



Supporting the entrepreneurial potential of higher education

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1 Linz University, Austria: Inspiring teaching and a support network for academic entrepreneurs

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Abstract

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The main hub for entrepreneurship education at Johannes Kepler University Linz (JKU), Upper-Austria, is the university's Institute for Entrepreneurship and Organisational Development (IUG). Entrepreneurship teaching is delivered by the IUG team and an established network of external lecturers. The institute's landmark approach to delivering entrepreneurship to students from all faculties entails a concentrated portfolio of courses in entrepreneurial management based on real-world entrepreneurial challenges for students to learn from. These courses are offered in cooperation with university patent scouts and academic entrepreneurs (the "patent-based business planning" and "innovation lab" courses are highlighted in the case). The flexible integration of external lecturers enables: a) offering a sustained hands-on entrepreneurship teaching in concert with IUG staff and, since it is based on the same people, b) a seamless coaching of potential entrepreneurs from the university within a network of regional start-up support and incubator institutions in Upper-Austria.

Case study fact sheet

■ Full name of the university and location:	Johannes Kepler University; Linz (Austria)
■ Legal status (e.g. public or private)	Public
■ Location (if applicable: branches):	Linz (Upper- Austria)
■ Year of foundation:	1966
■ Number of students:	Approx. 19.000
■ Number of employees (broken down by teaching, research and administrative staff):	1782 academic employees and 894 non-academic employees (no distinction is made between teaching and research staff). Third-party employees of the above: 499 academic employees and 194 non-academic employees (2013)
■ Budget in most recent financial year:	Allocated budget issued by the federal government in 2013: 98.6 million euro
■ Academic profile:	JKU hosts four distinct faculties: Social Sciences, Economics and Business (SOWI); Law (RE); Engineering and Natural Sciences (TN) and – since March 2014 – also Medicine (MED) (see: http://www.jku.at/content/e213/)
■ Entrepreneurial profile:	Entrepreneurship education at JKU is delivered through the university's lead institute "Institut für Unternehmensgründung und Unternehmensentwicklung" (IUG; Institute for Entrepreneurship and Organisational Development); the institute has won the EC's European Enterprise Award 2010 "Promoting the Entrepreneurial Spirit"
■ Activities focused in this case study:	Design of curricular entrepreneurship teaching – in particular "patent-based business planning" and "innovation lab" courses; regional support network for coaching individual entrepreneurs from university
■ Case contact person(s):	Norbert Kailer; Director IUG / Professor of Entrepreneurship JKU

Information included in this case study is from end of year 2014 unless stated differently.



1.1 The university's entrepreneurship education profile

1.1.1 The university's overall approach to entrepreneurship education

Johannes Kepler University (JKU) in Linz, the capital city of the Austrian province of Upper-Austria, follows a fairly concentrated approach towards entrepreneurship education (EE) around its "Institut für Unternehmensgründung und Unternehmensentwicklung" (IUG; Institute for Entrepreneurship and Organisational Development; <http://www.jku.at/iug/content>). The institute is domiciled in the Faculty for Social Sciences, Economics and Business (SOWI).

Norbert Kailer, professor of entrepreneurship, is the head of the Institute. One characteristic feature of the approach is to operate core EE activities through a small team of IUG teaching staff (1.2.5) in close co-operation with a substantial number of external lecturers from entrepreneurship practice, such as start-up consultants from private business and public service institutions, incubator and technology managers, as well as academic entrepreneurs (1.5.2). This allows IUG to pursue a (necessarily) resource-efficient approach and, at the same time, to implement its philosophy of giving entrepreneurship students access to real academic entrepreneurs and to people providing advice and material support to new venture projects at JKU and in the region of Upper-Austria. Regarding EE, the strategy enables IUG to offer the following:

- A rich curriculum of hands-on entrepreneurial management courses.
- Further extra-curricular activities, in particular platforms for networking and exchange between potential student and graduate entrepreneurs, alumni entrepreneurs, and professionals in start-up support in Upper-Austria.
- A chain of individual start-up support and coaching for university members interested in setting up their own business.

For its continuous efforts to establish and advance academic entrepreneurship in Upper-Austria, the IUG team has won the European Commission's "European Enterprise Award 2010 – Promoting the Entrepreneurial Spirit".

The following **case has two main aspects** centred on entrepreneurship teaching at the IUG in concert with its internal and external co-operation partners for entrepreneurship at JKU. The *first* focus is on the design of curricular EE offers made by the IUG in entrepreneurial management and business planning, in particular two courses where student teams do the following:

- a) Develop their own business ideas based on JKU patents from engineering and science (the "Patent-based Business Planning" course for business students);
- b) Work on solving practical entrepreneurial management problems in co-operation projects with academic entrepreneurs who bring these management challenges from their ventures right into class (the "Innovation Lab" course for master students from science and engineering) (for a detailed discussion in the case see 1.2.3 below).

The *second* focus is on the set-up of the above chain of support with EE at the individual level. The case explores the path from entrepreneurial learning in class towards pursuing one's own business idea within the support infrastructure set up by the IUG and regional players dedicated to entrepreneurship. Additional discussion and teaching materials on entrepreneurship at JKU published by IUG staff can be found, e.g., in Kailer (2000,



2010a, 2010b, 2012), Kailer and Gutschelhofer (2002), Kailer et al. (202, 2013, 2014), Kailer and Weisz (2014), Kailer and Wimmer-Wurm (2012), Wimmer-Wurm et al. (2013).

1.1.2 Leadership and governance

Importance of government strategies

Since the entrepreneurship professorship rooted from an endowed chair, national government funding programmes did not play an important role in the beginning. However, the Federal Ministry for Transport, Innovation and Technology (BMVIT) with its Impulse Program “AplusB – Academia plus Business” (www.apusb.biz) has fostered the establishment of high-tech incubators in the main regions of Austria, one of which – the Upper Austrian High Tech Incubator “tech2b” (www.tech2b.at) – is located in Linz, catering for the region of Upper-Austria. The university is one of the shareholders (amongst other regional higher education institutions), and staff from the incubator is part of the network co-operating with the IUG. The IUG as “training partner” of the tech2b incubator offers a range of extra-curricular networking activities in cooperation with tech2b.

In 2014, JKU – together with other universities in Upper Austria, Salzburg and in Tyrol, obtained grants from the Federal Ministry for Science, Research and Economy (BMWFW) to establish a centre for knowledge transfer with regional co-operation partners (“WTZ WEST”; Wissenstransferzentrum West; see 1.4.1). This is also important for IUG’s entrepreneurship teaching since one core element of the centre will be to further develop and scale IUG’s patent-based business planning course as a means of technology transfer. The IUG as well as JKU patent scouts are involved in this project.

Importance of entrepreneurship in the university’s strategy

The IUG itself originated from an endowed chair (the first of its kind in Austria). Entrepreneurship had been discussed in the region of Upper-Austria and its capital Linz around the turn of the millennium with the desire for JKU to establish education offers in this field. After singular EE courses and symposia in 1999 (Kailer et al. 2000), from 2000 to 2003 an endowed chair was sponsored by the Government of Upper Austria, the Town of Linz, the Chamber of Commerce Upper Austria and Bank Austria (Gutschelhofer/Kailer 2002). The IUG became a regular institute funded by the university in 2003. Within this organisational unit, EE has been understood broadly with offers not only for students from the Faculty of Social Sciences, Economics and Business (where the IUG is located) but also for students from other faculties, in particular Science and Engineering, where a line-up of course offers has evolved over time (1.2). As expressed by the Vice Rector for Research, the University’s main task for support in terms of entrepreneurship within the domain of science and engineering is to fill the pipeline for technology utilisation and potential start-up projects in particular – and the EE activities targeted at the Faculty of Engineering and Natural Sciences are an important vehicle for this.

In the JKU development plan 2013-2018, six fields of excellence have been defined. The excellence field “Management and Innovation” includes four areas, one of them “Entrepreneurship in the Economy and Public Administration” (Entrepreneurship in Wirtschaft und Verwaltung).



Level of faculties' and units' autonomy to act

The IUG and its staff act fairly independently, in particular in terms of defining contents of EE. However, entrepreneurship teaching delivered by the institute takes place in a context of education regulation and a resource setting, which reportedly seems to impact on the design of the entrepreneurship course portfolio and individual start-up coaching (see 1.2.6 and 1.4.1).

Organisational implementation

As introduced above, the university organised entrepreneurship and its teaching in a concentrated structure around the IUG in a magnet approach as the place to go to for those interested in entrepreneurship on campus. This is in terms of delivering EE to different target groups of students, as well as for the operation of the IUG StartUp Center as a point of contact for potential entrepreneurs. Both are funded from the resources of the IUG.

University's importance for driving entrepreneurship in its environment

Generally, JKU has a substantial impact on the labour market of the region. An alumni survey conducted by the IUG indicated that around three-quarters of all graduates start working in the region of Upper-Austria (Kailer et al., 2012). Regarding entrepreneurship itself, the GUESSS Survey 2013 (Global University Entrepreneurial Spirit Students' Surveys) administered for Austria by the IUG shows that more than one fifth of students in current generations intend to become entrepreneurs five years after finishing their studies (Kailer et al., 2014 - for a discussion of these surveys and further literature, see <http://www.jku.at/iug/content/e55642>). An overview of actual business start-ups and succession projects by former IUG entrepreneurship students and graduates can be found at <http://www.jku.at/iug/content/e49536>). In addition, the Institute also aims at developing potential career paths for students to work in professional services and public institutions that are involved in consulting, coaching, and funding start-ups and promoting business succession. In fact, many of the external lecturers and actors from regional institutions that support entrepreneurship were associated with the IUG before as graduates or members of university staff.

1.1.3 Resources: people and financial capacity

Human resources for entrepreneurship education

Essentially, the university people substantially involved in entrepreneurship teaching come from the IUG. The institute has only four members of internal teaching staff (1.2.5). In addition, it co-operates with (alumni) entrepreneurs involved in teaching (1.2.3; 1.2.5) and a number of external lecturers who teach a significant share of regular courses, often in team teaching with internal instructors. Internal teaching staff has substantial experience in business and further education, in particular competency development.

Financial resources for entrepreneurship education

The main part of financial resources for EE is reflected in the personnel budget consisting of the members of IUG staff (four teaching and research staff, one administrative). In view of this somewhat challenging resource base for delivering high-quality university-wide entrepreneurship education (and the specific challenges posed by temporary employment



of mid-level teaching faculty), the Institute aims at adding to its funding by acquiring grants to pursue additional research and teaching projects (see <http://www.jku.at/iug/content/e55642> on IUG's third-party research projects and the section on managing resource acquisition in 1.4.1).

1.2 Entrepreneurship in curricula and teaching

1.2.1 Overview of curricular offers

Curricular EE at JKU is provided by IUG teaching staff and the institute's network of external lecturers (1.5.2). Teaching staff deliver a range of different entrepreneurship courses and seminars to different target groups (1.2.2). The line-up of courses in the entrepreneurship specialisation for bachelor (and diploma) students from the Faculty of Social Sciences, Economics and Business follows a straight-forward structure of compulsory introduction courses (entrepreneurship and business development; Unternehmensgründung und -entwicklung), seminars (SE) and electives (Intensivierungskurse; IK), in particular in Business Planning, Entrepreneurial Finance, and Business Development and Succession.

A specific feature of EE at the IUG is the persistent focus on "practice-oriented", hands-on EE activities (see the sections on learning objectives and course design in 1.2.3). For example, there is an array of courses in business planning and entrepreneurial management where students develop business ideas and solve challenges in "real life" start-up management. Frequently, course work in the intensive courses (IK) unfolds together with the entrepreneurs facing these challenges in their start-up firms or with JKU's patent scouts ("Patentscouts").

The case study focuses on two of these elective intensive courses (IK) – **Patented-based Business Planning** ("PATENTes Business Planning"¹) and **Innovation Lab**. The latter is offered for science and engineering students in the Law and Business Master's degree programme ("Master Recht und Wirtschaft für TechnikerInnen"). In the following sub-chapters, different aspects of curricular EE at JKU will be highlighted along these two extensive entrepreneurship courses and supplemented with additional insights into the curricular approach of the IUG towards entrepreneurship teaching. The table below provides a general overview of curricular EE offers at JKU.

Exhibit 1: Overview of curricular EE offers at JKU Linz

No.	Name	Objectives	Target group	No. of participants in [year2013]
1	Introduction to Entrepreneurship and Organisational Development	Introduction to entrepreneurship, start-up and development of enterprises	Bachelor students (SOWI: social sciences, economics and business studies)	approx. 200

¹ „Patent“ also means smart or ingenious in German language.



2	Entrepreneurship and Business Development	<p>KS 1: The course aims at providing students with tools to establish their own business and pursue self-employment.</p> <p>KS 2: The course focuses on entrepreneurial finance and is designed to help to make better investment and financing decisions in entrepreneurial settings. The objective also aims to foster the understanding of theoretical concepts with regard to Corporate Venturing and Start-up Financing.</p> <p>KS 3: the final course in the specialisation provides general knowledge in corporate development with a focus on business succession</p> <p>In all courses the insight in entrepreneurial business practices is enhanced through guest lectures and networking activities.</p>	Bachelor and diploma students (social sciences, economics and business studies – SOWI)	450
3	IK 1 Business Planning (range of parallel courses)	Strategic business modelling, business planning, business idea presentation and evaluation	Bachelor and diploma students SOWI	150
4	IK 2 Entrepreneurial Finance	IK2 aims at preparing students for these decisions, both as entrepreneurs and venture capitalists. In addition, the course includes an in-depth analysis of the structure of the private equity industry.	Bachelor and diploma students SOWI	175
5	IK 3 Financial Planning	Preparation of a financial plan, valuation of a company.	Bachelor and diploma students SOWI	220
6	IK 4 Biz Kick	BizKick! (once a year) is a series of events that is organised in cooperation with the University of Applied Sciences Upper Austria, the Upper Austrian Chamber of Commerce and the Johannes Kepler University. Within a timeframe of six weeks, student teams have to find a business idea, to write a business plan and to put this idea into practice by generating first revenues. Course slogan: "Being an entrepreneur for one semester". The main purpose is to arouse the student's interest and awareness for self-employment and to illustrate the reality of entrepreneurial life	Bachelor and diploma students SOWI and TNF	25
7	IK 5 and 6	<p>IK 5 (once a year) is transfer-oriented and focuses on start-up management. Students get to know appropriate tools to elaborate, i.e. a strategy paper and also get involved in planning later implementation.</p> <p>IK 6: Specialised topics in entrepreneurship: i.e. legal aspects of business succession, sales training, competency development, crisis management in SME</p>	Bachelor and diploma students (SOWI)	50



8	Seminars in Entrepreneurship	In the Bachelor-Seminar as well as in Seminar 1, students work on current issues regarding the latest entrepreneurship research. The objective is to develop an academic paper that reflects the current state of research in the field of Entrepreneurship In the final Seminar 2 advanced student teams work on theoretical themes and/or empirical surveys including presentations	Bachelor and diploma students SOWI	240
9	Innovation Lab	Evaluating business models, work on specific practical problems of real enterprises	Master students (Business and Law for engineering and science students)	30
10	Entrepreneurial Knowledge for Students from Science, and Engineering & Entrepreneurship in the Creative Industry	IK "Entrepreneurial Knowledge for students from Science and Engineering: The aim of this workshop-based course is to get to know basic knowledge in entrepreneurship. The inputs are attuned to founding a business in the engineering context. Teams of students work out a business plan. IK "Business development in the Technological Sector - from Innovation to Marketability": Based on lectures from experts and practitioners, students deepen their entrepreneurial knowledge on special issues like patents, business model development and entrepreneurial finance.	Bachelor and diploma students	75
11	Thesis writing seminar	Coaching for students writing a diploma or master thesis in entrepreneurship	Diploma and master students (SOWI)	25
12	Seminar and Colloquium for PhD candidates	Coaching (in cooperation with professors from other institutes) for students writing their PhD theses (in the field of entrepreneurship, SME, family enterprises, entrepreneurial finance, technology transfer and related fields)	PhD candidates (SOWI – not restricted to entrepreneurship)	25

1.2.2 Target groups

Main target groups of entrepreneurship education

Entrepreneurship teaching at the IUG targets the following groups in terms of the future career paths and overall employability (OeH, 2013; Kailer, 2012):

- Staff and students from JKU's four faculties with an interest in entrepreneurship, entrepreneurial business development or intrapreneurship;
- Students interested in business succession (e.g. in family business which is a backbone of the SME economy of Upper-Austria as one of the core industrial regions of the country);
- Students interested in working as so called "Gründungshelfende" (e.g. in start-up consulting and coaching in incubators, technology parks, consultancies, banks, chambers of commerce and industry, etc.);
- Alumni, in particular alumni entrepreneurs, to be integrated in on-campus EE (generally as guest speakers and role models and practically, e.g., in entrepreneurial



management projects with JKU students in IUG's entrepreneurship specialisation courses).

IUG's approach thus goes beyond aiming exclusively at student and graduate start-up creation directly. Rather, the broader set of target groups also aims at contributing to the development of entrepreneurial mind sets ("instilling an entrepreneurial touch" as one of the interviewees put it) in indirect target groups who, later in their careers, might be in a position to support start-ups and entrepreneurship in society or act entrepreneurially in established organisations.

With regard to curricular and departmental segments, entrepreneurship at JKU is anchored in the curriculum of both bachelor and master degree programmes within the Faculty of Social Sciences, Economics and Business (SOWI). In numbers, more than half of the business and economics graduates choose the entrepreneurship specialisation provided by the IUG (160 in 2013). Furthermore, entrepreneurship is an elective for students within the Faculty of Engineering and Natural Sciences (TN) where interdisciplinary courses also include students from the local University of Art and Design Linz (Kunstuniversität), addressing business planning in technology as well as creative entrepreneurship (approx. 50 to 100 participants per year).

Overall, EE at the university appears to be well tailored to the different target groups. This is particularly seen in terms of the following:

- Students' *background and degree studied*; e.g. in a business planning course for the above science, engineering and art students in comparison to courses for business students ("Unternehmerisches Wissen für Studierende der TNF & Selbständigkeit im kreativen Umfeld"; IUG, 2014);
- *Business competences and experience*; e.g. in hands-on entrepreneurial management courses where students work in teams and take roles according to their competences and prior experience so as to manage heterogeneity in class;
- *Profession*; for example, in extra-occupational master programmes where the time structure of courses is adjusted to professional part-time studies.

Continuous education

At the post-graduate level, the university offers several extra-occupational master degree courses ("berufsbegleitende Masterstudiengänge"). Entrepreneurship is an elective in JKU's General Management master and one of the compulsory subjects in the master programme in Law and Business for Science and Engineering (Recht und Wirtschaft). In the latter, the Innovation Lab course is offered (see 1.2.3 for details).

1.2.3 Designing lectures and courses – basic curricular decisions

Objectives

In relation to the target groups of EE, a general objective of entrepreneurship teaching at the IUG is the employability of JKU graduates through entrepreneurship as a career path ("Karriereoption Selbständigkeit" – self-employment as a career option). This also includes the intention to qualify start-up consultants and other professions involved in entrepreneurship policy and start-up support ("Gründungshelfende"). The corresponding prime objective is to develop entrepreneurial competencies in students ("unternehmerische Kompetenzen"; "Gründungskompetenzen"; Kailer, 2012; IUG 2013, 2013a).



Practically, entrepreneurship qualification at Linz also aims at giving students access to the Upper-Austrian start-up and entrepreneurship network, in particular for students to personally get in close contact with experienced start-up consultants and people involved in the support infrastructure for entrepreneurship in the region (e.g. through the involvement of these external stakeholders in entrepreneurship teaching or at extra-curricular events like JKU's founders café ("Gründercafé") and the founders fair ("JKU-Gründermesse") (see 1.5.2 and 1.3.1 below).

At the level of individual courses, one overarching objective is the idea to familiarise students with concepts of entrepreneurial management and their application to practical start-up and business development problems through the students themselves. This is often in close co-operation projects with entrepreneurs and their ventures, e.g. in the focused **Innovation Lab** course but also in other courses such as the Business Planning course (IK 1) taught by Gerold Weisz, external lecturer and managing director of "akostart oö - Akademisches Startup Netzwerk Oberösterreich") – a regional Upper-Austrian pre-incubator for academic start-ups. Similarly, within the **Patent-based Business Planning** course, management students apply tools like the business model canvas to real patents from the university's Faculty of Engineering and Natural Sciences so as to develop and command application competencies within the tool box of entrepreneurial management instruments (IUG, 2013). Additionally, in both the innovation lab and patent-based business planning courses, students strengthen interdisciplinary teamwork and presentation competencies in comprehensive course elements throughout the semester.²

Contents

The team of IUG entrepreneurship staff and its network of external lecturers teach entrepreneurship courses both for larger groups of 200 students and smaller classes from 25 to 40 students. The larger courses are typically the introduction courses which provide the fundamentals of entrepreneurial management and venture growth (necessarily) in a lecture-type format (Unternehmensgründung und –entwicklung; UG I-III; see 1.2.1 above) and also include guest speakers. Based on this, there is a differentiated teaching portfolio on offer for students in so called "intensive courses (IK)" (entrepreneurship specialisation courses) with formats strongly dedicated to practical aspects of entrepreneurial management (i.e. competency development, crisis management, business succession law, sales training, management of start-ups).

The IUG team puts substantial teaching resources in the IK specialisation range where courses are regularly offered in parallel to enable teaching formats with smaller groups of students. In particular, within the IK 1 Business Planning course students can choose from different course options – one of which is the patent-based business planning IK course discussed in more detail below. In addition, there are IK business planning courses taught by external lecturers from different areas of entrepreneurship practice.³ In the course offered by Alexander Stockinger from the start-up service of the Austrian Economic Chamber ("Wirtschaftskammer Österreich"; WKO), students work in teams

² In both courses there are parts where direct feedback and reflective discussion of students' teamwork and presentations is integrated (e.g. in individual feedback sessions and investors' trade fairs where student projects are presented and evaluated – see the content section below).

³ IUG staff also developed course formats which go beyond just planning a new business. For example, in the Biz Kick course students develop their own business *and* put into practice on campus (in competing groups of students starting with a small amount of funding and the goal to make money from their business within five weeks).



(seven teams of four students each), developing business plans from self-selected business ideas. The business ideas in the course may come from a range of industries, following the philosophy of the WKO to be open for start-ups from all sectors. Typically, students work with different institutions involved in regional start-up support, for example, in collecting market data and evaluating their business ideas. Similarly, in a business planning course taught by Gerold Weisz from the region's academic pre-incubator institution "akostart", students team up and work together with entrepreneurs from the akostart pre-incubator to tackle current management challenges in the ventures of these entrepreneurs (e.g. internationalisation or sales strategies).

Patent-based Business Planning

Students in the Patent-based Business Planning course are usually from the Business Administration department while the patents used in the course are from the Faculty of Engineering and Natural Sciences. The central idea of the course is for students to develop potential product or service applications based on the technical patents, build a business model, and plan for subsequent opportunity exploitation; examples are product and service ideas for flexible batteries (e.g. applicable in intelligent wear) and servicing of oil pipelines (based on a patent from mechatronics; Energy Harvester/ PipeSec⁴). The course is taught by Birgit Wimmer-Wurm from the IUG in co-operation with patent scouts, typically young doctoral or post-doc scientists from engineering and science. The patents themselves root from inventions in basic research, often from physics and mechatronics. With around thirty participants in the course, students build teams and take on different team roles based on their competencies and personal interests (CEO; finance manager; infrastructure manager; marketing manager, and product manager). The course is structured in different phases and workshops, with students fulfilling different tasks throughout the semester.

Patent Workshop

The course kicks off with an introduction and a patent workshop (of approximately three hours contact time). Students organise their teams, choose their team roles, and each team picks a patent to be explored throughout the course. The patents will be presented by the patent scouts or the original inventors from the Engineering and Science Faculty and the student teams familiarise themselves with their patents (in a time slot of around 90 minutes). This element is both central and, at the same time, difficult for student learning in the course. Students need to explore and understand what the patent actually amounts to and what its advantage may be. For EE instructors, the presentation of patents by the scouts is a balancing act between telling just enough (in terms of exemplary practical applications of the patent the scouts may have in mind) and telling as little as possible to avoid students from developing too narrow a focus on the potential of a patent.⁵ At the end of the patent workshop, students summarise the basic points and issues of their patents on posters.

Creativity Workshop

As the next step in the course, in the following there is a creativity workshop. In the meantime students may and should discuss the patent and its practical potential with

⁴ The PipeSec student team has been one of the winners in the Austrian i2b business plan competition in 2014.

⁵ In the course different approaches have been tried out over time: explaining the patent exemplified by possible applications and explaining the patent purely in technical terms (without reference to applicability, which, however, does not seem to benefit student understanding).



their relatives and friends. This feeds into the creativity workshop where the main task for students is to find possible applications for their patents. The workshop is usually operated in the Innovation Lab sprint domiciled at the Fachhochschule Wels (University of Applied Sciences Wels). Students use electronic whiteboards to create, arrange, rearrange, and discuss possible ideas for applications in areas of daily life like leisure, household, or sports (see the exhibit below). In this brainstorming phase for idea generation, the patent scouts will take a backseat, refraining from interfering with students' idea flow. The patent scouts will give their opinion on the two most promising application ideas for each patent in discussion with the student teams on the basis of their technical understanding of the patents (evaluation phase). These two possible applications will then be mapped out on posters by students, pinpointing the technical advantages of the patent in the envisioned application setting.

Business model generation

The two potential product or service applications undergo technology screening and preliminary market analysis before the teams delve into business planning for their favourite idea.⁶ To facilitate the planning process students develop a business model canvas (the tool is to be introduced by course instructors in a short input section). This enables students to explore interrelationships between the building blocks of the canvas from a holistic perspective of business models.⁷ The student teams present their business model canvas concepts which will be discussed and evaluated in the course. In terms of formal output, student teams prepare business plan drafts, receive feedback from instructors, and submit their final versions at the end of the course after the investor trade fair (IUG, 2013). The business plans prepared in the course are submitted to a nationwide business plan competition ("i2b") where student teams from the course have achieved top ranks in the latest editions. In 2013, three out of five teams in the Austrian final round came from this course (<http://www.jku.at/iug/content/e49383>).

Investor trade fair (student presentations)

The investor trade fair is essentially a role play format in which students take on the dual roles of: a) entrepreneurs presenting their business idea and, b) investors making decisions on investing virtual money. The fair has a frame in which student teams aim at convincing investors in a ten-minute management presentation followed by a five-minute Q&A investment screening session before the teams make their investment decisions.

The overall concept of the course has developed over time. For example, the investor trade fair has started from what have been traditional classroom student presentations in the beginning. Also, the creativity workshop has been taken on board to give students more room to develop suitable application ideas (before that students jumped right into possible applications and business models after the patents had been presented by the patent scouts). Further improvements in the course are made from semester to semester by the instructors and the patent scouts involved in teaching.

Innovation Lab

In contrast to the patent-based business planning course, where the focus is on preparing a complete business plan, the innovation lab course (IUG, 2013a) follows a different approach. Students tackle practical entrepreneurial management problems in their team

⁷ In this phase, the nine building blocks of the canvas will be assigned to the different managerial team roles defined at the beginning of the course.



projects. These management problems stem from start-ups and young enterprises, for example from the akostart pre-incubator and tech2b high-tech-incubators in the region. Typically, though essentially set in the management arena, the problems also feature a technical perspective since students in the course usually have a strong technical background (that is in the university's master programme in law and business for engineers and natural scientists). It will be the entrepreneurs from the above start-up and young enterprises who present the management problems to students and function as role models of academic entrepreneurs. Entrepreneurs will stay involved throughout the course to work on and discuss possible problem solutions with their student teams. The course is facilitated by a member of staff from the IUG and an external business consultant who is with the tech2b incubator.

The course *kicks off* with students to build teams, entrepreneurs to introduce and present selected management problems in their start-ups, and the two instructors to provide input on the business model canvas tool. Familiarisation with this tool is essential since the student teams should appreciate and address not only their specific entrepreneurial management problems, e.g. developing a sales strategy for a start-up, but also the context of the overall business model of their assigned venture. And student teams – together with the founder(s) of the business – often come across interrelated management challenges that require additional attention.⁸ In addition to the business model canvas as a “meta tool”, students receive input on more specific tools (e.g. from marketing or strategy) that they may want to use. In the *second session*, student teams present their business model canvases for the start-ups and management problems. The concepts will then be evaluated and discussed in due course while the course instructors give feedback to each of the student teams. In the *final session*, the final concepts will be presented by the student teams, including management implications and recommendations. The final management reports have to be submitted one week later to allow the teams to integrate received feedback from the presentations (see 1.2.4 regarding the formal evaluation of the course). The Innovation Lab course gives students the opportunity to work on “real-life” start-up and entrepreneurial management problems in close, hands-on co-operation with academic entrepreneurs and their ventures. At the same time, the entrepreneurs receive added value including the management suggestions provided by their student teams and the class.

Methods

In entrepreneurship teaching different methods and approaches for supporting the objectives of the respective courses are employed, for example:

- Student team work as a format to support participants' problem-centred learning in the Innovation Lab and other business planning courses in which students work on practical entrepreneurial management problems requiring different problem-solving competencies manifested in different team roles.
- Role play segments, e.g. in the investor trade fair at the end of the patent-based business planning course where students assume the roles of entrepreneurs and investors (and learn to navigate both the view of founders to present business ideas as convincing investment opportunities and the (critical) view of investors in the investment screening process).

⁸ Course instructors, however, will make sure that the management problem is defined in way compatible to students' course work.



- Developing students' competence profiles with a special method for competences diagnosis and development (KODE®) developed by Prof. Volker Heyse and Prof. John Erpenbeck.
- Practical training on examples of real business cases.

Media

Similarly, both electronic and traditional media are used to facilitate learning in the courses, for example:

- Electronic whiteboards (including multi-touch-sketching-walls) within Sprint Lab/ Front End of Innovation Lab – used in the patent-based business planning course (during the creativity workshop) to facilitate students' creative search for patent applications.
- Electrostatic flexible whiteboard sheets, which can be put on almost every hard surface and are used in the idea generation phase or at the end of the course for creative presentations.
- Traditional posters and flip charts, often at milestone points at the end of course phases and specific workshops for students to summarise and consolidate results of course sessions and as a preparatory input to proceed to the next step of their course work.
- “Moodle” as an electronic object-oriented learning platform on an open-source base to support course management and communication exchange.

Informal evaluation of learning outcomes and feedback for students

Evaluation of student learning and subsequent feedback to students is provided by different types of people in different informal course settings:

- *Students* (and *instructors*) in class: student presentations, e.g. of business models or solutions to management problems – feedback by fellow students and instructors as management issues will be discussed in detail including routes for further development or improvement.
- In bilateral meetings with *instructors*: options for individual feedback are integrated in the time schedule of the courses, in particular to receive feedback before specific course milestones are due (e.g. the management report in the innovation lab course).
- *Entrepreneurs* (involved in the courses): in the business planning courses where real management problems of start-ups are addressed, the founders and managers of these businesses offer discursive feedback to students' problem analysis and their process to derive management implications.

In particular as students continue to refine their business idea beyond original course work (e.g. in the patent-based business planning course), there may follow a further feedback process, potentially on the route to real student or graduate entrepreneurial behaviour (see the section on student support in 1.2.6)



1.2.4 Setting of entrepreneurship teaching

Timing

For the two courses discussed in detail (but also for other course offers in the “Intensivierungskurs” segment), it stands out that course sessions do not follow a traditional format of a specific weekly contract time sliced into time slots of ninety minutes. Rather, sessions tend to be longer (often around half a day or even entire days) with less frequent meetings throughout the term. These extended course meetings are tailored to the contents and objectives of the sessions (e.g. to get students to familiarise themselves with the technical patents during the kick-off or for students to practice role play at the investor trade fair in the patent-based business planning course). Further, EE instructors emphasise the need to give students sufficient time to think through, for example, the patents they got introduced to or the feedback they received on their management reports during the patent-based business planning and innovation lab courses.

Formal evaluation of learning outcomes

In the formal evaluation process, a range of different student outputs will be marked, depending on the format and size of the course. The lecture-type introduction courses have an end-of-course written exam for capacity reasons. The courses in the entrepreneurship specialisation also formally evaluate student presentations of and interim reports on business plans, idea screening protocols and management concepts with a focus on the final versions of submitted business planning/ modelling and management papers (reflecting between 50% and 60% of the overall mark; IUG 2013 and 2013a).

1.2.5 Instructors: teachers and mentors

Professors, other employees and external lecturers of the university

There are different groups of instructors involved in entrepreneurship teaching at JKU: IUG staff, external lecturers, entrepreneurs, people involved in start-up support (“Gründungshelfende”) and patent scouts (<http://www.jku.at/iug/content/e49272>). The IUG is the central unit at the heart of EE at the university. The IUG is headed by a tenured entrepreneurship professor. In addition, there are three lecturing and research positions (“UniversitätsassistentInnen”) in entrepreneurship with fixed-term work contracts. IUG teaching staff has a background in management studies, business and economic education, and further education. The institute also integrates about ten external lecturers with two related strategic aims⁹: a) to enhance the resource base for entrepreneurship teaching and, b) to involve entrepreneurship practitioners in teaching. The external lecturers are typically entrepreneurs or start-up/ business consultants and incubator managers from the Upper-Austria region as well as specialised experts (e.g. in sales training or finance). Also, the system of establishing a pool of external lecturers ensures continuity in teaching to some extent. This is important because internal mid-level teaching staff is employed only temporarily in the higher education system in Austria.

⁹ The composition of the curriculum taught by external lecturers is adjusted by the IUG every semester according to teaching needs and available budgets.



“Real entrepreneurs” as teachers

At JKU, business founders and entrepreneurs are a core element of entrepreneurship teaching beyond one-off guest lecture events. Rather, in the business planning specialisation courses, entrepreneurs and their current management challenges take centre stage (see 1.2.3 above). For example, in the business planning course offered by Gerold Weisz, the instructor brings around four to five entrepreneurs from the akostart pre-incubator into the course. For the student teams, the co-operation with the founders involves the development of a mutual understanding of the management problems raised by the founders at the outset of the course, working (sometimes on-site at akostart) on alternative problem solutions, as well as presenting and discussing their analysis, solutions, and recommendations for implementation¹⁰. Occasionally, student internships and employment with the akostart ventures become an immediate output from the course.

1.2.6 Management of entrepreneurship education

Teacher and trainer management

The personnel development unit of JKU organises and operates a campus-wide programme for training of the university's teaching staff. The programme is compulsory for all new teaching personnel and thus not specific to entrepreneurship teaching. The course programme offers a tool box of didactic instruments and opportunities for building and improving lecturing competences (in interdisciplinary courses). In addition, there is a system of mentoring and peer-group visits of lectures/ seminars. This training is reported to be useful for teaching entrepreneurship because of its multi-faceted character with many different teaching situations and forms of interaction with students.

Managing student support

Managing the potential transformation from students of entrepreneurship in lectures and seminars towards students with a strong interest in becoming entrepreneurs is central to IUG's overall approach. To address the particular target group of students interested in founding their own business, to offer advice, and to organise extra-curricular activities for potential founders, the IUG has established a Start-Up Centre at JKU, situated within the institute (<http://www.jku.at/startup/content>; IUG 2014a). The extracurricular activities are specifically dedicated to offer a networking platform for potential founders and regional institutions providing start-up support and counselling. The activities run by the Start-Up Centre include, e.g., a regular founders café (“Gründercafé”) with founders and “Gründungshelfende” - those who support entrepreneurship, a start-up fair (“Gründermesse”; organised with the Junior Chamber Upper-Austria (“Junge Wirtschaft”)), a founders dialogue event (“Gründerdialog”) and other formats (1.3.1).

The Start-Up Centre is led and operated by Christine Blanka, a post-doc researcher and lecturer in entrepreneurship from the IUG team. Since it operates on a fairly limited resource base provided solely from IUG's resources, the centre is primarily an initial, low-threshold contact point for JKU students and staff interested in founding a business. For academic venture projects in their very early stages, the centre provides information material and initial consulting (e.g. related to discussing the feasibility of business ideas

¹⁰ Reportedly, the EE instructor of the course takes a backseat, particularly in the analysis and discussion phases of the course.



and to issues in initial business planning).¹¹ Further, the IUG has established a network of close co-operation partner institutions within Upper-Austria for providing further start-up support to JKU members (1.5.2).

In particular, start-up coaching is provided by the akostart pre-incubator where the university is one of the shareholders of the academic incubator (together with other Upper-Austrian education institutions).¹² With regard to technology venturing, the Start-Up Centre offers a taught course on the basics of entrepreneurship for students from engineering and science and, in co-operation with the tech2b incubator, consulting for students envisioning a high-tech start-up project. More general advice and support is provided by the Start-Up Service of the “WKO Wirtschaftskammer Österreich”. These instruments of start-up support are also tied back into EE and students’ development of entrepreneurial competences with the employees of the WKO Start-Up Service, akostart, and tech2b involved in entrepreneurship teaching as external lecturers. Overall, the IUG and its start-up support network in the region offer a chain of shared support with the Start-Up Centre at the front of the gateway of entrepreneurship students in curricula and, subsequently, individual support for student and graduate start-ups within the above regional network.

A typical case comes from a team of students in the Patent-based Business Planning course who are currently at a crossroads between finishing their studies and establishing a start-up based on a business idea and patent from the course. The student team originally developed a product to measure snow loads (e.g. on roofs) in the construction sector. The business idea later migrated to a different area of application and the team still has to make key decisions as to if and how to further pursue the project. Currently, the students are in contact with their instructor from the course and have taken their patent scouts on board. Later the project may be moved to the tech2b incubator for further support.

Internal and external network management

The IUG has had positive experiences with endorsing university start-up support and students’ learning about hands-on entrepreneurship (at the IUG and the Start-Up Centre) by bringing on board people from regional institutions who are also involved in entrepreneurship teaching. This enables JKU students to become familiar with opportunities for start-up advice and resource support. In terms of offering platforms for the integration of and communication between alumni (entrepreneurs), current entrepreneurship students and JKU staff, the extra-curricular founders café and fairs are a meeting point for all (including the regional “Gründungshelfende”) and a platform for presentations and discussions with JKU academic entrepreneurs. These entrepreneurs are also part of the group of founders and start-ups integrated in the specialised business planning courses. Currently, the IUG is in the process of broadening this base of entrepreneurs by collecting data on its entrepreneurship alumni to track their careers and entrepreneurial behaviour.

¹¹ Note that the personnel resources of the centre, which solely come from IUG’s budget, are limited and thus only initial consulting can be offered. However, according to their specific needs, potential entrepreneurs are then transferred to the strong network of external support, in particular the start-up service of the Chamber of Commerce, the akostart pre-incubator and the tech2b high-tech-incubator.

¹² In fact, after the founding of akostart detailed and continuous coaching and counseling of individual start-ups moved from the Start-Up Centre to the pre-incubator.



Evaluation of courses and programmes

In addition to general university-wide course evaluation, the IUG pursues a non-formalised approach of ad-hoc evaluation of courses. Experiences and routes for further improvement are discussed on a semester basis between IUG staff as well as external staff, such as the patent scouts, external lecturers, and entrepreneurs involved in entrepreneurship teaching.

1.3 Extra-curricular activities related to entrepreneurship education

1.3.1 Overview of extra-curricular entrepreneurship activities

JKU has established a range of different extra-curricular activities for the target groups of potential and actual entrepreneurs amongst students, graduates, alumni, and staff. The aims of these activities are: a) to provide a platform for communication, networking and co-operation around hands-on start-up, business succession and business development activities and, b) to support individual start-up and business venturing projects within the above target group community. Among these efforts to foster co-operation and start-up promotion, regional network partners around the university's IUG play an important role, for example in teaming up with the Start-Up Centre in consulting to individual entrepreneurs and as frequent participants in networking events like the "founders café" or "dialogue with entrepreneurs". The exhibit below offers an overview of the extra-curricular activities in entrepreneurship. Their relation to curricular education (which is the main focus of this case) and the relationships with regional network partners as external stakeholders are discussed in 1.2.6 and 1.5.

Exhibit 2: Overview of extra-curricular EE activities at JKU

No.	Name	Objectives	Target group	No. of participants in [2014year]
1	Founders Café	Networking event for (potential) entrepreneurs with other entrepreneurs and start-up consultants	Students, alumni and employees of JKU, entrepreneurs	250
2	Founders Fair	Networking event organised by the Junior Chamber of JKU, supported by IUG; information desks of consultants, Austrian Economic Chamber, banks, etc. (approx. 20 exhibitors)	Students, entrepreneurs and successors	250
3	Start-Up Centre	Initial consulting in the start-up phase; organisation of extra-curricular activities of the IUG	Students, alumni and employees of JKU	
4	Entrepreneurs Dialogue	Entrepreneurs reporting on their start-up activities	Basically students	
5	Business Plan Coaching and Start-up Consulting Days	Coaching with experts from tech2b and the start-up service of the WKOÖ (started in 2014)	Students, alumni and employees of JKU	15 appointments per year

In addition to the networking activities listed above, the IUG organises discussions with entrepreneurs within curricular courses or separated extra-curricular events (about 15-20 per year).



1.3.2 Details of extra-curricular activities

Extra-curricular activities are relevant for the university. They are, however not in the focus of the case. Extra-curricular activities which are important for the regional network in terms of supporting and coaching individual students, graduates, or staff planning to found a business are integrated in chapter 1.2.6 (e.g. IUG's StartUp Center and its activities).

1.4 Institutional aspects of entrepreneurship education

1.4.1 Organisational set-up and change

Measures for co-ordinating and integrating entrepreneurship education across the university

Since the IUG is the anchor of the university's magnet approach of entrepreneurship, the institute represents the central node in co-ordinating EE across JKU organisation.¹³ The IUG and its curricular and extra-curricular activities are reported to be well accepted and appreciated within the university. However, the resource environment for the further development of entrepreneurship in general, and activities in entrepreneurship teaching in particular, seems challenging (see the next sub-section on managing the acquisition of resources below). One of the aims of the IUG with regard to a further integration of EE in the university institution would be to move the university's leadership from considering entrepreneurship as a core theme of the IUG towards pursuing entrepreneurship as a development goal of the JKU organisation as a whole.¹⁴ However, beyond top-down leadership to advance entrepreneurship, activities and opportunities for spreading entrepreneurship also originate bottom-up from individual EE activities. One example of this is the co-operation between the business and the engineering and science faculties of the university within the patent-based business planning course where university patent scouts work jointly with IUG staff to develop business ideas and potential venture projects from the university's patent base (see 1.2.3 for details). In 2014, the university established a third-party funded project in technology and knowledge transfer. The co-operation on patent commercialisation within the above entrepreneurship course of the IUG is one of the core elements of this project (the "Wissenstransferzentrum West"; see <http://www.jku.at/iug/content/e49383>).

Managing the acquisition of resources

JKU funds entrepreneurship education through the budget of the IUG as a regular institute of the university. In addition, the university in general, and the IUG in particular,

¹³ Moreover, the IUG and the university currently aim at establishing an Entrepreneurship Charta for higher education institutions in Upper-Austria so as to anchor entrepreneurship more strongly in the education system of the region (WKOÖ/Academia Superior, 2013).

¹⁴ In fact, entrepreneurial behaviour and knowledge ("unternehmerisches Verhalten und Wissen") has been taken on board as one of the development goals of the university. However, with a plurality of different goals and organisational demands from the university's departments and research disciplines it is considered challenging in IUG's view to substantially improve the resource base for entrepreneurship education from regular funding from the university's annual budget.



put efforts into acquiring further third-party funding for entrepreneurial activities. These efforts are important for two reasons:

First, most of the mid-level teaching personnel in public higher education in German-speaking countries are in non-tenured temporary employment, which results in a high level of labour turnover. Projects funded by third parties offer scope for employing EE personnel which the university is only allowed to employ on fixed-term contracts for a limited time horizon.¹⁵

Second, the volume of the regular budget of the IUG is fairly limited (four full-time equivalent research and teaching staff and a small four-digit budget for material expenses). This basic resource endowment is fairly inflexible while enrolment to entrepreneurship (and other) courses is handled fairly open at JKU, thus leading to noticeable bottlenecks in entrepreneurship teaching and, reportedly, to challenges in maintaining the didactical quality in overcrowded entrepreneurship courses. The IUG, however, tries to address such bottlenecks by offering additional courses via external lecturing or stretching the teaching load of IUG staff who have a strong intrinsic motivation to engage in entrepreneurship teaching.¹⁶

1.4.2 Mindsets and attitudes

Raising awareness for the importance of entrepreneurship

In addition to IUG's visible campus-wide extra-curricular activities the institute has made efforts to promote its EE offers, to showcase the entrepreneurial careers originating from JKU (student/ graduate and alumni entrepreneurs), and to highlight the potential opportunities in acting entrepreneurially. For example, entrepreneurship events, the offers of the Start-Up Centre, portraits of JKU entrepreneurs as role models, and the work and support services of JKU's network of "Gründungshelfende" have been published in campus and alumni magazines, often featuring a whole issue dedicated to start-ups and entrepreneurship (e.g. Kepler Society Karriere News, Mai 2012 – Gründer Extra; Kepler Society 13 März – Karriere News Gründer Extra, 2013; JKU Univationen 2/13; JKU Campus News 02/2014; OÖ Nachrichten Campus, März 2014).

Overall, in the academic year 2013/14 around 150 students were enrolled in the entrepreneurship specialisation. In terms of employability the IUG's clear objective is to contribute to developing entrepreneurial mindsets in these students with self-employment as a tangible career option ("Karriereoption Selbständigkeit"). An alumni survey conducted by the IUG amongst JKU alumni (Kailer et al., 2012) has shown that 30% of them were involved in entrepreneurial activities (as entrepreneurs or intrapreneurs, succeeding in or running a family business; also see 1.6.1) or were planning the start-up.

Encouraging entrepreneurial behaviour

¹⁵ This is widespread practice in the public higher education sector in German-speaking countries like Austria. Labour regulation allows employment at higher education institutions for a maximum of four years in Austria (six years in Germany; with additional periods of employment)

¹⁶ The IUG's efforts to alleviate capacity bottlenecks for entrepreneurship students have been validated by representatives from the local branch of the Austrian National Union of Students (Österreichische HochschülerInnenschaft).



The interviewees in the case¹⁷ reported a range of catalysts and obstacles from different areas towards true entrepreneurial behaviour of university members, in particular among current and former students. The main *obstacles* (from the perspective of JKU students) to start a business are reported to be lacking financial resources, the perceived financial risks in starting one's own business, and the absence of marketable business ideas.¹⁸ These (and other) potential start-up barriers may be addressed to some extent by EE with designs of curricular and extra-curricular EE activities which generate actionable business ideas (e.g. on the basis of university patents, but also more broadly) and which give students real access to (regional) players that provide consulting and finance. The *catalysts* entail elements both outside and inside the university organisation.¹⁹

- *Regional context*: Upper-Austria features a strong industrial base with family firms and a backbone of SMEs with both ample opportunities for starting new businesses and needs for business succession²⁰.
- *Functioning regional support network of "Gründungshelfende" for academic start-ups* (as mentioned by the interviewees in different facets): the support network has been established and promoted at JKU and within the region for more than a decade; entrepreneurship students get in touch with actors and institutions in new venture support within the network during their studies.
- *Network and communication platforms within JKU*: extra-curricular activities like the founders café and the founders fair facilitate networking amongst nascent and experienced entrepreneurs, members of all regional universities interested in starting-up, and the network of "Gründungshelfende".
- *Chain of support for individual potential entrepreneurs*: within the above network students as potential entrepreneurs get support alongside the path from studying entrepreneurship on campus towards starting a business supported by the Start-Up Centre and the regional start-up network (see 1.2.6).
- *Hands-on, practical focus of EE*: the offer of business planning and problem-centred entrepreneurial management courses – though not sufficient in itself – contribute to encouraging entrepreneurial behaviour (see 1.2.3; in particular the patent-based business planning and innovation lab courses); an important design element of the course offers seems to be the opportunity for students to work in teams on real start-up challenges and business ideas, often together with academic entrepreneurs and the people from the above mentioned support network serving as external lecturers.

¹⁷ In all interviews, respondents have been asked for their opinion regarding possible drivers of entrepreneurial activity at their university (the drivers mentioned in the text have been replicated across individual interviews).

¹⁸ As reported in the sub-sample of students at JKU within the Austrian National GUESSS Survey – Kailer (2012); Kailer et al. (2012); data on the current Austrian GUESSS Survey co-ordinated by the IUG is available online at <http://www.jku.at/iug/content/e55642> (including a brief report on data for the JKU sub-sample).

¹⁹ For a further discussion of the entrepreneurial potential, activities, and context factors at JKU and in Austria see Kailer and Wimmer-Wurm (2012), Kailer et al. (2012), Wimmer-Wurm et al. (2013), and Kailer et al. (2014).

²⁰ See <http://www.jku.at/iug/content/e49536> for an overview of alumni start-up founders and entrepreneurs amongst the group of former IUG entrepreneurship students.



1.5 Outreach to external stakeholders of entrepreneurship education

1.5.1 Types of relationships with external stakeholders

The IUG has a range of relationships with external stakeholders. Two related types of co-operation stand out in particular with regard to EE: a) the major group of external lecturers coming from outside the university and, b) the coaching and support services provided for start-ups from the university by regional institutions. These two paths of stakeholder involvement in EE overlap. However, this is a positive characteristic as external lecturers originating from these regional institutions do build bridges between entrepreneurship students and their professional work as consultants at start-up/business plan consulting days or fairs. Many EE instructors in the pool of external lecturers have graduated in entrepreneurship from JKU or even worked with the IUG before moving to the professional start-up service, technology, or finance sector or founding their own business. Generally, this structure of personal, long-lasting relationships between the IUG staff and professionals from external stakeholder institutions has evolved into a support network for academic entrepreneurship around JKU. Within the network, it seems to work well to keep the wheels in motion on a frequent basis and to generate incentives for network members to support JKU entrepreneurs continuously (e.g. as their ventures become incubator firms and register as members of industry chambers etc.).

1.5.2 External stakeholders involved in entrepreneurship education

Enterprises

The most important form of involving enterprises in EE at the university is surely the continuous integration of start-up entrepreneurs in the IUG's business planning courses where entrepreneurs co-operate with student teams; frequently start-up internships and further collaboration projects evolve from initial class-room learning (see 1.2.3).

Support services

Both professional consultants and public start-up service employees are represented on the board of external lecturers associated with the entrepreneurship teaching portfolio at the IUG (e.g. professionals from WKO's start-up service). And, as noted in 1.5.1, the same people also offer advice and support to students interested in founding their own venture or pursue a career as "Gründungshelfende" in a similar way (see 1.2.3 and 1.2.6 for details).

Incubators, accelerators, science parks and technology parks

In much the same way, the university co-operates with all institutions which provide a home for start-ups and ventures from science. As a shareholder, the university is closely related to the pre-incubator "akostart oö Akademisches Startup Netzwerk Oberösterreich", which is dedicated in particular to domiciling venture projects from higher education institutions in Linz (e.g. offering co-working spaces close to the campuses; www.akostart.at) and to the technology incubator tech2b (www.tech2b.at).



1.6 Impact and lessons learned

1.6.1 Evaluating impacts of the entrepreneurship education approach

Overview of impact evaluation methods applied

The IUG puts a focus on instruments for further evaluating EE provided beyond traditional methods like exams or ex-post course evaluation by students. Three of these instruments are presented below: participation of student teams in national business plan competitions, local GUESSS sub-surveys, and alumni surveys.

Student teams in business plan competitions

This instrument is integrated directly in EE courses and is used in the business planning courses within the entrepreneurship specialisation for business students. Business plans written by student teams are submitted to national business plan competitions (such as the i2b competition). This provides not only a useful incentive instrument for students (JKU teams have been very successful in these competitions) but also a valuable tool for external feedback from the juries of these competitions.

Local GUESSS survey

The IUG leads the Austrian national initiative within the global university entrepreneurial spirit students' survey (GUESSS). In fact, IUG has been part of the GUESSS initiative (formerly ISCE) since its start back in 2006. The institute also publishes local surveys from the sub-sample of JKU students (f.i. Kailer and Wimmer-Wurm, 2012), including their extent of entrepreneurial intent, perceived barriers and chances in self-employment and business succession (within the context of other occupational choices), career ambitions, and evaluations of JKU's education and support offers in entrepreneurship. These surveys are valuable also in terms of Austrian national and international comparisons as well as – though not a true panel study – inter-temporal insights from previous GUESSS rounds (see Kailer et al., 2012, 2013, 2014 and, for the history of IUG GUESSS Surveys, <http://www.jku.at/iug/content/e55642>).

Entrepreneurship alumni survey

The institute has also conducted its own online alumni survey of JKU graduates with a sample of around 2.700 questionnaires (Kailer et al., 2012). Alumni surveys offer a good opportunity to explore the common time lack between participating in EE and actual entrepreneurial behaviour of students and graduates. Such ex-post evaluation of EE activities by alumni (who have already started their professional careers) also offers a useful addition to traditional ad-hoc evaluation of EE in class by the current generation of students. Though operating with limited resources, staff of the institute (assisted by thesis students) are currently in the process of setting up a more detailed database of alumni who studied in the entrepreneurship specialisation and, in particular, alumni entrepreneurs. With this database future entrepreneurial career paths may be tracked, for example, in the form of qualitative case studies and teaching cases.



1.6.2 Lessons learned

Summary of lessons learned from this case

Four distinct features stand out within the differentiated concept of entrepreneurship education operated by Johannes Kepler University Linz through its Institute for Entrepreneurship and Organisational Development (“IUG”): 1) the concentrated approach of the IUG on hands-on entrepreneurial management centred on real entrepreneurial challenges for students (**stimulating entrepreneurial challenges in a focused curriculum**); 2) the pronounced integration of entrepreneurs and professionals in start-up support (“Gründungshelfende”) as external lecturers (**entrepreneurs and “Gründungshelfende” in entrepreneurship teaching**); 3) the grown regional network for coaching individual academic entrepreneurs conjunct with class-room teaching (**chain of support for potential student and graduate entrepreneurs**) and; 4) the evaluation of entrepreneurship at JKU in the context of repeated student/ graduate surveys (**evaluation of EE and entrepreneurial careers**).

These features contribute to support and motivate students, graduates, and alumni to consider entrepreneurship as a career option, for example in self-employment, business succession, and work in start-up support organisations like incubators, technology parks, financing institutions, or in public start-up service. The approach is well aligned with the context in which the IUG operates as the core organisational unit delivering EE within the university. Both the above features and their conformance to the work and resource environment offer interesting lessons to be learned; the most instructive part of the case in terms of particular EE activities is the design of the “Patent-based Business Planning” and “Innovation Lab” courses:

(1) *Stimulating entrepreneurial challenges in a focused curriculum*: The course formats in entrepreneurial management (in particular business planning) based on real challenges for student teams to work on, constitute an engine for students to build competencies to develop their own business ideas, screen opportunities, and solve management problems in the course of exploiting these opportunities in a new business. This is in particular in the *Patent-based Business Planning* and *Innovation Lab* courses discussed in 1.2.3 where patent scouts from the university and real entrepreneurs provide authentic input in the teaching process and students work on building business ideas based on university patents held by the university and tackle entrepreneurial challenges in academic start-ups. A key driver of fine tuning the design of these courses to enhance students’ learning has been the process of continuous improvement initiated by internal IUG staff teaching these courses. Institutionally, sustainability of such elaborate EE offers is challenged by the typical fluctuation of mid-level teaching staff employed only temporarily at Austrian universities. IUG has found a viable path to at least partly ensure continuity and sustainability in its teaching portfolio through a long-term pool of external lecturers who often have worked with or studied at the institute before.

(2) *Entrepreneurs and “Gründungshelfende” in entrepreneurship teaching*: In addition to being an element of sustainability in entrepreneurship teaching, external lecturers also contribute to the practice-oriented teaching of entrepreneurship at JKU. This is not only in the typical function of entrepreneurs as role models, but also the approach to include professional “Gründungshelfende” from regional institutions of start-up support in curricular teaching in a systematic and continuous way (rather than one-off guest lectures or detached individual extra-curricular events). This approach also appears to be useful with regard to running IUG’s teaching portfolio resource-efficiently in light of the limited



internal resource base of the institute. In terms of teaching objectives, the close contact of students to such entrepreneurship professionals in class is a core element of the bridge to the established network for venture support at JKU within the region of Upper-Austria.

(3) *Chain of support for potential student and graduate entrepreneurs:* In essence, students at JKU can rely on a chain of support should they be interested in pursuing their own business idea and starting their own business. Three aspects stand out in terms of the effectiveness of the approach: First, support emanates directly from class-room teaching by external lecturers and by IUG staff who also run JKU's Start-Up Centre i.e., those persons who can address perceived start-up barriers by offering advice and material support for individual entrepreneurial careers are well known to students. Second, the network around the IUG is based on close personal contacts between people from the different institutions involved (the WKO, the akostart pre-incubator and tech2b high-tech incubator, other Upper-Austrian HEIs, and many others). This enables a fairly informal co-operation in processes of coaching individual academics and supporting start-up projects across institutions in the network. Third, the extra-curricular activities like the Founders Café and start-up fair events organised regularly by the Start-Up Centre help to maintain the network over time and provide a communication platform for potential entrepreneurs from university.

(4) *Evaluation of EE and entrepreneurial careers:* IUG's efforts to conduct regular evaluation surveys among former and current students, in particular as the country co-ordinator for Austria in the international GUESSS initiative (Global University Entrepreneurial Spirit Students' Survey), are important to argue the case within the university for the importance of entrepreneurship, for example its significant contribution to graduate employability as well as to the infrastructure for economic development and business activity in Upper-Austria.

Transferability to other universities

Overall, the magnet approach around the IUG as the single lead organisation delivering entrepreneurship education at Johannes Kepler University seems transferable. This is in view of the effective use of what is a comparatively lean internal resource base. In particular, higher education institutions planning to establish and expand their infrastructure in entrepreneurship teaching may find the case of the IUG to present a valuable blueprint. A focused combination of a portfolio of courses dedicated to hands-on entrepreneurial management and a strong network of external lecturers may allow setting up a curriculum in a flexible and resource-effective way and, at the same time, getting real-world practice into class. It will, however, require systematic and continuous efforts of committed university entrepreneurship staff like the IUG team in order to maintain such a teaching portfolio and a conjunct network of people providing regional start-up support around a university's potential entrepreneurs.

Others may also find IUG's teaching and course material useful and in fact the innovative patent-based business planning course is planned to be scaled to a transferable module format in the context of a knowledge transfer project funded by the Austrian government. Generally, mixed research and transfer projects fuelled by third-party funding may allow enlarging the resource base for entrepreneurship teaching. However, this may only be a feasible path for specific teaching and content formats attractive to third-party funding institutions, for example, related to technology entrepreneurship and patent commercialisation (in the area of innovation and technology policy) or sustainable and green entrepreneurship (in the area of public sustainability and environmental policy).



Finally, IUG's approach to evaluate entrepreneurship and graduate careers at Linz by contributing to larger national or even international surveys like the GUESSS (or other studies where entrepreneurship scholars are open to expand their data collection) may be interesting to follow. Such co-ordinated impact evaluation may generate insights to (further) improve entrepreneurship teaching and to raise the appreciation of entrepreneurship in higher education.

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Research for this case study was conducted by Marc Grünhagen (Researcher /Lecturer in Entrepreneurship, Schumpeter School of Business and Economics, University of Wuppertal, Germany), on behalf of the study for supporting the entrepreneurial potential of higher education (sepHE). Sources and references used include desk research plus:

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