TEACHING ENTREPRENEURSHIP AND INNOVATION MANAGEMENT IN HIGHER EDUCATION IN GERMANY

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ABSTRACT

Having taught Entrepreneurship and Innovation management (E&I) in higher education for more than 30 years, we were interested in current teaching practices in Germany. Therefore, we conducted expert interviews with colleagues from 15 universities and 5 universities of applied sciences. Nine of these interviewees teach entrepreneurship, and 11 teach innovation management. In this paper, we share the insights that we gained. We organize the findings according to the notions of teaching about E&I, teaching for E&I, and teaching through E&I, and in so doing, we address the learning effects, role of the lecturer, and deployed didactic methods. Furthermore, we summarize the interviewees' answers regarding the perceived opportunities, challenges, and prospects regarding E&I teaching.

Keywords: Entrepreneurship, Innovation Management, German Higher Education, Interview Study.

INTRODUCTION

The entrepreneurial mystique? It's not magic, it's not mysterious, and it has nothing to do with the genes. It's a discipline. And, like any discipline, it can be learned. (Drucker, 1985)

Regarding the above quote, even if the opposite view—that "entrepreneurs are born, not made" (Kuratko, 2005, p. 580)—holds true, ultimately, the acquisition of additional skills does not hinder but, rather, increases the likelihood of the success of a start-up. The same applies to innovation managers, who should have personal qualities such as a fundamental openness to new ideas and a willingness to communicate but also need to possess a wide range of skills (e.g., *vis-à-vis* organizing interdisciplinary cooperation within and outside the company, promoting employee creativity, and managing the innovation process) to perform their tasks efficiently and effectively. Such skills are taught at universities and universities of applied sciences in Germany[1], not least in courses on Entrepreneurship and Innovation management (E&I)[2].

The respective teaching content (e.g., regarding digital transformation) and didactic methods (e.g., idea competitions and start-up camps) are evolving over time. The aim of this exploratory study is to provide an overview of current E&I teaching practices at universities and universities of applied sciences in Germany. Unlike most previous research, this study also accounts for innovation management education (in addition to entrepreneurial education), as it is prevalent at German universities[3]. Furthermore, we focus on the lecturers and their experiences in E&I teaching (while previous research focused predominantly on the students' perspective). We structure the findings according to three basic teaching approaches—teaching about E&I, teaching for E&I, and teaching through E&I—and for each approach, we address the teaching objectives, possible roles of lecturers, and didactic methods.

As an interview study is exploratory in nature, it is impossible to derive generalizable statements regarding E&I teaching (e.g., about the differences between universities and universities of applied

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sciences). Nonetheless, the study (1) provides insights into E&I teaching/learning formats in higher education in Germany and (2) highlights E&I teaching opportunities, challenges, and prospective developments.

The remainder of this work proceeds as follows. The second section provides a literature overview of the current state of the research. The third section describes the study design, data collection, and analysis procedures. In the fourth section, we present the findings from the interview study, structured according to the three teaching methods (*i.e.*, teaching about, for, and through E&I). The fifth and sixth sections are concerned with opportunities and challenges in E&I teaching and prospects for future development, respectively. The paper concludes with a summary in the seventh section.

STATE OF RESEARCH

Previous Work

Entrepreneurship education dates back to the 1970s and 1980s and has since seen a sharp increase in courses, degree programs, and students (Kuratko & Morris, 2018). A distinct line of research on entrepreneurship education has developed simultaneously, culminating in the foundation of the Journal of Entrepreneurship Education. Corresponding research either addresses teaching at universities directly—for example, didactic methods such as case studies (Rao, 2024) or the role of mentors (Lein, 2024)—or deals with its benefits—for example, increased start-up intentions among graduates (Kraiem, 2024), the creation of an "entrepreneurial mindset" (Crosina et al., 2023; van Berten & Davis, 2025), or the strengthening of resilience (González-López et al., 2019). Such works are often based on case studies for individual countries—for example, entrepreneurial success stories in India (Arora, 2024), entrepreneurial self-efficacy in the United Arab Emirates (Hojeij, 2024), or start-up intentions among women in Nigeria (Isiwu et al., 2024)—or for specific industries—for example, entrepreneurship in the chemical industry (Walther et al., 2024)[4].

In contrast, to date, innovation management education has been less intensively studied (Chandra et al., 2021). Nevertheless, research on various relatively loosely connected topics has been published: the corresponding literature suggests a shift in innovation management teaching toward interdisciplinary work (Clarysse et al., 2009); provides teaching examples for innovation management from universities in Latin America and Europe (Morales et al., 2018); and offers a conceptual framework for innovation management teaching, subdivided into context, results, objectives, target group, content, pedagogy, and evaluation (Maritz et al., 2014). Furthermore, promising focus topics, such as intellectual property management, and suitable study models, such as part-time programs to enable simultaneous practical work (Hang et al., 2009), have been introduced. Moreover, participatory teaching/learning formats in innovation management (Stummer & Günther, 2014) are discussed, and selected didactic methods, such as management games (Stummer & Kiesling, 2021), are described.

Teaching Approaches According to Jamieson

I hear and I forget. I see and I remember. I do and I understand. - Confucius

Teaching approaches summarize patterns of behavior that lecturers use to convey learning objectives and content. Jamieson (1984) distinguished between three teaching approaches: Teaching about, teaching for, and teaching through a subject.

In teaching about E&I, the lecturer is the expert and the center of attention (Chaker & Jarraya, 2021), while the students have a relatively passive role (Samuel & Rahman, 2018). For this teaching approach, a typical format is the traditional lecture, which is supplemented by guest lectures or case study analyses as didactic methods. Although lectures are widely used, the consensus is that such a passive

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format is insufficient as the sole teaching method for E&I (McDonald-Mann, 1998).

In teaching for E&I, students are provided with a portfolio of tools, skills, and techniques on topics such as idea generation, team building, creativity, inspiration, opportunity recognition, risk-taking, assessment skills, critical thinking, selling and negotiating, networking, adaptation to change, time management, problem-solving skills, and dealing with failure (Bacigalupo et al., 2016; BIS, 2015; Chang & Rieple, 2013; Kirby, 2007; Morris et al., 2013; Piperopoulos & Dimov, 2015; Sirelkhatim & Gangi, 2015). In practice, these tools can be put to immediate use when needed. Learning in class is primarily simulation based (Sirelkhatim & Gangi, 2015); for example, students work in groups on tasks and act out scenarios in which they assume the roles of innovation managers or entrepreneurs. Complementary teaching formats are management games and excursions (Chang & Rieple, 2013; Corbett, 2005; Sirelkhatim & Gangi, 2015).

In teaching through E&I, students play the most active role and learn through real-world projects (Kakouris & Liargovas, 2021), which are often undertaken in collaboration with practitioners. Students can also gain experience in start-ups by leading a student organization or participating in an entrepreneurship program (Ribeiro et al., 2020). As teaching formats, workshops or practical programs are employed. Teaching through E&I goes hand in hand with Kolb's (1984) theory of experiential learning, which defines learning as "the process whereby knowledge is created through the transformation of experience" (p. 41).

Role Profiles According to Kolb

To this end, Kolb et al. (2014) introduced four role profiles for lecturers expert, facilitator, evaluator, and coach—who can then make deliberate decisions regarding which roles to take on in specific teaching settings. In the role of an expert, lecturers systematically impart specialist knowledge and encourage critical thinking. As traditional evaluators, they promote the application of knowledge and skills to meet course requirements, establish criteria for good performance, and offer learners opportunities to assess their own learning progress. As facilitators, lecturers support their students' reflections on their classroom experiences, thereby awakening or increasing their interest and intrinsic motivation. As coaches, lecturers help students apply knowledge, and in so doing, they often work individually with learners to offer feedback and enable them to better reflect on their own experiences (Gencel et al., 2021; Kolb & Kolb, 2017).

METHODOLOGICAL APPROACH

As a research approach to gathering insights from lecturers, the format for the guided interview aligned with a suggestion by Ilonen (2021). We used open-ended questions (listed in the appendix) to allow for free narrative passages and the setting of specific topics. The interview partners were professors and research assistants with E&I teaching experience.

Data collection began with a search for suitable experts. To this end, we used the Higher Education Compass website[5] and filtered public universities and universities of applied sciences with a dedicated chair or a degree program in entrepreneurship or innovation management. After reviewing the websites of these institutions, we emailed 72 colleagues—usually the chair holders or those responsible for the degree program or module—to ask whether they would be willing to participate in an interview. Twenty-two recipients agreed to do so, and we conducted 20 interviews. (We skipped the two remaining interview opportunities due to time constraints on our part.) The interview partners were either the original recipients of the email request or experienced (E&I) lecturers to whom the email recipients delegated the task.

After a pretest with research assistants at the University of Bayreuth and Bielefeld University in March 2023, we conducted the abovementioned 20 interviews *via* Zoom from April 4 to May 5, 2023;

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each interview lasted between 30 and 45 minutes. We conducted 15 interviews with lecturers at universities and 5 with lecturers at universities of applied sciences. The sample included 12 professors (with an average of 22 years' teaching experience) and 8 research assistants (with an average of 6 years' teaching experience). Nine interviewees focused on entrepreneurship teaching (statements from these interviews were randomly coded as #E1–#E9 and partially anonymized as #E0), and 11 lecturers focused on innovation management teaching (coded as #I1–#I11 or #I0, respectively). Table 1 lists the universities (in alphabetical order by location) where the interviewees teach.

Table 1
LIST OF INSTITUTIONS WHERE INTERVIEWEES TEACH

Universities	Universities of Applied Sciences
Chemnitz University of Technology, Brandenburg University of Technology Cottbus Senftenberg, Technical University of Darmstadt, Heinrich Heine University Düsseldorf, University of Erlangen–Nuremberg, Goethe University Frankfurt/Main, Technical University Bergakademie Freiberg, Leibniz University Hannover, Friedrich Schiller University Jena, Karlsruhe Institute of Technology, University of Kassel, Carl von Ossietzky University of Oldenburg, University of Regensburg, University of Siegen, University of Wuppertal	Ansbach University of Applied Sciences, Fulda University of Applied Sciences, Technische Hochschule Mittelhessen University of Applied Sciences, Stralsund University of Applied Sciences, Trier University of Applied Sciences

For data analysis, we used Zoom's recording function with the consent of the interviewees and transcribed the interviews using the Happy Scribe software. We reviewed all transcripts manually, making corrections where necessary. We applied qualitative content analysis, as described by Kuckartz and Rädiker (2022) and, in so doing, used the qualitative data analysis software MAXQDA, also developed by Kuckartz (2010).

During the qualitative content analysis, we used a category system as a search grid and systematization tool to structure the material in several passes. Table 2 shows the structure of the category system.

Table 2
CATEGORY SYSTEM

Category	Description
Teaching objectives	Definition of outcomes—that is, what students should be able to do after completing the course
Role of the lecturer	Classification of the role of the lecturer as subject expert *vs.* evaluator *vs.* facilitator *vs.* coach
Didactic methods	Information on the didactic and pedagogical communication of teaching content
Opportunities	Statements expressing the positive aspects and opportunities in teaching
Challenges	Statements expressing the negative aspects and challenges of teaching
Development	Perspectives on possible future developments and teaching content

TEACHING METHODS

Teaching about E&I

The central teaching objective lies in imparting knowledge of E&I and establishing a common understanding at the beginning of the course, as evidenced by the following quotes:

In fact, my primary concern is that [students] acquire the domain knowledge. (#E5)

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In the first two semesters, we focus more on ensuring that technical terms are learned in order to establish a common language. (#I6)

Overall, the interviewees mentioned three teaching roles regarding teaching about E&I. The role as an expert is prevalent in several cases in entrepreneurship teaching supplemented by efforts to serve as a role model for students. In innovation management teaching, lecturers often undergird their subject expertise with their own research in this field:

You also try to act as a role model yourself. [...] It is a mixture of everything. It always depends on the groups. Of course, I am also [..] the professor and the expert. (#E9)

One has to be an expert. Last but not least, we also conduct research in the field of TIE [technology, innovation, and entrepreneurship], which is a highly research-intensive area for me. (#I9)

In addition, the lecturers are evaluators of students' performance during and at the end of each course:

I cannot escape my role as an evaluator because, at the end of the day, I have to grade the exams or seminar papers. (#I1)

Finally, a few respondents mentioned the role of the moderator, especially when discussing exercises and case studies:

Then there are the exercises where I like to try to make things interactive so that the students come up with the solutions themselves. (#I1)

The interviewees frequently mentioned guest lectures as a didactic method both in entrepreneurship courses (especially in cooperation with start-ups from the region) and in innovation management courses (mostly by guest lecturers in management positions):

I bring in start-ups from different fields; sometimes start-ups from traditional fields or social entrepreneurship. (#E9)

Guest lectures, where we often look for companies or sometimes a consulting firm that can then [...] provide insights into practice. Most of the time, it is just bosses who talk about their processes and structures. (#I3)

I always reserve one or two slots in my lectures for guest lectures. (#I4)

The lecturers also use case studies in both areas to illustrate the practical relevance of theoretical concepts:

I have been working more intensively with case studies since 2021. So, it is no longer the classic "we repeat all the content we already covered in the lecture again in the exercise" but, rather, we apply it specifically to a case study. (#E0)

In the case studies, we work a lot with the Harvard cases [...], where basically a business situation is described, and we then ask the students questions. [...] These cases are always prime examples of how theory is applied. (#I0)

Entrepreneurship teaching also includes the practice of drawing up business plans:

Students interested in starting a business participate in my business plan course, then a business plan is set up, and [they] have to pitch it. (#E9)

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Teaching for E&I

The objectives of teaching for E&I include the practice-oriented teaching of useful skills and the application of previously acquired knowledge. To this end, lecturers and students discuss illustrative real-world examples; lecturers give students assignments that require creative solutions; and lecturers offer workshops on selected topics, such as scenario analysis or design thinking:

The exercise is therefore much more about [...] how do I proceed methodically? [...] How do I make the connection between what I have learned and what may be experienced in practice? (#E4)

It is important [...] that students in my major graduate with the skills to speak up and to argue for their ideas. (#E8)

We also give methodology workshops—that is, how to set up scenario analyses, how to apply design thinking, etc., when it comes to a certain application. (#I3)

We work on a problem or an issue from the company's perspective and present a possible solution at the company site. (#I9)

An obvious role of lecturers in teaching for E&I is to evaluate students' performance in their assignments. In entrepreneurship teaching, these assignments include presentations or pitches, videos, blog posts, reports on findings, business model building blocks, business plans, and start-up applications. In innovation management teaching, performance is evaluated with respect to presentations, posters, written papers, or oral exams:

Usually, the assignments are presentations, because that is what the students will need in their future jobs. Sometimes, students have to write papers or a business plan. I strongly align the assignments with the requirements for an EXIST proposal (a funding format for student start-ups in Germany) because it clearly states the criteria for what they need to work on. (#E2)

In principle, we have pretty much all exam formats [...], including posters [and] papers, presentations, group work, written exams, [and], of course, case studies [and] oral presentations. (#I5)

When a student team gives a presentation, I evaluate it and also provide feedback on the presentation style. (#I2)

Particularly in entrepreneurship teaching, lecturers often identify with the role of the coach. They give students a great deal of freedom to accompany their experiential learning, and they support their personal development. In innovation management, the role of a coach is less prevalent (and is sometimes explicitly rejected by the lecturers themselves):

[Students] often just need a coach who encourages them and sometimes says, "You don't have to do what I want you to do, but I give you the freedom to think about it, and if you do it, please do it well." (#E1)

I see myself as a coach […] as someone who accompanies the knowledge process or the experience curve. (#E8)

Basically, I would see my role more as a learning coach. So, my job is to help students develop, to help them recognize something they find interesting and useful for their further development, and to support them along the way. (#I8)

Definitely not a coach. We cannot do that because the number of students is too large. We do not have the resources, and it is not the objective of a university to coach people. (#I11)

Sometimes, E&I lecturers also assume the role of moderators, especially for workshops,

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discussions, and guest lectures:

I ask a lot of questions, such as "What do you think?" "How would you do it?" [and] "What is the problem here?" (#E2)

I always try to establish interaction by asking questions, and these are not just rhetorical questions […] I also expect an answer, which we then discuss. (#I7)

The interviewees frequently mentioned management games (e.g., Topsim[6] or Back Bay Battery[7]) as didactic methods:

In the management game, [...] the students ultimately have to set up a surfboard manufacturing company and […] sell surfboards. In so doing, they compete with the other groups in the same market. (#E0)

What we do on a regular basis is Back Bay Battery; that's the name of the case. It is about managing a technology transition. Essentially, one has to allocate research budgets and collect new information. [...] The students play the game in several rounds and learn over two or three rounds how to perform—better that is, what they need to pay attention to—and they also learn why it is difficult. (#I0)

In addition, discussion formats or the think–pair–share method[8] are used to engage students:

In the master's course, we also use a debate format. (#E3)

Students get together in small groups and discuss certain questions, and then we discuss possible solutions in the plenary session. (#I1)

Excursions are among the most popular teaching methods in E&I education, especially in entrepreneurship but also in innovation management. The excursion locations include established (often local) companies, start-ups, the chamber of industry and commerce, and coworking spaces:

Once a semester, we make a field trip to a [...] start-up. (#E5)
[...] to a local chamber of commerce or a coworking space—that is a trip. (#E3)
We have a practical seminar with [name of company]. (#I4)
We have to plan excursions very carefully because it can become challenging with an event involving 300 or 400 people. However, we have done that before in seminar formats at our site, which makes it considerably feasible. (#I9)

Participation in student competitions is common in entrepreneurship education:

It is an idea competition, and basically all universities take part. We also have regional winners here in [name of city]. (#E1)

Teaching through E&I

Teaching through E&I—also referred to in interviews as "hands-on teaching"—is predominantly found in the field of entrepreneurship. There, its teaching objective is to convey attitudes and mindsets regarding starting a business, possibly even leading to establishing one's own business. In the field of innovation management, teaching through E&I is usually found only when practical problems are tackled:

Some students dropped out of their studies because they believed their idea was good enough to start their own businesses—and they often succeeded. (#E1)

We have also had assignments in cooperation with small, young companies, where students developed a proposal for market entry, analyzed some countries, or performed similar tasks. (#I5)

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Regarding the role of the lecturer as an evaluator, external parties can also contribute—for example, entrepreneurs act as members of the jury to which student teams pitch their business plans:

For example, we always have someone from [name of organization]; we have someone from the city; [and] we always have an investor and a founder [...] on the jury, who then participate in evaluating the presentations. (#E5)

External parties are often involved in the course, acting as coaches:

It is sort of [...] separated from teaching; they organize numerous events around the topic of starting a business and also offer coaching opportunities, and they act as coaches once a semester. (#E5)

We have "business angels" here at our university in [name of town], whom we were able to attract. They support the students [...] in the start-up process. (#E2)

Cooperation with practitioners regularly plays a role in didactic methods:

We offer [...] companies and start-ups the opportunity to define their challenges together with us [...] and [...] then look for students who want to participate and tackle these challenges. (#E7)

A business challenge is introduced by the company, and the students then work on it in small groups in a seminar format [...]. In such a project, students are given a task from the company, which is innovation management in its purest form. (#I3)

On the way to a real spin-off, practical workshops or start-up camps are offered:

For example, students can attend workshops. These workshops are in a really nice room [...] in a real innovation lab, and then a trainer spends a day doing agile work with them. (#E0)

[...] our start-up camp, where students will pitch and can win 1,500 euros. (#E0)

OPPORTUNITIES AND CHALLENGES

Teaching Environment

By and large, the interviewees described the institutions' technical facilities as satisfactory; however, they mentioned several challenges in other areas, including a perceived lack of freedom in regard to designing the courses:

The necessary technical resources, whether it is the latest laptops or whatever, are provided. I just have to contact our IT department, and a few weeks later, I have what I need. Thus, we receive plenty of support in this regard. (#E1)

I used to think that as a professor, one would have creative freedom. [...] That is not always the case. (#E8)

There is no longer pure freedom in teaching. (#I9)

Several interviewees from universities of applied sciences emphasized that they have a significantly higher teaching load than their colleagues at universities[9] and that they have only limited access to administrative staff. Therefore, time to implement application-oriented research in their courses or to try out new course formats in fields that could be helpful for students in their future careers is scarce:

Eighteen weekly hours of teaching [...] and intensive involvement in a project scene, an entrepreneurial scene, and a start-up scene can take its toll physically [...]. Although that is what I enjoy most—that is, working on something together with the students. (#E1)

Some university lecturers also complained about limited time resources for teaching preparation, given that they have to invest a considerable amount of time in their academic qualifications. Nonetheless,

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some colleagues put this into perspective:

It is a shame [...] that there are relatively few innovative teaching formats and that people don't really have the heart to try them out. [...] They come up with excuses referring to the limited time available as lecturers. [...] For me, those arguments are not valid. (#E6)

At our universities, we are always confronted with this scarcity of resources in all respects. (#I11)

Finally, the lecturers criticized the bureaucratic effort, for example, for accreditation issues. However, an unconventional workaround could simply be to implement adaptations without initiating formal processes, as there would be no consequences to fear:

This whole accreditation madness is sometimes a tough business. (#E5)

If we had to discuss this with all our bureaucracy beforehand, it would be a lot of work. But if we just do it, then no one asks [...], and then it just happens, and that's okay. (#I5)

Perceived Relevance

The benefits of entrepreneurship education become particularly clear for students who see starting a business as an alternative to traditional employment and, thus, as a viable career path. Accordingly, some teaching formats offer a platform in a protected environment in which students can make first-hand experiences. Innovation management skills, in turn, increase employability given the challenges that companies face with respect to new technologies, changing markets, and fueled by trending topics such as sustainability. The practical relevance attributed to E&I by students is therefore perceived as an opportunity:

For people in general and for young people in particular, entrepreneurship is an alternative to the traditional career path. It is great to highlight this alternative, to prepare people for it, [or] simply to raise awareness. [...] It adds value, boosts the economy, and solves people's problems. (#E7)

The positive thing [is] that this field has high demand on the labor market. We see that our students are offered attractive jobs. (#I11)

Innovation management is great, as technologies and applications are constantly evolving, and aspects such as globalization, culture, change, and all these things are omnipresent [...] and can be addressed in so many different ways; thus, one can always do something innovative. (#I7)

Contrastingly, the interviewees sometimes perceived the students as less willing to take risks than in the past or as lacking the necessary self-confidence, which can make it challenging for lecturers to convey the vision of starting a business:

I get the feeling that the students are somewhat fearful [and] unwilling to take risks and that entrepreneurship might not be a particularly trendy topic right now [...]. When I see that students are so focused on security, I start to feel anxious and think to myself, 'They are only twenty years old and already have attitudes like a grandmother pushing her walker across the street.' To put it bluntly, there is too little spirit of discovery. (#E0)

I think the zeitgeist, or generation Z and Y, is changing in some way. There are people around—young people—who may not always have learned that they can do it or that they have the confidence to do it. Strengthening their self-confidence or catching them when they fall is [...] not easy. [...] That's also a role that a lecturer may have to take on. I need to give people this vision, and I have to encourage them [...] [and] give them self-confidence. (#E7)

Student Motivation

Most E&I lecturers emphasize their students' motivation and enthusiasm. In entrepreneurship

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teaching, this motivation can be experienced firsthand, for example, during the development of business ideas over the course of a semester. Furthermore, the oftentimes small group size provides an opportunity to address topics of particular interest on an individual basis and to strengthen interaction. This setting creates a beneficial learning atmosphere and can lead to long-term loyalty resulting in graduates being happy to return to their university later and give guest lectures that provide insight into practical work. Because both entrepreneurship and innovation management are highly interesting for students from other faculties, a high degree of interdisciplinarity often exists among course participants. Although this mixture may also pose a challenge, given the varying levels of prior knowledge, the interviewees generally perceived the students' individual perspectives as enriching:

It is just [...] a lot of fun [...], how the students are so enthusiastic […], get into such a flow, and then spend the whole semester working intensively on this business idea and [...] somehow move heaven and earth to make it [...] work. (#E5)

When you receive positive feedback from people and they come back to the university and give a presentation [...]. (#E9)

It is just very nice when you realize that the students also find it exciting. Innovation management is an elective, so no one has to take it. When so many come anyway, I realize that they are interested. (#I9)

However, in contrast to the above statements, several lecturers mentioned the short attention span of students in their courses as a challenge, even though this is not limited to E&I teaching. Students often adopt a consumerist attitude and show minimal initiative, which can lead to disappointment given the lecturers' high level of commitment:

A consumerist attitude is becoming increasingly prevalent. [...] Students like to listen and take notes, and if you mention that something is "relevant to the exam" every now and then, they immediately but temporarily pay close attention. However, it is rare for students to take the initiative and say, "Now I really want to learn how to do this or that." (#E1)

Their attention span is ten minutes. On Instagram, it is […] seconds [...] before someone has to dance on the stage; otherwise, their attention is gone. (#I11)

Digital Tools and Platforms

In E&I teaching, the lecturers frequently use classic digital platforms, such as Moodle, Stud.IP, and Opal, to interact with students and provide learning materials and assignments. They offer learning videos selectively, and these are usually made available *via* learning platforms or, as one interviewee reported, *via* YouTube. Collaboration tools (especially Miro[10] and Mural[11]) are used as a joint working platform.

Because almost all courses take place in person (after the lockdowns due to the pandemic), the lecturers rarely use video conferencing software, such as Zoom and Teams, which, when used, are mostly for guest lectures. When "regular" teaching units are delivered online, many students do not turn on their cameras and pay minimal attention to the content.

Several interviewees mentioned survey tools and gamification in E&I teaching. These include Moodle multiple-choice tests, Mentimeter, Slido, quiz duels—for example, in the form of a soccer game in which half of the lecture hall plays against the other half, and goals can be scored by giving the correct answers—or the game-based learning platforms Kahoot and ovos play. The objective of using these tools is to encourage activity in the lecture hall and stimulate the students to participate in the class:

Over the past two years, we have also developed a tool that is [...] a kind of hybrid card game, in which the aim is to develop MVPs (minimal viable products) and prototypes. The game also includes [...] QR codes, which

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allow for watching additional videos that are linked to it. (#E0)

It really encourages those students who don't like to express themselves verbally to participate. [...] When you do a survey with Mentimeter [...], you get a very quick and rich response. However, I see it only as a complement to direct human interaction. (#I9)

PROSPECTS

Teaching Environment

Unsurprisingly, many lecturers would appreciate having more resources, especially to implement new teaching formats or, in entrepreneurship teaching, to support start-up ideas:

Of course, it would be fantastic to have more funds available, which would allow us to finance certain ideas or organize more excursions [...]. So, simply put, better financial backing would be nice. (#E2)

One interviewee pointed to the increasing popularity of private universities in Germany and assumed that one reason is their greater flexibility regarding study programs and the more intensive supervision of students' theses:

Private universities are extremely popular with students. [...] They definitely offer better support. They also offer better access to resources, even in the evenings or during the weekend. (#E3)

Teaching Formats

Future courses should be even more application oriented (action oriented) to better impart key skills. To this end, interactive teaching concepts need to be further promoted and should ultimately replace traditional classroom teaching. In addition, more practitioners from both established companies and start-ups should be involved and should introduce assignments from the field where appropriate:

Perhaps [lecturers should] work more intensively with start-ups and established companies and incorporate challenges from the real world into the teaching context, especially from established companies but also from start-ups that are convinced that such a course could also function as a recruitment opportunity. (#E6)

Along with the suggestion to make E&I teaching a mandatory component of the curriculum so that students are exposed to the topic as early as their bachelor's or at least master's degrees, interviewees expressed concerns that it might be challenging to continue to maintain the desired level of interaction among larger groups of students:

Ideally, the topics of innovation, entrepreneurship, and start-ups would be broadly incorporated into the university curriculum at the bachelor's and master's levels. (#I4)

In a large lecture hall with several hundred students, interactive teaching formats are challenging. In principle, I would like to increase the interactivity in my course, but I am afraid I am a bit helpless in this regard. (#I0)

Further prospects raised by the interviewees are geared toward teaching formats that allow for more interdisciplinarity and internationality, especially with respect to students' personal development.

Digitalization and Artificial Intelligence

Another concern regarding future E&I teaching was the addition of digitally supported formats and the use of artificial intelligence, especially tools such as ChatGPT. Overall, most lecturers recommended giving students the opportunity to try out such tools to enable them to have firsthand experience of their advantages and disadvantages. The interviewees also mentioned the use of virtual reality in teaching as a

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way to make content more tangible:

Interaction with [...] AI [...] is exciting, and I wouldn't prohibit it. Make it open, and then show […] what comes out of it and what the advantages and disadvantages are. Anything that makes life easier will prevail. (#E9)

Otherwise, it can be a fantastic tool for starting a business and developing ideas. So, I actually see a lot more opportunities there. (#E2)

Let's not kid ourselves. Companies will use AI. Students should know how to deal with it and not be afraid of it. This is challenging for our exams. [...] We may have to switch (more) to oral exams. (#I4)

Virtual reality [...] is also something. If we are really moving around in a virtual space, I could imagine that. I have put it on my agenda for the next five years to test it out. (#I4)

CONCLUSION

Our interview study offers exploratory insights into teaching about, for, and through E&I at public universities in Germany and identifies opportunities, challenges, and prospects from the lecturers' perspective. In teaching about E&I, lecturers assume the classic roles of experts and evaluators and, in some cases, moderators. The predominant format is the lecture, supplemented by insights from guest lectures and case studies or, in entrepreneurship teaching, by the creation of business plans. In teaching for E&I, learners are more active, which is unsurprising given that the focus is on applying knowledge and imparting practical skills. Lecturers act primarily as facilitators and, in some cases, as coaches in the learning process. In addition, they necessarily assume the role of evaluator. The methods used include management games, discussions, field trips, and competitions in entrepreneurship teaching. Teaching through E&I focuses on the application of knowledge in real-life situations and therefore places particular emphasis on knowledge transfer. This method is regularly used in entrepreneurship teaching and usually takes place in a start-up, where students become "real" entrepreneurs. In innovation management teaching, knowledge transfer is implemented relatively rarely, and if so, it is achieved through working on and experiencing real-life problems. Learner-centered teaching through E&I primarily assigns lecturers the role of coaches (although they also necessarily remain evaluators). Camps and practical workshops and programs are used for this purpose.

The opportunities and challenges of E&I teaching can be divided into four areas. Regarding the teaching environment, complaints focused primarily on the limited flexibility of teaching formats and scarce resources. The practical relevance of E&I teaching has positive implications, given that starting a business offers a professional alternative to regular employment and skills in innovation management improve career prospects. Nevertheless, the lecturers criticized their students for their lack of courage, unwillingness to take risks, and low levels of self-confidence. The picture is mixed *vis-à-vis* student motivation. While some lecturers describe students' commitment and flow during the semester as impressive, others criticize their consumerist attitude and short attention span. The lecturers valued digital tools and platforms in E&I teaching, with, for example, collaboration tools and quizzes being used for gamification.

Prospects regarding the learning environment address the increasingly strong competition from private universities. Furthermore, teaching formats should be more practice oriented in the future, for example, through the more intense involvement of cooperation partners to promote the transfer of theory into practice. Finally, E&I lecturers are willing to develop AI tools. While they see the substantial potential of such tools, particularly with regard to their application in companies and the preparation of students in this respect, E&I lecturers are also aware of challenges, such as the need for new examination formats.

Insights from an interview study naturally suffer from the usual limitations of qualitative exploratory work; in particular, no generalizable conclusions can be drawn. However, the insights can

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serve as a starting point for further, more specific (and quantitative empirical) research endeavors, with a focus on the type of higher education institution, individual states, or specific teaching methods or formats, possibly also as part of an international comparison. Furthermore, it would be worthwhile to examine the extent to which the findings for E&I teaching differ from the experiences of lecturers in other business administration (or nonbusiness administration) disciplines. Although the present study focused on the perspectives of lecturers, it could be supplemented by those of students, for example, with regard to the use of AI tools.

APPENDIX: GUIDELINES FOR INTERVIEWS

Personal details: [12]

1. Is it correct that you have taught the following courses in E&I for the past two semesters?
2. How long have you been teaching at the university level?
3. If not verifiable in advance: Did you work in the private sector before becoming a university lecturer?

Structure of E&I teaching: [13]

1. When did your university start offering courses in E&I, and, if applicable, what prompted this decision?
2. Whom are the courses designed for? Which subject areas or degrees are eligible for participation?
3. To what extent can you influence the choice of the teaching format, and to what extent is it predetermined?
4. How are the courses structured?
5. What are your teaching objectives? What should students take away from your courses?[14]
6. How would you describe your role as a lecturer and your teaching style?
7. What teaching methods do you use to achieve your teaching objectives?
8. To what extent do you use digital tools and platforms?
9. How is learning evaluated, and how are teaching objectives evaluated?
10. To what extent are there opportunities for students to actually take on the role of an innovation manager or entrepreneur in order to work on real-world problems?

Development prospects: [15]

1. What do you find positive about teaching E&I?
2. Where do you see challenges in teaching E&I?
3. How should E&I courses ideally change over the next five years?
4. Where do you see AI tools, such as ChatGPT, in the development of E&I teaching (i.e., more as an enhancement or a threat)?

ENDNOTES

1. Higher education institutions in Germany can be roughly divided into traditional research universities and the more practice-oriented universities of applied sciences (or “Fachhochschulen”). Degrees from both types of institutions are equally recognized in Germany and other European countries. It should be noted that the above distinction is fuzzy to some degree—that is, many professors at the universities of applied sciences successfully publish their research, while many professors at universities cooperate with practitioners and offer practice-oriented courses.
2. Although entrepreneurship and innovation management are separate subjects, they overlap in many areas, and in several instances, they are even taught by the same group of lecturers.
3. According to www.hochschulkompass.de, 128 German universities (57 universities and 71 universities of

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applied sciences) offer E&I courses, and 94 of these offer courses in both innovation management and entrepreneurship.

4. For a literature review, see, for example, Nabi et al. (2017).
5. The Higher Education Compass is a freely accessible information portal of the German Rectors' Conference, in which state and state-recognized German universities publish current information about their degree programs. See https://www.hochschulkompass.de/en/study-in-germany.html.
6. Seehttps://www.topsim.com/.
7. See https://www.hbs.edu/faculty/Pages/item.aspx?num=37262.
8. Think–Pair–Share is a cooperative learning method consisting of three steps: thinking, exchanging ideas in pairs, and sharing the results in a plenary session.
9. At German universities, the teaching load is usually eight to ten weekly contact hours (which equals roughly four courses delivered) per semester, compared to 18 hours (or about nine courses) per semester at universities of applied sciences. However, it should be noted that supervising theses or certain research activities can substantially reduce teaching duties in courses.
10. See https://miro.com/de/.
11. See https://www.mural.co/.
12. The first questions were used solely to confirm information that had been researched in advance. The last question was motivated by the work of Blenker et al. (2006).
13. The first half of the second set of questions were motivated by the work of Fayolle and Gailly (2008), Mwasalwiba (2010), and Hellmann et al. (2014). The second half of the questions were motivated by the work of Béchard and Grégoire (2007) and Kolb et al. (2014).
14. It was also possible to differentiate answers according to teaching formats if the instructors taught several courses.
15. This should enable discussion beyond the specific events.

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