



Enhancing labour market relevance and outcomes of higher education: Country note Austria

Austria has a diversified and respected higher education system, and its articulation with the labour market is a key objective for the government. The analysis undertaken by the OECD project team, within the Labour Market Relevance and Outcomes of Higher Education Partnership Initiative, identified five key challenges in aligning the supply of and demand for higher education graduates in Austria:

- Completing a higher education degree can be lengthy.
- Students from some social backgrounds are under-represented in higher education.
- Bachelor's programmes have expanded, but employers and graduates continue to consider a bachelor's degree insufficient preparation for the labour market.
- Creating mechanisms that help identify, teach and signal work-relevant skills can be challenging for higher education institutions.
- While demand for graduates in Information and Communications Technology (ICT) is high, enrolment rates remain low, particularly among women.

The analysis identified the following priority areas for development: i) monitoring labour market developments; ii) guiding student choice; iii) supporting students' success in their studies and future jobs; and iv) adapting the educational offer to emerging labour market needs. For each priority area, this country note reviews the system context, highlights challenges faced by institutions, lessons learned from current practice, and presents policy options for improvement. Annex B presents a self-reflection questionnaire for use by higher education institutions to identify strengths and weaknesses of current practice.

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Aligning higher education with the labour market in Austria

Brief overview of higher education in Austria

In Austria, higher education encompasses International Standard Classification of Education (ISCED) levels 6-8 and is delivered at four types of HEIs, which form distinct higher education sectors: public universities, private universities, universities of applied sciences (UAS), and university colleges of teacher education.¹ Public and private universities offer research-focused curricula and they are the only institutions that can confer doctoral degrees. UAS conduct applied research, tend to have stronger links with the regional economy compared to universities, and their study programmes (ISCED levels 6-7) are more professionally oriented, with a highly defined course structure. University colleges of teacher education specialise in educating primary school teachers and, in collaboration with public universities, secondary school and vocational education teachers.

The 22 public universities form the largest part of the higher education sector, enrolling 76% of the approximately 380 000 higher education students. The UAS sector, with 21 institutions, currently educates 16% of higher education students. While most UAS are private institutions, they are largely financed by government. Comparatively recent additions to the nation's higher education system, UAS institutions were first authorised by a 1993 act of Parliament, and graduated their first cohort of students in 1997. The other two higher education sectors in Austria are comparatively small: private universities enrol 4% of higher education students at 16 institutions, while university colleges of teacher education enrol 4% of higher education students at nine public and five private institutions.

Austria's student body comprises a sizeable share of foreign students. Approximately 22% of students at ISCED levels 6-7 moved to Austria from abroad for their higher education studies. Approximately 40% of these foreign students hold German nationality (Unger et al., 2020^[1]). The number of foreign students in doctoral degree programmes is increasing. When considering the labour market outcomes of higher education, it is thus important to consider the share of graduates leaving Austria upon graduation, many of whom are foreign students.

Austria's student population has some unique features compared to those of other European countries. A substantial share of educational resident students² (27%) start their studies at least two years after their university entrance qualification (*Matura*) or enter from a non-traditional pathway. The average age of an educational resident commencing studies is 27 years; most have prior work experience and many combine study and work.

A government priority is to increase the enrolment share of students enrolled in UAS institutions, as a means by which to alleviate pressure on public universities resulting from increasing numbers of students, and to sharpen the respective profiles of the two sectors. The target is a ratio of 30:70 among students at UAS and public universities (BMWF, 2017^[2]). The different educational missions of public universities and UAS – offering students more academic, theory-based teaching at universities and a more professionally oriented education at UAS – are thought to enable students to choose a higher education programme suited to their study preferences and career aspirations.

Strengthening the alignment between higher education and the labour market is a key objective of the Austrian government, and is reflected in a range of policies. Changes in the design of public financing are expected to increase the supply of graduates in fields of study that are in high demand in the labour market, such as Information and Communications Technology (ICT) and science, technology, engineering and

¹ Private and public universities in Austria function within different legal and regulatory structures, and are considered two separate sectors.

² Educational resident students are those who acquire their university entrance qualification (*Matura*) in Austria (*BildungsinländerInnen*).

mathematics (STEM) more generally. This is reflected in the performance agreements established between the federal ministry and public universities and in the national development and financing plan for UAS. It is recognised that field of study choices are linked with choices early on in education, and various initiatives aim to inform prospective students about study programmes with high labour market demand and to raise interest in STEM and ICT careers, as well as higher education studies more broadly.

A national objective is the promotion of international study experiences, for instance through the European Union's Erasmus+ programme, as a way to increase graduates' employability by fostering the personal and professional development of students in international settings. Several initiatives have been introduced to enhance the employability of graduates through the development of transversal skills (*fachübergreifende Kompetenzen*), that is, skills applicable in a wide range of work settings, and throughout a long working life. A focus is on the development of digital skills.

Key challenges in aligning the supply of and demand for higher education graduates in Austria

The analysis of labour market outcomes of higher education graduates, carried out between March and December 2020 by the OECD review team, identified five key challenges that impede the alignment of higher education and the labour market in Austria:

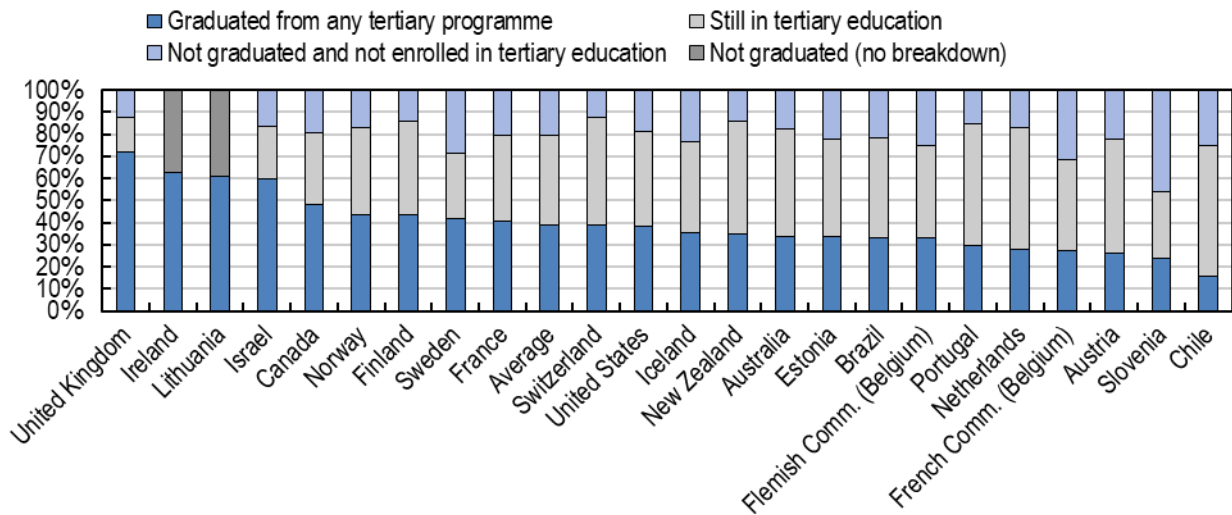
- Completing a higher education degree can be lengthy.
- Students from some social backgrounds are under-represented in higher education.
- Bachelor's programmes have expanded, but employers and graduates continue to consider a bachelor's degree insufficient preparation for the labour market.
- Creating mechanisms that help identify, teach and signal work-relevant skills can be challenging for HEIs.
- While employment demand for ICT graduates is high, enrolment rates in ICT programmes remain low, particularly among women.

Completing a higher education degree can be lengthy

Around one in four (26%) higher education students in Austria graduate within the theoretical study duration, which is low compared to other OECD countries. However, variation exists among fields of studies and higher education sectors. For example, students at UAS typically complete their studies faster than their peers at public universities (Schubert et al., 2020^[3]). Overall, around half of all students (52%) continue to study toward their degree beyond the theoretical duration of their bachelor's degree programme (Figure 1). Students in master's programmes complete their degrees faster – 40% finished within the theoretical duration (OECD, 2019^[4]).

Available evidence suggests that a key reason for the longer study duration is the high number of students who work during their studies. Approximately 65% of undergraduate and graduate students work while studying, with the share of working students increasing along with the progression of their studies. Most of the employed students (around 60%) work in a field related to their studies. Many students also work before entering higher education. Around 22% of students consider themselves as mainly working and only studying on the side (Unger et al., 2020^[1]). Even though no official part-time student status exists at universities, combining studies with work is possible as students can select the number of courses they take. At UAS, students have little freedom in choosing their timetable, but these institutions offer programmes designed for full-time workers, making it possible to combine work and studies in a more structured way.

Figure 1. Status of full-time bachelor's students at the end of the theoretical programme duration (2017)



Note: Data from Ireland, Canada, France and the United States are from earlier years.

Source: OECD (2019^[4]), Education at a Glance 2019 Indicators, “Indicator B5. How many students complete tertiary education?”, OECD Publishing, Paris, <http://statlinks.oecdcode.org/edu-2019-3777-en-t124.xlsx>.

Labour market policy in Austria provides the option of educational leave for workers after a minimum of six months of continuous employment (AMS, n.d.^[5]). The educational leave allowance, similar to the unemployment benefit allowance, can be used for a maximum of 12 months for studying, which many students use toward the end of their studies. The educational leave can also be taken on a part-time basis.

While working can be an important way for students to develop their career plans, longer study durations and the corresponding lower study intensity at a given point in time may block resources in higher education and distort resource allocation decisions. The Federal Ministry of Education, Science and Research, in collaboration with HEIs, is currently reviewing the “studiability” (*Studierbarkeit*) of higher education programmes – i.e. the feasibility of completing programmes on time – as part of performance contract discussions, with the aim of supporting institutions in the development of framework conditions and measures to increase the share of students who graduate within the theoretical duration of study, by ensuring a swift and successful study journey. Related to this, the 2019 national student survey revealed that almost half of the surveyed students thought that the actual workload for a course was higher than stated. For 32%, the number of classes per semester was too high and 41% criticised the excessive amount of exams taking place within too short a time period (Austrian Federal Ministry of Education, Science and Research, 2021^[6]). Theoretically, one ECTS point requires, on average, 25 hours of contact hours and self-study as regulated in the European Credit Transfer System (ECTS) for European Higher Education. The Ministry is committed to enhancing ECTS equity through mandatory internal quality assurance measures at HEIs and support for pilot initiatives to monitor ECTS equity.

Students from some social backgrounds are under-represented in higher education

As in other OECD member countries, there is a link between higher education enrolment and social background in Austria. Social differences in entry to higher education begin in the school system, which tracks students by academic ability at the ages of 10 and 14, placing some learners on pathways that make entry to higher education less likely. The probability of attending a public university or UAS is 2.5 times higher for students who have at least one parent with a *matura*, the higher education entrance qualification, than for students whose parents have not attained such a qualification (Unger et al., 2020^[1]).

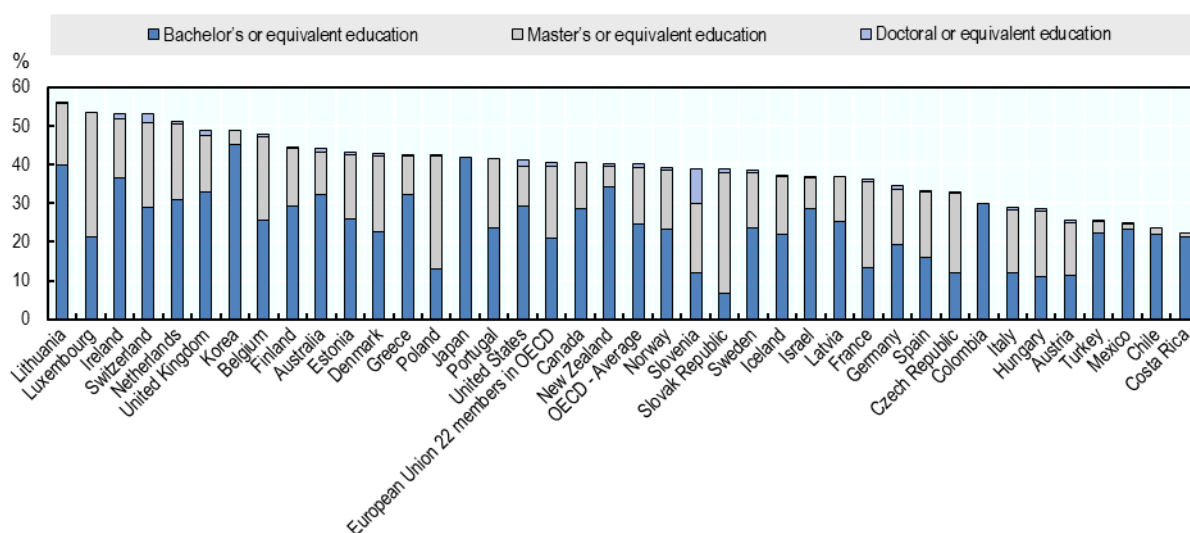
Widening access to higher education is a policy priority, as manifested in the 2017 National Strategy for the Social Dimension in Higher Education (Austrian Federal Ministry of Education, Science and Research, 2017^[7]). A significant achievement is the multitude of pathways that provide access to all sectors of higher education. Around 50% of higher education entrants previously living in Austria come from pathways other than the academic upper-secondary track, and 67% of higher education entrants are first-generation students, meaning that neither of their parents obtained a higher education qualification (Unger et al., 2020^[11]). One important means of widening access to higher education is the ongoing expansion of the UAS sector; UAS have been more successful than public universities at attracting students from non-traditional backgrounds (Unger et al., 2020^[11]).

Migration status and geography are also limiting factors for access to higher education. People with a migrant background are only half as likely to enter higher education compared to those of Austrian descent. A nationwide tracking system was launched in 2020/21 to obtain information on the higher education enrolment and study success of students with a migrant background. Additionally, the share of the population that will enrol in a higher education programme during their lifetime varies between 20% and 76% in different parts of the country, with major differences between rural regions and cities, as well as an east-west divide (Unger et al., 2020^[11]).

Bachelor’s programmes have expanded, but employers and graduates continue to consider a bachelor’s degree insufficient preparation for the labour market

The share of the Austrian population aged 25-34 holding a bachelor’s degree as their highest formal qualification has more than doubled in the past five years, from 5% in 2014 to over 11% in 2020. This was the highest relative increase among OECD countries. However, the proportion of population with a bachelor’s degree as their highest formal qualification remains low in international comparison (see Figure 2). A higher proportion of students than in other countries graduate from vocational training, and those that enter higher education often continue to study for higher degrees – around 70% of bachelor’s degree graduates at public universities enrol in master’s degree programmes at public universities within two years of graduating (Schubert et al., 2020^[31]).

Figure 2. Educational attainment of 25-34 year-olds (2020)



Notes: Data for Chile refer to 2017; data for Denmark and Japan refer to 2019.
 Source: OECD (2020^[8]), OECD Education Statistics, <https://doi.org/10.1787/edu-data-en>.

Employer demand for bachelor's degree holders is low. While there are differences between bachelor's study fields, overall, employers tend to consider a bachelor's degrees as a basic, general education and prefer either graduates from the vocational education system, as their education is more targeted towards a specific occupation, or post-graduate degree holders. In a survey of 500 hiring managers, 30% did not consider a bachelor's degree as a qualification that prepares students for the labour market (AMS and BMWF, 2014^[9]).

The low employer recognition of bachelor's degrees is reflected in earnings. On average, bachelor's degrees yield lower earnings premia than observed in other OECD higher education systems. A graduate aged 25-34 with a bachelor's degree, who works full time, all year, receives 103% of the pay that upper secondary or post-secondary non-tertiary graduates earn. This is the third-lowest wage premium among OECD countries, and significantly lower than the OECD average of 129%. Conversely, a master's or doctoral degree yields a 145% earnings premium in Austria, which is close to the OECD average of 153% (OECD, 2020^[8]).

In Austria, as in other education and training systems where the bachelor's degree is a recent addition to the labour market landscape, there are opportunities to strengthen recognition of a bachelor's degree among employers and students as a useful qualification for the labour market. To improve the acceptance of bachelor's degrees in the labour market, HEIs can take steps to provide employers with a better understanding of the knowledge and skills developed in bachelor's degrees. For example, through the involvement of employers in curriculum design and delivery.

Creating mechanisms that help identify, teach and signal transversal skills can be challenging for HEIs

In their hiring decisions for entry-level jobs, Austrian employers, like employers across the OECD, do not look only for subject-specific technical knowledge and skills, but also for a range of transversal skills, including digital skills, leadership, inter-professional teamwork, resourcefulness, system thinking, and entrepreneurial and innovation skills. The interviewed stakeholders commented that some programmes at UAS seem to be highly targeted towards current labour market needs, which may require their graduates to reskill in future when labour market demand changes. Higher education, generally, has a wider mission to sustain a learning society and to nurture the generation and application of knowledge for societal and individual well-being. Ideally, all of these are part of the work-relevant skills mix of graduates.

While there is consensus on the need for transversal skill development in higher education, the interviewed stakeholders noted the difficulty of developing a common understanding – among employers, students and HEIs – of the type and level of transversal skills students are expected to cultivate in education. Employers tend to consider only directly related or proximate fields of study and work experience when hiring. A further complication is that transversal skills can be interpreted in multiple ways. For example, entrepreneurial skills, including leadership, resourcefulness and managerial skills, can be considered a mind-set, or understood as the skill set needed to start a business. In a similar vein, “digital skills” include a broad range of skills, from the ability to use social media effectively to data analysis and coding.

To address these challenges, a number of HEIs have started using certificates and diploma supplements to signal transversal skills and their level of proficiency to employers. Some also integrate careers information into study curricula early on to allow students to develop a more complete understanding of the skills mix employers are seeking and to guide them in their course selection and choice of extra-curricular activities. Another way of addressing these challenges is through compulsory internships, which form part of bachelor's programmes at universities of applied sciences and bring students into contact with the labour market related to their field of study. At public universities, only a few study programmes include internships.

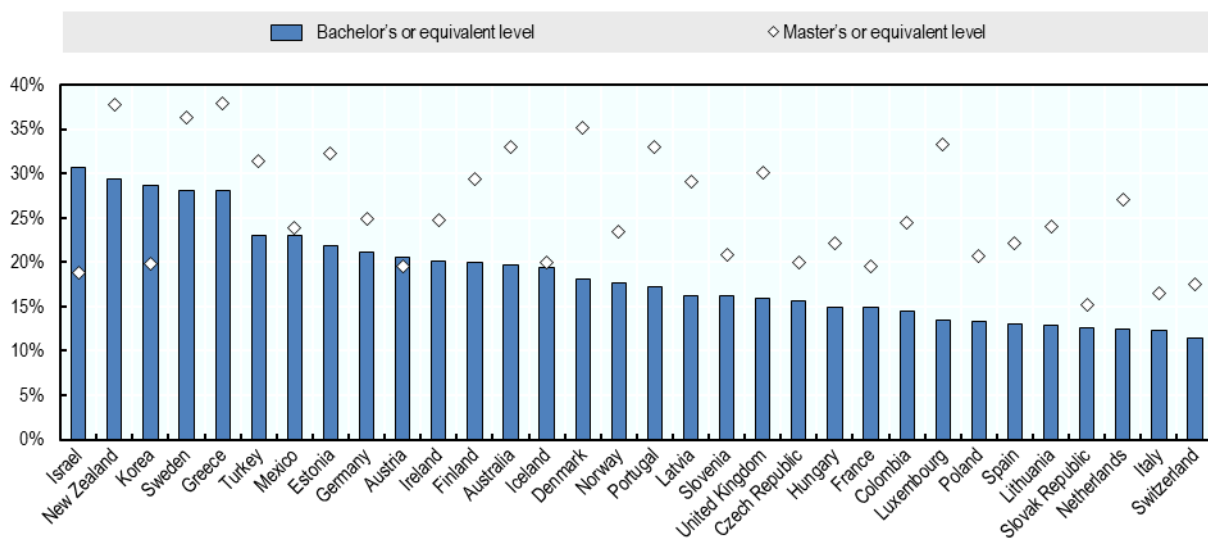
While employment demand for ICT graduates is high, enrolment rates in ICT programmes remain low, particularly among women

ICT occupations experience higher rates of job creation than the economy as a whole (AMS, 2019_[10]). However, there has not been a corresponding increase in the proportion of students enrolled in ICT programmes – around 6% of students were enrolled in ICT fields of study in 2019, a share that has remained stable since 2013 (OECD, 2020_[8]). Similarly, demand for STEM graduates exceeds supply (CEDEFOP, 2016_[11]).

More can be done to attract women into ICT and STEM fields. In Austria, 54% of women take up higher education studies during their lifetime, compared to 39% of men (Unger et al., 2020_[1]). In 2019, 21% of new entrants in ICT bachelor’s programmes were women. For STEM subjects, this share was 37% (OECD, 2020_[8]). Austria is one of the few OECD countries where, for women, enrolment rates in ICT master’s programmes are lower than in bachelor’s degree programmes (Figure 3).

Making further progress on this will require a dual approach to information and study guidance and support for students to succeed in their studies and stimulate participation and completion of higher-level studies.

Figure 3. Share of women among new entrants in ICT study programmes (2019)



Note: Sorted in descending order by share of enrolment in bachelor’s or equivalent programmes.

Source: Adapted from OECD (2020_[8]), OECD Education Statistics, <http://dotstat.oecd.org/Index.aspx?QueryId=113815>.

Priority areas for policy and practice development

The analysis of the labour market outcomes of higher education graduates in Phase 1 of the project led to the identification of four challenges for improved labour market outcomes of higher education in Austria. These were further analysed in Phase 2, with a focus on institutional practices and processes. As a result, four priority areas for policy and practice development were identified:

1. institutional practices for monitoring developments in the labour market;
2. guiding student choice;
3. supporting students to succeed in their studies and future jobs;
4. adapting the educational offer to emerging labour market needs.

The following section briefly presents the higher education system context for each of the four priority areas, highlighting the challenges faced by HEIs. This is followed by a discussion of what can be learned from current institutional practice and a presentation of policy options for public authorities to help HEIs scale up their current practice.

The policy options were developed following initial analysis carried out by the OECD review team between January and December 2020 on labour market outcomes experienced by graduates and employers and potential drivers and barriers affecting these outcomes. Further evidence was collected during peer-learning activities, organised between January and December 2021, both within the country and across the four countries, involving HEIs and higher education policy stakeholders.

Summary of key findings and policy options

Table 1. Summary of key findings and policy options

Priority areas for policy and practice development	Higher education system context and challenges for HEIs	What can be learned from current institutional practices?	Policy options
Institutional practices for monitoring developments in the labour market	<ul style="list-style-type: none"> HEIs have access to a range of publicly available information on graduate employment outcomes and emerging skills demand In addition, HEIs collect their own information on how their graduates perform in the labour market While many HEIs use labour market information for curricula updates, less common is the use of this information for guiding students in their choice of study fields and specialisations 	<ul style="list-style-type: none"> Central institutional structures and the use of digital platforms facilitate the collection, analysis and use of labour market information, and some HEIs have successfully involved technology transfer centres and knowledge exchange structures in this 	<ul style="list-style-type: none"> Support HEIs to make greater use of research collaboration with industry and public sector organisations for the identification of emerging skill needs and their reflection in the educational offer
Guiding student choice	<ul style="list-style-type: none"> A wide range of guidance services is available, but does not reach all prospective students equally, particularly those who are first in their families to enter higher education and students in STEM programmes at public universities seem to lack information HEIs could make greater use of labour market information in their study guidance and in demonstrating knowledge application during the first year thereby increasing study motivation Study guidance is largely focused on first degree programmes and may not meet the information needs of learners seeking higher-level studies or upskilling and reskilling 	<ul style="list-style-type: none"> HEIs collaborate with schools to demonstrate the societal relevance of study programmes with promising results in raising interest in STEM subjects HEIs use various ways to provide prospective students with information that describes the study environment, academic requirements, and labour market prospects of programmes as authentic as possible 	<ul style="list-style-type: none"> Support HEIs to increase the collaboration with schools and other stakeholders, particularly in STEM subjects Further develop the existing study guidance through high-quality online information platforms with information for learners who return to higher education for upskilling and reskilling, including those who seek to complete suspended or terminated studies

Priority areas for policy and practice development	Higher education system context and challenges for HEIs	What can be learned from current institutional practices?	Policy options
Supporting students to succeed in their studies and future jobs	<ul style="list-style-type: none"> • Study success in higher education varies significantly by gender and previous education • A large proportion of students combine study with work and/or care responsibilities, and HEIs are recommended to take this into account when designing courses and setting examination dates • Quality of teaching in STEM programmes is reported by students as an area of concern across the sectors 	<ul style="list-style-type: none"> • Public universities have increased their efforts to lower attrition rates with a study introduction and orientation phase and monitoring of study progression • HEIs are successfully making use of diversity-sensitive teaching to meet the needs of different types of learners with good results on study engagement and success • Some HEIs have introduced a structured approach to support students to combine study and work with guidelines that bind companies to a maximum amount of working hours per week • Some career centres are particularly successful at creating a match-making platform that requires firms to win students' interest through authentic descriptions of entry-level jobs, on-the-job training and career prospects 	<ul style="list-style-type: none"> • Stimulate peer learning across the sector through existing networks to upscale successful practices in the areas of diversity-sensitive teaching, mitigating attrition, and career guidance
Adapting the educational offer to emerging labour market needs	<ul style="list-style-type: none"> • Increasing the labour market relevance of the educational offer has become a strategic priority across the sector • Adapting the educational offer to emerging labour market needs is a common practice but can be cumbersome as process for study programmes 	<ul style="list-style-type: none"> • Public universities are increasing their offer of extension-curricula, adding specialisations to study programmes with a greater focus on digital skills and cross-disciplinary topics 	<ul style="list-style-type: none"> • Further develop the existing study guidance through high-quality online information platforms with information on extension-curricula studies

1. Institutional practices for monitoring developments in the labour market

Higher education system context and challenges for HEIs

HEIs have access to a range of information on graduate employment outcomes and emerging skills demand

HEIs in Austria have access to a range of public information sources on emerging occupations and the current demand for higher education qualifications by field and level of study. For example, the public employment service offers a “qualification barometer” and a “career compass”, which provide information on current and near-future trends in occupations, and labour market demand based on vacancies published via AMS, online and in the Austrian print media (AMS, n.d.^[12]); (AMS, n.d.^[13]). Various national and industry-specific employer surveys also provide information on employer skill needs.

The last nationwide graduate survey on labour market outcomes was carried out in 2009 and covered graduate cohorts from 2003/2004 to 2007/2008. HEIs would appreciate a new edition of the nationwide graduate survey. Related to this, in 2018 the Austrian Federal Ministry of Education, Science and Research

joined in the European Commission's pilot survey EUROGRADUATE, which covered several countries, and participates in the follow-up project EUROGRADUATE 2022 involving 17 countries – among them Hungary, Portugal and Slovenia, the other countries participating in the Labour Market Relevance and Outcomes (LMRO) Partnership Initiative.

Most of the publicly available labour market information needs substantive analysis by HEIs to be useable. Exceptions are Atrack, a government-funded initiative implemented by Statistics Austria that allows public universities to track the labour market outcomes of their graduates (Box 1). Data cubes anonymously combine university data with social security and unemployment data; this facilitates the evaluation of a graduate's labour market status, time between graduation and first employment, gross monthly income and many other labour market related indicators. Universities can select a number of points in time before and after a student leaves the university, up until five years after graduation. It is also possible to compare individual university results to an aggregate of all public universities in Austria. The most important indicators are published annually in factsheets, which are available by study programme and field of study, and show results for attrition and graduation rates. Universities use the data to plan and update their educational offer, and to guide the choices of prospective students.

While universities of applied sciences have not participated in Atrack to date, they need systematic labour market information to plan their educational offer, as they are requested by law to have proof of labour market demand for graduates for the (re)accreditation of their study programmes. The development and updating of study programmes requires a “need and acceptance study” conducted by an independent party. In addition, universities of applied sciences generally maintain close connections with employers in the local and regional labour markets.

Box 1. Atrack graduate tracking project at Austrian public universities

The Atrack project gives public universities access to comparative information on the careers of their graduates, e.g. the duration between graduating and starting their first occupation, their employment status, labour market integration, income and the economic sector in which they work. The results of the graduate tracking initiative are used, among other reasons, to inform steering decisions by university bodies, for the evaluation and further development of study programmes, to guide the study choices of prospective students, and to provide career guidance for students and graduates.

Universities participating in the project have access to an individual online database (STATcube), which provides comparative information on their graduates' entry to the labour market and first five years following completion of their studies. Each university receives a factsheet divided by university degree programme, academic degree (ISCED 6-8) and broader field of study (ISCED F 2013 fields of education). The factsheet presents diagrams for selected results in the following areas: i) labour market status, ii) time period until first employment, iii) top-five sectors, iv) gross monthly income for full-time employees.

The project ran initially from 2017-2021. It was led by the University of Vienna, involved all 21 public universities and received EUR 250 000 funding from the Austrian Federal Ministry of Education, Science and Research.

Data

Participating universities populate a data cube with their own data. This is complemented by comparative data from the Main Association of Austrian Social Security Organisations, the Resident Register and the Educational Attainment Register. The comparative data include all higher education graduates residing in Austria, who have either completed or abandoned their studies. Statistics Austria aggregates and processes the data in anonymous form. Each university has access to all of the data. The results are prepared and plotted appropriately and presented in an automated format, to the extent possible. By using a register-based approach, the participating universities avoid costly graduate

surveys, usually with low response rates, to gather information that is already collected and available through Statistics Austria.

Success factors and barriers

A starting point for the project was a push from the Federal Ministry of Education, Science and Research, in the form of performance agreements, to increase the graduate tracking efforts of public universities. Success factors included the presence of project leaders in the participating universities, the creation of a network of quality assurance specialists, and sufficient flexibility and time to agree, design and revise the project design. Barriers included agreeing on the core information to be included in the factsheets, and study programmes not reaching the minimum sample size required for the results to be published (the minimum sample size is 30, for data protection reasons).

Source: Submission of the University of Vienna to the 1st international peer-learning seminar of the LMRO Partnership Initiative in November 2020. Website: <https://qs.univie.ac.at/en/analyses/graduate-tracking/hrsm-project/>.

In addition, higher education institutions (HEIs) collect their own information on how their graduates perform in the labour market

The survey of current institutional practice and medium-term priorities carried out for this project showed that 74% of the surveyed HEIs across the sectors collect their own information on employer skills demand and graduate labour market outcomes, in addition to the publicly available sources. For this, HEIs typically use graduate surveys, LinkedIn data and various forms of interactions with employers to gain structured information on the current employment situation of graduates and level of satisfaction on the job, as well as on the relevance of the technical knowledge and skills they have developed during their studies. Common practice is to carry out graduate surveys one or two years after graduation; some institutions also conduct a survey five years after graduation and have plans to introduce a survey ten years after graduation. HEIs design their own questionnaires.

Other common sources of labour market information are the involvement of guest lecturers in teaching, the participation of employers in study programme commissions that review the relevance of curricula in light of current labour market developments, and economic and societal needs, and alumni. In addition, HEI career services are important sources of information. Some operate job exchange platforms and organise career fairs that can be considered rich sources of labour market information.

While many HEIs use labour market information for curricula updates, less common is the use of this information for guiding students in their choice of study fields and specialisations, particularly among public universities

Practices to monitor and ensure the labour market relevance of the educational offer are also common; 74% of the surveyed HEIs have institution-wide practices in place (Figure 4, Annex A). This was more common among the surveyed universities of applied sciences (89%), and the university colleges of teacher education than the public universities (58%) (Figure 5, Annex A). It seems that the surveyed HEIs are satisfied with their current level of practice in the area of monitoring relevance. Around one-third of the surveyed HEIs (32%) stated that they will further develop current practice in this area over the next two to three years. This was more common among the surveyed public universities (50%) than among the universities of applied sciences (11%) (Figure 6, Annex A).

While many HEIs use labour market information for curricula updates – 68% of the surveyed HEIs reported to have institution-wide practices in place – the use of labour market information in guiding student choice of study fields and specialisations is less common (35% of the surveyed HEIs reported this activity) (Figure 4, Annex A), particularly among the surveyed public universities (25%) (Figure 5, Annex A). Across

the surveyed HEIs, using labour market information to guide student choices was the lowest ranked medium-term development priority (Figure 6, Annex A).

What can be learned from current institutional practices?

Central institutional structures and the use of digital platforms facilitate the collection, analysis and use of labour market information, and some HEIs have successfully involved technology transfer centres and knowledge exchange structures in this

The analysis of case studies and stakeholder interviews showed an important role of central-level institutional structures to facilitate the collection, analysis and use of labour market information. As one interviewed stakeholder said: “There is already so much evidence from studies, measurements, surveys etc. that existing data can hardly be processed any more”. Such co-ordinated organisational capacity, often closely connected to institutional leadership, is widely perceived to be a key enabler for conducting pilot initiatives.

The use of digital platforms in the collection of employer feedback on study programmes can help with the sharing of information inside the institution. As pointed out in the interviews, “the initial resistance from faculty staff, when the approach was introduced some years ago turned into common appreciation for increased transparency, efficiency and user-friendliness of the tool”.

Some HEIs have successfully involved technology transfer centres and knowledge exchange structures in the collection of information about emerging skill needs. A common practice is the organisation of regular meetings between programme co-ordinators, teaching staff, researchers and industry partners.

Policy options

Support HEIs to make greater use of research collaboration with industry and public sector organisations for the identification of emerging skill needs and their reflection in the educational offer

One area of institutional practice that could be further developed with public policy support is the involvement of technology transfer centres and knowledge exchange structures in the identification of emerging skill needs. Public funding could stimulate HEIs to pilot new approaches, making effective use of links with firms and public sector organisations to i) collect information on emerging skill needs, and ii) reflect this information in the educational offer through curricula updates, teaching methods, learning environments and qualifications (e.g. micro-credentials).

One learning model is the skills intelligence initiatives developed in the Knowledge and Innovation Communities (KIC) to use machine learning and artificial intelligence to indicate to individuals emerging jobs and career trajectories that match the codified knowledge and skills documented in their curriculum vitae (InnoEnergy, n.d.^[14]). Artificial intelligence (AI) is used to identify skills in texts (e.g. job descriptions and CVs) and helps students and job seekers acquire these critical skills and supports human resources (HR) professionals in their learning and development efforts. HR managers in companies can use the tool to map the skills of their workforce, identify skill gaps based on trends in the sector and identify tailored course recommendations for their employees.

The approach of using AI for skills mapping could be applied to study programmes and piloted for an industry sector of interest to the Austrian government, also with a regional dimension. The matching could be done based on the learning outcomes codified in the curricula of study programmes, initially narrowed to existing study programmes related to the given industry sector with the potential of expansion to interdisciplinary programmes). The information on emerging skills that could be gained from this could be

particularly relevant given the growing presence of inter- and trans-disciplinarity³ in research, for example in the field of green technologies and the circular economy. First initiatives in this area exist, such as the Green Tech Cluster in Styria, with around 250 companies actively involved in research and development of green technology (Green Tech Cluster, 2022^[15]).

2. Guiding student choice

Higher education system context and policy rationale

A wide range of guidance services is available, but does not reach all prospective students equally, particularly those who are the first in their families to enter higher education; students in STEM programmes at public universities seem to lack information

In Austria, a wide range of publicly provided services is available to guide prospective students in their higher education choices. All secondary schools offer education and career guidance. Teachers are trained in education and career counselling, and act as study counsellors. HEIs also offer study guidance and organise outreach activities in schools.

Online guidance is available through various web portals, hosted by public and private providers. Sourcing relevant information online can be challenging given that, even at the institutional level, there are multiple websites offering information on study programmes, provided by the faculty, the university and student associations. Interviewed student representatives mentioned that an “onboarding” website would help them understand who does what and where to find information. *Studienplattform.at*, an online search engine run by the Austrian National Union of Students, seeks to provide this kind of information, giving online study guidance from a student perspective (see Box 2).

Although prospective students more commonly use guidance offered in schools, the guidance offered at HEIs is considered to be more helpful (Schubert et al., 2020^[3]). For example, “*Studieren Probieren*”, a nationwide service offered by the National Austrian Student Association, is a study initiative that starts in secondary schools and offers prospective students guided visits to HEIs organised by students in higher years (see Box 2). “*Studieren Probieren*” is rated as highly useful by prospective students, and should be further promoted (Binder et al., 2021^[16]).

The current provision of study guidance foresees that students have to first decide the type of HEI at which they would like to study. National studies show that students would benefit from more comparative information on study programmes across the different types of HEIs, reflecting teaching methods and learning environments, building on the findings of the national student surveys (Binder et al., 2021^[16]).

According to the 2019 national student survey (Schubert et al., 2020^[3]), the majority of new students (81%) used at least one higher education guidance service. Satisfaction is high in terms of the provision of information regarding the academic aspects of study programmes; only 11% of students felt uninformed. However, the provision of information on future labour market prospects appears to be less effective, with 20% of new students feeling uninformed.

A key policy challenge is that the existing study guidance does not reach all students equally. In particular, students who are the first in their family to enter higher education lack information on the academic requirements of programmes (Schubert et al., 2020^[3]). Another group of students that seem to lack information are students joining STEM programmes at public universities; the survey revealed that more

³ Interdisciplinary research refers to co-operation across scientific fields with attempts to integrate knowledge and provide joint results, while transdisciplinary research refers to the co-operation of scholars with (other) societal actors who play active roles in the research process, thus also termed participatory research (OECD, 2020^[33]).

than half felt insufficiently informed about the academic requirements of their study programmes and future labour market prospects (Binder et al., 2021^[16]). Across the sectors, female students feel much less informed about their study programme compared to their male peers. Particularly common is an uncertainty among female students about their field of study choice in computer science programmes at public universities. Only 17% of female first-year students were sure about whether they had made the right choice (versus 57% of male peers), particularly in terms of curricula/student content (Dibiasi, Schubert and Zaussinger, 2021^[17]).

In order to gain insight into how students in their last year of school plan their educational or professional future, the Federal Ministry of Education, Science and Research conducted a survey among students in their last year of upper secondary school and expects results by the end of 2022. This should facilitate improved planning of study offer and measures to improve the transition phase into the labour market, post-secondary or higher education.

Box 2. *Studieren Probieren* and the *Studienplattform* website by the Austrian National Union of Students

Studieren Probieren was launched in 2009 by the Austrian National Union of Students with the aim of connecting secondary schools and HEIs, guiding prospective students in their higher education choices and helping them to navigate the large number of study programmes.

The process starts with a team of students visiting secondary schools to present their experience of higher education to class groups and in one-on-one meetings and smaller groups. Students have diverse backgrounds and language skills, and come from different fields of study. The next step is for students to sign up for an accompanied visit to an HEI and programme of their choice. This gives prospective students the opportunity to reflect on whether the study programme, the HEI and the location could be a good fit for them. This is a very different first experience compared to visiting a higher education fair. A current student will accompany a group of prospective students to a lecture and will answer any questions related to the study experience, student life, housing and work. It is free for prospective students to participate in these guided visits.

In the winter semester of 2021/2022, almost 6 000 prospective students participated in the initiative. A priority target group are prospective students who are the first in their families to enter higher education.

The *Studieren Probieren* initiative is funded by the Austrian Federal Ministry of Education, Science and Research. It is based in Vienna, but relies on a network of local students to organise visits to HEIs across Austria and was created, developed and is run by students. Every student guide knows the nuances of their field of study and can therefore give authentic help to prospective students, and are particularly suited to the task, as they are young enough to remember their first steps into higher education themselves.

In its early years, *Studieren Probieren* lacked a public profile, meaning teachers and guidance counsellors in schools were initially reluctant and cautious to engage in the initiative. However, this has all changed, due to the positive response of participants and the growth of the programme. Going forward, the Austrian National Union of Students wishes to increase its efforts in impact studies and expand its “train-the-trainer” programme for guides. Schools can facilitate the work of *Studieren Probieren* by allowing their pupils to attend informational meetings; the initiative could reach more school pupils if the visits were embedded into the school curricula.

Studienplattform.at is an online search engine for all higher education degree programmes in Austria. It has been run, since 2010, by the Austrian National Union of Students as a “search engine from the students' perspective”, which offers basic information (e.g. curricula, ECTS, hyperlinks to relevant websites of HEIs), information on different types of entrance examinations (particularly for students with

a non-linear transition), application deadlines, contact details of student representatives, and information on occupational fields of work related to the study programme.

The aim is to support prospective students, education counsellors in schools and *Studieren Probieren* student guides by offering up-to-date and verified information, given the numerous changes in higher education and increasing number of programmes each year.

Source: Submissions of the Austrian National Union of Students to the 2nd international peer-learning seminar of the LMRO Partnership Initiative. Websites: <https://www.studierenprobieren.at/> and <https://www.studienplattform.at/> (both accessed on 15 February 2022).

HEIs could make greater use of labour market information in their study guidance and in demonstrating knowledge application during the first year of study in order to increase study motivation

Students need labour market information that is sufficiently specific and relevant to their study programme. This includes information on existing and emerging occupational profiles, for example a catalogue of emerging occupations in the sector, typical employment conditions and information on employment prospects and earnings. As one interviewed senior management representative pointed out: “Finding the right balance between the needs of individuals and society, and ‘full’ information is important. Do we tell students in teacher training explicitly that they will earn less than computer engineers or that sociology students might not find a job? Embedding labour market information into curricula can help in finding this balance”.

Labour market information can increase study motivation. Analysis of case studies and stakeholder interviews showed that programme co-ordinators, teaching staff, and those responsible for the design and delivery of student support services see positive effects on the learning culture and self-control of students from the use of labour market information in study guidance, and during the first year of study to illustrate fields of knowledge application. It is important to create awareness of where and how the knowledge and skills gained in the classroom can be applied in real life (Frauenberger and Purgathofer, 2019_[18]). As one of the interviewees noted: “... there is a story to tell about computational thinking, about technology and society, and about the kinds of involvement in our society that [graduates] can have”.

Labour market information for prospective students is currently mainly provided by the public employment service in the form of brochures for individual fields of study and an online “career compass”. The information is general and provides a broad overview. This is an area where HEIs can do more.

The institutional survey, carried out for this project, showed that currently around one-third of HEIs (35%) have institution-wide practices using labour market information to guide study choices, and slightly more than half (53%) have pilot initiatives in a wider range of programmes (Figure 4, Annex A). Institution-wide practices were most common in universities of applied sciences (Figure 5, Annex A). Across the sector, using labour market information to guide study choices was the lowest ranked medium-term priority (Figure 6, Annex A). Making progress in this area will also require a broader understanding of labour market information across higher education and career choices, going beyond information on earnings and employment prospects (OECD, 2020_[19]).

Study guidance is largely focused on first degree programmes and may not meet the information needs of learners seeking higher-level studies or seeking upskilling and reskilling

Study guidance in Austria is largely focused on prospective students about to start their first degree programme. However, the increasing number of study programmes, including interdisciplinary programmes, and the high proportion of students that continue higher-level studies after their bachelor’s

programmes means it is important for HEIs and public policy to take action in the area of guidance for higher-level studies.

On average, approximately 70% of bachelor's programme graduates continue their studies (Binder et al., 2021^[16]). The share is particularly high for STEM programmes at public universities, where between 81% of ICT students and 90% of engineering students enrol in a master's programme at an Austrian university within two years of graduating. Women have a lower continuation rate into higher-level STEM studies than men, both at public universities and universities of applied sciences.

Information on ways to pause studies, as well as information on alternative ways to graduate (e.g. change of programme, institution) could be improved. Additionally, information on occupational pathways, whereby graduates enter the labour market with a bachelor's degree and continue their post-graduate studies at a later point in time, could potentially help students with their long-term career planning.

A variety of factors can contribute to the avoidance of STEM-related careers, among others, lifestyle values and work-life balance preferences. Peer mentoring by higher-year students, teaching staff and researchers can help to raise awareness of gender biases in career choices and gender-specific challenges in achieving a balance between family and career. As was pointed out in the interviews, "compatibility between family and career is not something you can imagine as an 18 year-old."

Another important aspect of study guidance relates to students who return to higher education for upskilling or reskilling, as well as those who seek to complete previously postponed or terminated studies.

Executive education and other formats of continuing education are an integral part of higher education in Austria. Most of the HEIs surveyed for this project (85%) reported activities in either a wide range of programmes or institution-wide practices in place to meet the needs of learners who seek upskilling or reskilling, through adapting curricula, the mix and flexibility of programmes, and qualifications (Figure 4, Annex A). Around one-third of the surveyed HEIs (32%) identified the further development of current practice as a medium-term development priority. This was more common among public universities (42%) than among university colleges of teacher education (30%) and universities of applied sciences (22%) (Figure 5, Annex A). Across the sectors, the emphasis for medium-term development is on adapting the flexibility of programmes (73%) and adapting curricula (73%), followed by adapting the mix of programmes (64%) and adapting qualifications (55%) (Figure 6, Annex A).

STEM programmes still play a minor role in continuing education (Kulhanek et al., 2019^[20]). Expanding the offer could be considered as a way to attract students who suspended or abandoned their studies prior to graduation to enter the labour market, commonly referred to by the interviewed stakeholders as "job-outs".

What can be learned from current institutional practices?

HEIs collaborate with schools to demonstrate the societal relevance of study programmes with promising results in raising interest in STEM subjects

Collaboration between HEIs and secondary schools on study guidance is common in Austria, for example the development of innovative pedagogy in STEM subjects, school visits, mobile exhibitions and participatory laboratories, internships in STEM professions, as well as maths courses that secondary school students can take before enrolling in an HE programme, and for which they receive ECTS.

An Austria-wide initiative that brings together schools, school authorities, university colleges of teacher education and universities is "Innovations Make Schools Top" (IMST). The aim of the initiative is to support teachers in developing and implementing pedagogic innovations in the teaching of STEM subjects (Box 3).

As highlighted in stakeholder interviews, collaboration with schools can particularly support students who are the first in their family to consider a higher education degree, in their decision-making and during the transition phase into higher education.

Mentors can play an important role in supporting prospective students in their decision-making and during the first year of study. Confidentiality of the relationship (i.e. that teachers are not involved) and the open-ended nature of the process (which means that pupils may also decide not to enter higher education) are important features and help build self-confidence for the decision-making process. Interviewees pointed out that “students don’t feel ashamed of stupid questions”, particularly in situations that are new to them, “... they see that they are not alone. We give them perspective, so that they avoid focusing their attention on a course they don’t like or struggle with, but rather see themselves in the bigger picture.”

Box 3. “Innovations Make Schools Top” (IMST) initiative

Starting points

IMST started as a research project on innovation in the teaching of mathematics and science, then opened up to other subjects. The project (1998-1999) outlined suggestions for improving the teaching of mathematics and science at secondary level in Austria. From 2000-2004, IMST was continued as a development project with the aim of fostering innovation within secondary schools and proposing a long-term plan for making improvements. The proposal was to establish a nationwide support system for STEM teaching in Austria at all levels. Since 2005, some of these measures have been implemented (e.g. establishing national and regional competence centres, regional networks), some have been partially implemented (establishing a fund for teachers submitting innovative projects), and some have not been implemented at all (establishing a subject-related education management at the school level).

The role of teachers and school principals

IMST supports pre-service and in-service teacher training through teaching materials and a teacher network. The main idea is to help teachers become “reflective practitioners”. As part of this, teachers are asked to prepare “innovation papers” of around 20 pages. Young teachers often have no idea what innovative teaching means, but they can get inspiration from producing these papers as a way of reflecting on their own work. Teachers are also encouraged to look at critical moments in classroom management and teaching practice. IMST has an online search engine with teaching materials, including 1 600 innovation papers.

School principals are important enablers for innovative approaches in teaching. IMST research shows that if teachers are supported by their principal, they, in turn, show flexibility to their students. Hence, teacher development needs to be interlinked with institutional development. Principals have an incentive to participate in IMST because of the implicit spill-over effect.

Development plans

The initiative receives funding from various sources, the largest share coming from the Austrian Federal Ministry of Education, Science and Research. Negotiations on the continuation of IMST are underway, and the suggested new IMST action plan aims at building a nationwide professional development system for schools, with an emphasis on subject-specific pedagogies, collaboration among teachers, corresponding autonomous activities supported by school principals, individual school professional development strategies supported by educational administration and policy, and accompanying research. A pilot project could be to work with a selection of schools aiming to establish or further develop an existing focus on STEM subjects.

Source: Submission of IMST to the 2nd international peer-learning seminar of the LMRO Partnership Initiative. Website: <https://www.imst.ac.at/> (accessed on 13 January 2022).

HEIs use various methods to provide prospective students with information that describes the study environment and academic requirements of programmes as authentically as possible

To make informed choices, students need information that describes the study environment, academic requirements, and labour market prospects of programmes as authentically as possible. This information is best provided by HEIs, for example in the form of open days, “*Studieren Probieren*” (see Box 2), and entrance interviews where prospective students meet with teaching staff, programme co-ordinators and students from higher years. Interviewees noted that training on how to lead conversations and the involvement of multilingual student representatives can be beneficial preparation for entrance interviews, which can be particularly helpful for prospective students who may face language barriers.

Common practices include online information sessions, streamed for example on Facebook or YouTube, where students report live on their study experiences, exams and other difficult moments and how they managed to overcome these. A frequent question from prospective female students is whether they will be in the minority in their study programme.

Alumni can be important role models in study and career choices. They build career aspirations by making a credible link between the learners’ view of themselves today and an aspirational view of their future selves. The analysis of case studies and stakeholder interviews showed that while HEIs rely to a large extent on alumni for building research and collaboration links, including job-shadowing opportunities and internships, there is room for improvement when it comes to the involvement of alumni in study guidance, particularly for higher-level studies, upskilling and reskilling, and for individuals who return to higher education to complete suspended or terminated studies.

Policy options

Support HEIs to increase their collaboration with schools, particularly in STEM subjects

The regular national student surveys show that the more informed students are when entering a programme, the more certain they are about the requirements and prospects of their choice (Schubert et al., 2020^[3]). Informed student choice can be strengthened by collaboration between HEIs and schools to provide prospective students with authentic information about study requirements and learning environments. Supporting HEIs to increase collaboration with schools requires a continuous dedication of resources from HEIs, and the potential gains in terms of study guidance warrant public investment.

Collaboration, in the form of study taster/sample programmes and peer monitoring, can be effective in helping students, particularly those who are the first in their family to consider a higher education degree, in their decision-making and during the transition phase from secondary into higher education. Scaling up these efforts, evaluating who has benefitted and in what ways, and recognising the profiles of prospective students who were not reached will help strengthen the inclusiveness of the guidance and reach those who are under-represented in higher education and specific study programmes.

Another result of collaboration between HEIs and schools is the involvement of subject teachers in career guidance. The analysis of case studies and stakeholder interviews showed that subject teachers in secondary schools play an important role in raising interest in STEM subjects by illustrating how subject-specific theories, the foundations of which are taught in secondary school, are applied in daily life and through on-the-job practice. An engaged subject teacher can also have a positive effect on parents and

care-givers, who tend to play a fundamental role in study and career choices in secondary school and earlier.

International studies confirm this. For example, ASPIRES, a longitudinal study in the United Kingdom, regularly surveys students (aged 10-19) to explore how preferences develop and what influences the likelihood of a young person aspiring to a science-related career (Archer et al., 2020^[21]). The study found that only around 16% of the young people surveyed aspired to become a scientist, while almost two-thirds agreed that they learn very interesting things in science classes. Conversely, more than half of the surveyed students had career aspirations related to business and management. One of the explanations proposed by the study is that the students had a much clearer understanding of careers in business and management than of science-related careers. The effect of gender on engineering aspirations is large and evident from the age of 10; girls were much less likely than boys to aspire to careers in technology and reported less parental support to continue with technology. Similar findings come from a global study by UNESCO, which showed that most young European women become attracted to STEM subjects between the ages of 11 and 12. If not developed, this initial interest drops off significantly between the ages of 15 and 16, with limited recovery (UNESCO, 2017^[22]).

Further develop study guidance for learners who return to higher education for upskilling and reskilling, or to complete suspended or terminated studies

An important aspect of study guidance concerns students who return to higher education for upskilling and reskilling, as well as those who seek to complete suspended or terminated studies.

Easy access to meaningful and comparable information on study programmes is important for making study choices, particularly for people with busy working lives. Universities of the Netherlands (UNL) developed a website, which went online in November 2021, containing all online and offline courses for professionals. These courses range from post-graduate master's degrees for professionals to one-week short courses. Professionals seek an expansion of their skillset to adapt to the changing economy (broader multi-disciplinary skills, new technologies, etc.). The 14 public universities in the Netherlands have offered courses for professionals for several years, but did not have a "one-stop-shop" to present their offer. The website supports professionals to easily identify courses that are relevant to their work. It has an English language option, and the universities have an automatic link that updates the courses on a daily basis. There are between 1 200 and 1 600 courses available; website users are directed to the universities for registration. UNL has noticed an increasing public interest in lifelong learning, particularly after the recent introduction of learning vouchers with an annual entitlement of EUR 1 000 for lifelong learning, when searches on the website for educational offers below EUR 2 000 increased significantly.

An important outcome with policy relevance is that the collation of the information from online and offline courses for professionals into one platform has stimulated a dialogue between public universities (and the rest of the higher education sector), employers and government authorities about the role of higher education in the provision of lifelong learning and continuing education. The university perspective is focused on how to translate science and knowledge into a lifelong learning offer. This, however, may not be sufficient to meet the needs of the economy; for the crosswalk, increased dialogue with employers and employees is needed. The aim is to "collaborate with the private sector to build a radar that captures what is going on in the economy and what courses exist", as Universities of the Netherlands pointed out an LMRO international peer-learning seminar (LMRO Partnership Initiative, 2022^[23]).

3. Supporting students to succeed in their studies and future jobs

Higher education system context and challenges for HEIs

Study success in higher education varies significantly by gender and previous education

In Austria, study success in higher education varies significantly by gender and previous education (Dibiasi, Schubert and Zaussinger, 2021^[17]). The National Strategy on the Social Dimension in Higher Education policy seeks to achieve a more balanced gender ratio in all fields of study (Austrian Federal Ministry of Education, Science and Research, 2017^[7]). Gender-specific attrition is particularly high in STEM programmes, where the success rate for men is 1.7 times higher than for women (Dibiasi, Schubert and Zaussinger, 2021^[17]). Making progress on this will require a double approach to information and study guidance, as discussed above (2. Guiding student choice), and support for students to succeed in their studies, overcoming the risk of attrition, which is particularly high at the beginning and end of a study programme.

Across the higher education sector, measures to facilitate the transition phase into higher education include bridging courses in mathematics and other science subjects, and various cohort-building initiatives. However, an intensive mathematics refresher course may not be enough to compensate for gaps in subject-specific knowledge that stem from varying levels of secondary education. Similarly, cohort-building measures and group exercises can be enablers for social integration, but they can also act as barriers where group diversity is low and competition and peer pressure are high. This particularly affects minority groups, such as female students in male dominated study programmes (Dibiasi, Schubert and Zaussinger, 2021^[17]).

To address these challenges, higher education policy stakeholders are discussing an additional emphasis on critical elements in the curricula combined with the possibility of credit transfer for students with prior knowledge (Binder et al., 2021^[16]).

When designing courses and setting examination dates, HEIs should take into account that a large proportion of students combine study with work and/or care responsibilities

According to the 2019 national student survey, approximately 65% of undergraduate and graduate students in Austria work while studying, with the proportion of working students increasing with the progression of their studies. Around 22% of students consider themselves as mainly working and only studying on the side. Students have also care responsibilities; around 8% have children (Unger et al., 2020^[11]). For these students, the risk of attrition can be high. HEIs are required to take into account whether students work or have caring responsibilities when designing their courses and setting examination dates. To this end, they can provide special conditions for working students in their statutes or curricula (for example, working can be considered a reason for leave of absence). Working students who start a new degree programme from the academic year 2022/2023 onwards must also complete the compulsory minimum requirement of 16 ECTS credits in four semesters (Austrian Federal Ministry of Education, Science and Research, 2021^[24]).

There has been increasing movement of STEM students from public universities into universities of applied sciences (Binder et al., 2021^[16]). Potential reasons could be that UAS offer study programmes that students can follow on a part-time basis. However, other factors also seem to make a difference for students, such as curricula design and organisation, and the availability of support structures related to the learning environment (including infrastructure). The majority of students at universities of applied sciences (72%) rated these factors good or very good, which is almost twice as high as in public universities (39%) (Zucha, Zaussinger and Unger, 2021^[25]). STEM programmes at public universities received particularly low ratings: only one in three students (34%) rated these factors good or very good (Binder et al., 2021^[16]).

Quality of teaching in STEM programmes is a reported area of concern across the sectors

The quality of teaching seems to be a further area of concern for students in STEM programmes across the sector. At public universities, 35% of students rated their teachers good or very good in terms of their capacity to explain concepts and to motivate them to perform at their best, compared to 48% at UAS (Binder et al., 2021^[16]). Across the sector, women rated the quality of teaching in STEM programmes lower than their male peers (Dibiasi, Schubert and Zaussinger, 2021^[17]).

The institutional survey carried out for this project showed that currently around half of HEIs (56%) have institution-wide practices to support teaching staff to keep up to date with innovation and societal challenges linked to their discipline, and to reflect this in their teaching, and 26% have pilot initiatives in a wider range of programmes (Figure 4, Annex A). Institution-wide practices are most common in UAS (Figure 5, Annex A). Support for teaching staff is a medium-term development priority for half of the surveyed HEIs; this is also most common for UAS (Figure 6, Annex A).

What can be learned from current institutional practices?

Public universities have increased their efforts to lower attrition rates through a study introduction and orientation phase, mentoring, academic writing support, and monitoring of study progression

Stakeholder interviews confirmed that the two most critical phases for a student are the beginning and the end of a study programme. The analysis of case studies and stakeholder interviews showed that public universities build on peer mentoring among students as effective way to combine academic support with cohort building. Success factors include: i) wide dissemination of information on the mentoring offer, which ideally would reach all students, for example, by announcing the mentoring offer during the enrolment process; ii) small group sizes of 10-15 people per mentor; and iii) a letter of motivation requiring students to reflect upon their motivation and expectations. Furthermore, it is important to set incentives for mentors (e.g. certificates/recognition), training, regular feedback and reflection sessions. The typical duration of mentoring programmes is one semester. This may be long enough to gain an understanding of how studying works and where to find information on courses and exams, however, it may be too short for cohort building.

The option to modularise the dissertations in master's programmes, with credits awarded for the completion of sub-modules, can help students to structure an otherwise long period of self-study. Support with academic writing helps students during critical phases and throughout their studies. Different formats of support exist. What seems to be particularly effective is taking students out of their day-to-day student life, allowing them to dedicate time and full attention to the writing process, accompanied by elements of peer-review and expert feedback.

A recent change in the funding of study places has led to increased efforts by public universities to lower attrition rates, particularly during the first two years. A study introduction and orientation phase (StEOP, *Studieneingangs- und Orientierungsphase*) has been introduced in ISCED 6 programmes at public universities to provide guidance and improve student commitment (Austrian Government, n.d.^[26]). It provides general orientation at the beginning and allows students to check whether the chosen study programme was the right choice for them. Students gain insights into what can be expected during studies and what is needed to successfully complete the programme. StEOP consists of one or more courses that are outlined in the corresponding curriculum. Universities can mandate that students must successfully complete the introduction and orientation phase before they are allowed to take further courses and exams on the degree programme. A recent evaluation of StEOP showed that students greatly appreciate the orientation that these courses offer as well as the positive impact on self-organisation and opportunities for networking. "Student monitoring" is a collaborative initiative which involves nine public universities

(University of Graz, n.d.^[27]). The main focus is on monitoring study progression (completion, dropout and transfer), examination activity, and the effects of labour market integration and socio-demographic factors on study behaviour, performance and progress. The initiative is designed as a pilot, with upscaling potential to establish a comparative analysis of study and labour market-related behaviour of students at the participating universities to strengthen inter-university co-operation. There is collaboration between the quality assurance units of the universities, supported by a private research organisation, to develop relevant indicators. There are plans to continue and enhance the monitoring process. The “STUDMON” project started in 2018 and received funding from the Austrian Ministry of Education, Science and Research of EUR 250 000 for the period from January 2018 to December 2021. The aim is to roll-out the methodology to other HEIs in the country.

As part of the project, an interactive dashboard was developed to visually display study progression, examination activity and completion and dropout rates, and allows for the identification of critical phases in the course of the student lifecycle. For a more detailed analysis of risk factors in individual study phases, regression models were developed to identify student characteristics that are systematically associated with poorer performance or increased dropout probability. These results facilitate the target-group-oriented optimisation of study organisation and support services and enable the early identification of problematic study phases. The quality assurance units of the nine universities collaborate and are supported by a private research organisation to develop relevant indicators.

As pointed out by the leader of one of the participating quality assurance units, for the diagnosis tool to be effective, it needs to be combined with action. Reports need to be provided for programme and course directors, and teaching staff. Furthermore, this needs follow-up to ensure commitment, for example through discussions in governance boards or the benchmarking of study programmes.

HEIs are successfully making use of diversity-sensitive teaching to meet the needs of different types of learners, with successful results in study engagement and success

Diversity-sensitive teaching is an area of growing importance in Austrian higher education. This involves recognising gender diversity, the needs of different types of learners, their cultural backgrounds and their prior knowledge and experience (e.g. students in executive education). For example, the use of certain methods may need to be carefully considered when teaching probability theory to students with different cultural backgrounds; e.g. gambling examples may not be understood by students whose religion prohibits gambling, and methods would therefore need to be adapted. Furthermore, this means promoting diversity in a disciplinary understanding of sciences, that is, “the understanding that we have to teach more in an interdisciplinary way to address the grand challenges”, as one interviewee pointed out.

While there is no mandatory training or continuous professional development in teaching methods and pedagogy in higher education in Austria, several HEIs have introduced this practice, along with yearly teaching awards. The analysis of case studies and stakeholder interviews showed that new teaching staff are easy to reach, while teachers with several years’ experience may be reluctant to engage in training. In this case, the progressive introduction of awards, a quality label for diversity-sensitive teaching and for innovative teaching methods more generally, can be helpful to reach a larger group of teaching staff. Transparency, an independent jury, and the involvement of students in the awards process can turn this into a long-term process. This seems to be most effective when part of a strategy that involves quality assurance, programme co-ordinators, teaching staff and students, and when based on guidelines and support, and which allows for innovation through individual approaches under a common framework.

Throughout the higher education sector, and particularly in public universities, student tutors have a teaching role in the courses, increasingly also in learning environments that operate blended- and online-learning scenarios. A key success factor is the combination of incentives (e.g. ECTS credits, certificates) with support through a structured course, which also signals to teaching staff the value added that these

tutors can bring to their teaching. This could be a way to engage established teaching staff in innovative teaching methods.

Some HEIs have introduced a structured approach to support students to combine study and work through guidelines that bind companies to a maximum amount of working hours per week

Around two-thirds of Austrian students work during their studies. The students interviewed for this project pointed out that clear communication on how much time can be spent working while studying helps students to establish a limit beyond which their studies might suffer.⁴

Some HEIs inform their students about how much work per study year is feasible. Furthermore, a common practice to support students at risk of attrition is to set up student-specific arrangements between programme co-ordinators and companies to facilitate programme completion for working students. This works particularly well with smaller companies.

In some fields of study, the labour market demand for students who have gained some knowledge and skills but have not yet completed their studies is high, particularly ICT and business administration programmes (e.g. accounting). This has led some HEIs to develop a more structured approach to mitigate attrition and support students to combine study and work. The analysis of case studies and stakeholder interviews showed that a key success factor is to put in place guidelines which bind companies to a maximum amount of working hours per week, adaptable per semester. The use of scholarships to attract high-performing students to studies in areas with high labour market demand is also practiced.

Some career centres are particularly successful at creating a match-making platform that requires firms to win students' interest through authentic descriptions of entry-level jobs, on-the-job training and career prospects

Career guidance services are well established at Austrian HEIs and there is a long history of organising career days and other activities to connect students with potential employers. However, getting students to make the most of career guidance services can be challenging.

The analysis of case studies and stakeholder interviews showed that getting students to make use of career guidance throughout their studies, and not just in the months before graduation, requires career guidance to be seen as “a discovery that should be fun. The aim is to gain experience and to enjoy the experience. This is not a linear process, it is jumping back and forth”, as pointed out by a leading staff member at one of the career centres interviewed. Additionally, students may change direction in their job aspirations, as mentioned in the interviews: “First they wanted to go into corporate, then consultancy, and now the development is towards work-life balance, a certain degree of self-responsibility and being able to make decisions.”

The analysis showed that career guidance is most effective when integrated into study programmes, for example through formats that include ECTS credits and signal value for future employers (e.g. a course with the name “Talent programme”). Furthermore, students learn to ask and answer open and circular questions. This is not “about students memorising questions but understanding why these questions are being asked. It is the change of perspective: putting yourself in the other side's shoes”, noted one interviewee.

Some career guidance centres are particularly successful at creating a neutral match-making platform that requires firms to win students' interest through authentic descriptions of entry-level jobs, on-the-job training and career prospects. HEI leaders appreciate career centres playing this role, which requires firms to go

⁴ National student data show that the limit is ten hours work per week (Unger et al., 2020_[1]).

beyond their typical self-promotion. This also helps students to gain self-confidence and awareness of potential biases in interview situations and hiring strategies.

Policy options

Stimulate peer learning across the sector through existing networks to upscale successful practices in the areas of diversity-sensitive teaching, mitigating attrition, and career guidance

A notable feature of the Austrian higher education sector is the presence of accompanying research (*Begleitforschung*) to evaluate, further develop and upscale pilot initiatives to promote innovation in student support services. The above-mentioned central-level structures fulfil this function (See Central institutional structures and the use of digital platforms facilitate the collection, analysis and use of labour market information). In addition, some networking structures exist, also across the sectors, at least at an informal level.

Building on the tradition of accompanying research and existing networks could help to upscale sector-specific pilot initiatives and institutional-level practices in the following areas: high-quality inclusive teaching in higher education, curricula design to facilitate study success for students combining study and work, mitigating attrition, and career guidance. Given the growing focus on innovation in teaching and learning across Austria's higher education sector, this could be an umbrella topic to combine efforts.

A learning model could be Ireland's National Forum for the Enhancement of Teaching and Learning in Higher Education, which was established by ministerial order in November 2012. The creation of the National Forum represented the beginning of a new era for Irish higher education. Ireland's National Strategy for Higher Education to 2030 outlined the importance of ensuring the centrality of teaching and learning in Irish higher education and the National Forum became the national body responsible for leading and advising on the enhancement of teaching and learning across the higher education sector. The National Forum for the Enhancement of Teaching and Learning in Higher Education acts as a link between national policy and institutional practice. It has established stakeholder consultation and ensures that national decision-making is informed by the experiences and views of those who teach, learn and lead. It also ensures that national developments are communicated in a timely manner across the higher education sector. The National Forum collects evidence related to teaching and learning that informs important decision-making. For example, the Irish National Digital Experience (INDEX) Survey gathered information on the digital experiences, engagement and expectations of close to 30 000 students and staff; a unique dataset that captured digitalisation efforts and effects immediately prior to the COVID-19 pandemic (T&L National Forum, 2022^[28]).

4. Adapting the educational offer to emerging labour market needs

Higher education system context and challenges for HEIs

Increasing the labour market relevance of the educational offer has become a strategic priority for HEIs across the sector

The overall understanding at the outset of this project was that labour market relevance is an operating principle for UAS, but not a strategic priority for public universities. This view has proved to be too narrow, and as one of the public universities noted in preparation for the virtual site visit:

- “Universities are called upon to contribute to the constitution of new professional fields through research and development and to prepare for the requirements of future professions by offering new courses of study”.

- “Education as preparation for new forms of work includes non-linear thinking, changing perspectives, making cross-disciplinary connections, communication skills between disciplines, and using imagination and intuition” (Johannes Kepler Unievrstaet Linz, 2019^[29]).

The institutional survey showed that the use of teaching practices, learning environments and assessment methods that equip students with skills valued by employers, including transversal skills, is widespread. Most of the surveyed HEIs (89%) have either pilot initiatives in a wider range of programmes or institution-wide practices in place (Figure 4, Annex A). Institution-wide practices are most common in the surveyed universities of applied sciences (89%), compared to 58% in public universities and 50% in university colleges for teacher education (Figure 5, Annex A). Further developing teaching practices, learning environments and assessment methods is a medium-term-development priority for 42% of the surveyed HEIs, mostly among public universities (58%) (Figure 6, Annex A).

The Diploma Supplement, which sets out a detailed description of the studies completed and an indication of the competencies acquired, including transversal skills, has been introduced in all study programmes across the higher education sector.

Adapting the educational offer to emerging labour market needs is common practice, but can be a cumbersome process

Adapting curricula in response to emerging labour market needs is a common practice among HEIs. More than two-thirds of the surveyed HEIs (68%) have institution-wide practices to adapt curricula, the mix and flexibility of programmes, and qualifications, and 24% have pilot initiatives in a wider range of programmes (Figure 4, Annex A). All surveyed universities of applied sciences reported institution-wide practices (Figure 5, Annex A). For more than half of the surveyed HEIs (55%), adapting the educational offer is a medium-term development priority. This was most common among the surveyed university colleges for teacher education (70%). Adapting the educational offer, along with supporting staff to keep abreast of innovation and societal challenges linked to their discipline, and to reflect this in their teaching, were the two highest ranking medium-term priorities (Figure 6, Annex A).

Through the stakeholder interviews and the analysis of case studies, it became clear that updating curricula can be a cumbersome process for study programmes. Study commissions determine the curricula, professors seek to push through their own areas of interest, and new curricula units and subjects have to pass through several stages of evaluation and approval. For universities of applied sciences, this also includes an independent study to provide evidence of labour market demand and completion of an external quality assurance process.

What can be learned from current institutional practices?

Public universities offer extension-curricula, adding specialisations to study programmes with a greater focus on digital skills and cross-disciplinary topics

Extension-curricula are regular studies offered by universities that allow students to acquire additional competencies that are not covered by their main study programme. The general concept of extension curricula was introduced in 2017, and the first two extension curricula started in Austria in the academic year 2018/19 (Austrian Government, 2002^[30]).

Many universities offer extension-curricula studies to develop digital skills, in line with the University Development Strategy 2019-2024 which states: “students should not only use digital technologies as consumers, but also develop a basic understanding of how to deal with them creatively, how to change them and develop them independently” (Austrian Federal Ministry of Education, Science and Research, 2017^[31]).

On average, extension-curricula studies have around 30 ECTS credits. These studies allow students a possibility to gain specialist knowledge in subjects related to their field or to gain knowledge in a different field based on their general interests and/or career aspirations. Study programmes can be added to bachelor's and master's programmes. The analysis of case studies and interviews showed that a key component in the design of extension-curricula was the identification of emerging skill needs.

Extension-curricula studies are also a way to introduce inter- and trans-disciplinary educational formats. Interviewed HEI leaders underlined that this will require the review and adaptation of existing structures and processes, in line with cross-disciplinary topics that have already emerged through research (Box 4). The aim is to support students to develop critical thinking, abstract thinking, and to deal with different concepts, e.g. one of the interviewed programme co-ordinators pointed out that “as a Computer Scientist, my concern should also be how to anticipate and mitigate negative implications of technology. This approach changes our perspective as researchers. Students learn from this much more than if we focus on only one field of science”.

Box 4. Centre for Technology and Society (CTS) in Vienna: A platform to stimulate inter- and trans-disciplinary educational formats

The Centre for Technology and Society (CTS) is a cross-HEI co-operation platform based in Vienna and funded by the Austrian Federal Ministry of Education, Science and Research. It stimulates and supports inter- and trans-disciplinary co-operation on issues concerning the interface between technological development and social responsibility (e.g. climate crisis, digital transformation, demographic change), involving non-academic stakeholders.

The CTS supports the development of inter- and trans-disciplinary educational formats at the partner HEIs and beyond. An extra-curricular format that receives a lot of interest from students and researchers is “Lectures for Future”, which has evolved from the idea behind “Scientists for Future”, an international movement that supports the global climate movement by providing facts and materials based on reliable and accepted scientific data, and “Fridays for Future”, an international movement of pupils and students to protest the lack of action on the climate crisis.

What the different formats all have in common is that they empower students to carry out their own projects while becoming familiar with different concepts and methods. For example, hackathons with activists or the creation of a video in which students document their own opinion following a structured process from being critical and reflective, articulating the idea and handling reactions, which might be a critical element.

The CTS was founded in 2019 and brings together the Technical University of Vienna, the University of Vienna and two universities of applied sciences, the Campus Wien and the Technikum Wien.

Source: Submission of CTS to the 5th international peer-learning seminar of the LMRO Partnership Initiative. Website: <https://cts.wien> (accessed on 12 February 2022).

Policy options

Further develop existing study guidance and skills-signalling mechanisms through high-quality online information platforms with information on extension-curricula studies

Adapting curricula in response to emerging labour market needs is a common practice among HEIs in Austria, and the use of teaching practices, learning environments and assessment methods that equip students with skills valued by employers, including transversal skills, is widespread. There seems to be a

tendency among public universities in Austria to offer extension-curricula for students across the Austrian higher education sector and beyond. This has the potential to stimulate skills-driven student mobility, also in light of the ongoing developments to build a European approach to micro-credentials as a means to certify learning outcomes of shorter forms of learning opportunities in higher education. It is also a promising approach in strengthening the role of higher education in up- and re-skilling.

Recognition of new curricula and the skills they seek to develop can be challenging, as employers tend to consider only directly related or proximate fields of study and work experience when hiring. Here, technology transfer offices, business participation in governing boards, career centres and other HEI units with strategic employer relations can play an active role in communicating the skills content of (new) educational offers to students and employers using/developing well-recognised formats (e.g. micro-credentials, badges, etc.). Further progress in this direction would benefit from an information infrastructure to guide student choice. A relevant example would be the above-presented example of the website developed by Universities of the Netherlands (UvL) (see policy options for 2. Guiding student choice). While the website primarily informs learners about the education offer, it also permits employers to recognise the skills content of studies.

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Annex A. About the project and field work in Austria

About the project

To support policy makers and HEIs in their shared commitment to enhance the labour market relevance and outcomes (LMRO) of higher education, the European Commission and the OECD launched the LMRO Partnership Initiative in 2019, a collaborative project with the participation of Austria, Hungary, Portugal and Slovenia.

The LMRO Partnership Initiative has three objectives and related strands of work:

1. To assess the alignment of the supply and demand of graduate skills and identify ways to improve this alignment by:
 - a. analysing detailed evidence of the labour market outcomes experienced by graduates and employers to identify the potential drivers and barriers affecting these outcomes;
 - b. identifying policy options and institutional practices with the potential to overcome existing barriers, increase the connections between higher education and the labour market, and improve associated labour market outcomes – by drawing upon international practice and research evidence.
2. To stimulate peer learning about policy options and institutional practices that can improve the articulation between higher education provision and labour markets.
3. To maximise the impact of research evidence and peer learning on institutional practice by developing a self-reflection questionnaire for higher education institutions on labour market relevance and outcomes (Annex B.).

Through policy analysis, peer-learning activities and the development of a self-reflection questionnaire for use by higher education institutions, the project contributed to building national government and higher education institutional capacity to implement future higher education policy reforms. The project informed and supported the European Strategy for Universities, linking its planned aims to national and institutional context and spurring the transformation of the higher education sector.

Country-specific analyses assisted policy makers in the participating countries with the examination of existing policy portfolios, and the identification of policy options that have the potential to improve labour market relevance and outcomes of higher education.

Analytical framework

The analytical framework of the project consists of eight policy and practice areas that public authorities and HEIs can use to enhance the articulation between higher education and the labour market, with the aim of supporting good alignment between skills supply and demand:

- educational offer: curricula and programme content, programme duration and delivery modes that respond flexibly to current and predicted demand for knowledge and skills, including through programmes aimed at existing workers;
- student support and learning environment: financial and non-financial support that encourages students to develop and obtain knowledge, skills and credentials relevant to the labour market;
- policies governing staff profiles and use of time: to support a focus on developing labour market-relevant knowledge and skills among students;
- labour market information: widely available, reliable and accessible information on labour market skill needs and outcomes of graduates from different programmes that is used by students and graduates to make effective career decisions;
- skills-signalling mechanisms: various mechanisms to help employers understand the skills that graduates from different programmes should possess and to help graduates convey the skills they have obtained through higher education;
- quality assurance and accreditation processes: to ensure that education credentials are of good quality and trusted by employers;
- strategic planning, forecast mechanisms and co-ordination: to help ensure the higher education system delivers programmes in response to both current and projected labour market needs;
- public funding to HEIs: taking into account the real or projected career prospects of graduates to encourage labour market-relevant provision as part of a diversified mix of higher education study options.

The project was organised in two phases. Phase 1, from March to December 2020, focused on analysing the labour market outcomes of higher education graduates with the aim of assessing the supply and demand of graduate skills in each participating country. Phase 2, from January to December 2021, focused on analysing institutional practices that seek to enhance the relevance of the educational offer to the labour market.

Call for Practices

The Call for Practices had three aims:

1. to collect information on the current practices and priorities of HEIs in enhancing the labour market relevance of their educational offer;
2. to analyse current and planned future practices to identify enablers, success factors and barriers, and develop from these a set of statements that HEIs can use for a self-reflection exercise to identify areas for improvement;
3. to identify innovative practices for presentation and review in a series of peer-learning activities, which informed the development of a self-reflection questionnaire for use by higher education institutions.

The Call for Practices was addressed to all HEIs in the country and consisted of two questionnaires: a “Survey on Institutional Priorities” and a “Submission of Practices”. The survey period was April - June 2021.

Field work in Austria

Key higher education policy stakeholders in Austria formed a National Advisory Group (NAG) and guided important project decisions with their knowledge and expertise. The NAG played a leading role in identifying priority areas for the country-specific analyses, and is expected to provide an important national dissemination channel to ensure involvement of key stakeholders in the implementation of the project’s recommendations.

Participation in the project was co-ordinated by the Federal Ministry of Education, Science and Research (*Bundesministerium für Bildung, Wissenschaft und Forschung, BMBWF*). NAG members are: the Agency for Quality Assurance and Accreditation Austria (AQ Austria); the Association of Universities of Applied Sciences, Austria (FHK); the Austrian Economic Chambers (WKO); the Austrian Institute of Economic Research (WIFO); the Austrian National Union of Students (ÖH); the Austrian Research Promotion Agency (FFG); the Austrian University Continuing Education and Staff Development Network (AUCEN); the Chamber of Labour (AK); the Council for Research and Technology Development (RFTE); the Federation of Austrian Industries (IV); the Institute for Advanced Studies (IHS); the Public Employment Service Austria (AMS); the Quality Assurance Council for Teacher Training (QSR); representatives from University Colleges of Teacher Education; Statistics Austria; Universities Austria (uniko); and WPZ Research.

Review of higher education institutional practices

Higher education institutional practices can have a significant impact on the quality and relevance of the skills that graduates develop and the labour market outcomes they experience after completing their studies. To examine these practices, the project team carried out interviews with key higher education policy stakeholders and virtual study visits to a non-statistical sample of HEIs, proposed by the national co-ordinator (Table 2, Table 3).

Table 2. Stakeholder interviews in Austria

Stakeholder groups interviewed as part of the project	Number of interviewees
Student representatives	22
Study programme co-ordinators	17
Career centres, student support services in HEIs	11
Employer representatives	10
Third-mission units (e.g. technology transfer offices, science parks)	8
Other members of the National Advisory Group (other than those stakeholders listed here)	7
Senior management of HEIs	6
Internal quality assurance offices of HEIs	5
Ministries or government agencies	5
Higher education sector representative bodies	5
Alumni	4
Teaching staff	3
National quality assurance agency	1
Total number of interviewees	104

Table 3 gives an overview of the overview of the virtual study visits and the Call for Practices that were carried out in the project.

Table 3. Study visits and Call for Practices in Austria

Study visits	Call for Practices
Johannes Kepler University Linz: 20-22 April 2021, 22 interview partners	Number of participating institutions: 9
Alpen-Adria University Klagenfurt: 31 May-2 June 2021, 34 interview partners	Number of submissions: 46
Technical University of Vienna: 1-2 and 5 July 2021, 29 interviews	Submissions by type of institution:
	Public Universities: 39
	Universities of Applied Sciences: 7
	Private Universities: 0
	University Colleges of Teacher Education: 5

Survey results

A total of 72 higher education institutions (HEIs) in Austria were invited to participate in a survey of current practices and institutional priorities survey, and 34 HEIs participated, making the total response rate 47%. A total of 31 responses were analysed. The private universities in the sample were excluded due to low response rate (19%). Response rates for the analysed types of institutions were: Public Universities: 55%; Universities of Applied Sciences: 45%; University Colleges of Teacher Education: 71%. The HEIs that participated in the survey cover 69% of the student population enrolled in the winter semester 2019-2020 (Statistics Austria, 2021^[32]).

Table 4. Austria: Review of higher education institutional practices

Institutional survey	
Total number of responding institutions:	34
Total number of institutions invited to participate:	72
Survey response rate:	47%
Response rate by type of institution:	
	Public Universities: 55% (12 HEIs responded out of 22 invited)
	Universities of Applied Sciences: 45% (9 out of 20)
	Private Universities: 19% (3 out of 16)
	University Colleges of Teacher Education: 71% (10 out of 14)

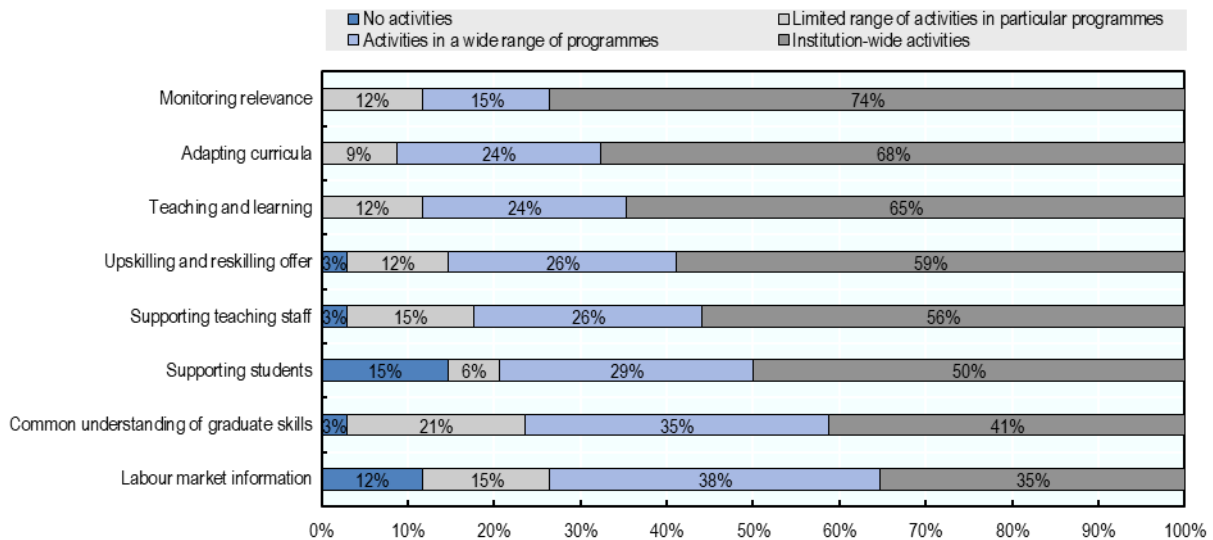
The survey covered eight areas of current practices and priorities of HEIs in enhancing the labour market relevance of their educational offer (**LMRO practices**):

- monitoring and ensuring the continued relevance of the educational offer (**monitoring relevance**);
- adapting curricula, the mix and flexibility of programmes, and qualifications to respond to evolving labour market demands (**adapting curricula**);
- using teaching practices, learning environments and assessment methods to equip students with skills valued by employers, including transversal skills (**teaching and learning**);
- supporting teaching staff to keep up to date with innovation and societal challenges linked to their discipline, and to reflect this in their teaching (**supporting teaching staff**);
- building a common understanding of graduate skills through collaboration with employers and creating trusted mechanisms for students to signal their skills (**common understanding of graduate skills**);
- using labour market information to guide study choices (enrolling in and/or switching study programmes, and/or choosing specialisations) and career decisions (**labour market information**);

- supporting students to enrol and succeed in study programmes with high labour market demand (**supporting students**);
- meeting the needs of learners who seek up- or re-skilling through adapting curricula, the mix and flexibility of programmes, and qualifications (**upskilling and reskilling offer**).

Figure 4. Current coverage of LMRO practices

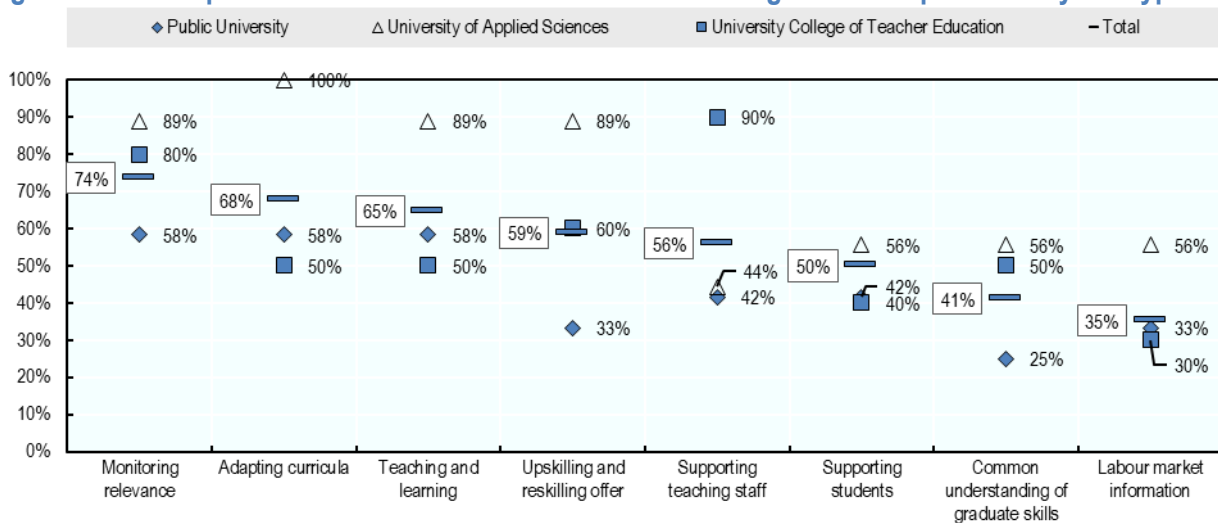
Please rate the status quo of the following eight areas:



Note: The questionnaire provided the following explanation for “activity”: “an activity includes any form of action undertaken to enhance the labour market relevance and outcomes of the HEI’s educational offer.”

Source: LMRO Call for Practices: “Survey of Institutional LMRO Priorities”. Survey period: April-June 2021.

Figure 5. Current presence of institution-wide activities coverage of LMRO practices by HEI type

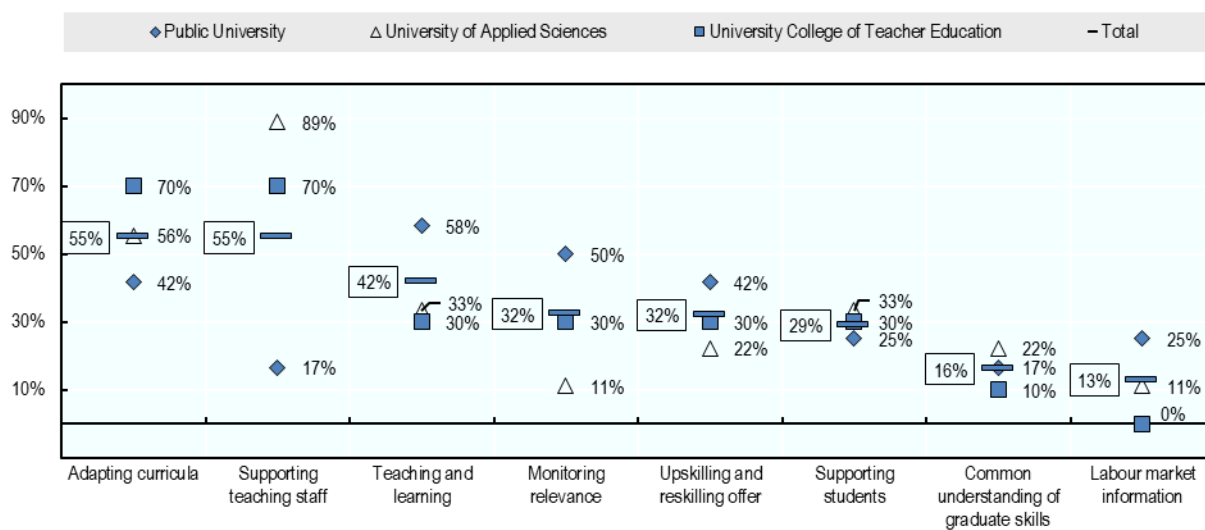


Notes: LMRO practices are shown in descending order by total. Percentage of respondents who stated that institution-wide activities exist for each of the eight areas of LMRO practices. The questionnaire provided the following explanation for “activity”: “an activity includes any form of action undertaken to enhance the labour market relevance and outcomes of the HEI’s educational offer.”

Source: LMRO Call for Practices: “Survey of Institutional LMRO Priorities”. Survey period: April-June 2021.

Figure 6. Medium-term LMRO priorities of HEIs by type of institution

Which are the most important areas you would like to develop further over the next two to three years?



Note: LMRO practices are shown in descending order by total.

Source: LMRO Call for Practices: “Survey of Institutional LMRO Priorities”. Survey period: April-June 2021.

Annex B. Self-reflection questionnaire for HEIs on the articulation with the labour market

This self-reflection questionnaire aims to support higher education institutions (HEIs) in Austria and elsewhere: i) to reflect on the articulation of higher education with the labour market, by identifying strengths and weaknesses of current institutional practices; and ii) to identify and scale-up effective institutional practices. The self-reflection questionnaire can stimulate (international) peer learning among study programmes and HEIs, and help HEI leadership to identify strategic institutional development priorities.

This self-reflection questionnaire contains statements in five categories with examples of current institutional practice that were found to have the potential to enhance the articulation between higher education and the labour market and the alignment between skills supply and demand. Each category was examined in a peer-learning event, which gathered an international audience of higher education policy stakeholders, including policy makers, leaders of HEIs, teaching and administrative staff, higher education researchers, and representatives of quality assurance bodies, industry and student unions. Seminar brochures document the discussion and exchange of policy and practice examples among stakeholders, and are a resource for policy makers and practitioners to support new initiatives and further develop existing initiatives (Table 5).

Table 5. Crosswalk: Self-reflection categories and international peer-learning seminars

Self-reflection category	LMRO Partnership Initiative's international seminars
Monitoring the relevance of the educational offering	"Using labour market information to improve learners' choices and curriculum" (November 2020)
Adapting the educational offering and skills signalling	"Stimulating innovation through inter- and trans-disciplinarity in education and research" (March 2022)
Continuous development of teaching practices and learning environments	"Supporting improvement in teaching and learning to address students' needs and labour market demands" (March 2022)
Supporting student enrolment in study programmes with high labour demand	"Widening access and attracting students to fields with high labour market demand" (February 2022)
Supporting student success in higher education and in the labour market	"Raising study success through student support and improved career-study linkages" (February 2022)

1. Monitoring the relevance of the educational offering

The HEI monitors the relevance of the educational offering in light of changing labour market needs.

	Not practiced	Pilot initiatives	Further development underway	Established practice
Use of publicly available information on graduate employment outcomes and current and emerging employer skill demand to monitor relevance of the educational offer, update curricula and support students in their study choices				
Encourage the collection, analysis and use of labour market information by providing guidance for the evaluation of initiatives, and support for the upscaling of successful initiatives				
Use of strategic collaboration with firms to learn about emerging skill needs				
Support for study programmes to make effective use of labour market information for curricula updates and study guidance				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “**Using labour market information to improve learners’ choices and curriculum**”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

2. Adapting the educational offering and skills signalling

The HEI adapts its educational offering (curricula, mix of programmes and qualifications) to evolving labour market needs, and builds a common understanding of graduate skills and trusted mechanisms for students/graduates to signal their skills to employers.

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
External and/or internal quality assurance processes of study programmes are used to identify opportunities for adapting curricula				
Courses that equip students with in-demand transversal/transferable skills (e.g. digital skills), and knowledge of relevant cross-disciplinary topics (e.g. environmental sustainability) are offered as specialisations or add-ons to study programmes				
Technology transfer offices, business participation in governing boards, career centres and other HEI units with strategic employer relations are actively involved in communicating the skills content of (new) educational offers to students and employers using/developing well-recognised formats (e.g. micro-credentials, badges, etc.)				
Machine-readable records of study programmes are used to increase the efficiency of quality assurance and curricula update, and are used to improve skills-signalling mechanisms which permit employers to recognise the skills content of study programmes				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “**Stimulating innovation through inter- and trans-disciplinarity in education and research**”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

3. Continuous development of teaching practices and learning environments

The HEI promotes the continuous development of teaching practices, learning environments and assessment methods that equip students with transversal/transferable skills, and encourages and supports teaching staff to keep up to date with innovation and societal challenges linked to their discipline, and to reflect this in their teaching.

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
Support learning among peers within the HEI and in an international context to adopt and further develop teaching practices, learning environments and assessment methods				
Project-based learning is offered across programmes and levels of study to allow students to gain practical experience in the “world of work” as part of their study programme				
Organise the involvement of students in collaborative research projects facilitating transversal skills development, identifying and documenting the skills developed				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “**Supporting improvement in teaching and learning to address students’ needs and labour market demands**”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

4. Supporting student enrolment in study programmes with high labour demand

The HEI supports student enrolment in study programmes with high labour demand.

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
Collaboration with secondary schools to demonstrate the societal relevance of in-demand study programmes, for example in science, technology, engineering and mathematics (STEM), to raise interest among learners				
Prospective students receive information that describes the study environment, academic requirements, and labour market prospects of programmes as authentically as possible				
Prospective students are made aware of the academic support available to them (e.g. tutoring, STEM, academic writing)				
Students are offered study guidance for electives, specialisations, higher-level studies and the HEI’s upskilling and reskilling offer				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure “**Widening access and attracting students to fields with high labour market demand**”. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

5. Supporting student success in higher education and in the labour market

The HEI supports student success in study programmes with high labour market demand, and meets the needs of diverse learners, including those combining study with work/care obligations.

	Not practiced	Pilot initiatives	Further development underway	Established practice across the institution
Use of predictive analytics and proactive advising to identify and support students at risk of attrition				
Diversity-sensitive teaching and curricula designed to have practice-based elements in the beginning of a programme are used to meet the needs of different types of learners and to increase study engagement and success				
Peer-delivered study guidance (e.g. tutoring) and support delivered by the HEI's central units are linked up to increase the effectiveness of guidance and support, and to design targeted services				
Students are informed about the potential adverse impact of the number of hours worked per week on study engagement				
Structured approaches to support students to combine study and work (e.g. partnerships with guidelines for companies defining the maximum amount of working hours per week)				
Frequent touchpoints with supervisors and academic writing support are offered to help students with their dissertations				
Participation opportunities in research groups for doctoral students to benefit from peer connections and learning through observation				
Services of career centres reach students early in their studies and are tailored to different levels of study				
Efforts to meet the needs of learners who seek up/reskilling through adapting curricula, the mix and flexibility of programmes, and qualifications				

For relevant policy and practice examples and brief descriptions of initiatives, see the Seminar Brochure **“Raising study success through student support and improved career-study linkages”**. Download the seminar brochure at <https://www.oecd.org/education/higher-education-policy/>.

This Education Policy Perspective has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

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