevance and outcomes of higher education in Mexico*

Literature and secondary information on the practices used in Mexico to enhance the labour market relevance and outcomes of higher education are limited. The OECD review team conducted interviews and workshops with Mexican higher education stakeholders and employers (Box 5.1) to better understand whether these practices were being used, and to what extent, across the Mexican higher education system.

Without a broader research base to support the review findings it is difficult to make definitive conclusions about practices across the system as a whole. However, the review team found that good practices to help students develop labour market relevant skills exist in a number of Mexican higher education institutions or faculties within institutions, but they do not appear to be applied consistently across the system. In addition, the involvement of social partners, particularly the participation of trade unions, is generally low. Stakeholders were often not aware of the practices that take place within their own organisations, much less the system as a whole.

**Figure 5.1. Higher education institution and social partner practices to enhance the labour market relevance and outcomes of higher education**



*Note:* HEI: higher education institution, ANUIES: National Association of Universities and Higher Education Institutions, CONOCER: National Council for Standardisation and Certification of Labour Competencies, FESE: Higher Education-Industry Foundation, FIMPES: Federation of Mexican Private Higher Education Institutions, INADEM: National Institute for Entrepreneurship, PADES: Programme to Support Higher Education, PFCE: Strengthening Education Quality Programme, PRODEP: Programme for the Professional Development of Academic Staff.

### Box 5.1. OECD review team visit to Mexico

In January-February 2018, the OECD review team for the in-depth analysis of the labour market relevance and outcomes of higher education in Mexico visited Mexico City, Monterrey and Tuxtla Gutierrez. The review team conducted workshops and interviews with a wide range of stakeholders to identify and discuss current practices in the higher education system to support labour market relevance and outcomes.

During the visit, the OECD review team held workshops in four higher education institutions with the participation of students, graduates, academic staff, non-academic staff and employers. In addition, the review team undertook face-to-face interviews with employers, trade union representatives, rectors, and representatives from private, public and direct-provision higher education institutions and associations.

Telephone interviews were also conducted throughout 2018 to gather further opinions, experiences and good practices from key stakeholders. In March and April 2018, an online survey on practices collected the views of over 6 500 higher education students, academic staff, non-academic staff and rectors in Mexico.

## Higher education institution practices to support the labour market relevance and outcomes of higher education

Higher education institutions can use a range of practices to ensure study programmes are relevant to the labour market and help students achieve good labour market outcomes. They can take account of supply and demand and try to align their study programmes with the labour market by using labour market information when making decisions about which programmes to offer or to close, and the number of places to offer in different programmes. Linking higher education and the world of work through curriculum design and delivery can enhance skills development. Higher education institutions can also collect information on the labour market outcomes of their graduates to inform programme delivery and admissions to their programmes. This information can also help prospective students make choices about which study programme to enrol in. Innovative learning and teaching practices, as well as practices that boost internationalisation, have proven to be valuable in increasing the labour market relevance and outcomes of graduates by helping them to develop the skills valued by employers. Moreover, supporting students academically and providing career counselling services helps students transition to the labour market.

### *Labour market information to inform the mix of programmes and curriculum*

Using labour market information, such as skills needs and deficiencies, can help the strategic and operational planning of higher education institutions, which minimises risks. Information showing declining demand for study programmes can inform decisions to either close or change programmes that are no longer economically viable. Data showing growing demand can indicate which programmes to expand. A thorough scan of the environment and labour market demand can help make decisions about opening new

campuses or programmes. This information can also help ensure the curriculum is relevant to employer needs. Valuable sources of information on the types of skills in demand include employer contacts, reports from trade and industry bodies, professional institutes, and practitioner journals. Former graduates provide valuable information on the skills they developed in higher education and the labour market relevance of their programmes. Students engaged in work-based learning can provide insights into the sort of skills employers currently require and value (Maginn and Dench, 2000<sup>[8]</sup>).

Unfortunately, many higher education institutions in Mexico do not make the best use of labour market information. Many autonomous universities and private universities determine the programmes on offer and the number of student places they deliver based primarily on the availability of financial, physical and human resources, the estimated cost to deliver the programme and the expected student demand, rather than labour market outcomes for graduates. Stakeholders have reported that many of these universities, for instance, have responded to the high demand for law programmes, particularly among students who are the first in their families to attend higher education, by expanding their delivery. However, there is a risk that the creation of new law programmes and increased student intakes will create an oversupply of law graduates in the labour market.

On the other hand, direct-provision higher education institutions, state public universities with solidarity support and intercultural universities are required to undertake a feasibility study that includes an assessment of their labour market relevance when seeking government approval to open new programmes. As part of this process, higher education institutions are required to consult local employers on the relevance of the proposed programme to the regional economy. However, once the programme has been approved, there are no further requirements to consider labour market relevance or outcomes when adjusting the number of student places or revising the curriculum.

To complement the analysis of recent labour market information, some Mexican higher education institutions collect and analyse real-time information and make future projections of labour market needs. For example, the Autonomous University of Nuevo León (UANL) conducted a 25-year projection of the state labour market in collaboration with the state government and the chambers of commerce. UANL is using this information to help make decisions about the programmes it offers. Other institutions, such as the Autonomous University of the State of Hidalgo (UAEH), the *Instituto Politécnico Nacional* (IPN) and *Instituto Tecnológico de Monterrey* (ITESM), generate their own real-time labour market information and projections through a technology observatory and make the information publicly available. They collect, monitor and analyse data and information on business trends and the labour market needs of strategic sectors and industry clusters to identify potential opportunities for greater university-business collaboration

### ***Institutional labour market information to help students make an informed decision***

Higher education institutions can help students make informed choices by providing them with labour market information about the prospects of their programmes, including information about the outcomes of past cohorts. Higher education institutions can generate this information directly (through graduate and/or employer surveys) or they can disseminate information collected by other organisations or the government.

It appears that Mexican higher education institutions rarely provide students with institutional labour market information; and only a minority (e.g. UANL) presents students with a range of potential careers by programme. As a result, students and their families must find other sources of information to support their decision making. Family tradition and recommendations remain the strongest influences for Mexican prospective students.

Prospective students have some exposure to graduate labour market information generated and made publicly available by other organisations. The think-tank, the Mexican Institute for Competitiveness (*Instituto Mexicano para la Competitividad*, IMCO), created a platform ([www.comparacarreras.org.mx](http://www.comparacarreras.org.mx)) to compare the outcomes of higher education programmes using the average salary, unemployment rate and informality rate. An investment index was designed to divide programmes into excellent, good, insecure and very insecure study investment choices (IMCO, 2016<sup>[9]</sup>). In 2017, an average of 495 people compared 6.5 programmes daily on the website. In 2014, the Centre of Research for Development (*Centro de Investigación para el Desarrollo*, CIDAC) published the Survey on Professional Competences (*Encuesta de Competencias Profesionales*, ENCOP), which focused on higher education graduate skills, first employment and university-employer engagement. The centre also manages a website ([www.profesionistas.org.mx](http://www.profesionistas.org.mx)) that has relevant labour market information for students and recent graduates (CIDAC, 2014<sup>[10]</sup>).

The development of a graduate survey is a requirement for undergraduate and postgraduate programme accreditation, and to access certain public funds, but survey implementation and results are not considered in either process. Stakeholders advised the OECD review team that graduate surveys are rarely implemented successfully in Mexico because of the poor and outdated tracking systems of graduates, which prevent institutions from contacting a large number of graduates. There are also low response rates to surveys, resulting in unrepresentative or incomplete samples. Moreover, the generation and analysis of robust information may be too costly for some institutions.

Comparability across Mexican higher education institutions is impossible as institutions, and faculties within institutions, use a variety of methods to design and implement graduate surveys. The National Association of Universities and Higher Education Institutions (ANUIES) proposed a common methodology for the development and implementation of graduate surveys in 2009 (Ramírez Domínguez, Reséndiz Ortega and Reséndiz Ortega, 2017<sup>[11]</sup>). However, most higher education institutions continue to apply their own methodology.

A large and active alumni network can facilitate the application of graduate surveys, but few Mexican higher education institutions have an established alumni network. The National University of Mexico (UNAM), the largest university in the country with close to 330 000 students, is an exception. Since 2008, UNAM's alumni network has gathered 156 existing alumni associations by faculty, programme, cohort and state. With almost two million members, it generates over MXN 200 million) (USD 1.1. million) of revenue annually. UNAM uses the alumni network to conduct its graduate survey, which helps inform the university about labour market activity and graduate outcomes.

### *Student admission processes*

Higher education admission processes can help ensure that students are prepared for higher education and well matched to their choice of programme. In Mexico, higher

education institutions set their own admission criteria, resulting in a variety of requirements and processes.

Many higher education institutions admit students only on the basis of an upper secondary education certificate from a general or combined programme. This is the case for most private higher education institutions, which accept 93.8% of applications (SEP, 2017<sub>[12]</sub>). The higher education institutions that own or are associated with upper secondary schools admit students from these schools (*pase automático*) with lower admissions criteria (see Chapter 3).

However, as noted in Chapter 3, there are concerns about the quality of secondary schools in Mexico, as measured by the Programme for International Student Assessment (PISA) and National Plan for the Evaluation of Learning (PLANEA) tests. Students may therefore be entering higher education with very poor skill levels. This increases the likelihood of non-completion or poor graduate outcomes.

More prestigious institutions are able to be more selective and use additional admissions criteria to ensure that students admitted into their programmes are better prepared for higher education. This includes interviews with prospective students and the use of standardised tests, such as the EXANI-II and EXANI-III conducted by the National Centre for Higher Education Assessment (CENEVAL). These tests assess specific and transversal skills, such as: verbal and mathematic reasoning; capacities to infer, analyse and synthesise; and competencies in information use, such as organising, obtaining and understanding information (see Chapter 3). However, higher education institutions generally do not use the results of these tests as an admission cut-off score, but rather as a way of ranking applicants. As a result, some institutions may accept applicants who performed poorly in the standardised tests.

### *Academic support for students*

Academic support helps students who are struggling to succeed in their studies. As noted above, some students are entering higher education with poor skills levels and may not have the academic aptitude and preparedness for higher education. Some higher education institutions are tackling this problem by offering introductory courses, largely focused on numeracy and literacy. These courses can be offered over several weeks, an extra semester or a year before starting the programme.

To improve student retention levels in higher education, all public higher education institutions offer individual and group tutoring, some of which are supported by the government programme to support professional development in academic staff (*Programa para el Desarrollo Profesional Docente*, PRODEP) (see Chapter 6). Tutoring identifies students who are lagging behind or groups considered to be at risk and provides them with the academic support they need to succeed. For instance, UAEH identified that Indigenous students in their institution had a higher risk of dropping out, so created a programme aimed to provide them with additional academic support.

Higher education institutions in the three technological subsystems provide additional tutorials and systematic academic support throughout the entire programme for all students (*tutorías*), with specific support for students who lag behind (*asesorías*). However, outside the technological subsystems, higher education institutions in general appear to lack systematic institutional approaches to supporting students; and often the support offered does not reach all students in need. This can contribute to increase the

dropout rates. Stakeholders noted that there is insufficient public and institutional funding for academic support and not enough qualified personnel.

### *Innovative learning and teaching*

Higher education institutions worldwide have traditionally focused on developing deep discipline-specific knowledge. However, there is an increasing emphasis in many higher education systems on the development of a wide range of transversal skills, which increase student employability and their success in the labour market. This has been accompanied by changes to learning and teaching approaches from a teacher-centred didactic information transmission model, which relies heavily on lectures, to student-centred approaches, such as competency-based learning and problem-based learning that use innovative methods such as blended learning, flipped classrooms, design thinking, and project or game-based learning.

#### **Box 5.2. The Tec21 Educational Model**

The *Instituto Tecnológico de Monterrey* (ITESM) has designed and implemented a new educational model, Tec21. Tec21 aims to create graduates with deep knowledge of their disciplines and transversal skills that allow them to solve problems in interdisciplinary team-based settings. The model has four pillars:

- A challenge-based approach that engages students with problems of the surrounding community. This facilitates the development of leadership and entrepreneurial skills, generating tangible value.
- Flexibility to choose what, how, when and where to learn. For example, students can choose modules from different programmes on any of the 29 campuses.
- Inspiring lecturers who use innovative teaching methods and tutorials to enhance student learning and development inside and outside of the classroom.
- Wide offer of athletic and cultural extracurricular activities, including international experiences, entrepreneurship programmes and community work.

Tec21 also aims to transform ITESM's traditionally isolated infrastructure into multi-purpose shared spaces where students and academic staff can socialise and collaborate with each other, as well as interact with industry representatives and the community.

*Source:* (Pieprz and Sheth, 2017<sup>[15]</sup>).

Higher education stakeholders interviewed by the OECD review team noted that most teaching in Mexico is still centred on lecture-based classes where students play a passive role. They advised the review team that individual learning needs are rarely considered, and assessment is almost uniquely based on student knowledge and memory. Stakeholders also advised that the curricula in most programmes is largely theoretical, without enough real-life cases, and suggested that it needs to be updated more regularly. However, a small number of Mexican higher education institutions have recently



developed more innovative approaches to learning and teaching, such as the Tec21 Educational Model (Box 5.2).

In technological and polytechnic universities, the competency-based learning approach consists of 70% practical and 30% theoretical content. Through the use of new technologies and real situations, and using a mix of guided, independent and group learning, this approach aims to provide students with the knowledge, skills, attitudes and values they need to solve problems, manage projects and communicate effectively throughout their lives (Mota and de Ibarrola, 2012<sup>[13]</sup>). Despite their innovative approach to learning and teaching, these universities are not the first choice of prospective students, many of whom prefer to undertake bachelor's programmes in traditional institutions.

Some of the main barriers to wider implementation of the competence-based learning approach include the lack of training for academic staff to apply this method in their teaching and assessment methods, and a general reluctance of academic staff to change traditional teaching methods. The lack of appropriate infrastructure, laboratories, equipment, and teaching resources also hinders wider implementation. Furthermore, experience in innovative learning and teaching methods is not considered when hiring new staff or in terms of career progression (Lozano Rosales, Castillo Santos and Cerecedo Mercado, 2012<sup>[14]</sup>).

Innovative teaching often includes interdisciplinary approaches, which expose students to knowledge in different disciplines and allow them to collaborate in teams with students from different backgrounds. The tolerance, flexibility, critical thinking and communication skills developed through this approach prepare students for diverse working environments (Detmer Latorre, 2017<sup>[16]</sup>). Although stakeholders mentioned to the OECD review team that interdisciplinary approaches, such as including humanities courses in technical programmes, could have a very positive effect, these approaches are still uncommon in higher education. The main barriers to implementation include the silo structure of departments, time and resources for academic staff to better co-ordinate these approaches, and the current emphasis on the discipline-specific knowledge and skills of the accreditation process and the professional license.

Mexican higher education institutions are slowly starting to implement technology-based innovative approaches to learning and teaching that support individualised, flexible and remote learning or new approaches in terms of pedagogy and content. In 2015, Mexico had a wide range of e-learning programmes, covering around 7% of total demand for higher education. In absolute terms this amounted to 200 000 students taking various types of programme, but especially advanced technical degrees and bachelor's degrees (OECD, 2015<sup>[17]</sup>). A small number of Mexican higher education institutions offer massive online open courses (MOOCs), and some have recently introduced game-based courses within higher education programmes. However, some institutions, particularly those in remote rural areas, face significant technical difficulties due to low penetration rates for the Internet and other technologies, which hinder the implementation of technology-based initiatives (OECD, 2015<sup>[17]</sup>). A lack of financial resources and staff training in the use of technology in higher education are common barriers for many higher education institutions across all subsystems.

In the meetings and workshops with the OECD review team, students mentioned that they would like to experience more innovative learning and teaching approaches. Academic staff were supportive, but recognised the need for training to improve their teaching and introduce more innovative practices. However, they stated that there were few training opportunities and limited support in this area, outside recent efforts in certain subsystems

(e.g. institutes of technology) and a small number of other institutions. Academic staff also advised that the curriculum is too rigid, which deters the introduction of different approaches, particularly in programmes that are or aim to be externally accredited. As with many higher education systems, incentives for academic staff focus on research performance rather than teaching. Additional remuneration for high-performing academic staff through the National System of Researchers (*Sistema Nacional de Investigadores*, SNI) is based mainly on research performance and teaching hours, without considering the quality or innovativeness of teaching.

Data on measuring the quality of learning and teaching in higher education institutions and student learning outcomes, particularly with value-added models that attempt to attribute changes in student performance to a higher education institution, can drive improvements in learning and teaching (Kuh and Jankowski, 2017<sub>[18]</sub>). Recent initiatives, such as the DESCAES project (Box 5.3), have begun to address the issue of measuring the impact of higher education on the development of skills.

### Box 5.3. DESCAES project

The Skills Development and Evaluation for Higher Education Learning (*Desarrollo y Evaluación General de Competencias para el Aprendizaje en Educación Superior*, DESCAES) pilot project is being carried out by a network of 15 Mexican higher education institutions across five subsystems. The aim of the pilot is to measure students' skills in their first and third year of higher education so that improvements made during higher education can be recorded. This information will then be used to improve skills development.

The pilot includes two tests:

- The DESCAES test, which measures communication, information management and problem-solving skills using 54 items.
- The metacognition and self-regulation test, which measures the ability to learn through planning, control of execution and self-reflection.

Based on their results, students are assessed as having initial, basic, intermediary or advanced skills.

The tests were conducted on 6 747 first-year students in 2017 and show that 28% of these students have initial skills and only 9% of students have advanced skills. By field of study, first-year students in basic sciences (physics, chemistry and mathematics) achieved the highest scores in the DESCAES test, and health sciences students reached the highest score in the metacognition and self-regulation test. The same students will be tested again in their third year.

Higher education institutions within this network co-design and exchange strategies, projects, practices and resources for skills development. The Secretariat of Public Education (*Secretaría de Educación Pública*, SEP) funded the pilot project through the PADES programme in 2014, but its future sustainability will depend on the individual institutions.

*Source:* Based on discussions with the DESCAES project co-ordinators.

### *Internationalisation*

International student mobility – inward and outward – and an internationalised curriculum can help students develop a set of skills often labelled as “intercultural competencies” or “cross-cultural capabilities”, i.e. the skills, attitudes and values that allow them to operate effectively in diverse cultural environments (The Higher Education Academy, 2014<sub>[19]</sub>). Travelling abroad as part of a study programme can help students develop these cross-cultural capabilities. Students who cannot travel abroad to study can also develop these skills through an internationalised curriculum that provides them with global perspectives in their field of study and exposes them to international students. These skills are highly valued by employers and are of particular importance in an open economy such as Mexico’s, which is integrated into global value chains. Nevertheless, internationalisation does not appear to be a priority for many higher education institutions in Mexico, where the current focus is on responding to the rapidly growing demand of national students.

### *Student mobility*

Mexican higher education institutions do not attract international students. Less than 1% of undergraduate students, 1% of master’s students and 3% of doctoral students come from abroad to study in Mexico. This limits the opportunities for national students to interact with foreign colleagues on campus. There is also little outward mobility, with only 0.9% of Mexican students studying abroad (OECD, 2018<sub>[20]</sub>). The majority of these students are in the United States: almost 17 000 Mexican were enrolled in American higher education institutions in 2017 (9 400 undergraduate students, 4 100 postgraduate students, 1 900 students in non-degree programmes and 1 500 in optional practical training) (Institute of International Education, 2017<sub>[21]</sub>).

The language used in learning and teaching is likely to affect international students’ selection of potential destination countries. The prevalence of predominantly English-speaking destinations, such as Australia, Canada, New Zealand, the United Kingdom, and the United States, as the most popular countries for international students in part reflects the progressive adoption of English as a global language. English-taught higher education programmes are also offered in an increasing number of institutions in non-English-speaking countries. Only a small number of Mexican higher education institutions offer programmes taught in English, despite Mexico’s trade links with the United States and Canada and its aims to further integrate into global value chains. Those that do offer programmes taught in English tend to have close links with strategic industries. For example, the industrial engineering programme at the Hermosillo Institute of Technology (ITH), which is delivered in collaboration with automotive and aerospace companies in the state of Sonora, is taught completely in English. The Technological University of Puebla is part of the bilingual, international and sustainable (BIS) model launched by the Mexican government in 2012. Established in 2016, the university offers 28 programmes related to the automotive sector taught exclusively in English.

Internationalisation efforts by Mexican higher education institutions are supported by the Mexican Association for International Education (AMPEI), but with around 350 members, the work of this non-profit organisation only reaches a small share of the system. The government supports international mobility through the National Science and Technology Council (*Consejo Nacional de Ciencia y Tecnología*, CONACyT), which has awarded over 44 000 scholarships for postgraduate studies abroad since 2007. The majority of these were for programmes in the fields of science, technology, engineering and mathematics (STEM).

Mexican students can participate in mobility programmes that are based on government agreements, for example, the Mexico-France Programme for Engineering Students (MEXFITEC), the Ibero-American Programme for Academic Mobility (PIMA-OEI), the Fulbright-García Robles scholarship programme and the Platform for Academic and Student Mobility of the Pacific Alliance. Co-operation with the United States is currently framed under the Bilateral Forum on Higher Education, Innovation and Research (FOBESII) (Box 5.4) and includes numerous bilateral agreements, mainly with higher education institutions in the American border states, such as Texas, California and Arizona.

International networks of higher education institutions can facilitate student mobility. Mexican higher education institutions are part of a range of programmes and associations, such as the Mexico-Argentina Youth Exchange Programme (JIMA), the University Mobility in Asia-Pacific Programme (UMAP), the Programme of Academic Mobility in Latin America (PIMA), the Academic Programme for Student Mobility of the Association of Universities in Latin America and the Caribbean (PAME-UDUAL), the mobility programme of the Consortium for North American Higher Education Collaboration (CONAHEC), and the Santander Group internationalisation programme. However, bilateral institutional agreements between higher education institutions in Mexico and abroad are the most common mechanism for mobility.

#### **Box 5.4. Bilateral Forum on Higher Education, Innovation and Research (FOBESII)**

The Bilateral Forum on Higher Education, Innovation and Research (FOBESII) was established in 2013 as a joint initiative by the Mexican and US governments. It aims to develop a successful labour force for the 21<sup>st</sup> century by enhancing mutual understanding and creating knowledge networks through academic exchange, student mobility and research and innovation joint programmes.

Under this framework, higher education institutions in Mexico and the United States have signed over 120 new agreements. The University of California raised around USD 15 million to support programmes in collaboration with Mexican higher education institutions. There are also joint projects between the US National Science Foundation and CONACyT. Some US universities have opened “Mexico Centres”, e.g. the Mission Foods Texas-Mexico Center at the Southern Methodist University. A number of bi-national research and innovation centres have been established, e.g. the CaliBaja Research Center in San Diego.

Since 2013, the United States has received over 100 000 Mexican graduate students, researchers or enrolled students in short programmes to improve their English proficiency; and the movement of US students to Mexico has increased by 20%.

FOBESII also includes a professional internship programme for Mexican graduates that is focused on strategic sectors such as aerospace, automotive, manufacturing, telecommunications and energy.

*Source:* (SEP, 2017<sub>[22]</sub>).

Despite this range of programmes, the OECD review team learned of significant barriers to student mobility. Stakeholders reported that key factors hindering more internationalisation included competing priorities in higher education institutions, the

limited number of international mobility places (some of which do not include financial support), the limited funding for student mobility, the lack of a national credit system, rigidity of the curricula, and the internal bureaucracy in higher education institutions to apply for a mobility programme. Consequently, internationalisation efforts reach only a small number of students who can afford to study abroad.

The lack of international units in higher education institutions with clear strategies or institutional policies for internationalisation is another limitation to both inward and outward mobility. Information about mobility opportunities is often not disseminated across the student body, leading to a frequent lack of awareness among students. Students also advised the OECD review team that credits for courses taken abroad may not be recognised in their home institution in Mexico, which can prolong programmes and have associated costs.

### *Internationalisation of the curriculum*

The majority of programmes offered at Mexican higher education institutions are not internationally oriented and there is little evidence of attempts to internationalise the curriculum. An internationalised curriculum uses learning and teaching activities, resources and tools, classroom practices, and assessment tasks that are designed to help students develop cross-cultural competencies (Griffith Institute for Higher Education, 2011<sup>[23]</sup>). An internationalised curriculum can help students develop these competencies without the need to travel abroad, and can provide students with valuable skills for the labour market by including diverse perspectives and presenting different professional practices across cultures.

Joint programmes with foreign higher education institutions can also promote student mobility and ensure a more internationalised curriculum. However, this model is not common in Mexico, with only a small minority of institutions developing double degree programmes with institutions abroad. ITESM has developed a bachelor's programme in automotive engineering with the Technical University of Cologne in Germany and a Master of Science programme in information technology with Carnegie Mellon University in the United States. UNAM has a double degree doctoral programme with Groningen University in the Netherlands.

Mexican higher education institutions have participated in a number of international projects that have allowed them to interact with higher education institutions and social partners in other countries, contributing to the internationalisation of the curriculum and, in some cases, to staff and student mobility:

- The European Union (EU) programmes, Latin America Academic Training (ALFA) and Erasmus+, which support the establishment of networks of European and Latin American institutions to improve the quality and relevance of higher education in Latin America, and the labour market outcomes of students.
- The EU-supported Tuning Latin America projects, which sought to develop easily comparable and comprehensible qualifications across Latin America, develop professional profiles in terms of generic and discipline-specific competences, facilitate transparency, and help create networks to share good practice.
- The Ibero-American Knowledge Space project (*Espacio Iberoamericano del Conocimiento*), which is aimed at enhancing interaction and co-operation across institutions in the region.

### *Entrepreneurship education and start-up support*

Higher education institutions can support the development of entrepreneurial skills by helping students think like an entrepreneur, training them to start up their own companies, and supporting them in establishing and growing their companies. While these practices are rapidly evolving in higher education institutions worldwide, Mexican higher education institutions lag behind and rarely involve employers in these practices.

The three technological subsystems have well-developed entrepreneurship support models in place in all their institutions. However, very few Mexican higher education institutions outside these subsystems offer entrepreneurship courses. Furthermore, most entrepreneurship courses in Mexico are offered as extracurricular activities or as part of business programmes. Entrepreneurship courses delivered outside of business programmes and across disciplines with students from different programmes can positively affect the development of entrepreneurial and transversal skills in general, since students are required to collaborate with people from different backgrounds and with different points of view (Detmer Latorre, 2017<sub>[16]</sub>). The introduction of entrepreneurship courses across a broader range of programmes is also hindered by the organisational barriers that can affect interdisciplinary activities, such as the silo structure of faculties and departments or the time and resources needed to co-ordinate across the institution.

Some higher education institutions organise conferences, events and contests (e.g. *Semana I* at ITESM) where entrepreneurs meet with students or where students can present their business ideas and projects to the public and potential investors. The National Event of Technological Innovation (*Evento Nacional de Innovación Tecnológica*), organised by *Tecnológico Nacional de México* (TecNM), aims to enhance students' entrepreneurial skills through events at local, regional and national levels. Students apply technology to develop innovative products, services and processes that address societal problems.

Support for business start-ups is more common. The three technological subsystems have well-developed incubation support practices and over 200 public (around 20%) and 130 private (5%) higher education institutions in Mexico have an incubation programme to support business start-ups created by students and staff. Around 60% of incubators are located in three states: Mexico City, Jalisco and Nuevo León. The incubation programmes often include advisory services and access to infrastructure. For instance, the UANL provides students with a large network of mentors, workshops, boot camps, pitch competitions and support for crowdfunding. It also provides support to academic staff to help develop their entrepreneurial skills.

The Secretariat of the Economy (*Secretaría de Economía*, SE) certifies and financially supports the establishment and development of incubators and accelerators through the National Institute of the Entrepreneur (INADEM), a number which are located in higher education institutions, for example, IPN, the University of Sonora, the Autonomous University of the State of Mexico and the Autonomous Metropolitan University. Start-up businesses located in these incubators can also apply for financial support from INADEM. INADEM also runs online courses in entrepreneurship and an annual national award scheme for education institutions that foster an entrepreneurial mind-set. The Autonomous University of Sinaloa won the award in 2016 based on its support to students in creating successful companies that generate jobs. However, the lack of transparency in the INADEM criteria for the awards is a concern.

A number of Mexican incubators have recently developed connections with innovation hubs in the United States and other countries. Santander Group partners with 158 Mexican public and private higher education institutions to develop students' skills for entrepreneurship and support start-ups by funding summer stays in US entrepreneurial hubs. Santander Group also runs a contest where students set up a virtual enterprise and business innovation prizes are awarded to the best student business projects. In 2017, 5 572 students presented 1 066 projects in the entrepreneurship contest and were awarded MXN 800 000 (USD 42 500) in prizes. Junior Achievement Mexico also offers several programmes to support entrepreneurship in young people, such as the International Entrepreneurs' Forum, business simulations and seminars.

Nonetheless, most start-ups in Mexican higher education incubators are either low or medium-tech (Martínez Ramírez, Torres Vargas and Munoz Flores, 2017<sup>[24]</sup>), despite the large amount of support that the government and higher education institutions provide for high-tech start-ups. The key barriers to entrepreneurship in higher education are the lack of professional experience among the managers of the incubation centres and mentors, the poor management of incubators and their weak ties with businesses (Gallegos, Grandet and Ramirez, 2014<sup>[25]</sup>), and investors.

Some Mexican higher education institutions are exploring how they can use an entrepreneurial approach to tackle social problems rather than exploit market opportunities. Social entrepreneurship aims to provide innovative solutions to unsolved social problems (OECD, 2010<sup>[26]</sup>) and, as an activity, is developing quickly around the world. This presents a significant and untapped opportunity for innovation and new approaches in Mexico to benefit society and reduce the existing economic and social gaps. ANUIES recently signed an agreement with the global Enactus network of students, academics, and business leaders across 36 countries to promote social entrepreneurship in Mexico.

### *Provision of extracurricular activities*

Sports activities, student clubs, academic societies and other extracurricular activities are effective ways for students to develop transversal skills such as leadership, communication and teamwork, which are highly valued by employers. However, there is not a tradition of offering extracurricular activities in Mexican higher education. The few institutions that do offer extracurricular activities tend to only provide a narrow range of activities. This reflects the absence of a student-centred approach in Mexican higher education, as well as insufficient infrastructure and financial resources.

Nonetheless, a number of Mexican higher education institutions, particularly large private universities, have recently created institutional units responsible for extracurricular activities. The technological universities host regional and national gatherings each year, which are dedicated to sports and culture. TecNM organises art and culture festivals and the technological universities offer theatre, painting and dance as extracurricular activities, as well as athletic competitions. However, it is a challenge to reach a large percentage of students and keep the activities free or low cost for students.

### **Box 5.5. Practices in institutes of technology to enhance labour market relevance and outcomes**

An online survey implemented by the Engagement Unit at TecNM in 2017 surveyed the engagement directors and vice-rectors of the 262 institutes of technology across the country on practices to enhance labour market relevance and outcomes in higher education. With a response rate of 89%, the survey offers valuable insights concerning the practices within this subsystem:

- Almost 80% of respondents stated that students lack basic discipline-specific knowledge and skills, as well as communication and writing skills, at entry to higher education programmes. Over 80% of institutes offer introductory courses to improve these skills before the first semester, and 75% have a programme to continue supporting students' low skills during their studies.
- Eighty percent of respondents said that the competency-based model is more effective in preparing students for the labour market than traditional lecture-based classes. However, many noted that this is only the case when the model is correctly implemented. Respondents reported that the lack of training for academic staff was a key barrier to successfully implementing competency-based approaches.
- Almost 70% of respondents were aware of existing incentives for academics to teach innovatively.
- Seventy percent of higher education institutions measure skills and competences in their institutes with methods other than exams.
- Around 75% of the institutes of technology use the subsystem's student mobility scheme.
- Approximately 80% of institutes administer graduate surveys to monitor the performance of their graduates in the labour market.

*Source:* Information provided by TecNM.

### ***Career guidance***

Career guidance services offered in higher education institutions can help students transition more successfully to the labour market. They support students through a range of different activities, such as information sessions, interview preparation, internship support, career fairs, resume-writing workshops and training in soft skills. Higher education institutions in the United Kingdom and the United States are recognised for their comprehensive career guidance to students.

In Mexico, 11% of companies recruit graduates through higher education institutions (CIDAC, 2014<sub>[10]</sub>), and many of these companies reported long-lasting economic benefits from this collaboration (De Fuentes and Dutrenit, 2012<sub>[27]</sub>). These companies are usually those that regularly collaborate with higher education institutions to organise joint workshops and job fairs. The Autonomous University of San Luis Potosí (UASLP) has been organising annual job fairs for internships and graduate jobs since 2010. This has helped to raise the employment rate of graduates within one year of graduation to 95%. In



preparation for the annual fair, UASLP organises workshops with students to train them in writing successful job applications and interview.

Most Mexican higher education institutions have a career office to help students prepare for the labour market (*oficina de servicio social y prácticas profesionales*), but holistic, individual and interactive student guidance is not a well-established practice. These services are generally understaffed and the personnel often do not have any professional training in career guidance. Collaboration with academic staff and other offices responsible for engagement activities (e.g. incubators and technology transfer offices) is weak, and the offices often lack industry connections and labour market information. There is also limited use of technology to help more students in a personalised way, for example, by offering personalised online courses to develop employability skills or an online platform to match student profiles with suitable employers. Students reported to the OECD review team that they were unaware of the existence of this office in their institution or of the services provided.

### *Enabling factors and barriers to the use of higher education practices that enhance labour market relevance and outcomes*

Designing and implementing practices that raise the labour market relevance and outcomes of higher education has been difficult for Mexican higher education institutions. Discussions in the meetings and workshops with the OECD review team show that institutions face some common barriers, the largest of which is the lack of institutional and public funding to support these activities. Although the government provides support for some of these practices through targeted funding, stakeholders reported that the programmes do not provide sufficient funds and their limited duration does not allow sufficient time to embed practices within the system.

Low funding levels and variations across institutions and subsystems (see Chapter 3) mean that some public higher education institutions do not have the resources to support additional activities that could enhance the labour market relevance and outcomes of higher education. Large private higher education institutions with stable financial situations are able to focus more on the labour market relevance and outcomes of their education activities, but small public and private institutions have difficulty dedicating enough resources to these practices.

Higher education institutions in Mexico tend to have a large administrative structure with complex processes (Badillo Vega et al., 2016<sup>[28]</sup>), which is exacerbated by the siloed nature of faculties and departments. This unfavourable context hinders the development and use of practices to raise the labour market relevance and outcomes of higher education. They can impede opportunities to collaborate between faculties, and create barriers to: modifying curricula or assessment methods, recognising modules undertaken in a different institution, and creating new programmes or modules to respond rapidly to labour market demands.

There are no incentives for Mexican academic staff to develop more innovative learning and teaching practices or to improve their teaching skills. Academic staff are not provided training or support in developing or implementing new teaching and assessment methods. They are generally reluctant to change their teaching methods and there are no financial or career incentives to develop better learning and teaching practices. The financial rewards and career progression provided by SNI are based on research performance, knowledge transfer and the amount of time spent teaching, but not on the quality of

teaching. The rigidity of the curriculum also prevents the incorporation of these practices, particularly in programmes seeking external evaluation or accreditation.

The lack of information on labour market needs also hinders the introduction and greater use of these practices. The quality of institutional-based graduate surveys is generally low and there is no nationwide methodology that allows comparisons across institutions.

Despite the efforts of some higher education institutions, the system-wide implementation of these practices still appears to be very limited. Improvement requires financial stability, but also a model that is centred on the student, academic staff with up-to-date pedagogical expertise and academic incentives to put these practices in place. The measurement and evaluation of practices can be very useful to identify good practice and share this information across higher education institutions. Stronger internal quality assurance mechanisms could also facilitate the application and success of practices to support the labour market relevance and outcomes of higher education.

### **Collaborative higher education institution and social partner practices to enhance the labour market relevance and outcomes of higher education**

Higher education institutions can work together with social partners to support labour market relevance and outcomes. Through collaborative practices with employers and trade unions, higher education institutions can ensure that the design and delivery of programmes is relevant for current and future business needs, and they can offer students and graduates meaningful work-based learning where they solve real problems, which will help them develop labour-market relevant skills. Interactions with academic staff and students can also help employees update their skills (Wilson, 2012<sub>[29]</sub>). It is common practice in US higher education institutions to appoint a senior staff member with leadership responsibility for engagement to oversee and co-ordinate these practices (Zellner and Washington, 2012<sub>[30]</sub>).

In 2014, approximately 87% of Mexican companies that collaborated with higher education institutions reported that the collaboration improved student skills, and 91% reported benefits for their company (CIDAC, 2014<sub>[10]</sub>). Most higher education institutions in Mexico include collaboration with social partners as part of their institutional mission. However, it is often poorly developed and generally only takes place with large companies, particularly international firms. In most higher education institutions, there is no institutional policy for engagement with external stakeholders in general, and employers in particular.

Levels of collaboration vary greatly across subsystems and institutions. Collaboration with employers is a common practice in the three technological subsystems as these institutions were established to support regional development in lagging regions or to raise the level of skills in well-developed industrial areas. The programmes offered are aligned with regional needs and their competence-based learning approach has a strong practical component that involves collaboration with employers in the region, particularly small and medium-sized enterprises (SMEs).

#### ***Role of social partners in the governance of higher education institutions***

Higher education institutions are increasingly accountable to employers for the quality and relevance of their graduates, and to students for the labour market relevance and outcomes of their study programmes. As a result, social partners and members of the broader community are often appointed to the governing boards of higher education

institutions in many OECD countries. This provides employers and others with the opportunity to contribute to the strategic vision and plan of institutions, as well as setting institutional policies and monitoring their performance. In some countries, higher education institutions establish advisory bodies, which include social partners, to help improve the labour market relevance and outcomes of higher education.

Many Mexican higher education institutions include employers in an advisory role, but few engage with social partners in their governing bodies. Only the three technological subsystems are governed by a legislative framework that requires employer engagement in their governing and advisory boards. Mandated employer engagement on governance bodies in these subsystems ensures that external members from the world of work are in a position to support decision making and provide advice on aligning education with regional labour market needs. Within these subsystems, employer representatives take part in engagement councils at institutes of technology and polytechnic universities, in relevance and engagement councils at technological universities, and in patronage and social councils at polytechnic universities. However, there is no evaluation of the effectiveness of these councils in improving collaboration with employers or enhancing the labour market relevance of study programmes and outcomes of graduates.

The autonomous universities may include social partners in various governing bodies, including on university councils (*consejos consultivos*) and patronage boards. These bodies provide an important forum for employer input into the operations and outcomes of institutions. University councils provide recommendations on the performance of the institution; and patronage boards manage the assets of institutions, raise additional funding and, in some cases, establish tuition fees. However, the universities are not required to include social partners in these governing bodies and there is no data on the number of external representatives on these bodies.

### *Collaboration on curriculum design and delivery*

Higher education institutions can directly involve social partners in designing new programmes and in developing, updating and delivering the curricula of existing programmes to enhance their alignment with labour market needs. Social partners can help deliver programmes by being involved in teaching as either a guest lecturer or as an adjunct or part-time lecturer. These forms of collaboration can help ensure study programmes are endorsed by industry and the curriculum is more responsive to the labour market. Collaborating with social partners on curriculum design and delivery can help academic staff develop their own skills and identify new research and consultancy opportunities. Students benefit from real-world experiences and employers can influence the development of the kinds of skills they are looking for in the workplace.

Overall, collaborating with social partners in the design of programme curriculum is not common across the Mexican higher education system, and practices vary between institutions. Autonomous universities are reluctant to involve employers in curriculum design and delivery on the basis of maintaining their autonomy and academic freedom. It is more common in direct-provision higher education institutions, which are required to include a feasibility study in which employers confirm the labour market relevance of the proposed programme. National academic relevance commissions (*Comisiones Nacionales Académicas de Pertinencia*) in the technological university subsystem include employers and define 80% of the programme content of all institutions every three years. Local relevance commissions define the specific content of programmes (20%) based on regional needs. Stakeholders advised the OECD review team that joint delivery is more

common because it is relatively easy for higher education institutions to invite employers as guest lecturers or to lecture a course for a whole semester or year (Box 5.6).

**Box 5.6. Joint curriculum design and delivery in Mexican higher education institutions**

Some of the Mexican higher education institutions that co-design and co-deliver programmes together with employers belong to two large industry clusters in the state of Querétaro. The Technological University of Querétaro (UTQ) and the Polytechnic University of Querétaro (UPQ) co-design and co-deliver curriculum with companies in the automotive cluster (e.g. Peugeot), while the UPQ and the Aeronautical University of Querétaro collaborate with aeronautic and aerospace companies in the *Aerocluster* (e.g. Airbus and Bombardier).

The Popular Autonomous University of the State of Puebla and Volkswagen Mexico co-created the bachelor's programme Automotive Design Engineering in 2008, and the Technical University of Jalisco and Caterpillar co-created the Heavy Machinery Maintenance two-year programme in 2007. The curricula of both programmes were designed and delivered jointly by academic staff and employers. In addition, the companies donated machinery to the university workshops, where students can practice and host student internships. Volkswagen also offers scholarships to the highest-performing students of the programme.

***Work-based learning integrated into the curriculum***

Work-based learning includes a wide range of actions, from social service, internships or dual education programmes to activities and projects with employers. Work-based learning helps students to foster relationships with employers and develop work-relevant professional and technical skills, as well as transversal skills such as communication, negotiation or teamwork. However, generating a good match between the student and the position in the company is critical for the success of work-based learning and the potential hiring of students by employers afterwards.

As a lack of experience in the labour market is the main reason that young Mexican graduates are unemployed (CIDAC, 2014<sub>[10]</sub>), the opportunity to gain work experience during their studies is important. Work-based learning helps employers identify talented students, which can reduce hiring and training costs. Almost one fifth of Mexican higher education graduates found their job because of their social service and internships. This is the second most common way to get a job for graduates, and is especially common among recent graduates (UVM, 2018<sub>[31]</sub>).

***Internships***

As in many countries, there are various types of internship in Mexico. For the purposes of this report, the discussion is restricted to internships that are part of formal education. Over half of the overall collaboration between Mexican higher education institutions and employers is through student internships (*prácticas profesionales*) (CIDAC, 2014<sub>[10]</sub>). While many institutions offer internships as part of the curriculum to develop professional skills and gain work experience, ANUIES estimates that they are not compulsory in 45% of institutions.

Internships in Mexico (in the form of clinical placements or teaching practicums), as in many countries, are compulsory and a requirement to obtain the professional licence for programmes such as medicine, nursing, dentistry and teaching. They are also compulsory in some higher education subsystems, including the technological subsystems. For example, in programmes delivered by the technological universities, students must undertake three compulsory internships: two short internships (60 and 120 hours) undertaken part-time in the fourth and seventh semesters, respectively, and a longer internship (600 hours) undertaken full-time in the tenth semester.

### Box 5.7. Work-based learning in Irish higher education institutions

Career services in Irish higher education institutions recognise the importance of effectively organising work-based learning by:

- sharing information internally due to host organisation preference for single interlocutors,
- facilitating the supervision of students, especially related to academic requirements and co-tutorship arrangements,
- providing assistance to interns during work placements,
- ensuring that experience reports cover the twin objectives of supporting the student to reflect on the learning experience, and informing other students and teachers about the experience.

The Higher Education Authority (HEA) funded the Roadmap for Employment-Academic Partnership (REAP) project, which developed a model for work-based learning arrangements. This model helped to establish responsibilities and commitments for higher education institutions, students and employers (Table 5.1).

**Table 5.1. Responsibilities for work-based learning**

Higher education institution	Student	Employer
<ul style="list-style-type: none"> <li>• Plan and clearly define responsibilities for all</li> <li>• Standardise duration and structure</li> <li>• Enhance networking and engagement</li> <li>• Dedicate resources</li> <li>• Develop employer and student placement information packages</li> <li>• Design structured alternatives to placement</li> <li>• Organise preparatory and reflective learning activities</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in preparatory and reflective learning activities</li> <li>• Manage and clarify expectations before placement</li> <li>• Take responsibility for achieving learning outcomes</li> <li>• Engage in reflective learning activities</li> </ul>	<ul style="list-style-type: none"> <li>• Assist higher education institutions in developing placement contract/ agreement</li> <li>• Enhance networking and collaboration with higher education institutions</li> <li>• Develop job specification</li> <li>• Support workplace learning</li> </ul>

Source: (OECD/EU, 2017<sup>[32]</sup>)

Students are assessed on their performance during the internship by their supervisors in the firms. Employers commented that students frequently lack basic knowledge and transversal skills, such as responsibility and teamwork. At the same time, students and graduates advised the OECD review team that working conditions on internships are usually poor, and tasks are not aligned with skills levels or their fields of study. This

suggests that Mexican higher education institutions do not have the governance and quality assurance mechanisms in place to ensure the quality of internships for their students.

The good management of internships requires considerable resources and the commitment of both organisations. Some Mexican higher education institutions cover the insurance cost of internships to facilitate this practice, but many institutions do not have the financial resources. In addition to the costly management of internships, stakeholders suggested that the lack of employer contacts and difficulties in finding supervisors in both organisations are common barriers to internships.

The legal rules that govern internships in Mexico are not clear, and the Mexican labour law, even when part of formal education, does not regulate them. They can be paid or unpaid and it is unclear whether students have any protections based on institution-level regulation. This lack of clarity, alongside potential issues around insurance, means that some employers may be reluctant to offer internships to higher education students in Mexico.

Following an appeal by ANUIES for funding to address these issues, the Higher Education-Industry Foundation (*Fundación Educación Superior-Empresa*, FESE) was established in 2008 as a not-for-profit civil organisation supported by the federal government. Between 2008 and 2014, FESE operated as a central platform for connecting students with employers for internships. It developed guidelines to facilitate the organisation of internships and increase their relevance for students. FESE also introduced a standard contract and insurance policy for internships, thus overcoming a gap in the Mexican labour legislation. Stakeholders advised the OECD review team that FESE was largely effective, particularly for smaller higher education institutions that lack internal resources. However, they also noted that FESE could have developed better connections with higher education institutions and disseminated its services to students more effectively. The public funding for FESE ceased in 2014 and there is currently no central platform to connect students with employers for internships.

### *Social service*

Bachelor and short-cycle tertiary education students in Mexican higher education institutions who have passed at least 70% of the academic credits of their programme must complete a social service (*servicio social*) in order to obtain their qualification and professional licence. The social service is a period of at least 480 hours intended to allow students to give back to society by working in non-governmental organisations, public education institutions, or government. Companies can also host students for their social service if they have a corporate social responsibility programme.

Students are expected to apply the discipline-specific knowledge and skills as well as transversal skills that they developed in higher education. However, stakeholders have reported that the social service is not sufficiently connected with study programmes or labour market relevant skills, and that there are no mechanisms in place to ensure that students complete a suitable social service. As a result, many students do not see the benefit of completing a social service. The co-ordination of student participation in social service is organised by a dedicated office (*oficinas de prácticas y servicio social*) in higher education institutions, but organisational capacity issues have been identified as a barrier to effective management across all subsystems.

Upon completion of the social service, students must produce a report detailing the tasks undertaken (Mexican Federal Government, 1981<sup>[33]</sup>), but this has different requirements in each institution. TecNM designed a standard evaluation form for all institutes of technology. However, the work undertaken during social service is not evaluated in terms of learning outcomes and transversal skills development. Furthermore, students do not have any avenue to provide formal feedback to higher education institutions on their social service experience, including its relevance and the types of skills they developed and applied in the workplace.

### *Dual education programmes*

Dual education programmes, where students are employed in a firm full-time while also enrolled in an undergraduate programme, are well established in Germany. Since the 1990s, there have been several efforts to implement these programmes in Mexico, but they have been more accepted at the upper secondary education level. Started by German companies working in the automobile industry in Mexico, these programmes have also been adopted by large foreign companies in other sectors (e.g. aerospace and electronics) and, more recently, by some large Mexican companies.

Higher education institutions across all subsystems can establish these programmes; for example, Volkswagen Mexico, Audi Mexico and the private Inter-American University for Development established the first dual education programme in industrial engineering, which combines three months in the classroom and three months in the company over a period of ten semesters. However, these programmes are more common in the technological subsystems, where the SEP has developed a model for implementation.

Dual study programmes allow students to fully connect with potential employers, who also benefit from the recruitment of highly qualified and committed employees. However, there is still little awareness of these programmes or their benefits among higher education institutions, students and companies. The scarcity of resources and the lack of long-term planning dominant in many Mexican companies hinder the commitment of resources to negotiate programme conditions and to supervise and support students throughout the duration of the programme.

### *Collaborative initiatives and projects with employers*

Students and employers can undertake a wide range of activities and projects together, which may even be included as part of the curriculum. For example, within the curricula of technological and polytechnic universities, it is common that students from the beginning of their studies work on projects based on real employer demands, which often include visits to company facilities. Students can also work with academic staff in providing consulting services to regional companies. The University of Guadalajara, which uses a competence-based and project-based approach, offers students a large project portfolio from different external organisations, and students choose projects to work on to gain academic credits.

There are other initiatives open to all students to interact with employers that are not part of the curriculum. For example, some companies launch contests targeting all higher education students to solve specific problems, such as the Valeo Innovation Challenge, which offers USD 200 000 in prizes worldwide for technological innovations or ideas for new ways to use cars. Similarly, the Schlumberger Ocean contest for university students aims to find solutions for marine oil exploration.

Other higher education institutions facilitate student interaction with employers by using common facilities. CETYS University created the Centre of Excellence for Innovation and Design where students benefit from hands-on innovative experience developing projects and solving industrial problems together with faculty and businesses in the aeronautics, automotive, electronics and renewable energies sectors.

The involvement of higher education institutions in science and technology parks can also facilitate collaboration between higher education institutions and employers. Around a dozen Mexican higher education institutions currently share a common physical space with employers to facilitate the development of relationships, which consequently increases the quantity and quality of collaborative practices. The Monterrey Research and Technology Innovation Park, which includes several universities such as ITESM and UANL, is one of the most successful parks. ITESM also owns or co-owns other 12 technology parks as part of its campuses, and UANL owns the World Trade Centre Monterrey, which is helping businesses to create and retain over 2 000 jobs annually in the state.

Similarly, the active participation of higher education institutions in business clusters promoted by SE facilitates interactions with employers and allows them to explore mutually beneficial situations. These often start with low commitment and low budget practices (e.g. a guest lecture), which can be used to develop personal relationships and progress towards more complex practices and potentially to strategic partnerships.

### *Staff mobility between higher education institutions and the world of work*

The temporary mobility of staff between higher education institutions and external organisations has been proven to offer multiple benefits for both parties by reducing or eliminating cultural and organisational barriers. However, this practice is not common in many OECD countries due to professional norms and a lack of tradition, as well as academic workforce regulations.

Staff regulations in Mexican public higher education institutions allow full-time tenured academic staff to take a sabbatical period for a semester or a year after six years of service. During their sabbatical period, academic staff can undertake postgraduate studies, research or training, develop a business project or work in a company. For work in a company, the institutes of technology have prioritised the automotive, aerospace, agroindustry and energy sectors. Academic staff need to justify how working in their chosen sector will strengthen their academic profile and explain how the practical knowledge gained from their sabbatical period can be applied in the classroom.

Students can also benefit from practical learning through exposure to lecturers with business experience. This can be facilitated by offering experienced professionals short-term contracts in higher education to teach in specific programmes. Over 70% of academic staff in Mexico are on short-term contracts (ANUIES, 2018<sub>[34]</sub>). Some of these staff have had business experience or combine teaching with their non-academic employment, but stakeholders reported that most casual staff are teaching in areas in which they do not have any practical experience.

Students undertaking doctoral programmes in companies can be an effective bridge between higher education and business. To date, almost 1 500 doctoral candidates have participated in the CONACyT Postgraduate Programme with Industry (*programa de posgrados con industria*), most of whom were already employees before starting the programme. Joint research and development (R&D) and shared infrastructure can also



have a similar effect on mobility when employers, academic staff and, at times, students are collaborating and sharing the same physical space. However, this practice may not give students as much exposure to the business environment as if they were working in the company.

#### **Box 5.8. Collaborative practices between institutes of technology and employers**

The Engagement Unit of TecNM's online survey of engagement directors and vice-rectors of institutes of technology (detailed in Box 5.5) offers some valuable insights into the practices undertaken in collaboration with employers within the subsystem of institutes of technology.

Within the higher education system, institutes of technology are at the forefront of employer collaboration. Over half (54%) of the lecturers work part-time, and many have business experience, which helps their collaboration.

As part of their continuing education strategy, around 70% of the institutes offer at least one programme with the participation of regional companies, industrial sectors or government agencies. In addition, almost 40% of institutes of technology offer at least one dual education programme in collaboration with regional employers.

Students establish contacts with employers through their mandatory social service and compulsory internships. Almost 20% of respondents believe that the social service does not help students improve their labour market performance, mainly because the social service they complete is often not related to their studies. On the other hand, respondents indicated that compulsory internships have a greater impact on graduates' skills; and over half reported that internships help students succeed in the labour market.

Around 70% of respondents think that their institute is developing a suitable number of professionals with appropriate skills, but recognise that graduates still face major problems in entering and succeeding in the labour market. The main issue is the inability of the labour markets to accommodate all graduates.

Respondents believe that in order to improve the results of graduates in the labour market, employers should be more open to participating in dual education programmes, work-based learning, curriculum co-design and other engagement practices.

*Source:* Information provided by TecNM.

### ***Continuing education***

Higher education institutions can engage with employers in tailored continuing education and training courses that specifically address their needs. For higher education institutions, the tuition fees for continuing education are a source of extra funding. For employers, this can be an effective way to quickly update or improve the skills of their employees in specific areas.

Continuing education in higher education systems is common practice in many countries, where institutions offer a wide range of professional development and training courses, enabling courses to help students enter higher education through alternative pathways, and general interest courses. In some instances, students can elect to take an exam for the courses taken through this arm of the institution and receive credits for degree programmes. However, few Mexican higher education institutions offer a comprehensive

set of continuing education programmes, and most of those that do are direct-provision institutions. For instance, in 2016, UAEH delivered courses, workshops, seminars and conferences to 16 355 users and generated almost MXN 20 mill (USD 1.1 million) in revenue. While some courses are open to the public, others are tailored for public servants or for specific sectors or companies.

The National Council for Standardisation and Certification of Labour Competencies (CONOCER), a government agency of the SEP, also provides a form of continuing education through higher education. Over 110 higher education institutions act as skills certification agencies for CONOCER and, as such, not only certify specific skills, but also provide short courses and exams to help their students, graduates and the public develop occupation-specific and transversal skills. Almost 70% of certificates awarded in 2017 were in the area of information and communication technology (ICT). CONOCER has also recognised some of these institutions as “normalisation agencies”, which identify and standardise new skills for inclusion in the National Registry of Competency Standards (*Registro Nacional de Estándares de Competencia*, RENE) (CONOCER, 2018<sub>[35]</sub>). Some skills have been standardised at the request of a specific sector. For example, the Technological University of Tijuana works closely with the state government and certifies a number of public sector skills for state civil servants.

A small number of higher education institutions have a strategic relationship with employers and share infrastructure, including joint training centres, which helps ensure students are using state of the art equipment and developing current skills. This is particularly the case with foreign automotive companies based in Mexico, and has led to the establishment of the UTQ-Peugeot Training Centre and the Technological University of Puebla-Audi Training Centre.

However, on the whole, higher education plays a very small role in professional development and training in Mexico, with only 1% of Mexican companies using continuing education in higher education institutions as a way to train their staff (CIDAC, 2014<sub>[10]</sub>). Although large companies provide more training than smaller ones, there is a clear preference for either internal training or private training providers (World Economic Forum, 2018<sub>[36]</sub>). For instance, over 100 large companies in Mexico have their own institutional training programmes, and some have established universities that offer programmes officially recognised by the SEP through a Recognition of Official Validation of Studies. For example, the Liverpool Virtual University is a private university established by a shopping centre chain, which has provided its employees with government recognised bachelor’s and master’s programmes since 2000, as well as short certificate courses (Universidad Virtual Liverpool, 2018<sub>[37]</sub>).

The lack of a training culture in Mexican companies may also be contributing to higher education’s limited role in employee training. Many employers do not provide training for their employees. This is partly because of the large share of companies operating in the informal economy, which tend to invest less in training (OECD, 2017<sub>[38]</sub>), but also due to a perception among employers that training will provide more opportunities for employees to find alternative work and leave the company (CIDAC, 2014<sub>[10]</sub>).

### *Enabling factors and barriers to the use of collaborative practices*

Collaboration between higher education institutions and social partners is a requirement in the technological subsystems. The legal framework for these institutions facilitates the use of a wide range of collaborative practices, from the participation of social partners in governing and advisory boards to their involvement in curriculum design and update.

The participation of higher education institutions in science and technology parks and clusters involves physical proximity with companies, which facilitates personal interaction, synergies and infrastructure sharing. This is likely to lead to greater collaboration in research and education.

A number of Mexican higher education institutions have formal and well-established collaborations with companies and other higher education institutions in Mexico and abroad that have previous experience in collaborative practices. Mexican institutions can learn from these relationships and adapt the practices to their context.

However, these promising practices are hindered by the absence of a tradition of collaboration between academic staff and social partners in Mexico more broadly. Higher education institutions and employers are generally not well connected or aware of each other's needs. Many employers do not know how to get involved in collaborative practices with higher education institutions, and the staff within higher education institutions do not have a good understanding of the labour market and the types of skills needed by employers.

Higher education institutions lack formal structures and sufficient human resources to support collaborative practices with social partners. Collaboration is often the result of informal relationships at the individual level. However, many academic staff find the administration of collaboration overwhelming and time consuming.

Professional staff dedicated to supporting engagement between institutions and social partners could overcome some of these issues. However, there are few intermediaries in higher education institutions with adequate industry knowledge or professional training to assist academic staff or establish relationships with employers. In addition, initiatives or offices responsible for collaborative activities within most institutions are not connected, which limits synergies. As a result, employers also find it difficult to make contacts and build relationships with academic staff and students.

Employers and academic staff who engage in collaborative practices report significant communication issues, which are exacerbated by organisational and cultural differences (Cabrero et al., 2011<sup>[39]</sup>). They both report that they have very different objectives for education and expectations of students' skills, and that they feel as though they are speaking two different languages when discussing education matters. While employers have reported that graduates do not have the appropriate skills to succeed in the labour market, they rarely discuss this with higher education institutions, thereby missing the opportunity to provide valuable feedback that institutions could use to adjust their programmes (CIDAC, 2014<sup>[10]</sup>). The poor communication between the key actors involved in this area often leads to confusion, and even resistance against collaboration. This can hamper opportunities to transform one-off interactions into long-term strategic partnerships based on trust and commitment.

Most public funding is based on student numbers, and stakeholders have identified the lack of funding as the main barrier to the implementation of good practices to support labour market relevance and outcomes in higher education. However, funding alone will not improve the situation if academic staff and higher education managers do not change their views on the importance of developing labour-market relevant skills in students, notably with a longer-term view and an established commitment to student learning and employability. This attitude is exacerbated by the focus on research performance, the lack of business experience among academic staff, and the absence of incentives to collaborate with employers and time officially allocated to collaboration.

The absence of established methodologies for measuring collaborative practices or mechanisms to systematically share good practices are key barriers to the more widespread use of collaborative practices across the Mexican higher education system. As a result, successful practices are often not disseminated or adopted by others.

### Implications for public policy

There is general lack of awareness among students, higher education institutions and employers concerning the importance of connecting higher education with the labour market. The use of practices to enhance labour market relevance and outcomes in the Mexican higher education system appear to be limited to a small group of higher education institutions or faculties within institutions (Badillo Vega et al., 2016<sup>[28]</sup>); (Badillo-Vega et al., 2015<sup>[40]</sup>). The use of these practices within subsystems and institutions is uneven, and overall only reaches a small number of students. The implementation of current practices could be improved, as many practices are not applied effectively.

There are examples of good practices in Mexico that could serve as learning models for other institutions. However, there is little attention paid to this topic by Mexican researchers and, unlike many other countries, there is a dearth of literature on practices used in Mexico or their effectiveness. The little information available is not widely or systematically disseminated across institutions and social partners. By contrast, there is a wealth of international literature on practices to enhance labour market relevance and outcomes of higher education, as well as examples of good practice in other countries. Mexican higher education institutions could use this information to adapt to their own context. However, there is no mechanism in place to share this information among higher education institutions and social partners.

Improving teaching in higher education, including through the introduction of more innovative learning and teaching practices, has the potential to improve the labour market relevance of study programmes and graduate outcomes. However, there is a great deal of room for improvement in this area as there is not a strong culture of excellence in learning and teaching, Mexican academic staff have little exposure to training on teaching in higher education, and there are no incentives in place to raise the profile of teaching in higher education.

Collaborations between higher education institutions and social partners require adequate resources and good management to be effective, but this engagement in Mexico is piecemeal. With the exception of institutions within the technological subsystems, there are a lack of comprehensive strategies, sufficient financial resources or supporting mechanisms in place to effectively collaborate with social partners. Some academics do not even see the value of these collaborative practices and do not involve social partners for fear of compromising their autonomy and academic freedom.

Within the higher education system, the government has substantial influence on the practices of direct-provision subsystems; however, most higher education institutions have significant discretion in how they develop and implement these practices. This reduces the influence of the government and makes the effectiveness of policies difficult to predict. Despite this autonomy, the government can still play a key role in creating adequate frameworks and conditions for these practices through public policy.

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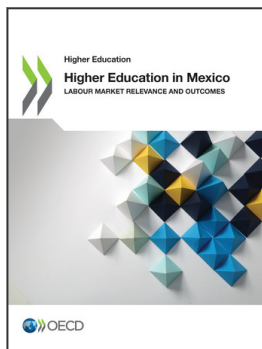
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