

Chapter 4. Entrepreneurial teaching and learning in Austria

This chapter focuses on the “entrepreneurial teaching and learning” dimension in Austria. Entrepreneurship education is not only about starting a venture or running a business. It is a holistic activity, whose main aim is to provide students with an entrepreneurial mindset (problem-solving capacity, team-working experiences, creativity, capacity to handle complexity, etc.). Importantly, entrepreneurship education gives higher education institutions (HEIs) the opportunity to be more flexible and generate interdisciplinary curricula and engage with external stakeholders, which can provide students with real-life experiences. From this perspective, the chapter assesses the performance of the Austrian higher education system and discuss Austrian case studies. It identifies some challenges and provides some Austrian stakeholders with recommendations.

Introduction

Entrepreneurial teaching and learning top the agenda of the higher education (HE) system in Austria. National stakeholders have selected this dimension – out of the eight listed in the HEInnovate framework – as a focus in this chapter. Field visits confirmed the importance of this dimension at the level of HEIs: all case studies take entrepreneurship seriously. HEIs have integrated entrepreneurship in their development strategy to promote interdisciplinary teaching and research activities, as well as engagement. This is in line with the national strategy to strengthen the linkages between science and industry (OECD, 2018).

Initiatives to encourage entrepreneurial behaviour and action take different forms in different regions and different kinds of HEI. For example, universities of applied sciences appeared to be well equipped to promote the entrepreneurship and innovation agenda. Universities of applied sciences (UAS) are designed to interact with businesses and are more open to these stakeholders, including in teaching activities. In promoting “transversal skills” such as entrepreneurship, UAS are legally required to provide practically oriented higher education. This includes internships as well as study programmes specially designed for working students. UAS absorb 20% of students enrolled in HEIs.

Entrepreneurship education is also becoming more mainstream in public universities. Several among them address the entrepreneurial agenda in their development plans and missions. These institutions have put in place activities in the field of entrepreneurship education, to provide interdisciplinary competencies and transferrable skills to students, faculty and staff (for example the KLUG-Learning Competencies at the University Graz and entrepreneurship education at the University of Vienna) (see Chapter 1).

In addition, Austrian HEIs have acquired an active role in the development of their economic, local, social and cultural environment (ecosystems) and are increasingly aware of their contribution to innovation and value creation. The performance of HEIs in terms of their capacity to engage with entrepreneurial teaching and learning depends also on their regional “ecosystem”. HEIs are often supported by regional development agencies and chambers of commerce. For example, local stakeholders in Innsbruck have clearly influenced entrepreneurship learning in HEIs.

There are many start-up schemes, entrepreneurship courses and ecosystem level initiatives in different kind of HEIs, all supporting entrepreneurship and innovation (some of these are discussed in the next chapter: “Preparing and supporting start-ups in Higher education in Austria”. Nevertheless, there is an issue regarding the definition of what entrepreneurship means for HEIs and the implications in the development of the entrepreneurial university – which appears to be in an early stage of development in a number of Austrian HEIs. A common and comprehensive definition of “entrepreneurship” would help to implement entrepreneurship education in Austria more effectively.

Within this context, there is still much to do to formulate a sustainable strategy at the HEI level, which clearly shows how to integrate and implement entrepreneurship activities in all parts of a complex university environment (cf. Chapter 2). This is an important issue for different reasons: in the short term, it limits the capacity of HEIs to encourage firm creation and employment; in a longer-term perspective, the lack of an effective strategy may impinge upon skills relevance and also on skills resilience on the labour market.

This chapter is structured as follows. The first section shortly discusses how the entrepreneurship concept could be defined. It focuses on teaching entrepreneurship at the

undergraduate, master's and PhD levels, how research on entrepreneurship could be linked to teaching the subject and also extracurricular, no-credit-based courses in entrepreneurship. The second section discusses whether universities validate entrepreneurial learning outcomes. The section gives examples of learning cases from Austria and other European countries to provide ideas on how to develop new entrepreneurial initiatives. The final section presents some recommendations – or rather suggestions – on actions that national stakeholders could implement to promote the development of entrepreneurial universities in the Austrian context.

Defining entrepreneurship in the context of higher education

Is it possible to teach entrepreneurship?

Before discussing entrepreneurship education in Austria, it is useful to discuss the possibility of teaching/learning entrepreneurial skills. In general, there is a long-lasting debate about whether or not entrepreneurship can be taught. In general, scholars are split into two different schools of thought. One side argues that entrepreneurs are born, not made. The other, conversely, states that entrepreneurship can be learned and that, although culturally and experimentally influenced, it is a skill that can be developed through education and training (Fayolle and Gailly, 2008; Rasmussen and Sørheim, 2006). For example, Drucker (1985) stated that entrepreneurship is a discipline and, like many other disciplines, can be learned.

Once one has taken a side in this dispute, other questions appear. Among others, a key issue concerns the methodology of teaching entrepreneurship. The approach to entrepreneurship education represents another layer of the debate. In particular, there are three different perspectives: teaching “through” entrepreneurship – as a metaphor for economic and organisational change –; teaching “about” entrepreneurship – as a subject area –; and lastly, teaching “for” entrepreneurship – considering the creation of a new business as a possible outcome (Gibb, 1987; Caravan and O’Cinneide, 1994; Klofsten, 2000).

Entrepreneurship education should not be mixed up with teaching general business and economics. Entrepreneurship is about change through creativity and experimentation rather than preserving the status quo and the administration of organisations (Stevenson and Jarillo, 2007; Norrman et al., 2014). Therefore, based on the above, entrepreneurship can be defined as the capacity to transform innovative ideas into sustainable process and products.

Teaching entrepreneurship to improve sustainability and impact

Entrepreneurship is generally perceived as a driver of sustainable development and growth (EC, 2008). Within this context, entrepreneurship education, as a way of increasing the pool of potential entrepreneurs, represents a successful practice (Aronsson, 2004; Lyons and Zhang, 2018).

At the HEI level, entrepreneurship education should aim to develop a mindset and capacity for entrepreneurial activities (Wilson, 2008). Evidence indicates that academically educated entrepreneurs are well suited for working with the development of regional economies, while entrepreneurs with less education tend to be better suited for entrepreneurship on a business-to-business level (Taatila, 2010).¹

Given their understanding of the economy and society, academically educated entrepreneurs have the opportunity to co-ordinate high-growth firms and thus induce large-

scale job creation (Klofsten and Jones-Evans, 2013). With additional skills, use of new business models and cutting-edge exposure acquired in academic education, these entrepreneurs may find it easier to develop a firm and promote advanced levels of innovation than those with less education (Minniti and Levesque, 2008).

Learning and teaching entrepreneurship in a university context

Main features of the entrepreneurial HEI

An entrepreneurial HEI offers a wide range of opportunities to innovative teaching and learning with the overarching aim to develop an entrepreneurial mindset across all study programmes. To achieve this result, an HEI should:

- Introduce new pedagogies that are student-centred, cross-disciplinary and promote practice-based learning.
- Provide support and training to staff with the objective of creating new curricula related to entrepreneurship.
- Allow students to engage in the evaluation of courses and provide them with the possibility of providing feedback.
- Involve entrepreneurs in classes, so that students can get new perspectives in their formal education.

Approaches to learning and teaching entrepreneurship in HEIs

Entrepreneurship can be supported and taught in HEIs in many different ways. For example, Klofsten (2000; 2008) describes three common approaches that HEIs carry out to deliver entrepreneurial teaching.

- *Mainstreaming entrepreneurship.* This holistic approach features “entrepreneurial universities” that aim to create and promote an entrepreneurial culture across their institution. In this case, entrepreneurship is not distinguished as a specific subject but connects with all the activities of the university concerning undergraduate and graduate courses, research and outreach activities.
- *Teaching entrepreneurship.* In this approach, the HEI organises specific courses in entrepreneurship, where students can learn more about entrepreneurship as a subject in itself. The HEI puts in place different credit-based (European Credit Transfer [ECT] credit) courses of theoretical character at all academic levels. These courses focus, for example, on business creation, legal and regulatory frameworks, business development and financial aspects related to business development.
- *Supporting entrepreneurs.* The HEI can set up specific training programmes for individuals who wish to start their own firms or develop ongoing businesses. These include entrepreneurship programmes, incubator facilities and growth programmes. These activities are more practical than theoretical and are often placed outside the traditional curricula (they are extracurricular) and, therefore, do not give any ECT credit.

Within an entrepreneurial university, all these activities will work together and enrich each other. For example, the development of an entrepreneurial culture in a given HEI and the presence of a variety of courses in entrepreneurship in that HEI will act in parallel and influence students’ attitudes in a positive way. As a result, students will act

entrepreneurially in their careers, independently from the fact of actually owning a business. Training entrepreneurs can give valuable contributions to courses in the form of case studies and lectures conducted by entrepreneurs who have participated in previous programmes and gained some experience since.

Formal entrepreneurial teaching and learning in Austrian HEIs

Almost all HEIs in Austria have an understanding of the importance of the entrepreneurial and innovation agenda, as can be seen in the results of the leader survey discussed in Chapter 3. This also reflects the presence of entrepreneurship learning opportunities in many different forms, both curricular and extracurricular, formal and informal.

Entrepreneurship education at the undergraduate and master's levels

Many Austrian HEIs offer a variety of entrepreneurship courses targeting different student groups. Good examples of such undergraduate courses “about entrepreneurship”, as discussed above, are VU-Entrepreneurship (University of Innsbruck), Sustainable Entrepreneurship (BOKU) and the interdisciplinary entrepreneurship courses organised at the FH Upper Austria (Campus Hagenberg, Steyr and Wels). At the FH Campus Wien, almost all study programmes have dedicated courses in their modules to improve the entrepreneurial skills of students. The master's degree programme “Health Assisting Engineering” also includes the development of interdisciplinary competencies. Further examples of credit-based entrepreneurship courses at master's level are The Sustainability Challenge and The Garage. The former adopts an inter- and transdisciplinary approach and is based on the co-operation of four universities: BOKU, the Vienna University of Economics and Business, TU Vienna and the University of Vienna. The latter allows students from TU Vienna, the Vienna University of Economics and Business, and BOKU to work together with external stakeholders on their start-up ideas/projects, fostering the ability to communicate across academic cultures. These experiences have benefitted from the experience of the Centre for Global Change and Sustainability at BOKU, which has been a frontrunner in the support of sustainable entrepreneurship and socioecological student initiatives through university courses, networking events and individual coaching.

These courses aim to provide students with the skills needed for an entrepreneurial career, including the development of a business plan as well as an application-oriented approach to starting and running a new business. Most courses are designed not only for students of business administration and management but also for students in all disciplines who want to attend entrepreneurship classes.

Often, experienced entrepreneurs outside the university – who support faculty members and can provide students with role models and inspiration – teach the courses. Participants can generate their own business ideas and it is common that students work in multidisciplinary teams, combining different approaches and perspectives, to get new insights and skills into the business planning process. At the end of the courses, students (mostly in teams) present a business plan and their practical experience.

In general, entrepreneurship education programmes in Austrian universities focus on competencies and skills related to the creation of start-ups. This feature is present in all HEIs selected as case studies for the review process. The result of this approach is that entrepreneurship translates into information and skills that are required to start and run new businesses. Students learn how to write a business plan, analyse new business ideas through the Business Canvas Model, and pitch business models in a lifelike business environment.

Curricular (credit-based) entrepreneurship courses are rare and some entrepreneurship courses offered lack a clear “label” and have differing titles. This situation generates the risk that students do not fully understand the course objective. For example, entrepreneurship courses are often labelled as “business management”, “business planning”, etc. Among others, this was the case at the TU Graz and the Vienna University of Economics and Business. These institutions offer a wide range of courses and activities to encourage entrepreneurship through experimentation, leadership, specific support, and incentives and rewards. However, as discussed, these are labelled as business management courses or similar; they are not clearly identified as “entrepreneurship” courses.

In other case-study HEIs, credit-based courses are labelled as “creativity” education. These courses encourage students’ entrepreneurial mindset and skills. For example, the University of Applied Arts Vienna (*Die Angewandte*) has introduced new formats in cross-disciplinary education and research to prepare people to think and act between and beyond disciplines and manage complexity (Box 4.1).

Despite their declared objective of educating students “about” entrepreneurship across the entire institution, case-study HEIs could reach a larger proportion of students.² In addition, entrepreneurship education is not fully integrated into most of the university curricula. For example, entrepreneurship courses are often designed for up to 40 students. Given that some of the case study HEIs have more than 20 000 students, the group of students that can access entrepreneurship education-labelled courses is very small. The current improvements in terms of number of students, although quite generalised, are not sufficient to mainstream entrepreneurship teaching and learning.

Box 4.1. Entrepreneurship education to develop creativity and manage complexity

The case of the University of Applied Arts, Vienna³

The University of Applied Arts Vienna has put in place a bachelor’s degree programme to develop students’ capacity to develop creativity and handle complexity (of globalised societies and economies), with an interdisciplinary approach. The bachelor’s “Cross-Disciplinary Strategies. Applied Studies in Art, Science, Philosophy, and Global Challenges” programme provides students with a mix of artistic and scientific skills.

The bachelor’s course is designed to provide insights into strategies and methods from a number of areas of knowledge. For instance, basic principles of art, philosophy, natural sciences, engineering and the humanities are an integral part of the curriculum. In addition, the bachelor’s specifically focuses on digital technologies, growing automation, artificial intelligence and progress in the area of genome editing. Students will need creativity and entrepreneurial skills to work in these areas.

The study programme offers new teaching and learning methods and action strategies with the aim of generating professionals able to operate in a globalised and interconnected world and who possess the necessary qualifications to handle complex dynamics. The programme promotes collaboration and teamwork, and enables the planning, creation, implementation, analysis and inspired leading of projects.

Creativity/entrepreneurship teaching has generated engagement opportunities for the *Angewandte*. For instance, a Vienna-based company that is currently developing digital technologies for self-driving cars has asked the University of Applied Arts, and in

particular the students of the bachelor's course on "complexity", for help in streamlining (i.e. reducing the complexity of) digital frameworks, in order to improve the reliability of self-driving technologies.

Sources: Bernhard Kernegger; University of Applied Arts Vienna (n.d.), *Cross-Disciplinary Strategies - Applied Studies in Art, Science, Philosophy, and Global Challenges*, https://dieangewandte.at/cds_en (accessed on 20 February 2019).

Concerning the way in which entrepreneurship education is integrated into course curricula, Austrian HEIs have learnt from successful practices on a European level. A general feature of these practices is their capacity to promote entrepreneurship education in connection with different disciplines, to reach out to a large number of students. An example of this interdisciplinary approach is the Conceive, Design, Implement and Operate (CDIO) Entrepreneurship course at Linköping University in Sweden (Box 4.2). Since 2009, over 2 500 students, from a wide range of technical disciplines, have participated in this course. The CDIO Entrepreneurship course provides entrepreneurship education in view of helping students' technology projects, which is at the core of the CDIO procedure. Entrepreneurship education helps the students to understand a technical project from a business viewpoint and improves their capacity to communicate the results of their project (both orally and in writing). With this approach, technology projects benefit from a business perspective and students have both theoretical and practical learning opportunities.

Box 4.2. CDIO Entrepreneurship at Linköping University, Sweden

The CDIO (Conceiving, Designing, Implementing and Operating) Entrepreneurship course deals with how entrepreneurship can be inspired to and integrated within a university curriculum, specifically among science and technology students. This case shows how entrepreneurship can be taught to a large group of students (150 or more) and also how teachers and researchers in entrepreneurship can effectively collaborate with other teachers in different scientific disciplines, sharing common teaching goals and learning outcomes. Therefore, entrepreneurship facilitates interdisciplinary learning and teaching.

The CDIO concept was originally conceived at the Massachusetts Institute of Technology in the late 1990s. CDIO entrepreneurship was launched in 2009. It grants students three credits (ECTS). The course is compulsory for all science and technology students in graduate studies. Since its beginning, the course has seen more than 2 500 students graduate from a variety of technical disciplines such as VLSI design, mixed-signal processing systems, applied mathematics, design and fabrication of sensor chips, automatic control systems and biomedical engineering.

Students learn entrepreneurship and, in parallel, formulate and develop a business idea that has to be connected to their technically oriented projects. They then develop their idea using a Need, Approach, Benefit and Competition (NABC) framework. The course shows the importance of using a practice-based approach since most students have no educational background in business and organisation, development, finance and management. In general, entrepreneurship education should bridge students' attitude gap – convincing them that entrepreneurial skills will be crucial in their future careers, even if they do not develop their own business. For this reason, the CDIO course is mandatory at Linköping University.

Source: Professor Magnus Klofsten, Linköping University, Sweden.

In case-study HEIs, there are several master's courses aiming to promote entrepreneurship but few master's programmes in entrepreneurship. Austria could benefit from international good practices to overcome this situation. Sweden is a good example of a country that was, at the beginning of the millennium, in the same situation that Austria is currently facing. Only a few Swedish universities had started to set up master's programmes in entrepreneurship, often labelled "schools of entrepreneurship". In 2009, the Ministry of Education and Research of Sweden launched a national call for "advanced education in innovation and entrepreneurship", with a specific funding allocation (see Box 4.3). Reacting to this national call, 11 Swedish universities sent applications to the ministry. Two of them received government financing: the Chalmers School of Entrepreneurship and the Master's Programme in Entrepreneurship, Lund University.

Box 4.3. Chalmers School of Entrepreneurship – A master's programme in Sweden

The Chalmers School of Entrepreneurship (CSE) was established in 1997 and consolidated by a subsequent application in 2009.

The original application put forward the following idea to strengthen entrepreneurship education. First, develop an interdisciplinary platform combining innovation, entrepreneurship education and research. Second, attract (or generate through PhD programmes) faculties that are both action-based entrepreneurship educators and transformational leaders within the academy and beyond. Third, increase entrepreneurial capabilities in selected research areas also concerned with innovation and implementation of research.

CSE can be described as a venture creation programme (VCP) (Lackéus and Williams-Middleton, 2015; Ollila and Williams-Middleton, 2011) where "learning through entrepreneurship" (LTE) is central.

The special attributes in the approach at CSE are the following:

- Students are surrogate entrepreneurs. They are put in the drivers' seat to develop early-stage technical ideas provided by the incubator Chalmers Ventures (Lundqvist, 2014).
- The two-year master's programme evolves from providing courses with varying amounts of project work into a one-year thesis. Most of the learning is enabled through teamwork, whereas examinations in the MSc programme are both individual and team-based, focusing on academic reflections and on action learning.
- The main competencies developed within the programme are: entrepreneurial strategy and sales execution; technology and product development; and entrepreneurial mindset and teamwork.
- The school encompasses the six disciplines: entrepreneurial and organisational behaviour; team dynamics; innovation management; strategy; intellectual property management; and entrepreneurial finance. These subjects are mostly taught through project-based interdisciplinary pedagogy.

The CSE programme has been evolving over time. Some of its more notable improvements since it started in 2009 are:

- Implementing a 60 ETC (one-year) master's dissertation into the programme, rather than a normal 30 ETC one. This has allowed students to become more focused on their venture-learning already during the second year of the programme. Along with this change, an adapted "thesis with appended papers" structure has evolved, to capture the different disciplines the programme encompasses (entrepreneurial strategy and sales

execution, technology and product development, and entrepreneurial mindset and teamwork).

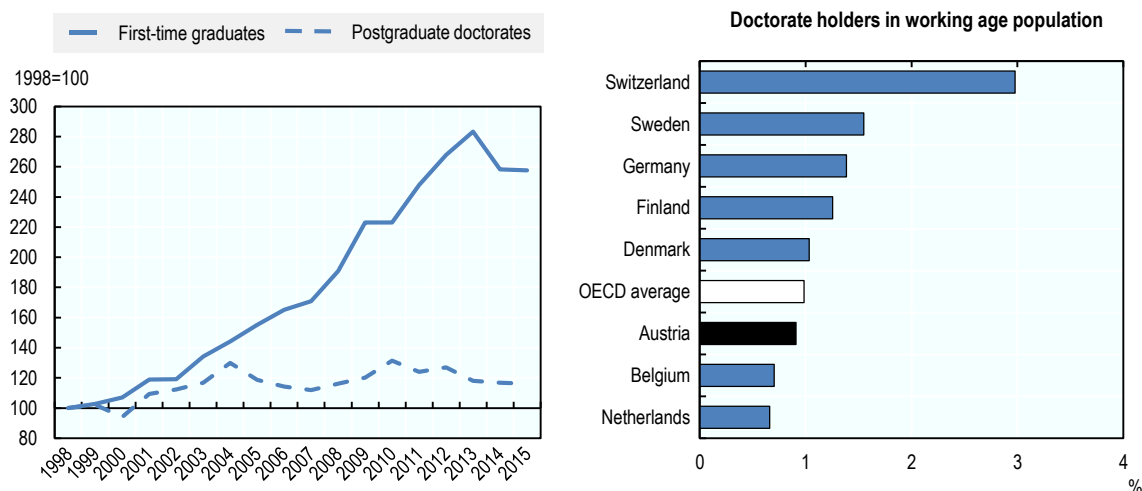
- Running and developing a clinical lab including research, PhD training and international collaboration.
- Going from one faculty to four permanent faculties at the core of the school.
- Starting a corporate entrepreneurship track in 2015, where students are “intrapreneurs” within partners firms.
- The effects of the entrepreneurship programme can be measured on at least three levels:
 - *Long-term effect on students’ skills, capacity to handle complexity, and resilience on the labour market.* To assess the long-term impact of the CSE programme, more than 50 alumni who graduated between 1998-2014 were interviewed. The evaluation showed several long-term effects. For example, it found that interdisciplinary team-based learning (which is typical of the entrepreneurship approach) and capacity to handle uncertainty had both affected students’ career paths. A majority of graduated declared that they had developed their career based on their capacity to handle uncertainty, often through leading a team. Respondents had capitalised on these skills in both corporate and start-up contexts.
 - *Venture impact (economic, social and environmental sustainability).* Ventures started at the school are more able to deal with sustainable innovation. Graduates have the specific capacity to generate actionable innovation that ends on the market.
 - *The ability of the school and its student to also bring and grow such innovation on the market* is much higher than alternative tech-transfer models in Sweden (i.e. incubating ventures started by inventor entrepreneurs or doing occasional licensing) (Lundqvist, 2014).

Sources: Professor Mats Lundqvist, Chalmers University, Sweden; Lackéus, M. and K. Williams-Middleton (2015), “Venture creation programs: Bridging entrepreneurship education and technology transfer”, *Education+ Training*, Vol. 57(1), pp. 48-73; Ollila, S. and K. Williams-Middleton (2011), “The venture creation approach: Integrating entrepreneurial education and incubation at the university”, *International Journal of Entrepreneurship and Innovation Management*, Vol. 13(2), pp. 161-178; Lundqvist, M.A. (2014), “The importance of surrogate entrepreneurship for incubated Swedish technology ventures”, *Technovation*, Vol. 34(2), pp. 93-100.

Entrepreneurship education targeting PhD students

In Austria, the percentage of doctorate holders as a share of the working-age population (at 0.9%) is currently somewhat below the OECD average (OECD, 2018) (Figure 4.1). Enrolment in PhD courses is relatively high but the dropout rate is also high, limiting the number of graduates. The relatively low number of PhD workers may generate constraints on the labour market if one considers that the number of R&D-performing companies in Austria has doubled in the past two decades and overall student numbers at lower degree levels have increased substantially. Austria has acknowledged that developing world-class doctoral education is essential and is undertaking efforts in view of reform (OECD, 2018). A further step to improve the attractiveness of PhD courses and their capacity to generate carriers outside of academia would be to develop entrepreneurship education for graduate students.

Figure 4.1. Postgraduate doctorates in Austria 1998-2015 and share of doctorate holders in working-age population, 2015



Source: OECD (2018), *OECD Reviews of Innovation Policy: Austria 2018*, <https://doi.org/10.1787/9789264309470-en>.

Entrepreneurship education for PhD students is a crucial element for universities to become truly entrepreneurial (Bienkowsk, Klofsten and Rasmussen, 2016). Doctoral students represent one of the larger groups of university academics and play an important role within research groups, which may end up commercialising their research results (Thune, 2009). Many PhD students will make a career as senior researchers whose ambitions and commitments may intensely affect the different forms of scientific production at universities. Postgraduate education can cover a broad range of domains, aims and teaching practices, which do not focus solely on the creation of new businesses as such but also include entrepreneurial attitudes and skills that are valuable in research or teaching (Huyghe and Knockaert, 2015). In addition, due to the increasing number of individuals holding a PhD, job opportunities in academia have been reducing. This requires PhD programmes to provide students with the possibility of finding a job outside the university system (Bienkowska and Klofsten, 2012). Thus, attending a PhD course in entrepreneurship might give graduate students encouragement in an alternative career as a start-up entrepreneur or an entrepreneurial employee within the industry or public sector (Klofsten, 2016).

In several Austrian public universities, there are PhD courses in entrepreneurship or entrepreneurship-related topics, open to all graduate students. These courses provide education in several topics such as technology transfer, commercialisation of research, innovation management (e.g. TU Graz) and courses in intellectual property rights (e.g. Paracelsus University and the University of Natural Resources and Life Sciences Vienna [BOKU]). However, due to the way these courses are designed in most universities, they attract almost exclusively graduate students in fields such as engineering, manufacturing, construction, science, mathematics and computing, and health, which, at first glance, are better related to entrepreneurship or innovation. A more holistic design, promoting an interdisciplinary approach to entrepreneurship could dramatically improve the attractiveness of these PhD courses, helping Austrian institutions mainstream entrepreneurship learning.

Some successful practices exist already and can inspire other Austrian public universities. For example, the interdisciplinary PhD Entrepreneurship course at the University of Innsbruck (Box 4.4). The PhD course of the Innsbruck University provides entrepreneurship education to students and alumni from all faculties. It mixes theory with a practical approach to entrepreneurship education and helps students generate skills that could be useful in their future career, inside or outside the academic system.

Box 4.4. The interdisciplinary PhD Entrepreneurship course at the University of Innsbruck

The PhD Entrepreneurship course at the University of Innsbruck aims to provide doctoral students with skills that help them in an entrepreneurial career. The design of the course requires an interdisciplinary composition in terms of students. So, entrepreneurial education is offered to graduate students from all faculties.

Seminars take students through each stage of launching a new venture and combine theory with workshops run by experienced entrepreneurs. At the end of each seminar, participants present their business plan and first hands-on experiences. All participants in the seminar can present their own business ideas.

The PhD course favours collaboration among students with different backgrounds and skills. For example, an arts student that has generated a business idea and business model can collaborate both with a student in computer science with programming skills and with business students in order to translate this idea into reality.

The course is organised into two parts. The first part is about relevant entrepreneurship topics. Between the first and the second part of the course, students are asked to register on a platform and upload a one-pager with a description of their research and a possible translation into a business idea. Afterwards, students are invited to comment on and discuss each other's ideas in order to prepare for a "hackathon", which will be the focus of the second part of the course.

The hackathon allows students to apply theory in practice. During two days, students work intensively in small groups to prepare a business plan for their idea. At the end of the second day, students present to a jury – composed of potential investors – which will nominate the winner of the hackathon. On completing the course, the participant receives 5 ECTS.

Source: Professor Johann Füller, University of Innsbruck, Austria.

There are also international successful practices that could inspire Austrian stakeholders. For example, the Swedish PhD course Entrepreneurship in Theory and Practice (ETP) has attracted approximately 200 PhD students since 2006. The ETP has involved PhD students from a broad range of research arenas in science and technology ranging from management and engineering, computer and information, to medical and health sciences, comprising a rather mixed group regarding study curricula, organisation and research group association. The course is not mandatory and the "market pull" has been the key force behind recruitment. Many participants are students who would not normally consider a PhD course outside of their research field. The drivers for participation include: individual career goals; capacity to work in groups; and, last but not least, the fact that the PhD course has acquired a positive track record in the local academic community (Box 4.5).

Box 4.5. The PhD course Entrepreneurship in Theory and Practice (ETP), Linköping University

A PhD course called Entrepreneurship in Theory and Practice (ETP) started at Linköping University in 2006. ETP aligns with the university tradition of continual efforts in developing a relevant support structure for students and staff. To date, 12 ETP courses that give 7.5 ECTS have been run with 188 PhD students participating from various disciplines throughout the university. At the end of this course, participants are able to discuss and reflect on the meaning of entrepreneurship in various settings and situations; formulate, develop and present an idea for a new venture, organisation, process or project; co-operate with colleagues in other disciplines and fields of research during idea development as well as understand how an entrepreneurial approach contributes to the development of “me” as a researcher and teacher. The entrepreneurship chair at the university leads the course; a team of eight people, all with extensive practical experience in academic entrepreneurship, coach and assist in workshops. As an extra twist to the course content, participants are offered group coaching by an experienced entrepreneur in connection with the development of new ideas. Previous courses in entrepreneurship for undergraduate students had shown that a practical orientation was useful for scholars who came from fields outside of business and management.

The ETP is an elective course so, to be successful, it has to attract the attention of students who would not normally place entrepreneurship high up on their agenda. Successful recruitment to the course rests on good relations and clear communication channels with the various university research environments. The student’s supervisor must approve the course for inclusion in the student’s PhD curriculum. So the student as well as the supervisor must be convinced that the ETP is relevant for PhD-level education. Topics include new business development in various contexts, opportunity recognition, team formation, intellectual property rights, and case studies of both successful and failed businesses, to name only a few.

The ETP stimulates students to develop original ideas that have some connection with their doctoral research. At the beginning of the course, participants vote on which of the presented ideas are most interesting. Groups of two to three are formed for each idea, with each group comprising persons from different academic backgrounds, when possible. The groups draw up development plans during workshops and two coaching sessions. At the end of the course, the groups present their ideas in front of a panel of experienced academic entrepreneurs.

Course evaluations show that the participants – in addition to the practical content – highly appreciate the establishment of contact across institutional boundaries, new perspectives on solving problems, and the ways an entrepreneurial attitude benefits future non-academic career. The PhD students who have taken the ETP are a large and diverse group of researchers. In particular, one of these PhD students has played a central role in the founding of more than 20 new spin-off firms.

Source: Professor Magnus Klofsten, Linköping University, Sweden.

Integrating research in entrepreneurial education

For a curriculum to stay up to date and relevant, the entrepreneurial education offer needs to be continuously reviewed and updated. Therefore, HEIs should integrate the results of entrepreneurship research into their entrepreneurial teaching and learning.

The Vienna University of Economics and Business represents a good example of how entrepreneurship research relates to entrepreneurial education. In this university, high international quality entrepreneurship research affects teaching and connects with the local environment. In this case, innovation and entrepreneurship are understood as two sides of the same coin and are widely present in teaching and learning. The university encourages scientific staff to review the latest research in entrepreneurship education.

The Vienna University of Economics and Business's Institute for Entrepreneurship and Innovation provides a forum whereby teaching staff can exchange new knowledge and ideas, incorporating the latest research. The educational offer involves learning “about”, “for” and “through” entrepreneurship. The focus is on applying projects in real-world situations (more than 700 projects have been carried out so far), in collaboration with external stakeholders (ranging from start-up companies to multinationals). The institute aims to offer entrepreneurship education at all teaching levels, i.e. bachelor's, master's and PhD, and to label such courses as “entrepreneurship” and not “business planning” (as it is today). The Vienna University of Economics and Business also collaborates with other HEIs (e.g. Technical University Vienna, University of Vienna and University of Natural Resources and Life Sciences Vienna) to networking and sharing good practices. Importantly, the Vienna University of Economics and Business developed the vision that every student should be exposed to the concept of entrepreneurship during his or her time at the university. It would be important to generalise this approach in all sectors of Austrian HE, taking into account the respective specific profile and the range of study fields.

Co-designing and co-delivering entrepreneurial education with the support of external stakeholders

The capacity to collaborate with stakeholders in the design and delivery of entrepreneurship education features in many case-study HEIs. This is a very important characteristic of the Austrian system, which public authorities could strengthen. External stakeholders are often involved in both formal credit-based courses, as well as extracurricular learning activities and support services. Austrian HEIs support several collaborative partnerships with local communities and organisations, local and regional governments, chambers of commerce, industry and HEI alumni.

The capacity to engage with external stakeholders in co-designing and co-delivering entrepreneurial education is particularly developed in Austrian UAS, due to their specific connections with regional ecosystems, which is part of their mission. For example, the FH Campus Wien collaborates extensively with external actors: the institution has a pool of 1 680 part-time staff (external lecturers mainly from the industrial sector) compared to 240 full-time staff. External lecturers represent an important source of expertise to be used in entrepreneurial teaching and learning since the UAS does not have staff active in entrepreneurship research.

Many Austrian UAS consider their capacity to co-operate with external experts and stakeholders from the productive sector as their peculiar trait *vis-à-vis* public universities.⁴ For example, regular engagement with external stakeholders encourages long-term

collaborative relationships with the business community. This can provide UAS with useful insights to understand future skills needs, for example.

There are, however, several examples of public universities that have been able to develop strong linkages with external stakeholders, especially in ecosystems where firms and institutions are denser. For example, the Vienna University of Economics and Business has several “competence centres” including one that specifically engages with non-profit organisations, in order to promote education in social entrepreneurship (Box 4.6). The case of the Vienna University of Economics and Business illustrates well that the interaction with external stakeholders generates innovations and a mutual benefit for the HEI and the ecosystem.

Box 4.6. Co-designing and co-delivering entrepreneurial education with the support of external stakeholders

The example of the WU Vienna (Vienna University of Economics and Business)

WU Vienna has seven specific “competence centres” connecting the university with external stakeholders. Competence centres at WU are primarily third-party funded, which ensures a focus on the needs of relevant stakeholders.

The WU Vienna started to look at the non-profit sector over 20 years ago and a group of interested scholars has been studying these issues generating data and evidence. Based on this experience the WU created the NPO SE (Non-Profit Organizations and Social Entrepreneurship) Competence Centre. This centre has 20 staff and receives about 98% of its funds from external sources. The NPR SE Centre focuses on three pillars: applied research, education and networking.

- *Applied research.* WU Vienna started the NPO SE Centre to generate data for non-profit organisations and the public sector. The centre co-operates with the WU Vienna’s Institute for Non-profit Management, the Institute for Social Policy, and other WU research bodies. Research focuses on philanthropy (foundations and large organisations), intended as the supply side of the not-for-profit sector, and on the demand side. For example, NPO SE has recently conducted a study on social businesses in Austria, which informed the Federal Ministry of Social Affairs and AWS Austria. Based on research results AWS has allocated EUR 3 million to assess the capability gaps in the social entrepreneurship sector. This is an example of how research can translate into policy initiatives.
- *Education.* The second pillar aims to inform and train practitioners in the non-profit sector and students interested in the subject. Concerning students, the NPO SE Competence Centre often represents a gateway into social entrepreneurship. In addition, by attending NPO SE’s programmes, students acquire credits they can transfer into their own study programmes. NPO SE also organises workshops series and training activities. By attending these events, participants learn, for instance, how to develop and submit a social business plan. Ten years ago, the centre founded the Social Impact Award. Over the years, this award became an educational programme, which has been exported to 22 countries.

- **Networking.** Through its third-pillar activities, the NPO SE develops and manages contacts with non-profit organisations, as well as national and international research networks.

This competence centre's activities show the need for an academic focus on social entrepreneurship internationally, an area that will have increasing significance across developed countries in the coming decades. The non-profit sector and social entrepreneurship will provide scope for co-operation on main social challenges that span disciplinary and national borders.

Evaluating curricular entrepreneurship teaching and learning programmes

Austrian case-study HEIs tend to make limited use of evaluation when it comes to their curricular entrepreneurship teaching and learning programmes and activities. This may depend on the relatively few credits that are associated with entrepreneurial courses and the lack of formal recognition of entrepreneurship as an academic subject. However, based on international evidence, including that gathered by the HEInnovate Guiding Framework, HEIs that value entrepreneurial learning commit to regularly review, validate and update the contents of courses and the learning outcomes across all study programmes.

To improve the validation of entrepreneurial learning outcomes, Austrian authorities could consider the following actions:

- Organise the expected entrepreneurial learning outcomes in relation to knowledge, skills and competencies in all study programmes.
- Ensure that the students understand the entrepreneurial learning outcomes expected and achieved.
- Validate entrepreneurial learning outcomes at the institutional level and acknowledge entrepreneurial learning outcomes in the students' records of accomplishments.

Informal learning opportunities to stimulate the development of an entrepreneurial mindset

Extracurricular learning opportunities are an important complementary part of entrepreneurship teaching and learning provision. An innovative HEI should offer a range of informal learning opportunities for students to inspire individuals to act entrepreneurially. There are different ways to achieve this result including by: supporting access to student enterprise clubs, awards and societies; organising networking events between students and entrepreneurs; engaging students in business idea and business plan competitions as part of their extracurricular opportunities.

Extracurricular learning opportunities are widely used by Austrian HEIs in their efforts to stimulate the development of entrepreneurial mindset and skills. There are some good examples of extracurricular activities like the Start-up Centre at the FH Campus Wien and the Start-up Garage at the Technical University Graz (see the following chapter). These learning opportunities could also generate opportunities for strengthening the linkages between HEIs and their respective ecosystems. For instance, in Rotterdam, the Netherlands, the local UAS, in co-operation with the municipality, has created a laboratory where faculty and students can coach entrepreneurs facing difficulties who are looking for technical support (Box 4.7).

Box 4.7. HEIs providing support to local entrepreneurs: The case of the Rotterdamse Zaak (DRZ)

The Netherlands represents an international good practice in the field of entrepreneurship education and university engagement – or “valorisation” – more generally. There are activities in which HEIs are embedded in their ecosystems and generate concrete and targeted services for the business community. The Rotterdamse Zaak (DRZ) is a good example of this capacity to engage.

The DRZ is aimed at entrepreneurs who are financially unable to find solutions to their problems. The target audience of the DRZ are individuals who have been entrepreneurs for at least 1.5 years and who face financial difficulties. Former entrepreneurs (senior coaches) act as a sounding board for the students of Rotterdam University of Applied Sciences (junior coaches). Students of RUAS help the entrepreneurs learn to give advice on how to improve their business operations – financially and commercially – and help to develop their entrepreneurial skills. The DRZ works with the *Regionaal Bureau Zelfstandigen* (RBZ, a regional bureau for the self-employed) and the *Ondernemershuis Zuid* (OHZ, a meeting place for nascent entrepreneurs) so that students are properly facilitated and get the training they need to master the skills and competencies required for coaching.

The evaluation criteria for access to the DRZ project is set by *Dienst Werk en Inkomen*, the regional governmental agency for employment. They look at the entrepreneur’s business plan, their annual statement and credit risk, and decide whether the case should be handed over to the DRZ. One of the criteria for participation in the DRZ, for example, is to have been refused a credit loan by banks. The activities of students who “work for” the DRZ and advise entrepreneurs are peer coached by alumni students who stay on at the DRZ by means of internships. There are peer coaches for financial and commercial activities, as well as junior advisors and assistant junior advisors (from secondary vocational training). There is a weekly briefing at the Chamber of Commerce where students receive training, such as information on entrepreneurship-relevant regulations. The intake interview with the entrepreneur to assess their eligibility for participation in the project is carried out by a senior coach and junior consultant and involves a problem analysis and a plan of approach. Further practical support and guidance are given by the junior consultants but there are also coaching consultations.

De Rotterdamse Zaak (DRZ) started in 2012 with less than 100 entrepreneurs but by 2015 had helped more than 250 entrepreneurs. Since 2013, about 65 students per year have been active as junior coaches. Up to 2016, a total of 905 entrepreneurs had received advice from students. The University of Groningen carried out a study on the effectiveness of the DRZ, based on 100 real cases of entrepreneurs who had received its help. The results show that, in total, the DRZ saved EUR 200 million, which equates to approximately EUR 100 000 per entrepreneur in terms of saved bankruptcy costs, welfare costs, etc. Recently, the DRZ won the prestigious European Enterprise Promotion Award.

Source: OECD/EU (2018), *Supporting Entrepreneurship and Innovation in Higher Education in The Netherlands*, <https://doi.org/10.1787/9789264292048-en>.

To be effective, however, extracurricular and informal teaching activities need a certain degree of formalisation and recognition. This also to illustrate the importance of entrepreneurship education within the higher education system. Including entrepreneurship education in HEI curricula as well as the formalisation of activities connected to

entrepreneurship education represents an important condition to illustrate the importance of the entrepreneurial and innovation agenda within the higher education system in a country.

The large use of extracurricular and informal entrepreneurship learning represents a specific challenge of the Austrian higher education system, both public universities and UAS. In the majority of the visited Austrian HEIs, some of the extracurricular activities currently adopted in Austrian HEIs could be easily transformed into formal credit-based activities to increase the formal recognition of the importance of entrepreneurial learning; e.g. the “Extension curriculum for entrepreneurship” at the University of Vienna (Box 4.8).

Austrian HEIs could consider integrating the numerous extracurricular activities currently in place into credit-based learning offer or, alternatively, complementing them with formal credit-based entrepreneurship courses. Extracurricular activities should be a complementary part of entrepreneurship teaching and learning. They should not replace entrepreneurship learning and teaching. Otherwise, they will take time away from other formal activities like formal credit-based courses.

In the current situation, only students with a high interest in entrepreneurial activities participate in extracurricular activities. The fact that most of these activities are run in parallel to their study programme exposes them to the risk to delay their studies. In general, the fact that entrepreneurial learning is mostly provided through extracurricular activities indicates a lack of commitment and understanding about the importance of creating an entrepreneurial mindset for all students and not only those who take on extra work.

In the current framework, the Austrian higher education system – encompassing both UAS and public universities – does not mainstream entrepreneurship and engagement. Entrepreneurship education remains a niche opportunity for selected students that are eager to engage with this kind of studies, rather than a possibility for all students that can acquire new, relevant skills.

Box 4.8. The extension curriculum for entrepreneurship at the University of Vienna

The University of Vienna, the largest in the country with about 90 000 enrolled students, has introduced an extension curriculum for entrepreneurship. The idea behind this approach is that bachelor students can take an active role in developing their individual education and advance supplementary skills that are not covered by their study programme.

The practice of the University of Vienna shows how students who “have not earlier been active” in the entrepreneurship field can take a course in entrepreneurship. A self-assessment tool is used to test student entrepreneurial orientation. More than 100 students enter the course every year. However, only an average of 60 students finalise the course. This high dropout rate may depend on the lack of awareness in students concerning the effort it takes to be an entrepreneur. The course has a “traditional” approach to entrepreneurship and subjects are treated with the perspective that students should be able to start a venture and run a business.

The course takes advantage of the institutional framework supporting entrepreneurship in the University of Vienna as a whole. For instance, the course is connected to other start-up initiatives in the Vienna entrepreneurial ecosystem. This gives students the possibility to engage with experienced teachers and mentors, and to visit start-ups and companies connected with the university’s ecosystem.

Source: Professor Michaela Schaffhauser-Linzatti, University of Vienna.

There are however some promising developments in the system. Some HEIs are taking action with the aim of mainstreaming entrepreneurship education in their curricula. For instance, the importance of letting every student get in contact with entrepreneurship education was mentioned at the Vienna University of Economics and Business. Individual initiatives of HEIs can have a systemic impact. A similar process, for instance, happened in Sweden in the 2000s; the Chalmers University of Technology's long-term engagement with the Chalmers School of Entrepreneurship generated successful practices that were adopted by the university and then by other HEIs in the country (Box 4.9).

Box 4.9. Integrate research into entrepreneurship in teaching: Chalmers School of Entrepreneurship - Development over time

The Chalmers School of Entrepreneurship (CSE) unites education and research through entrepreneurship, with the aim to generate value for society by developing novel and innovative ideas. The CSE is part of the Chalmers University of Technology, which is situated in Gothenburg, Sweden, and has 10 300 full-time students and 3 100 employees. The CSE played an important role in mainstreaming entrepreneurship first within the Chalmers University and then in the Swedish HE system as a whole.

Since 2009, CSE has evolved in many ways, namely:

- Creating a “clinical lab” around the school allowing unique entrepreneurship and educational research.
- Organising a PhD programme linked to the School of Entrepreneurship, focusing on the clinical lab.
- Attracting external faculty and hired faculty having graduated from its own PhD programme.
- Establishing research and educational collaborations with other venture creation programmes and entrepreneurial education researchers in other universities: Aarhus, Colorado, Leeds, Luleå, Lund, NTNU, etc.
- Adopting the MIT CDIO framework for quality assurance, emphasising learning outcomes that include knowledge, skills and attitude developments.
- Consolidating the School of Entrepreneurship as an autonomous entity, offering entrepreneurial education at all levels of education: primary, secondary and higher education.

Although the CSE remains an advanced venture, operating at the master's level, it has produced positive feedback for the entire University of Chalmers since its inception in 1997. Although it is difficult to measure the overall impact, there are many effects the school has on its university. Its students and ventures are frequently seen in the media, which affects the inner “ecosystem” as well as the way Chalmers is perceived outside the school. Over the years, many university researchers have also been idea providers for the school and gained entrepreneurial experience. Students are expected to gain from having entrepreneurial experience. Thus, CSE has been spreading entrepreneurship through a “value creating” pedagogy, which has now been adopted by the whole university and beyond (Lackéus, 2016).

Sources: Professor Mats Lundqvist, Chalmers University, Sweden; Lackéus, M. (2016), *Value Creation as Educational Practice-Towards a new Educational Philosophy grounded in Entrepreneurship?*, PhD dissertation, Chalmers University of Technology.

Conclusions

Summarising, Austria represents an interesting case study to promote entrepreneurship teaching and learning in higher education. Based on the available information, it is possible to identify some possibilities for improvement. This report puts forward six main recommendations – or rather suggestions – to promote entrepreneurial teaching and learning and engagement in Austrian HEIs. These are:

1. Austrian HEIs need to define what entrepreneurship means in their specific setting. To build a common understanding of how to support entrepreneurship through teaching and learning at HEIs could lead to peer learning and collaborative initiatives between HEIs. As discussed above, there is a need for a wider definition of entrepreneurship compared with the current one, which focuses too much on the importance of new start-ups and business planning. Students and staff need to understand that entrepreneurship education should aim to develop a mindset and capacity for entrepreneurial activities, including social entrepreneurship. Importantly, the definition of entrepreneurship and the strategy will not be the same for every HEI. For example, entrepreneurship has a different meaning in engineering and life science contexts (in which generating spin-offs and start-ups is more common) compared with arts and humanities or teacher education programmes, etc. (where entrepreneurship has a broader meaning and serves different aims).
2. Mainstreaming the entrepreneurial agenda across HEIs. A better – more general – definition of entrepreneurship can help HEIs to raise awareness and develop a strategy that will “percolate” to other parts of the institution, including those that are not engaged in the entrepreneurial agenda, thus mainstreaming the entrepreneurship vision across the entire university context (cf. Chapter 2). Austrian HEIs are on a positive trend and most of them have proved to be aware of the importance of providing students with entrepreneurial capabilities. However, and especially in some public universities, entrepreneurship has not been integrated into teaching and research activities in a sufficient way and entrepreneurship education does not provide credits. This also depends on a systemic problem, as the performance agreements with public universities lack a clear goal for improving their capacity in terms of entrepreneurship, employment and engagement. Specific attention should be given to entrepreneurial learning at the PhD level due to the impact on the labour market and quality of start-ups as well as on academia, as some PhD students will be absorbed by academia.
3. Improving labelling for “entrepreneurship” courses as such, and not as business management or similar. This will help to raise awareness and increase recognition. The Austrian HE system should find a way to recognise and assess the impact of entrepreneurship education on skills, and could be better assessed by graduate tracking/graduate surveys. This would represent an advantage for both graduates and employers.
4. Formalising entrepreneurial education. An increasing number of Austrian students engage in entrepreneurial education delivered in extracurricular activities, which they attend in their own time. This reflects the importance that “soft skills” have acquired overall in the labour market and economy. Parts of these extracurricular activities can be transformed into credit-based (and research-linked) entrepreneurship courses. Generally, to recognise extracurricular activities, it

would be important to introduce learning outcome recognition for entrepreneurship education activities (e.g. diploma supplements). In this way, employers could easily identify individuals who have acquired entrepreneurial skills in their university studies.

5. Including entrepreneurship competencies across bachelor's, master's and doctoral programmes. It is possible to design and implement entrepreneurship education in a variety of ways, depending on the goal of education and on the groups of target students. There is a difference among teaching "about", "for" and "through" entrepreneurship. This will influence the content and pedagogical approach when organising courses in entrepreneurship. There are potential complements to the present "low-volume" entrepreneurship courses at bachelor's and master's levels. For instance, "high-volume" courses could be generated by integrating different courses and subject disciplines.
6. Evaluating entrepreneurial attitudes among the student population to understand whether it is an outcome of selection or treatment. Do entrepreneurial students select into HEIs that promote entrepreneurship or does HEI education create an entrepreneurial attitude? Addressing this question is important because it has implications for curricula development and for understanding how to promote entrepreneurship, among others. One way to address the question is to follow students' attitudes towards entrepreneurship during (and ideally even before) their university education (randomised controlled experiment).

Notes

¹ Taatila (2010) illustrates four case studies in which entrepreneurship education supports the creation of entrepreneurs who contribute to regional development. In particular, while discussing the possibility that entrepreneurial skills can be learned, Taatila puts forward the idea that "entrepreneurship requires numerous skills that are difficult to define as individual atomic subjects, while a specific business requires subject-specific skills in which the heart of entrepreneurial competency lies within psychological and social skills. [...] Since an entrepreneur, by definition, is planning to capitalise on a business idea, she cannot have all the facts available at the moment of decision. [...] In this situation, the aim of entrepreneurship education is not "to seek and teach the ultimate blueprint, but [...] to secure both long- and short-term goods in future experience. Pragmatism acknowledges that real situations are often "fuzzy or messy" and that all the relevant information is often not even available or is internally incoherent". Within this context, a pedagogic approach towards entrepreneurship needs to be based on the practical development of real-life situations to be the focal point of research.

² Generally, data from the leader survey illustrates that the percentage of students involved in entrepreneurship education is higher – more than 30% of overall students involved in entrepreneurship learning opportunities – for UAS compared with public universities – the majority of which reach out to between 10% and 30% of the total number of students.

³ The University of Applied Arts (Angewandte) self-understands itself as a university in transition that is interested in having a positive impact on society, and in co-influencing the change and transformation process in society. Through the interdisciplinary and transdisciplinary combination and recombination of different disciplines in the arts and sciences across research, teaching and application, the Angewandte supports innovation, but more so the Angewandte creates innovation by new approaches toward education, by combining methods from the arts and different fields of science, and by actively shaping a public discourse on global challenges. With the engagement of faculty, staff, students, and graduates of the Angewandte, in innovation and in processes of innovation, this results in new forms of entrepreneurship, based on social responsibility and a broad

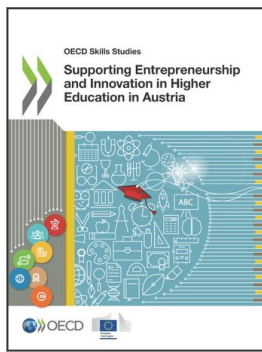
understanding of innovation far beyond technology and economics. *Source*: David F.J. Campbell and Bernhard Kernegger (University of Applied Arts, Vienna, 2019)

⁴ The capacity to engage with external experts/stakeholders was mentioned by several Austrian universities of applied sciences when presenting the results of their self-assessment tool exercise to the OECD delegation of experts and peers.

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