Social network tools and procedures for developing entrepreneurial skills in PhD programmes

D2.2 (WP2): Needs and requirements analysis

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PREPARED/REVIEWED BY			
Name	Role	Partner	Date
Elías Sanz Casado, María Luisa Lascuraín Sánchez Antonio Serrano López Bojan Ali Haidar Carlos García Zorita Patricia Alonso Álvarez	Author	UC3M	30/08/2021
Dr. Marina Biniari Prof. Jan Andersson Prof. Philippe Rigo Prof. Hossein Ghaemi Prof. George Panagakos	Reviewer	Aalto University, Finland VTI, Sweden University of Liege, Belgium Gdańsk University of Technology, Poland Technical University of Denmark, Denmark	24/08/2021

EXECUTIVE SUMMARY

Introduction: The prodPhD project aims to address the challenging problem of introducing entrepreneurship training in PhD programmes regardless of discipline. The prodPhD project will create the necessary teaching methodologies and the platform for applying them. The project consists of a consortium of four organizations from across Europe.

The main objective of the prodPhD project is to implement innovative social network-based methodologies for teaching and learning entrepreneurship in PhD programmes. The multidisciplinary teaching and learning methodologies will enable entrepreneurship education to be introduced into any PhD programme, providing students with the knowledge, skills, and motivation to engage in entrepreneurial activities. The methodology will be conceived to develop experiential knowledge, involving academics, entrepreneurship experts, and mentors in its development and implementation. Besides, the exchange of experience, competences, and approaches facilitated by social networking will pave the way to crowdsourcing new ideas, improving training methodologies, and stimulating academics' entrepreneurial skills.

Aims and scope: The main aim of this work package was to study and identify the needs and requirements of the target groups and to carry out a state-of-the-art analysis with a particular focus on offering entrepreneurship courses to PhD students. The target groups were sorted into two subgroups: PhD students and faculty. Both subgroups were deemed to have valuable insights that would help in the endeavour to build a comprehensive multidisciplinary approach to entrepreneurship training courses.

Methodology: A thorough procedure of examining existing literature was conducted in order to assess the target groups' needs and requirements. Based on the literature review and the conceptual framework, two surveys geared towards PhD students and faculty were carried out. The surveys were subsequently complemented with a set of semi-structured interviews addressed to both faculty and doctoral candidates.

Analysis: The analysis of the data collected through the student and faculty surveys was conducted using primarily descriptive statistics in order to understand the participants' learning and teaching needs, along with their interests. Furthermore, the analysis of the semi-structured interviews was carried out using a thematic analysis technique.

Results: The results show the findings of both surveys and interviews. Surveys provide a general overview on how students and faculty view entrepreneurship education in general and courses in particular. It is also useful to highlight the differences between the two groups showing that it

might serve to help to design courses that are more in line with what students want and need. Particularly, students demand more collaborative courses with inter-discipline and inter-university modules, in which they can discover and learn from people with highly diverse backgrounds and ideas. Regarding the courses' content, students seem interested in finding resources and communication skills, which they consider the most important abilities to become an entrepreneur. Finally, interviews complement the results of the surveys and deepen the most relevant topics.

Conclusions: The needs and requirements of the target groups, namely doctoral students and faculty, were identified using two distinct surveys and several interviews. They show that PhD students' knowledge on entrepreneurship is rather low yet also the high interest that some of them display. Faculty and students seem to agree in how the methodology of the courses should be but their ideas about the module's content differ. On the one side, the faculty considers that encouraging students to develop innovation and creativity skills should be the focus of entrepreneurship training. Thus, according to the faculty members, the courses should focus on early entrepreneurship stages, which is associated with the idea generation phase. However, students seem to have a more practical outlook and demand courses where they can learn how to transform their ideas into business and how to earn money and resources. This implies a stronger interest in the later stages of entrepreneurship, which is associated with the commercialization of invention phases. Both groups appear to miss the stages in between, such as idea testing and validation. The results of this report may be used to improve entrepreneurial education and adapt the methods and materials to the students' needs.

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1.   INTRODUCTION

This report describes the organization and internal procedures implemented in Work Package 2 (Deliverable 2.2). The document outlines the actions taken to identify the information needed to define the specific characteristics that training courses, materials, and platform tools must meet.

In particular, prodPhD will use different pilot actions to deliver and demonstrate a social network-based training methodology that will include the necessary teaching guidelines and specific 'learning by doing' materials for entrepreneurship training, as well as the required prodPhD Online Training Environment, integrating customized collaborative work and social network solutions. The outcome of the prodPhD project will be openly offered to the higher education community.

The project is built on the basis of collaboration with four running ERASMUS+ and MSCA-ITN projects involving 20 higher education institutions from nine EU countries and more than 25 companies and research centres. Four running H2020 projects and 16 other European associations and organizations will also collaborate with the project by becoming members of the prodPhD Expert Advisory Board. This collaboration will be fundamental for the analysis of specific requirements and for the development and assessment of the demonstration actions, in which all the collaborating institutions will be invited to participate.

In this deliverable, UC3M and its partners IPAG and WEGEMT embarked on the journey to design the research framework. This framework provided the foundation for characterization, analysis, and transfer of good practices, according to the identified target needs. Collaboration among the partners and the sharing of results from collaborating projects and EAB experts were crucial for the achievement of this deliverable.

This analysis was completed during the preparatory stage of the project's implementation. Within WP2, a thorough analysis of the needs and requirements of the target groups (university faculty and PhD students) was carried out in order to clearly define PhD programmes' actual entrepreneurship training needs and to identify the requirements training activities must meet to facilitate their integration into current PhD programme curricula. With that aim, surveys and interviews were developed for each of the two target groups. Thus, within this WP, a package of entrepreneurship-related skills was also identified to be specifically addressed by the training modules. Furthermore, the skills the academic staff require to guide the training modules were also analysed. The needs and requirements analysis included examining how transversal/entrepreneurial skills can be developed at the international level and collecting the best practices for unlocking the target groups' potential in that direction.

The objective of Work Package 2 was to identify the needs and requirements of PhD students and faculty. However, prior to the identification of the needs and requirements, the target groups were identified and described clearly as follows:

- PhD students: this includes PhD students in any academic discipline regardless of their age and gender.
- Faculty: this includes teaching staff, programme directors, and thesis supervisors who have taught entrepreneurship previously or are willing to do so in the future.

Identifying the target groups' needs and requirements was of paramount importance for the creation of the teaching methodologies and the set-up of the social networking tools.

Needs and requirements were identified through a traditional comprehensive literature review, followed by a survey of both target groups.

2. STATE-OF-THE-ART ANALYSIS

This chapter outlines and describes the state-of-the-art analysis that will support the methodologies used in this project. The main activities are 1) literature review of the key factors, drivers, and barriers in entrepreneurship, identifying and collecting initiatives, best practices, etc., and 2) creation of a shared bibliographic database of the subject (entrepreneurship in PhD programmes) and methodologies (information about surveys, interviews, and focus groups).

2.1. LITERATURE REVIEW

The scientific literature review aimed to gather information on the key factors of entrepreneurship and entrepreneurship education (drivers and barriers), especially in higher education and in the European environment, by identifying and compiling initiatives, best practices, and methodological aspects. The bibliography includes research articles, project reports, books, book chapters, conference presentations, etc.

The different stages of the process for gathering and selecting the bibliography are specified below.

1. Selection of information sources:

    -   The databases of the Web of Science (WoS) core collection were used to retrieve scientific literature published on the subject (mainly articles). The objective of the WoS database search was to find recent peer-reviewed documents on entrepreneurship education.
    -   A second search was done using Google Scholar. The objective was to supplement the literature selected from the WoS database with valuable information from reports, guidelines, manuals, project reports, presentations, books, book chapters, and other materials that were not available in WoS.
    -   Further valuable information was drawn from reviewing the bibliography referenced in documents of interest related to the subject and documents citing them.
    -   Bibliographies included in European research projects (H2020), based on their location in the EU CORDIS database (https://cordis.europa.eu/es), such as H2020-EU.5.a. projects and parent programmes, were reviewed also.
    -   Lastly, EUR-Lex, an online publication service for European Union legislative texts with an official website at europa.eu (https://eur-lex.europa.eu/homepage.html), was used to locate legislation related to the project's objective.

2. Design of search strategies for the retrieval of the documents of interest in WoS and Google Scholar: The search strategy included the terms 'entrepreneurship' + 'education or training' + 'high education or universit*'. Given the large number of documents obtained, we filtered by

date and by number of citations. The decision to include or exclude a publication was based on the title and abstract of the article as indicators of whether the article provided sufficient information for the project.

3. Design of a spreadsheet template to establish a protocol for reviewing the readings carried out by the members of the research group: The complete guide for filling in the spreadsheet can be consulted in Appendix 1. The main fields were:

⇒ Document type
⇒ Document title
⇒ Author(s)
⇒ Year of publication
⇒ Publication name: journal, book (for book chapters), conference/meeting
⇒ Topic
⇒ Abstract
⇒ Objective
⇒ Usefulness
⇒ DOI

4. Entry of documents in the template and annotated reading: This task will continue throughout the project, adding new references that the partners consider to be of interest to the project. The next step is to include the bibliography in a repository in SCIPEDIA created to self-archive the selected documents, research reports, monographs, etc.

2.2. BIBLIOGRAPHIC DATABASE

Of the 169 documents collected so far (27-Apr-2021), the majority come from Google Scholar (73.96%/n=125), followed by documents retrieved from WoS (19.53%/n=33) and EUR-Lex (5.92%/n=10). The largest group of documents by type is articles published in scientific journals (78.11%/n=132). This is followed by books (7.10%/n=12), regulations (5.92%/n=10), and book chapters (5.32%/n=9). Reports and conferences together add up to less than 5% of the documents.

Almost half of the documents (46.15%) correspond to the last six years, as one of the selection criteria is the topicality of studies dealing with the different aspects of entrepreneurship education. However, some older documents have been collected due to their relevance. Thus, the earliest document in the database dates from 1983 [1]. It is a journal article that explores the concept of stakeholders in an organization. Altogether 20.12% of the documents collected were published before 2001.

In the 'Topic' field, the conceptual content of the documents is classified into several thematic categories: methodology, survey, indicators, stakeholders, etc. These categories are reviewed and discussed after the documents are read.

2.3. THEORETICAL FRAMEWORK

The following is a summary of the information on the characteristics of entrepreneurship training drawn from the literature review described in sections 2.1. and 2.2.

<u>Regulations</u>

In relation to the recognition of entrepreneurship as a driver of economic growth and job creation, the European Commission's Entrepreneurship 2020 Action Plan, adopted in 2013, states that EU economies need more entrepreneurs with higher levels of technical education to become more competitive and innovative [2] . The Action Plan identifies entrepreneurship as an important driver of social cohesion and sustainability that can boost the economy while alleviating deprivation, social exclusion, and other societal problems. It recognizes that universities need to be more active in entrepreneurship education and includes a list of measures specifically targeting higher education in Europe. The 'Council Conclusions on Entrepreneurship in Education and Training' adopted by the Council of the European Union in December 2014 [3] also deal with these same points.

More recently, in September 2015, the European Parliament adopted a resolution on 'promoting youth entrepreneurship through education and training', which 'emphasizes the need to develop more participatory and learner-centred innovative pedagogies in order to foster the acquisition of a set of transversal competences necessary for the development of entrepreneurial mindsets' [4]. In its resolution of 8 September 2015 on promoting youth entrepreneurship through education and training, the European Parliament calls on the Council and Commission to apply a gender perspective in respect of methodology, communication, and financial tools, in order to encourage greater engagement in entrepreneurship by girls and young women.

The New Skills Agenda [5] meanwhile focuses on 'Improving the quality and relevance of skills training' (such as 'Building resilience: key competences and higher and more complex skills' and 'Getting connected: focusing on digital skills') and 'Enhancing learning'.

The Modernization Agenda [6], includes among its priorities 'Addressing skills mismatches and promoting excellence in skills development' and 'Ensuring that higher education institutions contribute to innovation'.

Entrepreneurship training

There is an ongoing debate about whether students can be taught to be entrepreneurs. Many authors argue that entrepreneurship can and should be taught on the basis of an understanding of its changing and environment-related nature. Appropriate entrepreneurship education requires a thorough understanding of the aims and objectives of entrepreneurship education interventions, the alternative forms such interventions can take, and the need to train the trainers [7].

In addition, pressures for greater international competitiveness mean that Europe regards entrepreneurship education as a political imperative. Entrepreneurship education involves many social actors and universities, which, as a whole, are better positioned than other actors, including business schools [8].

Thus, universities, in addition to evolving their teaching and research mission, are striving to develop strategies to fulfil this third mission, 'fostering an entrepreneurial culture to thrive in an entrepreneurial society' [9]. Universities play an important role as spaces for both formal and non-formal entrepreneurial learning and must dedicate resources to enable the design of appropriate educational programmes and the creation of new avenues for research into entrepreneurship, and they must facilitate interaction with the different agents that contribute to learning [10;11;12].

The literature on university entrepreneurship is growing considerably in both the United States and Europe, albeit in a somewhat fragmented way. Based on a review of the literature, Rothaermel, Agung and Jiang [13] categorise four correlates of research: university entrepreneurship research, transfer office productivity, new venture creation, and the environmental context, including innovation networks.

Educational concerns in higher education about entrepreneurship focus on the social and economic role entrepreneurship can play for both individuals and society, the systematisation of entrepreneurship education, the content to be taught and how it should be taught, and the individual needs of students [14;15]. Integrating entrepreneurship education within other disciplines is also a challenge [16].

Universities contribute to the development of entrepreneurship through education, which works to foster entrepreneurial attitudes in young people [17]. To do so, universities must provide entrepreneurship awareness, education, and training. The authors identify three main functions: developing entrepreneurial teaching and learning practices, involving stakeholders inside and outside the university (students, teachers, student societies, academic positions, entrepreneurs, and businesses), and creating an enabling institutional environment [18;19;20;21;22]

Students in entrepreneurship programmes increase their competences and strengthen their intention of self-employment. Entrepreneurship programmes have a significant positive impact on the likelihood of graduates' setting up businesses in the future [23].

3. METHODOLOGY

In this section, the needs and requirements analysis is explained. Prior to the analysis, the target groups were identified. The primary target group consisted of PhD students regardless of academic discipline. The secondary target group was the faculty of higher education institutions. The goal of this work package is to understand how entrepreneurial skills can be better taught and transferred to students. Thus, the survey, interviews, and focus groups were designed to understand the target groups' needs and requirements regarding entrepreneurship skills and training. Thus, the survey and interviews were devised to ascertain the target groups' needs and requirements regarding entrepreneurship skills and training.

In order to identify the needs and requirements of the target groups, the consortium has embarked on a three-step journey shown in Figure 1.

State-of-the-art	Literature review Bibliographic database
Survey	Student survey Faculty survey
Interviews	In-depth insights Adaptation of training courses
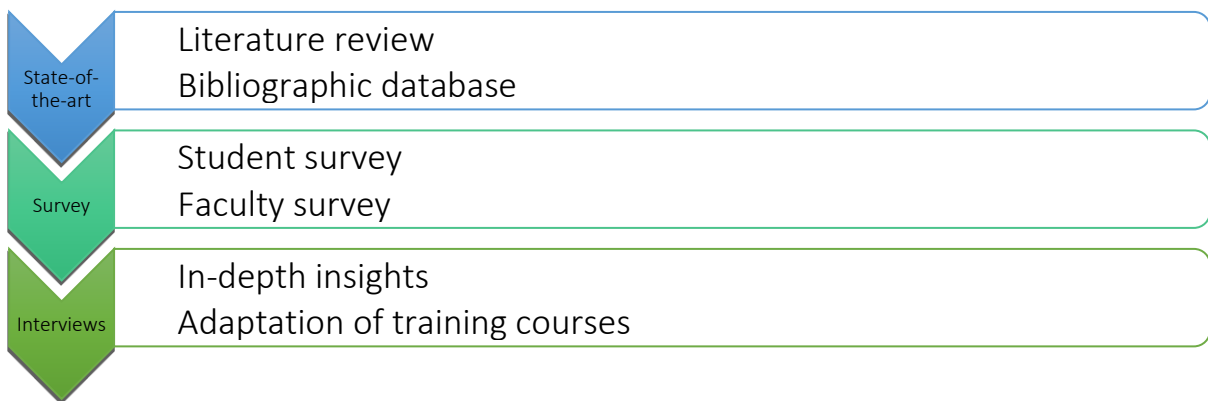
Figure 1 – Illustration of the three-step method used for the needs and requirements analysis

As shown in Figure 1, the first step was to perform a comprehensive literature review and state-of-the-art analysis to find the relevant literature and reference projects that prodPhD can build on. The second step was to carry out two surveys, one addressing students and the other, faculty members. The final step was to interview students and faculty members to gather in-depth information on the next step of the project, which is to adapt the training courses for inclusion in PhD curricula.

Surveys and interviews are widely used research procedures since they allow for information to be obtained quickly and efficiently [24; 25; 26; 27] and both are often used as mixed methods studies to investigate educational assessments [28].

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On the other hand, the goal of the interviews is to capture in-depth insights from the target groups in order to enrich the quantitative results from the survey [29].

Both methods have been used in studies on entrepreneurship to find out the opinions of students, professors and stakeholders about the interest of university education in this field, its educational methodology or its academic and social importance [30; 24; 19; 20; 31; 22].

3.1. TARGET GROUPS

The prodPhD project aims to introduce entrepreneurship courses for PhD students in all disciplines through innovative teaching methods. To this end the target population was predefined by level of engagement with the prodPhD project. There were two primary target groups: PhD students and faculty (Figure 2).
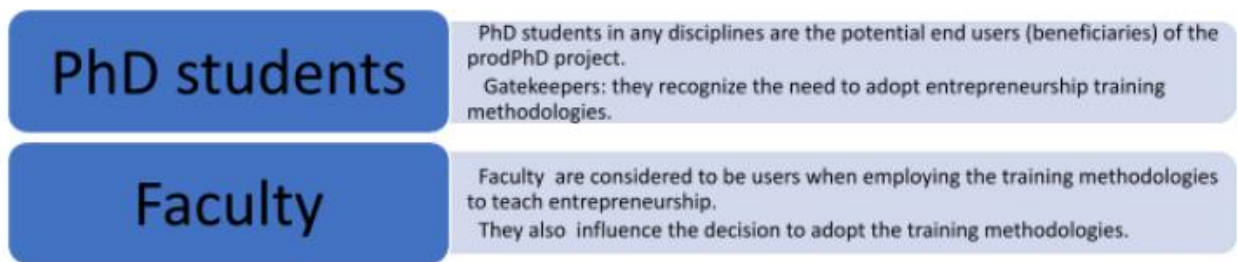
Figure 2 – Target groups

The prodPhD project will be targeting these two groups. The target groups identified here form part of a wider entity, universities. Sixty universities were initially identified. They are shown in Table 1.

University	Country	University	Country
Ghent University	Belgium	Newcastle University	United Kingdom
University of Liege	Belgium	University of Plymouth	United Kingdom
Technical University of Denmark	Denmark	University College of London	United Kingdom
University of Strathclyde	United Kingdom	Vienna University of Economics and Business	Austria
ENSTA Bretagne	France	University of Zagreb	Croatia

Centrale Nantes	France	University of Southern Denmark	Denmark
University of Rostock	Germany	Lappeenranta University of Technology	Finland
Bremen City University of Applied Sciences	Germany	Heilbronn University of Applied Sciences	Germany
University of Duisburg-Essen	Germany	Corvinus University of Budapest	Hungary
Hamburg Technical University	Germany	Polytechnic of Turin	Italy
National Technical University of Athens	Greece	Bologna University	Italy
University of Piraeus	Greece	University of Business, Arts and Technology	Latvia
University of West Attica	Greece	Wroclaw University of Economics	Poland
Genova University	Italy	Plekhanov Russian University of Economy	Russia
Federico II Napoli University	Italy	Complutense University of Madrid	Spain
University of Trieste	Italy	University of Saint Gallen	Switzerland
Delft University of Technology	Netherlands	Manchester Salford University	United Kingdom
Norwegian University of Science and Technology	Norway	Edinburgh - Napier University	United Kingdom
Gdańsk University of Technology	Poland	Nottingham Trent University	United Kingdom
Lisbon University	Portugal	Sheffield Hallam University	United Kingdom
Dunarea de Jos University of Galati	Romania	University of South Wales	United Kingdom
Polytechnical University of Catalunya	Spain	University of Hertfordshire	United Kingdom
University of A Coruna	Spain	Technical University of Istanbul	Turkey

Polytechnical University of Madrid	Spain	Autonomous University of Madrid	Spain
Royal Institute of Technology	Sweden	Carlos III University of Madrid	Spain
Chalmers University of Technology	Sweden	King Juan Carlos University	Spain
World Maritime University	Sweden	Cordoba University	Spain
Technical University of Istanbul	Turkey	Santiago de Compostela University	Spain
University of Southampton	United Kingdom	University of the Basque Country	Spain
Porto University	Portugal	Aalto University	Finland

Table 1 – Initial target universities

3.2 SURVEY METHODOLOGY

3.2.1 SAMPLE

The survey was conducted using network sampling. The questionnaire was sent to the universities in Table 1, which then emailed it to their PhD students and also shared the link on their social media platforms and websites. Altogether the survey was sent to 61 universities, and it was completed by 111 students from 20 universities in 13 countries.

The same technique was employed for the faculty survey. In this case, the number of responses was 32, which included participants from 15 universities in 11 countries.

3.2.2 DATA COLLECTION

The goal of both the student survey and the faculty survey was to provide the foundation for the characterization, analysis, and examination of the participants' needs and requirements for learning and teaching entrepreneurship skills. The surveys particularly aimed to obtain information needed to define the specific characteristics and features that the training courses, materials, and prodPhD platform must meet. Therefore, the two surveys were sent online via Google Forms to the contact persons of the universities shown in Table 1, who subsequently distributed them to their PhD students, teaching staff, researchers, PhD supervisors, and programme coordinators.

3.2.3 STUDENT SURVEY DESIGN

The survey was drafted after a thorough literature review and state-of-the-art analysis, as well as an examination of current teaching methodologies used in existing projects. The first version of the survey was shared among the consortium partners and experts on entrepreneurship to gather their feedback. Once the comments and suggestions were incorporated, the survey was sent out to students of various universities for a pre-test. The students who responded belonged to the Universidad Carlos III, the Universidad de Córdoba and the Universidad de País Vasco. The complete outline of the process is shown in Figure 3.

Figure 3 – Stepwise illustration of student survey design

Finally, the student survey was made up of ten sections. The first and last section included practical information, whereas the other eight sections included information questions and/or statements related to the target group's intentions, experiences, background, and future perspectives on entrepreneurship. The sections of the student survey are shown in Table 2. The complete questionnaire is also available in Appendix 2.

Section number	Content	Number of questions per section
Section 1	Introduction: aim, duration, consent, and instructions	N/A
Section 2	Demographic information: age, gender, university, year of PhD, discipline, and name of the PhD programme	6 questions
Section 3	Career intentions: intention to start a business, motivation for being an entrepreneur, and post-PhD plans	3 questions
Section 4	Business prospects and background: business ownership, support received for setting up a company, the kind of support received, rating of a prospective job as an entrepreneur	4 questions
Section 5	Entrepreneurship course information: previous participation in entrepreneurship courses, source of	4 questions

	previous entrepreneurship training, interest in attending optional entrepreneurship training during PhD studies, amount of time respondent would be willing to spend on entrepreneurship training	
Section 6	Alternative entrepreneurship training: participation in previous initiatives, university initiatives and services, incentives received	10 questions
Section 7	Entrepreneurship competences: rating of their entrepreneurship skills, rating of importance of entrepreneurial skills	2 questions
Section 8	Importance of entrepreneurship training: awareness and perceived importance of entrepreneurship training	1 question
Section 9	Evaluation of entrepreneurship courses: where the focus of entrepreneurship courses should be description of how entrepreneurship courses can stimulate their entrepreneurship initiatives	2 questions
Section 10	Contact details for follow-up interviews: willingness to participate in a follow-up interview	N/A
	Total number of questions	32 questions

Table 2 – Final structure of student survey

The final questionnaire for the student needs and requirements analysis was sent to the universities shown in Table 1.

3.2.4 FACULTY SURVEY DESIGN

The faculty survey was carried out similarly to the student survey. It was drafted based on an extensive review of literature analysing key factors, drivers, and barriers in entrepreneurship, identifying and collecting initiatives, best practices, and methods. It was then shared among the consortium partners and experts in the field, who contributed new comments and suggestions. After the partner feedback was incorporated, the survey was sent for a pre-test.

The faculty survey pre-test was sent to various Spanish and Portuguese universities. Eleven responses were obtained. The faculty members who responded belonged to the Autonomous University of Madrid, Carlos III University of Madrid, Porto University, Barcelona University, Cordoba University, Zaragoza University and NOVA University of Lisbon. Some of the suggestions from the pre-test were used to improve the survey. These improvements included the

clarification of some questions, elimination of others and addition of new questions. The outline of the whole design process is shown in Figure 4.

Figure 4 – Stepwise illustration of faculty survey design

Finally, the faculty survey consisted of five sections. The first and last section included practical information, whereas the other three sections included information questions and statements related to the target group's demographics, entrepreneurship courses and experiential training, and evaluation of entrepreneurship courses. The sections of the faculty survey are shown in the table below in more detail.

Section number	Content	Number of questions per section
Section 1	Introduction: aim, duration, consent, and instructions	
Section 2	Demographic information: gender, university, discipline, and name of the PhD programme	N/A
Section 3	Entrepreneurship courses and experiential training: participation in entrepreneurship courses as teacher, topics, aims, interest in teaching entrepreneurship courses in the future, reasons why they would not teach, participation in a technology-based company or at least the transfer of research results to a company, involvement and coordination of different disciplines in entrepreneurship courses, and experience in teaching entrepreneurship courses	16 questions
Section 4	Evaluation of entrepreneurship courses: where the focus of entrepreneurship courses should be description of how entrepreneurship courses can stimulate students' entrepreneurship initiatives	2 questions
Section 5	Contact details for follow-up interviews: willingness to participate in a follow-up interview	N/A

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	Total number of questions:	18 questions

Table 3 – Final structure of faculty survey

The final step was the launch of the final version of the survey. The surveys were distributed online via Google Forms. The survey was sent to the partners' networks, which comprise the universities shown in Table 1.

3.3 INTERVIEWS' METHODOLOGY

The surveys were complemented with 10 semi-structured interviews. These interviews were approached with a predefined set of priorities based on the literature review, and the results from the surveys addressed to both PhD students and teaching staff. The interviews, here again, were addressed to two clusters i.e., PhD students and Faculty members. The procedure the interviews followed is explained in the following sections. The purpose of the interviews was to complement the surveys by obtaining a more thorough understanding of the survey

3.3.1 STUDENTS' INTERVIEWS

3.3.1.1 SAMPLE

At the end of the students' survey a question asking the respondents if they were willing to participate in an interview was included. After the analysis of the survey the participants for the interviews were identified. The final sample consisted of seven interviews. The doctoral candidates were submitted and their affiliation as well as their gender and interview numbers are displayed in the Table 4.

Interview number	University	Country	Gender	Date
1	Istanbul Technical University	Turkey	Female	July 5th 2021
2	Autonomous University of Madrid	Spain	Female	July 5th 2021
3	Cordoba University	Spain	Female	July 5th 2021
4	Lisbon Technical Institute	Portugal	Male	July 6th 2021
5	Cordoba University	Spain	Female	July 6th 2021

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| 6 | World Maritime University | Sweden | Male | July 7th 2021 |
| 7 | Gdańsk University of Technology | Poland | Male | July 22nd 2021 |

Table 4 - Participants in students' interviews

3.3.1.2 DATA COLLECTION

Prior to the data collection process, the participants identified from the surveys were approached by email. Those that stated an interest in being interviewed were emailed and asked to contribute to the interviews. The interviews were conducted via Zoom. The duration of the interviews ranged between 20 to 30 minutes each. The interviews were approached using an interview guide, see Appendix 4 student's interview guide.

3.3.1.3. DATA ANALYSIS

The interviews were structured based on the results of the surveys. After analysing the survey results, four main nodes were identified. Further the main nodes were intersected with sub nodes that corresponded to specific questions in the surveys. The intersections and correspondence of the nodes to the survey questions are shown in Table 5.

The analysis was carried out using thematic analysis [32; 33] to elicit information according to the themes identified from the literature review as well as the survey. Firstly, four main nodes were identified from the survey and literature review as shown in Table 5. These main nodes were subsequently coded. Then, based on the main nodes, several sub nodes were identified in order to correspond them with specific survey questions. Finally, the intersecting nodes serve as a benchmark to the comments that complemented the survey results. In the forthcoming section, results from each corresponding survey question are linked to the nodes additional qualitative insights drawn from the interviews will be provided.

Main nodes	Code	Sub nodes	Corresponding survey question	Intersecting nodes*
Experiences	Ex	Entrepreneurship courses	Q14	P Ex Q14 3
		Interest in learning entrepreneurship	Q16	P Ex Q16 6
Network	Net	Interaction	Q20	P Net Q20 2

		Collaboration	Q20	P Net Q20 4
Entrepreneurship	Ent	Social environment	Q23	P Ent Q23 5
		Creation of a business	Q23	P Ent Q23 5
		Reward	Q23	P Ent Q23 3
E-learning platforms	Ep	Opportunities and challenges	Additional insights	P Ep Insight
		Multidevice access	Additional insights	P Ep Insight

Table 5 - Codes of students' interviews analysis

*Intersecting nodes are referring to: P- PhD student, node, corresponding question and interview number

3.3.2 FACULTY INTERVIEWS

3.3.2.1 SAMPLE

Following a similar procedure as in the sampling of the students' interviews, the participants in faculty interviews were identified from the faculty survey. The sample of the faculty interviews consisted of three participants. The faculty members, affiliation, and interview numbers are given in Table 6.

Interview number	University	Country	Gender	Date
1	Piri Reis University	Turkey	Male	July 6th 2021
2	University of Piraeus	Greece	Female	July 9th 2021
3	NOVA University of Lisbon	Portugal	Male	July 7th 2021

Table 6 - Participants in faculty's interviews

3.3.2.2 DATA COLLECTION

As with the students' interviews, a similar process was followed for the faculty data collection procedure. The participants who voiced their interest, were approached by email. The interviews

were carried out via Zoom and lasted between 20 to 40 minutes. A guide script was used during the interviews, see Appendix 5 faculty interview guide.

3.3.2.3 DATA ANALYSIS

Based on the results of the surveys, an interview guide with specific facets was structured. After analysing the survey results, four main identical nodes were identified. Further the main nodes were intersected with sub nodes that corresponded to specific questions in the surveys. The intersections and correspondence of the nodes to the survey questions are shown in Table 7. Further, the analysis was carried out using thematic analysis to elicit information according to the themes identified from the literature review as well as the survey.

Further, the analysis was carried out using thematic analysis [32; 33] to elicit information according to the themes identified from the literature review as well as the survey. First four main nodes were identified from the survey and literature review as shown in Table 7. These main nodes were later coded. Then, based on the main nodes, several sub nodes were identified in order to correspond them with specific survey questions. Finally, with regard to the students, the intersecting nodes serve as a reference to the comments that complemented the survey results.

Main nodes	Code	Sub nodes	Corresponding survey question	Intersecting nodes*
Experiences	Ex	Previous experience	Q6	F Ex Q6 1
		Interest in teaching entrepreneurship	Q6	F Ex Q6 2
Network	Net	Interaction	Q13	F Net Q13 3
		Collaboration	Q14	F Net Q14 3
Entrepreneurship	Ent	Social environment	Q12	F Ent Q12 2
		Creation of a business	Q15	F Ent Q15 3
		Reward	Q16	F Ent Q16 1
E-learning platforms	Ep	Opportunities and challenges	Additional insights	F Ep Insight 2

		Multidevice access	Additional insights	F Ep Insight 2

Table 7 - Codes of faculty's interview analysis

*Intersecting nodes are referring to: F- Faculty, node, corresponding question, and interview number.

3.4. METHODOLOGICAL LIMITATIONS

Nevertheless, the findings of this study have several limitations that have to be taken into account. To begin with, the response number to the surveys is not high given the sample technique employed (i.e., snowball sampling procedure). Furthermore, due to the same limitation of the sampling technique, the sample was not equally distributed geographically as well as in terms of academic disciplines.

In order to mitigate these limitations, however, a mixed methods approach was taken. The surveys were further also complemented by semi-structured interviews. Also, a wide range of experts in the fields of entrepreneurship and business administration were asked to review the soundness of the methodology as well as the surveys and the interviews approach.

4.   SURVEY RESULTS

The survey was answered by 111 students and 32 faculty members. The main results obtained from the analysis of the responses are presented below.

4.1. STUDENTS

4.1.1 DEMOGRAPHIC INFORMATION

Most of the students were in the 26-30 and 31-35 age ranges, with the extended 26-35 age range accounting for 66% of the respondents.
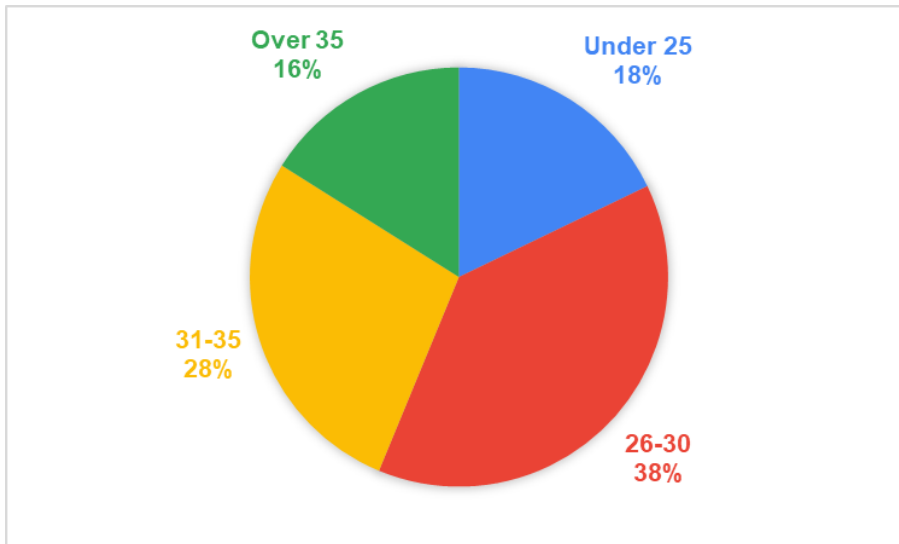
Figure 5 – Age groups

As can be seen, the proportion between men and women is fairly equal, with 54% men and 46% women.
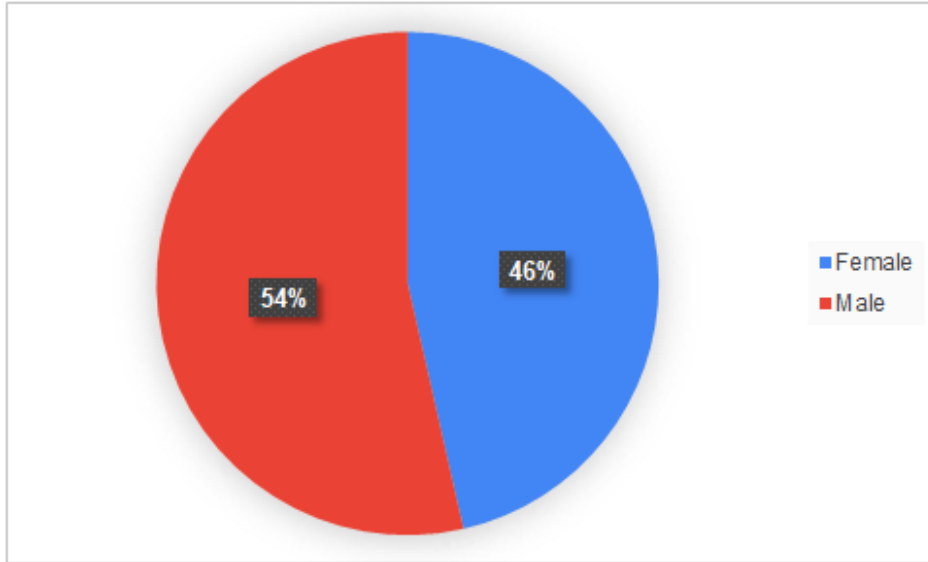
Figure 6 – Respondent gender

However, when the age ranges are compared by gender, a notable difference appears between men and women: a much lower proportion of women were engaged in doctoral studies in the 26-30 age range, while in the over-35 age range the proportion of women was twice that of men. This could be due to the need for women to break the glass ceiling as they advance in their professional careers.
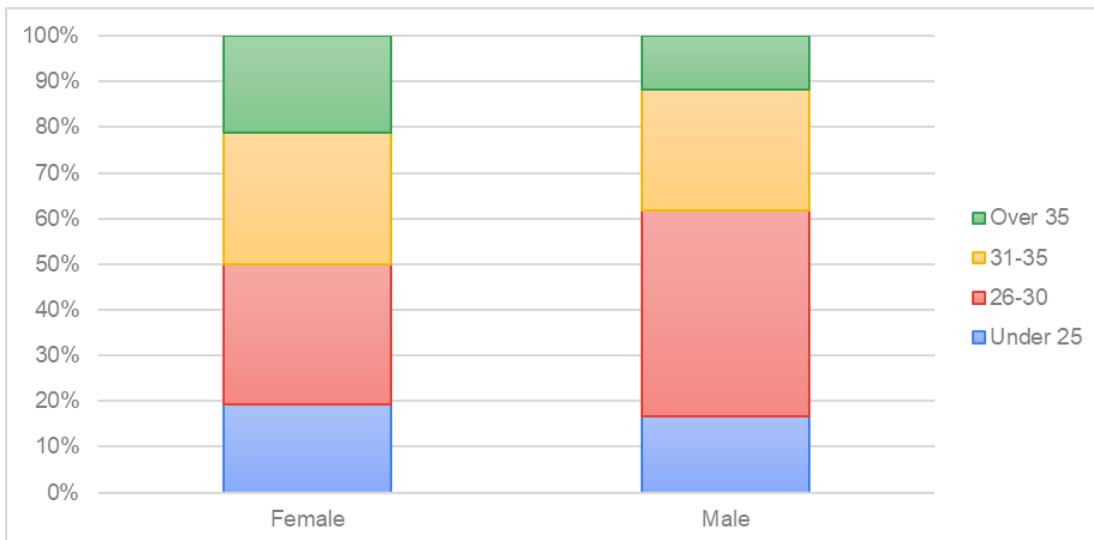
Figure 7 – Age ranges by gender

As for the origin of the respondents, 29% of them were from Poland, specifically from the Gdańsk University of Technology, as can be seen in Figures 8 and 9.
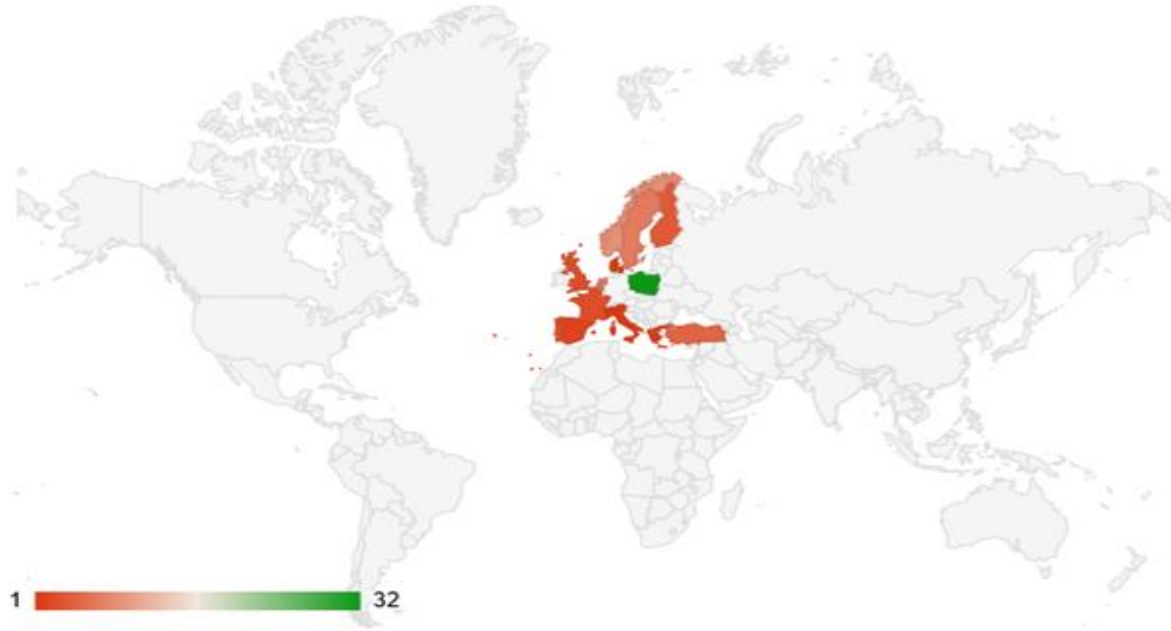
Figure 8 – Responses by country

Figure 9 – Responses by city

University	Country	Number of responses
Gdańsk University of Technology	Poland	32
Cordoba University	Spain	12
Norwegian University of Science and Technology	Norway	9
Delft University of Technology	The Netherlands	7
World Maritime University	Sweden	7
Lisbon Technical Institute	Portugal	6
Autonomous University of Madrid	Spain	3
Istanbul Technical University	Turkey	5
Ghent University	Belgium	4
KTH Royal Institute of Technology	Sweden	4
Aalto University	Finland	4
University of Strathclyde	United Kingdom	3
Lisbon University	Portugal	3
Centrale Nantes	France	3
National Technical University of Athens	Greece	2
University of Southampton	United Kingdom	2
Polytechnical University of Catalunya	Spain	2
Genova University	Italy	1
Technological University of Denmark	Denmark	1

	United Kingdom	1
Imperial College London		
Total respondents		111

Table 8 – Number of responses by university and country

Most of the students reported that they were in the first or second year of their doctoral thesis, which is in line with the age ranges indicated.

Year of PhD	Frequency	Percent
First	41	36.94
Second	34	30.63
Third	14	12.61
Fourth or higher	23	20.72

Table 9 – Year of PhD

Finally, most of the respondents (more than 70 of the answers) belonged to scientific areas linked to the applied sciences, especially fields related to life sciences and the various branches of engineering.

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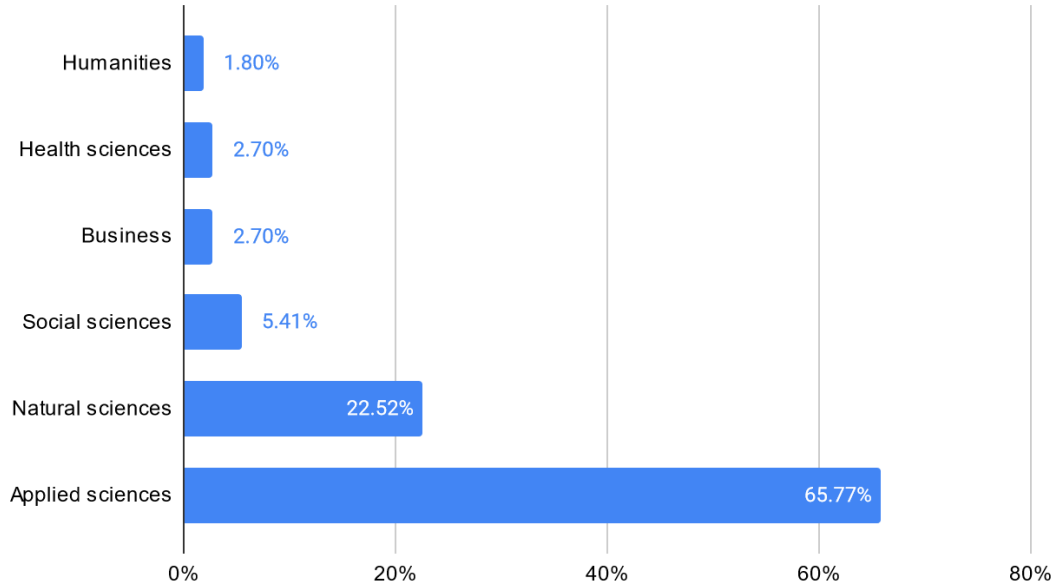
Figure 10 – Student discipline/area

4.1.2 CAREER INTENTIONS

The following questions are related to the students' career prospects, especially in terms of whether they intend to become entrepreneurs and what factors might have contributed to that idea.

Most of the respondents indicated a preference for continuing in academic institutions (n=60) or an intention to work in the private sector (n=44), with entrepreneurship as the third most chosen option, with 27 responses.

What do you plan to do when you finish your PhD?	Frequency
Find a job in academia	60
Find a job in the private sector	44
Start my own business	27
Do not know yet	21
Find a job in the public sector	19

Find a job in a non-profit organization	5
Continue to be an employee in the public sector	1
Not sure yet. Either continue my research or start in a private company	1

Table 10 – Student career prospects

Among those who responded that they were interested in entrepreneurship, the most important factor was funding opportunities (n=12). This factor outranked others, such as belonging to an entrepreneurial family or the student's personal motivation. The last factor mentioned by students was encouragement from their professors.

Factors encouraging students to start a business	Frequency
Financial opportunities for entrepreneurs	12
My parents/family have a business of their own	7
My friends own or are planning to start a business of their own	6
University courses and initiatives have encouraged me to start my own company	6
Self-motivation	6
Government policies that support entrepreneurs	3
My professors have encouraged me to set up a business	2

Table 11 – Factors encouraging students to start a business

Students' main motivation for becoming entrepreneurs is a desire to work in a more flexible, independent environment. In second place they value the possibility of creating something of their own and making money.

Motivation	Frequency

To have more flexibility and independence	20
To create something of my own	16
To make money	16
To satisfy a market need	15
To solve a social problem	11
To head up an organization	8
To create jobs	8
To pursue my passion for entrepreneurship	7
To gain high social status	5
To have more free time	2
To follow a family tradition	2

Table 12 – Motivations for being an entrepreneur

4.1.3 BUSINESS PROSPECTS AND BACKGROUND

In order to find out more about the students' background in entrepreneurship, a series of questions were asked. The first question was whether they already belonged to some kind of company, to which the majority of them (90%) answered that they did not.

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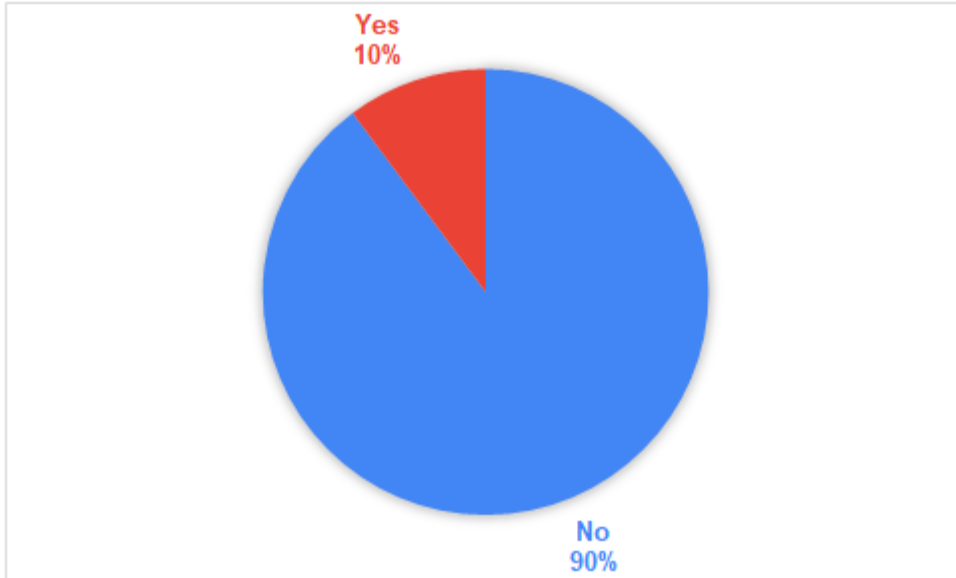
Figure 11 – Students' entrepreneurship background

They also overwhelmingly (85%) indicated that they had not received any support from their universities to help them engage in business activities.
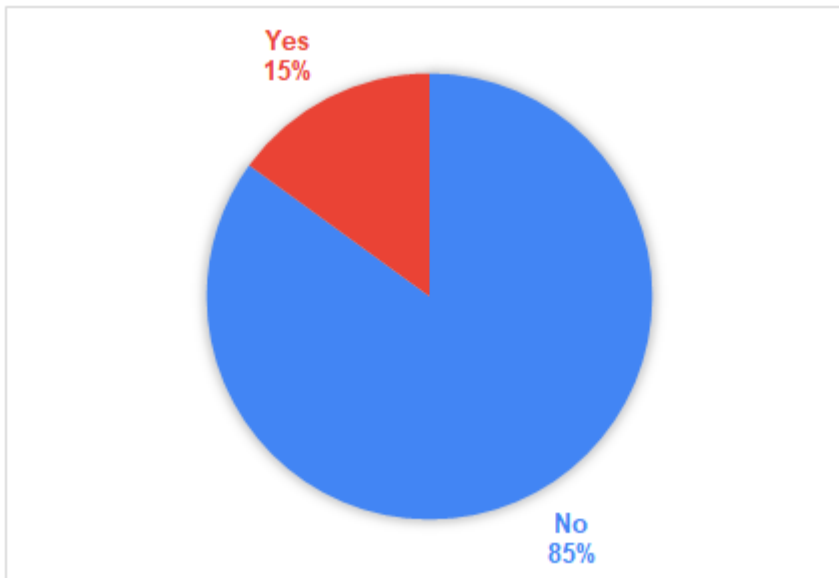
Figure 12 – Percentage of students with university support to set up their own company

Lastly, students were asked about their view of entrepreneurs' jobs. Most of the students strongly agreed that being an entrepreneur is rewarding, although it is a hard job (39 answers). This answer was followed much less frequently by 'I think having a company can be very hard'

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and 'I believe being an entrepreneur is risky', with 27 and 26 answers, respectively. Table 10 shows the student responses (1 meaning they 'strongly disagree' with the sentence and 5, that they 'strongly agree').

Please rate your view of an entrepreneur's job	1	2	3	4	5
I believe being an entrepreneur is risky	1	2	25	52	26
I think having a company can be very hard	2	4	25	48	27
I believe entrepreneurship might be a fun career option	3	19	21	43	19
I think being an entrepreneur is too stressful	1	20	38	33	14
I believe it is a hard but rewarding job	2	4	25	35	39
I believe being an entrepreneur gives you more freedom than other jobs	8	18	36	26	19
I believe that the results of my thesis could be used to create a spin-off/tech start-up	22	24	26	27	7

Table 13 – Student views on an entrepreneur's job

4.1.4. ENTREPRENEURSHIP COURSE INFORMATION

The next section of the survey focused on the training that students had already received in the field of entrepreneurship. The majority of respondents (64%) answered that they had not received any training in this area during their student career.
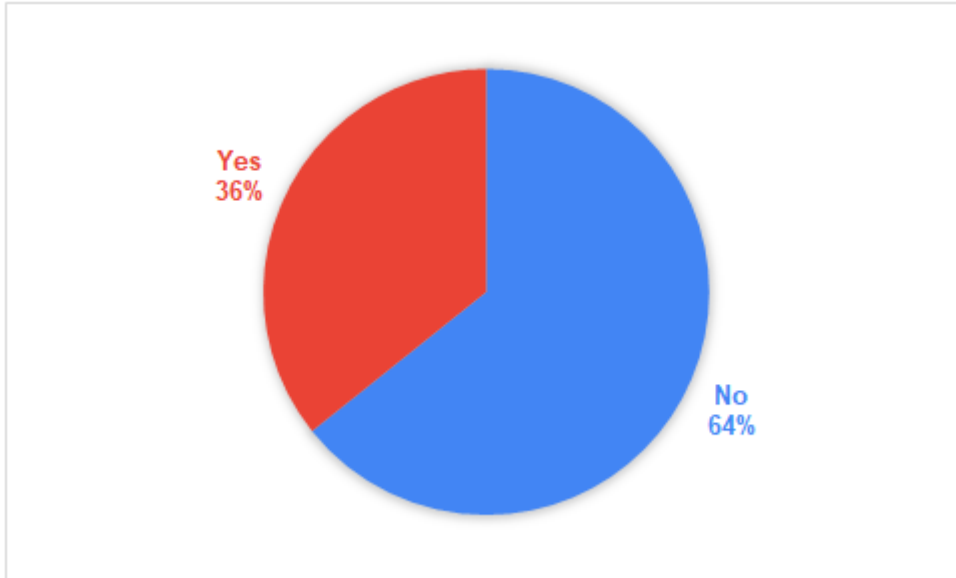
Figure 13 – Participation in entrepreneurship training courses before starting the PhD

In the cases where they had taken entrepreneurship training courses, it was mainly while pursuing their undergraduate degree (n=21) or master's degree (n=17) or, to a lesser extent, it was in the form of specific courses and activities (n=12). However, 70% of respondents did report an interest in receiving entrepreneurship training in the future.

Where?	Frequency	Percent
University training: undergraduate degree	21	18.92%
University training: master's degree	17	15.32%
Non-university courses, workshops, etc.	12	10.81%
Training programme	2	1.9%
High school	1	0.9%

Table 14 – Entrepreneurship training courses

Seventy percent of the students surveyed were in favour of taking (additional) entrepreneurship training modules during their PhD studies. Where students reported attending or having attended this type of training, the majority (53%) indicated that they spent an average of two hours per week on it (Figures 14 and 15).
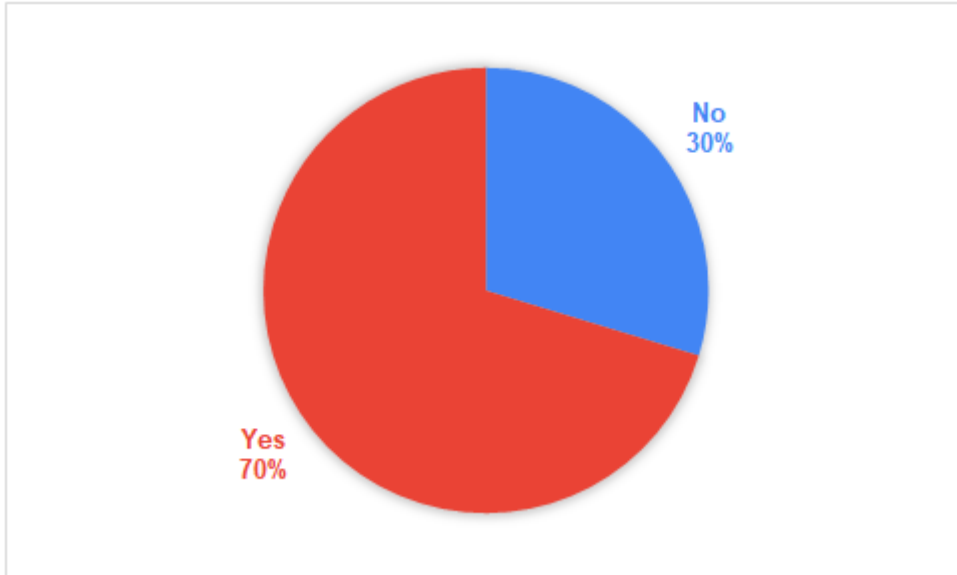
Figure 14 – Percentage of students interested in attending additional entrepreneurship training modules during their PhD studies

Figure 15 – Commitment to training modules

4.1.5 ALTERNATIVE ENTREPRENEURSHIP TRAINING

The questions in the next section explore the entrepreneurship training received by students outside the formal channels of the university. Although 39% of respondents indicated that the university had specific courses and seminars on entrepreneurship, a striking 52% indicated that they did not know whether the university offered such training or not.
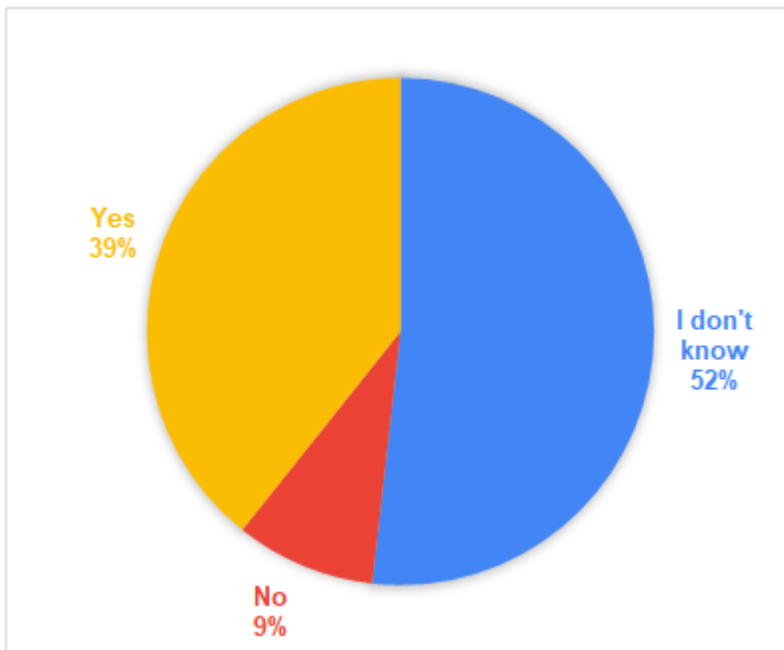
Figure 16 – University entrepreneurship seminars, workshops, or conferences

Seventy-five percent of the students surveyed indicated that they had never attended seminars,
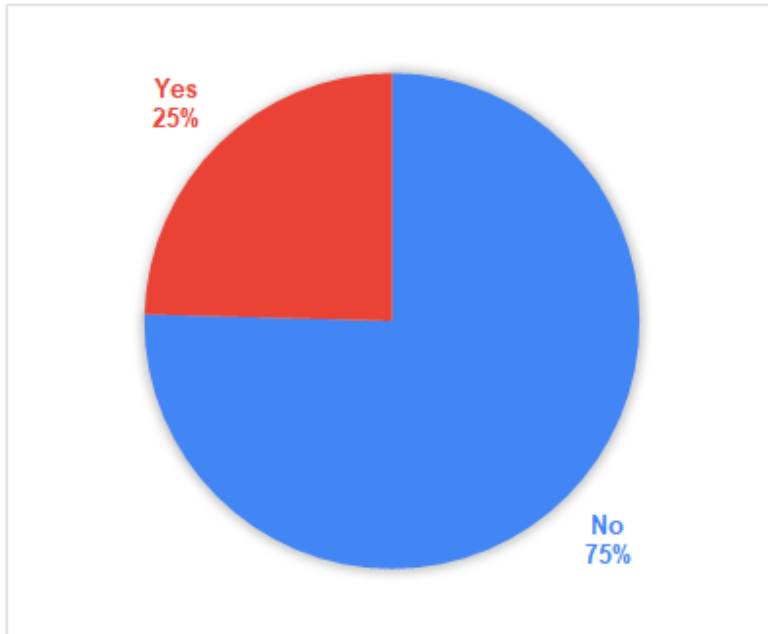
conferences, etc. on entrepreneurship.

Figure 17 – Seminar, workshop, or conference attendance

More than half of the respondents (52%) did not know whether there were any entrepreneurship orientation units for students at their university (e.g.: incubators, business associations, science parks). Because of this lack of knowledge, only 5% of PhD students have used any such services (Figures 18 and 19).

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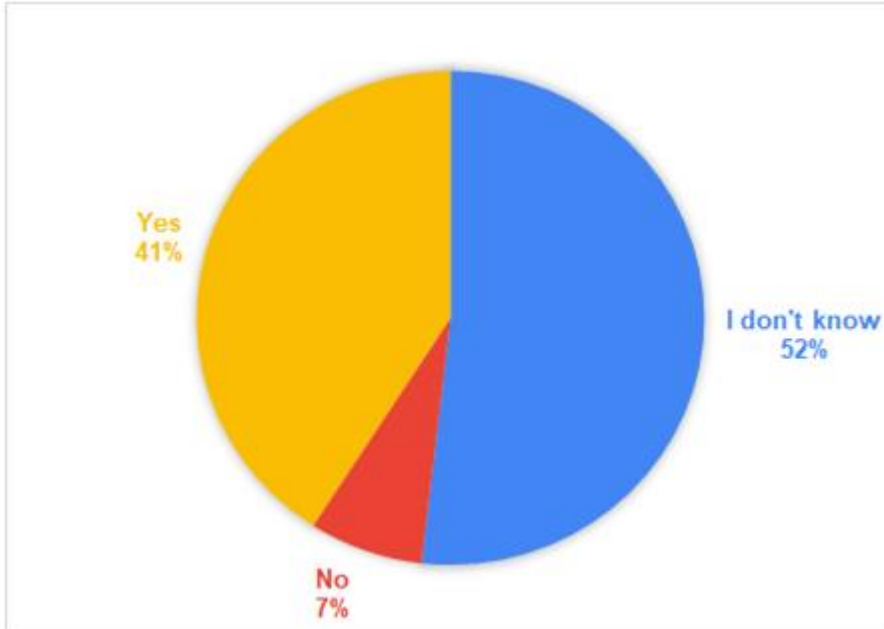
Figure 18 – Existence of entrepreneurship orientation units for PhD students
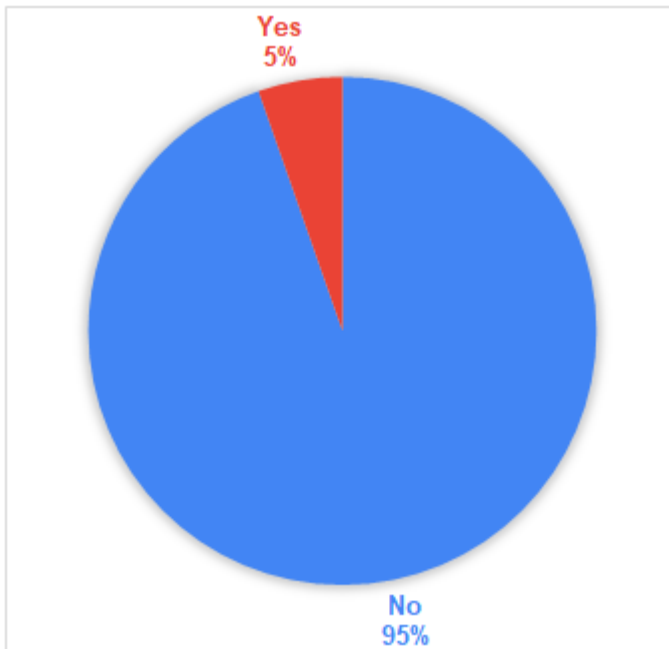
Figure 19 – Use of entrepreneurship orientation units by PhD students

Entrepreneurship incentives follow a similar pattern: 76% of the respondents said that they were not aware of any (Figure 20), of which 12% indicated that such incentives do not exist. Furthermore, in the cases where respondents were aware of entrepreneurship incentives, very few had participated (only 6% of the respondents) (Figure 21).
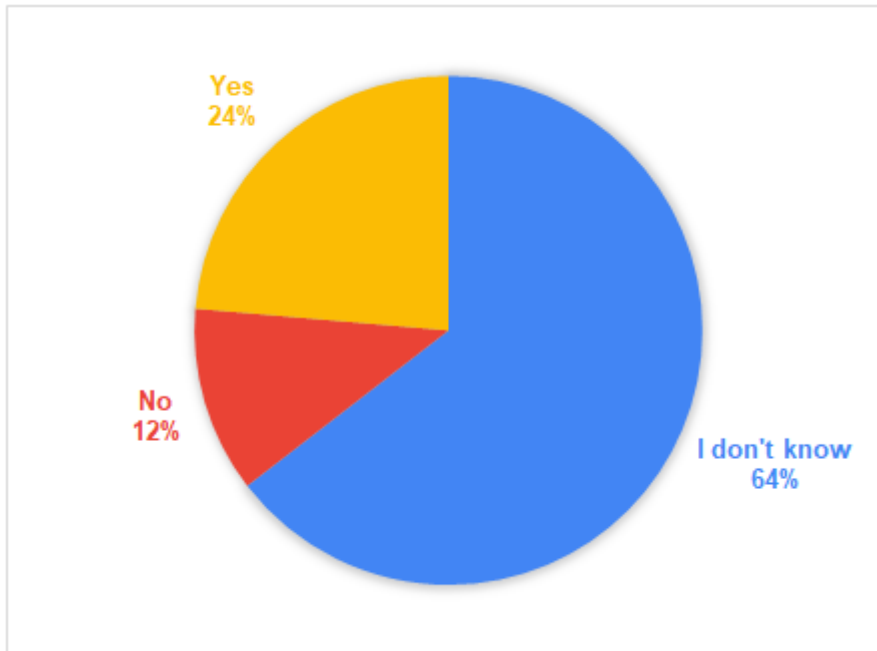
Figure 20 – Universities' incentives for entrepreneurial activities
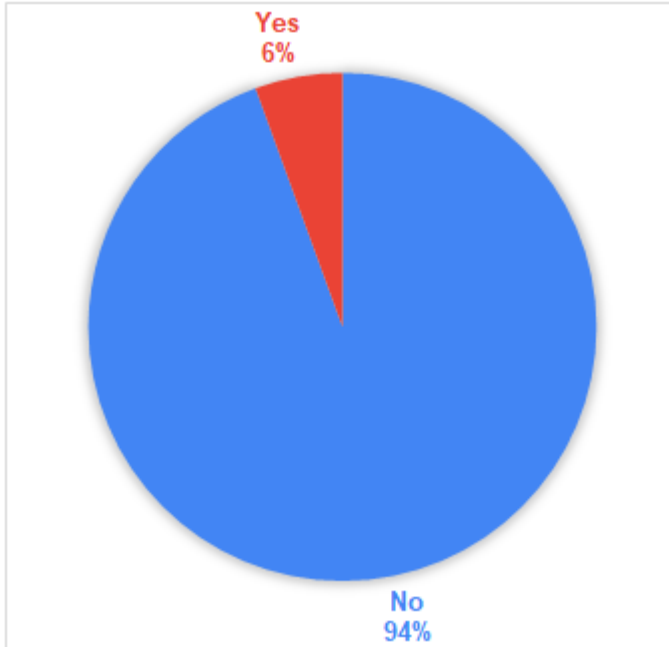
Figure 21 – Student participation in universities' activities and incentives

Lastly, only 2% of the students said that they are aware of any other type of incentive organized by their universities regarding entrepreneurship training.
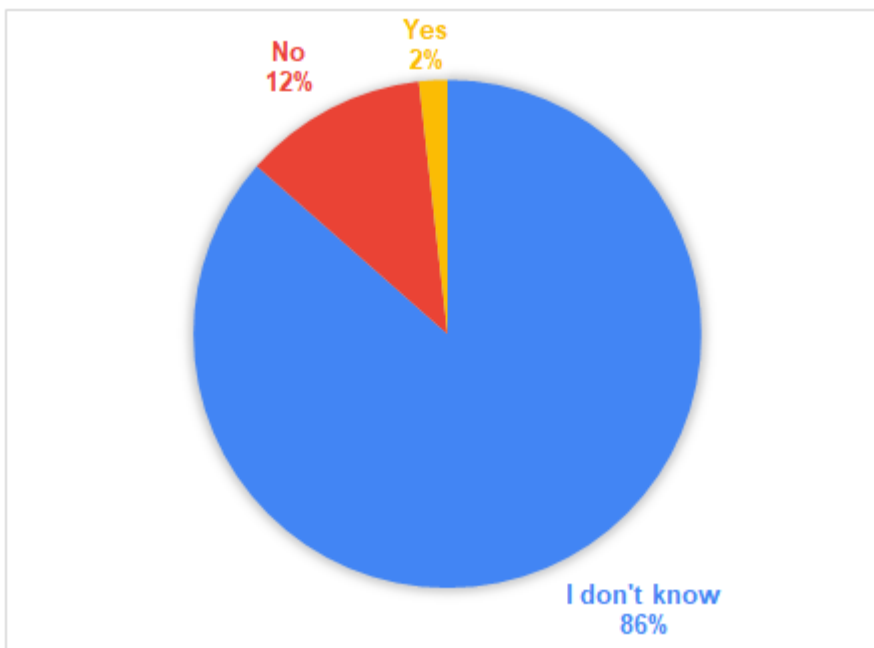
Figure 22 – Existence of other initiatives related to entrepreneurship organized by universities

4.1.6 ENTREPRENEURSHIP COMPETENCES

Respondents were asked about their level of competence in a number of general skills related to entrepreneurship. The responses show that students are more confident about their interpersonal abilities than their instrumental and conceptual capabilities. In other words, the surveyed students believe they have relatively good leadership, team management, networking, and negotiation abilities (Table 15).

Entrepreneurship skills	1	2	3	4	5
Instrumental skills (problem solving, decision making, risk managing, finances and accounting)	4	11	48	34	11
Interpersonal skills (leadership, managing teams, networking, negotiation, business ethics)	4	12	37	37	17
Conceptual skills (business opportunity identification, creativity, innovation)	7	21	34	31	14

Table 15 – Entrepreneurship skill importance rating

The respondents also rated the importance of several entrepreneurial skills. Abilities such as decision making, problem solving, and leadership were scored very high, whereas other more technical skills, like web design, search engine optimization, and IT competences, were ranked much lower (Table 16).

Entrepreneurship skills rating	1	2	3	4	5
Project development	0	1	12	49	46
Teamwork	0	0	17	45	46
Problem solving	0	2	10	39	58
Budgeting	0	1	20	42	44
IT competences	3	14	44	33	14
Web design	14	32	39	19	4
Decision making	0	0	5	25	78
Data management	1	12	31	32	32
Creativity	0	1	17	35	55

Data analysis	2	8	29	47	22
Search engine optimization	12	20	34	27	15
Finances and accounting	3	10	28	36	31
Advertising and promotion	1	21	31	30	34
Content creation	1	18	34	30	24
Leadership	0	2	15	35	56
Strategic planning	0	2	13	41	52
Negotiation	0	3	14	45	46
Risk management	0	1	12	43	52
Legal structures	4	6	38	35	25
Market research	0	5	21	47	36

Table 16 – Importance of the skills an entrepreneur should have

Similarly, respondents felt that acquiring these skills was important, regardless of their specialization field. Most of them agreed with the statement that many of the skills could not be acquired in class and that they would be useful in the future, whether or not the students eventually pursued an entrepreneurial career. The table below shows the students' responses, where 1 means they 'strongly disagree' with the sentence and 5, that they 'strongly agree'.

Entrepreneurship training	1	2	3	4	5
I believe that training in entrepreneurship is important regardless of one's specialization field	3	18	29	35	26
I believe that essential entrepreneurship skills cannot be taught in a class	10	27	37	26	12
I believe entrepreneurship training can develop skills that will be useful in the future	0	5	19	50	37
I believe entrepreneurship training is only important if you want to start a business	22	42	26	14	7

Table 17 – Importance of entrepreneurship training

4.1.7 EVALUATION OF ENTREPRENEURSHIP COURSES

Lastly, they were asked to indicate those aspects of entrepreneurship which should be addressed in entrepreneurship courses. They highlighted issues related to planning, obtaining and managing resources, strategies for presenting and selling products, and examples of success. On the other hand, the respondents gave less importance to receiving encouragement to become an entrepreneur. Table 18 shows the students' responses, 1 meaning they `strongly disagree' with the sentence and 5, that they 'strongly agree'.

Entrepreneurship courses	1	2	3	4	5
Theoretical concepts behind setting up and running a business	3	14	56	29	8
Encouragement for students to set up and run their own business	4	19	40	32	15
Strategies for managing and ensuring the growth of established companies	0	9	23	48	29
Training in marketing and finance	1	10	30	40	29
Conditions that favour business creation	0	8	35	51	16
How to move/make the transition from traditional employment to self-employment	0	7	29	49	26
Presentation and review of real cases of entrepreneurship	0	2	26	46	36
Business plan development	0	2	18	48	42
Training in innovation and creativity	2	8	30	39	31
Understanding how different kinds of businesses work	0	7	29	47	27
The competences and skills that make a successful entrepreneur	0	6	26	48	30
How to obtain resources to create my own business	0	3	18	38	51
Problem-solving skills	3	9	30	32	36
Dealing with failure	3	10	18	38	41
How to work under pressure	5	13	22	41	29

How to bring my project/ideas to the market	0	3	12	43	52

Table 18 – Expected content of entrepreneurship courses

4.2. FACULTY

As discussed in the methodology section, the survey was answered by 32 faculty members from several European universities. This section reports the analysis of the responses.

4.2.1 DEMOGRAPHIC INFORMATION

Most of the respondents were teaching at the undergraduate, master's degree, or doctorate levels. In some cases, the respondents held positions of academic responsibility as dean, vice dean, head of department, director of the doctoral programme, or some similar capacity (Figure 23).
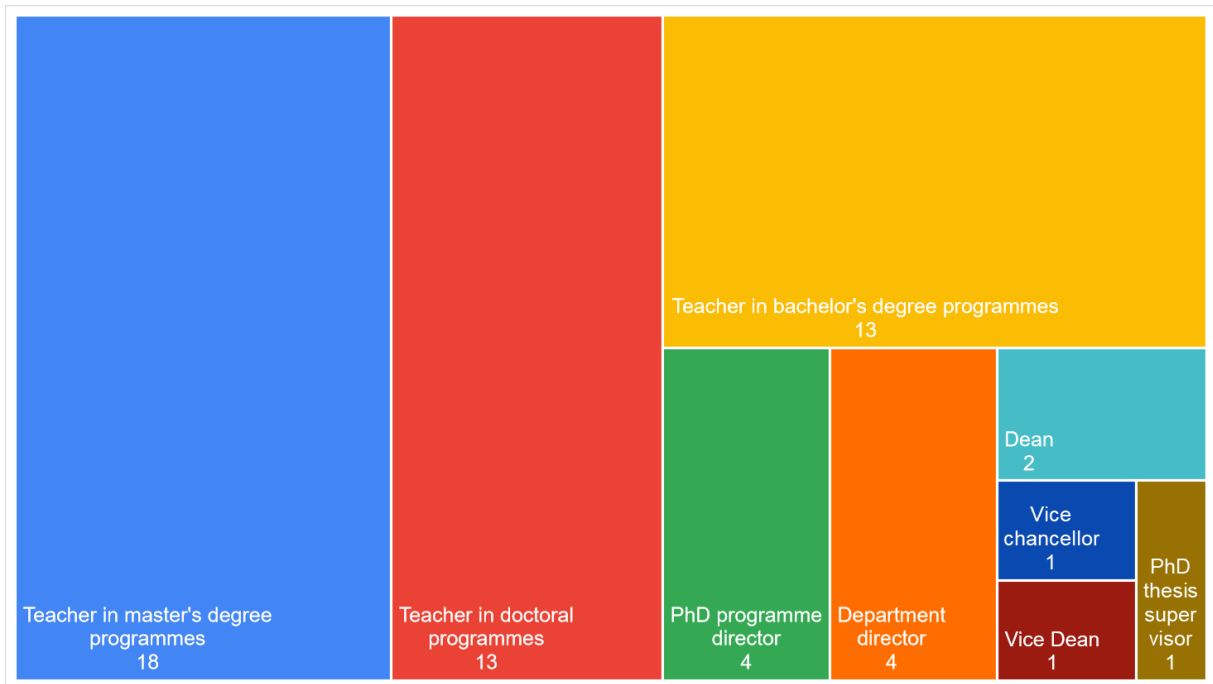
Figure 23 – Current academic situation of faculty members

Seventy-five percent of respondents were male, and 22%, female. Three percent of the respondents preferred not to state their gender (Figure 24).

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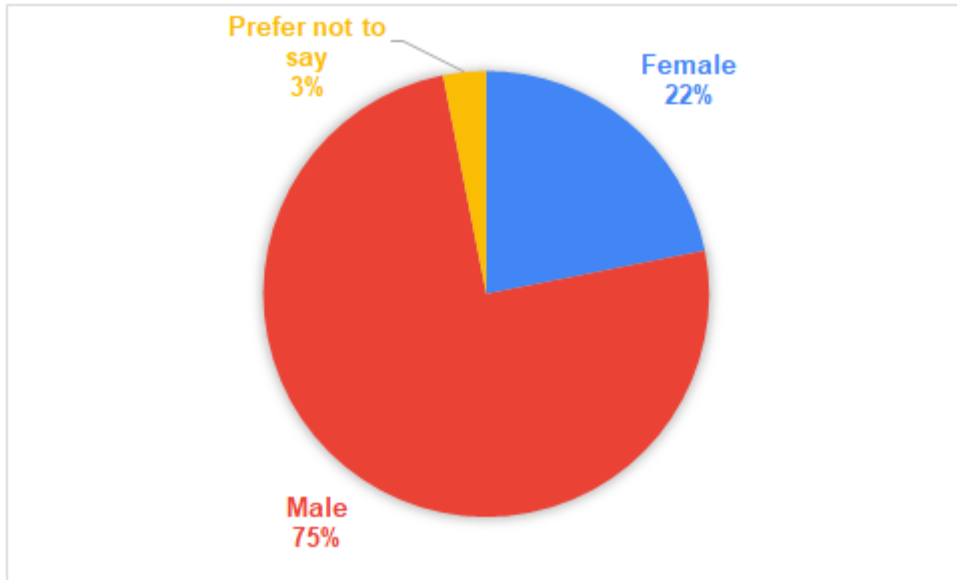
Figure 24 – Respondent gender

Most of the respondents worked at technical universities and, therefore, universities of applied sciences. Gdańsk University of Technology was the institution from which the highest number of responses were sent (14). One or two responses apiece were received from the rest of the institutions listed in Figure 25 and Table 19.
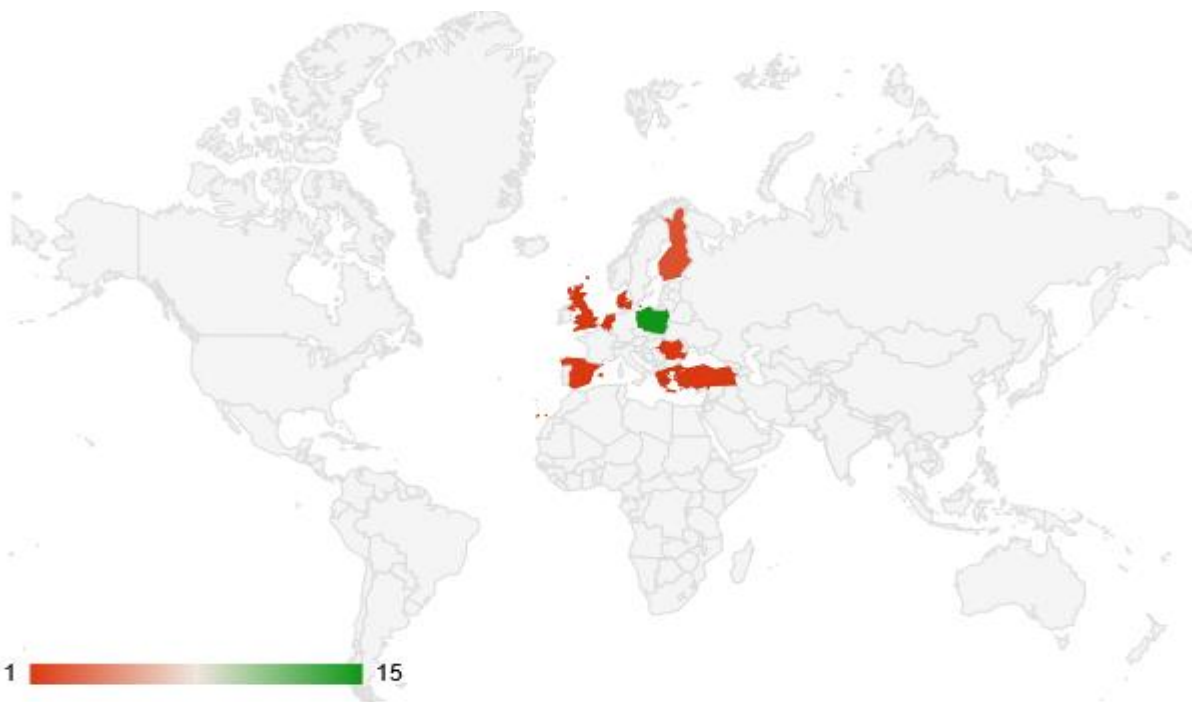
Figure 25 – Location of respondents' universities

University	Country	Number of responses
Gdańsk University of Technology	Poland	15
Aalto University	Finland	2
Polytechnical University of Madrid	Spain	2
ENSTA Bretagne	France	2
Delft University of Technology	The Netherlands	1
Dunarea de Jos University of Galati	Romania	1
Ghent University	Belgium	1
Piri Reis University	Turkey	1
Southampton University	United Kingdom	1
Technical University of Denmark	Denmark	1
University College of London	United Kingdom	1
Polytechnical University of Catalunya	Spain	1
University of Liege	Belgium	1
University of Piraeus	Greece	1
University of Strathclyde	United Kingdom	1
Total number of responses		32

Table 19 – Number of faculty survey participants per country and university

Figure 26 shows that 71% (23) of the respondents were in the area of applied sciences, computer science, and engineering, while five belonged to natural sciences, and four, to business.
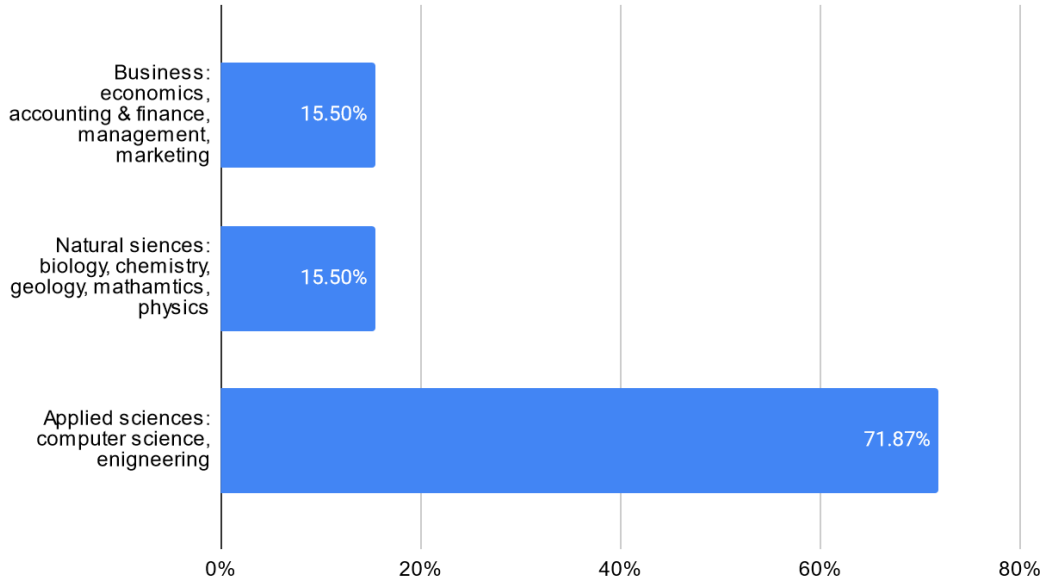
Figure 26 – Respondent discipline

4.2.2 ENTREPRENEURSHIP COURSES AND EXPERIMENTAL TRAINING

Most of the faculty who responded to the questionnaire (91%) said that they did not teach any entrepreneurship courses of any kind (Figure 27). Those who did teach entrepreneurship courses (9%) specified that the courses also addressed other skills, such as programming, macroeconomics, and digital entrepreneurship (Figure 28).
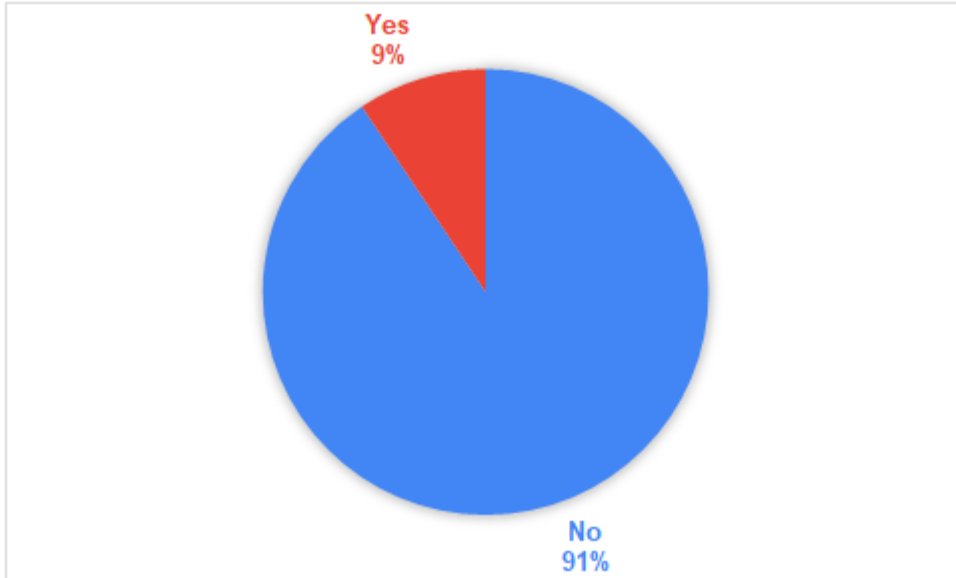
Figure 27 – Teaching in entrepreneurship courses
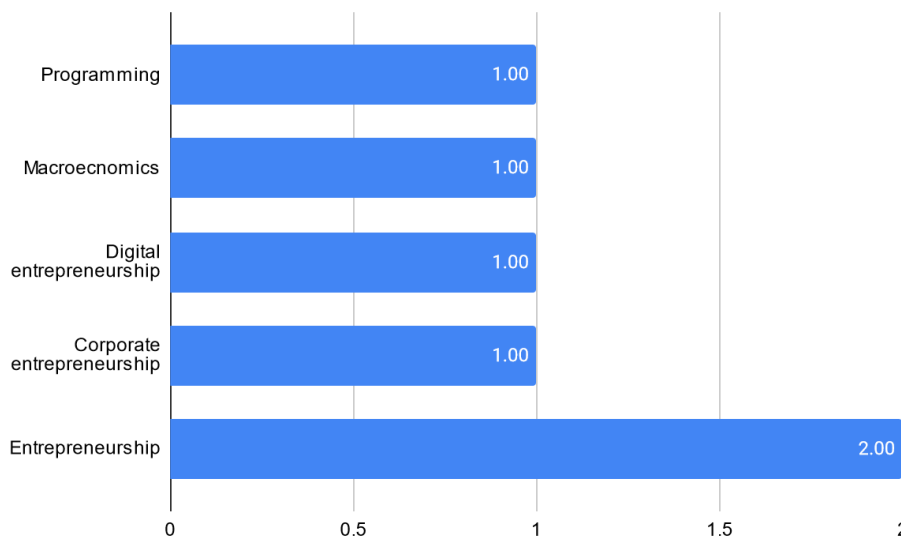
Figure 28 – Entrepreneurship course topics

When asked about the main objectives of the entrepreneurship courses they teach, most of the respondents stated that they teach theory (71.43%), which corresponds to five faculty members. Encouraging students to set up and run their own businesses was another of the objectives considered important by almost 30% of the faculty who responded to the survey (Figure 29).
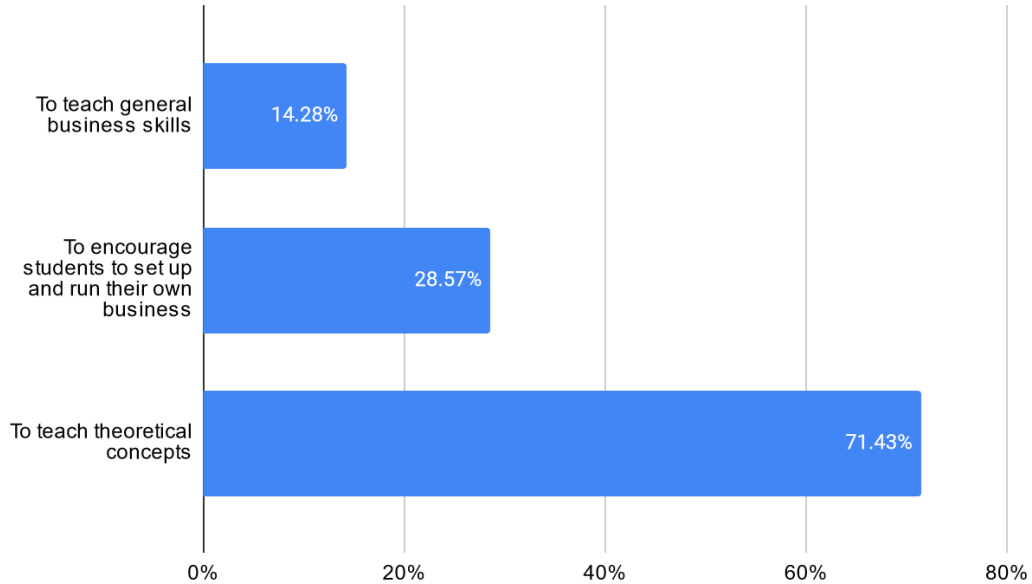
Figure 29 – Main aim of entrepreneurship courses

Forty-one percent of the respondents declared that they would be interested in teaching this type of course if they were given the opportunity, and that if they had not done so before it was mainly because they did not have the right competences or enough time. A minority pointed to the fact that the university already had a specific entrepreneurship programme, students were not interested, or the respondents did not consider entrepreneurship an appropriate part of doctoral studies (Figure 30).
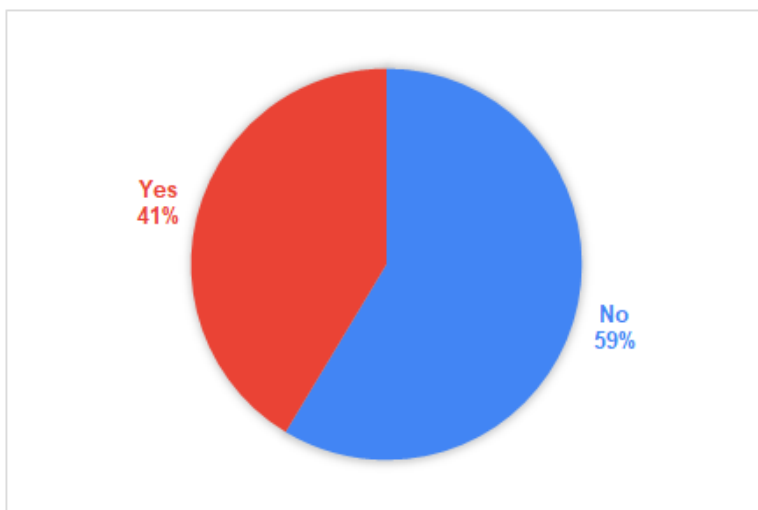
Figure 30 – Faculty interested in teaching entrepreneurship courses to PhD students

The faculty who responded that they were not interested in teaching entrepreneurship courses (59% of the sample) were asked why. The majority cited a lack of skills for teaching entrepreneurship. Other reasons were lack of time and the consideration that such courses were not important for training in PhD programmes (Figure 31).
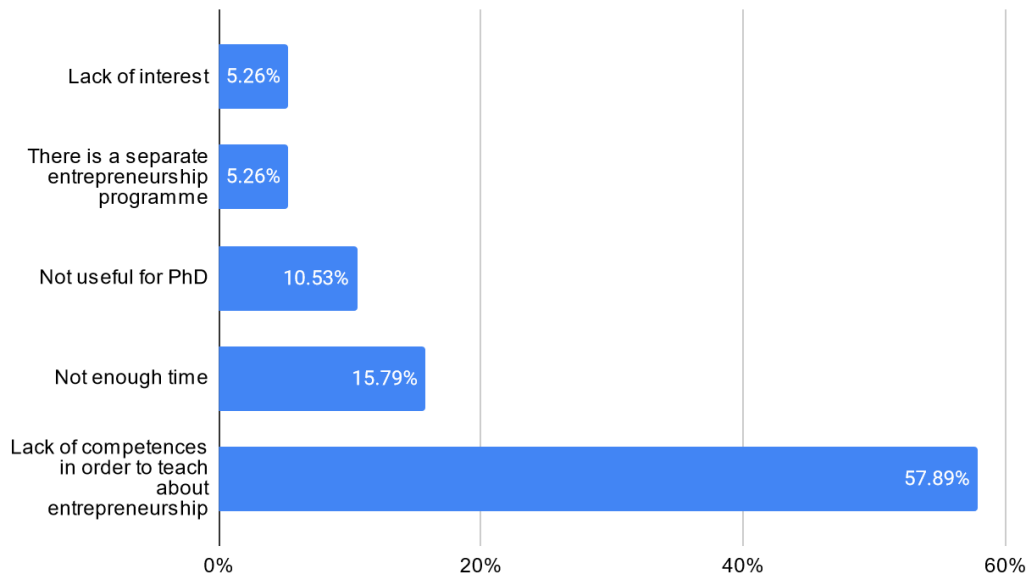
Figure 31 – Teachers' reasons for not teaching entrepreneurship courses

When asked about their universities' initiatives in relation to entrepreneurship, most of the faculty members mentioned seminars and webinars, followed by workshops and incubators. A lower percentage mentioned initiative such as entrepreneurship associations (Figure 32).
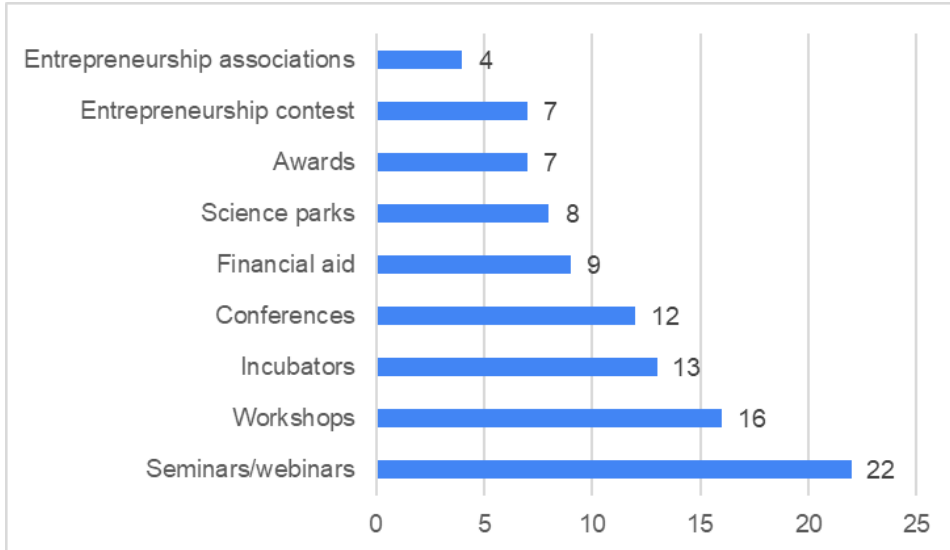
Figure 32 – Entrepreneurship initiatives offered by universities for PhD students

However, despite claiming a lack of skills as a problem, more than half of the teachers (56%) indicated that they were or had been involved in technology-based companies or had transferred research results to companies at some point (Figure 33).
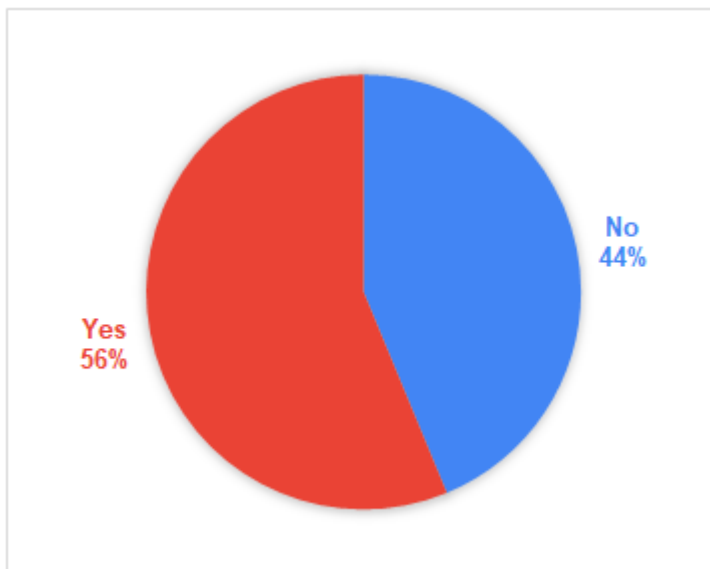
Figure 33 – Participation in a technology-based company or university-company partnerships

They also indicated that entrepreneurship courses tended to involve their own departments and/or areas of knowledge and tended to be university-specific programmes, specific research projects, or technology-based companies (Figure 34 and Table 20).
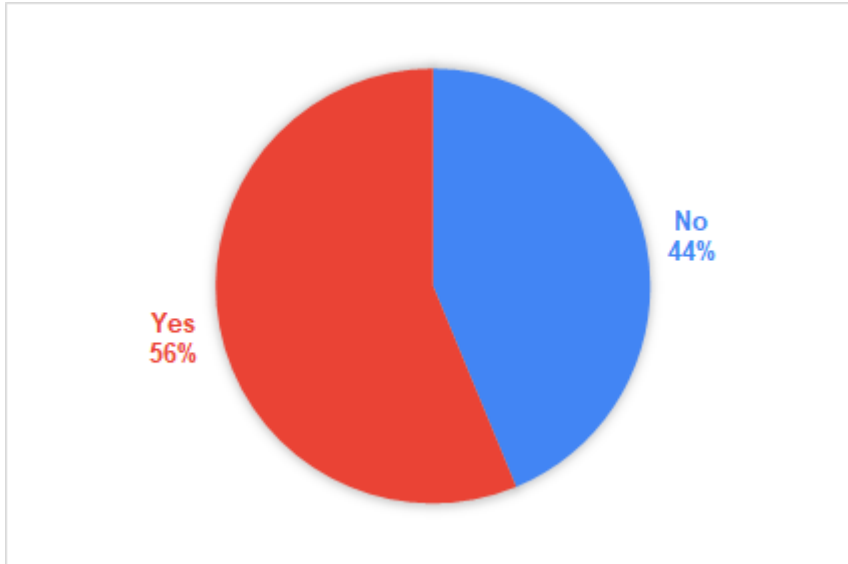
Figure 34 – Interdepartmental coordination regarding entrepreneurial training

Kind of collaboration	Frequency
Specific programme at the university	6
Specific projects	4
Spin-offs/start-ups	3

Table 20 – Kinds of interdepartmental collaboration

When the faculty members were asked to describe the main barriers, they had encountered that prevented them from providing students with entrepreneurship opportunities, they mostly pointed to lack of resources (n=6) and student preferences (n=6). Table 21 concerns an open-ended question whose answers have been standardised and grouped according to content.

Barriers	Frequency
Lack of resources	6
Student preferences	6
Formal barriers (regulations, requirements, etc.)	4
Lack of specific programme	4
There are no barriers	3
Enterprises are not prepared to accommodate PhDs	2
Time, but this is also a matter of priorities	1

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Intensive nature of PhD	1
Different expertise	1

Table 21 – Significant barriers, obstacles, and challenges in offering entrepreneurship training to PhD students

The experiences in entrepreneurship education that respondents found most interesting to offer to PhD students were scientific training programmes and direct contact with entrepreneurs. They pointed to the existence of these programmes as fundamental to offer opportunities to students who want to create a company. The faculty also considered it very valuable to have direct contact with other entrepreneurs and offer opportunities that are truly realistic (Table 22).

Experiences	Frequency
Scientific training programmes	7
Direct contact with entrepreneurs	6
Awareness of realistic opportunities	5
Experience working in a business environment	3
Funding opportunities	2
Legal and administrative support	2
Financial issues and business plan	2
English competence	1

Table 22 – Most relevant training to offer PhD students interested in entrepreneurship

4.2.3 ENTREPRENEURSHIP COURSES

Finally, they were asked the same question as the students about the skills that should be included in entrepreneurship courses. Faculty members agreed with the students about the more strategic skills (planning, project development, etc.), but they differed substantially from them in the fact that they considered it fundamental to encourage students to be entrepreneurial, while the students did not consider encouragement a fundamental part of course content. Table 23 shows the faculty responses, 1 meaning they 'strongly disagree' with the sentence and 5, that they 'strongly agree'.

Entrepreneurship abilities	1	2	3	4	5
Theoretical concepts behind setting up and running a business	2	8	11	5	3
Encouragement for students to set up and run their own business	1	5	4	12	8
Strategies for managing and ensuring the growth of established companies	5	2	8	11	4
Training in marketing and finance	3	3	12	7	5
Conditions that favour business creation	4	4	10	7	5
How to move/make the transition from traditional employment to self-employment	4	2	10	10	4
Presentation and review of real cases of entrepreneurship	1	4	8	6	11
Business plan development	2	1	5	12	10
Training in innovation and creativity	3	1	5	11	10
Understanding how different kinds of business work	4	2	8	15	1
The competences and skills that make a successful entrepreneur	3	2	10	10	5
How to obtain resources to create my own business	3	2	8	12	5
Problem-solving skills	2	2	6	13	7

Dealing with failure	2	4	6	7	11
How to work under pressure	2	7	7	9	5
How to bring my project/ideas to the market	3	1	3	15	8

Table 23 – Expected content of entrepreneurship courses

4.3. ADDITIONAL ANALYSES
4.3.1 ENTREPRENEURSHIP SKILLS

In this section, the perceptions of doctoral students in relation to the importance of their business skills. The skills are aggregated into three large groups (question 28) and compared to their perception of those same skills broken down disaggregated into 20 specific skills (question 29) as shown in Table 24. The equivalence is established based on the definitions given in Table 15.

Specific Skills (Q-29)	Label	Aggregate Skills (Q-28)
[Project developing]	PROJ_DEV	INSTRU
[Team-working]	TEAMW	INTERP
[Problem solving]	PROB_SOL	INSTRU
[Budgeting]	BUDG	INSTRU
[IT competences]	IT_COMP	CONCEP
[Web design]	WEB_DES	CONCEP
[Decision making]	DEC_MAK	INSTRU
[Data management]	DT_MANG	INSTRU
[Creativity]	CREA	CONCEP

[Data analysis]	DT_ANAL	INSTRU
[Search engine optimization]	SEO	CONCEP
[Finances and accounting]	FIN_ACC	INSTRU
[Advertising and promotion]	ADVER	INSTRU
[Content creation]	CONT_CREA	CONCEP
[Leadership]	LEAD	INTERP
[Strategic planning]	STR_PLAN	INSTRU
[Negotiation]	NEGO	INTERP
[Risk managing]	RISK_MANG	INSTRU
[Legal structures]	LEGAL	INTERP
[Market research]	MKT_RES	INSTRU

Table 24 - Equivalence between aggregate and specific entrepreneurship skills

Firstly, Figure 35 shows the distributions of the importance perceived by doctoral students of each of the 20 specific skills detailed in the question 29 of the survey. Boxplot type graphs are used to represent these distributions.

As can be observed, in two instrumental skills (decision making and problem solving), an interpersonal skill (leadership) and another from the conceptual side (creativity), half of those surveyed viewed them as the most important (rated 5). On the other hand, the rest of the conceptual skills, linked to innovation and digital matters, are viewed by half of those surveyed as skills of middling importance (rated 3). The remainder of the skills are graded by half of those surveyed as being significant (rated 4).

With regard to the average significance, digital skills are rated as the least important, with web design being the least significant entrepreneurial skill in the view of those surveyed (average rating below 3).
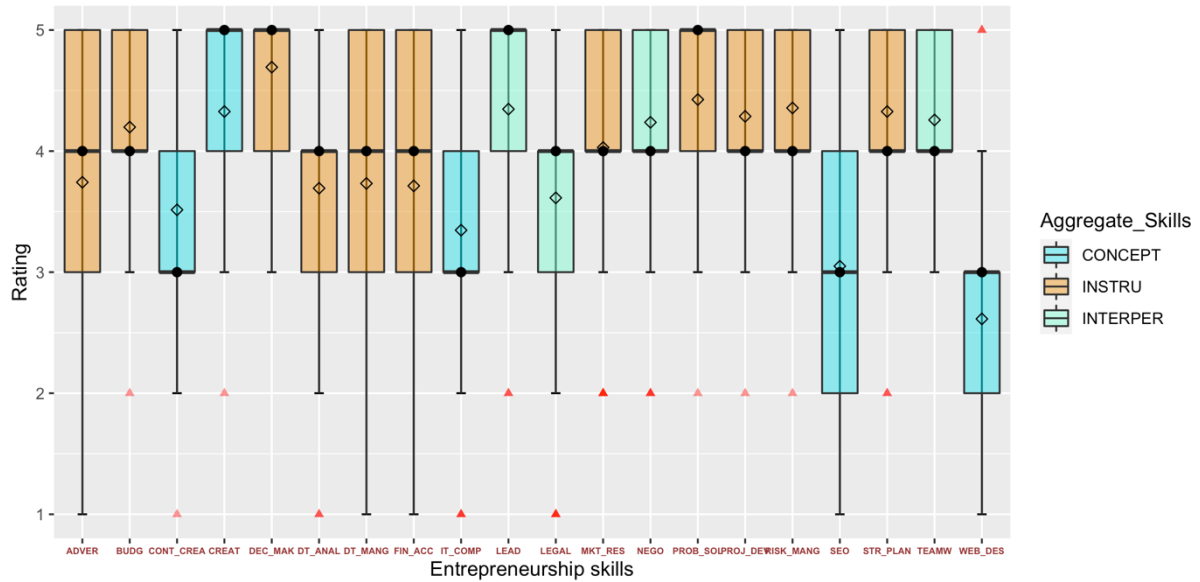
Figure 35 - Entrepreneurship skills rating distributions (Q-29)

Finally, in relation to the variability of the data, it is observed that there are 11 skills (7 of these being instrumental and 3 interpersonal) in which 50% of the responses are rated with significance levels between four and five, while another 3 instrumental skills are noted between 3 and 5. A further 4 skills (2 interpersonal) are grouped in the ratio of 3 and 4 and one more (web design) in the of 2 and 3. Finally, one digital skill (SEO) groups half the responses in the ration of 2 to 4.

In Figure 36, the distributions of the appraisals made by the doctorate students with regard to the significance of entrepreneurial skills in education are displayed, though these are broken down into the gender of those surveyed on this occasion.
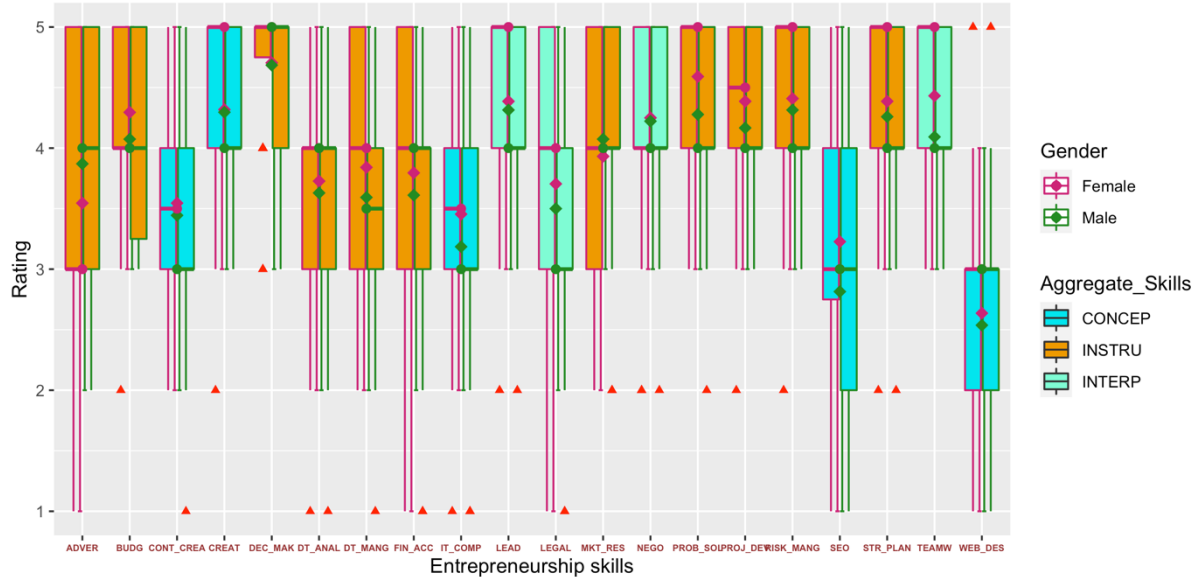
Figure 36 - Entrepreneurship skills rating distributions, by gender (Q-29)

The figure shows that in some skills there are differences between the opinion expressed by females compared to that expressed by males. Below are some of these differences:

- There are 7 (4 instrumental and 2 interpersonal) skills in which 50% of the females surveyed believe that they are the most significant skills.
- Differences of opinion are noted in the skills relating to budgeting, decision making, data management, finances and accounting, marketing research and SEO.
- In a general sense, females tend to consider these skills as more significant than males do, to a lesser or greater extent, with the exception of those related to advertising.

4.3.1.1 CONSISTENCY OF RESPONDENTS' OPINIONS

Below is a selection of graphs displaying the differences between the opinion expressed by each one of the valid surveys performed (N=97) in both questions (questions 28 and 29). Solely those responses from students who have replied to all the issues in both questions and who have not graded with the same rating all skills in question 29 have been taken into consideration.

In Figure 37, these differences are displayed as grouped into the categories of question 28. The red points correspond to the specific skills of question 28, while the blue dots show the average of the categories in Table 24.

Instrumental skills

Interpersonal skills
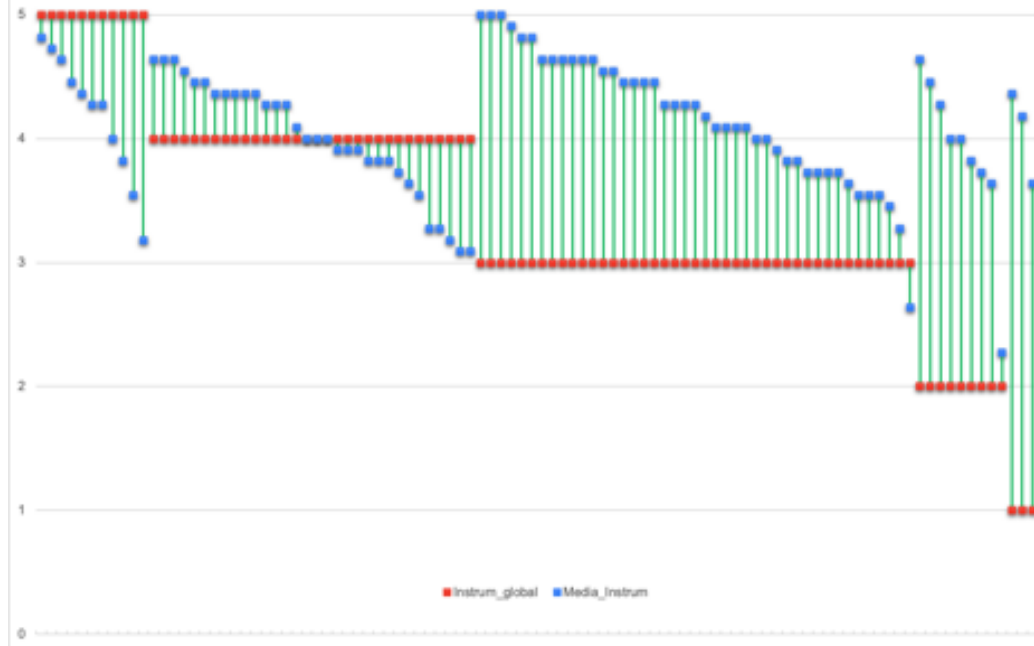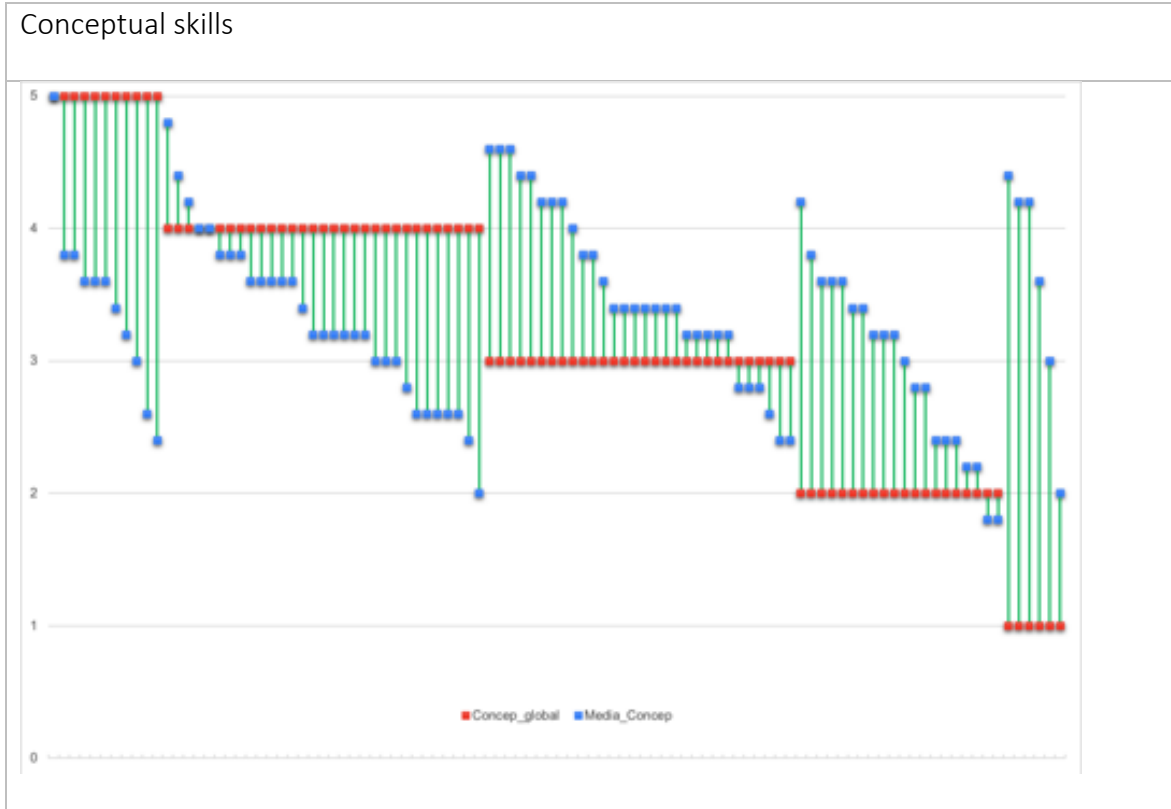
Figure 37 - Charts of business skills evaluation differences

From the observation of these differences, the following issues are worthy of special mention:

- A scant number of individuals who adjust their aggregate and disaggregate opinion: blue dots on the discreet ranges (lines of red dots) of the aggregate skill. Solely a few in the area of the instrumental skills and some more at level 4 significance in the interpersonal section.
- Generally, with the exception of a few individuals in the interpersonal skills (3 persons surveyed) and conceptual skills (just one), who adjust their opinions, those surveyed overestimate their opinion when they consider to the maximum value of the significance in the aggregate skills. Similarly, the rations for levels 1 and 3 are underestimated, with wide-ranging differences of opinion on view.
- For all of the skills (with scant exceptions) the levels of significance 3, 2 and 1 are underestimated.
- Amongst the skills linked to innovation and digital aspects, when these are deemed significant (rated 4) or highly significant (rated 5) the aggregate estimation, the opinion shown in question 28, is highly overestimated with regard to the average values displayed in the responses to question 28.

Therefore, it can be concluded that the skills cannot be comprehended on a disaggregate level or are not identified with their corresponding aggregates. In general terms, the skills linked to digital issues, those entailing the European framework entitled DigComp: Digital Competences Framework for citizens [34] are rated the lowest by the doctorate students surveyed.

Thus, it seems necessary to offer increased training in entrepreneurial culture, above all when linked to new concepts (digital issues). The classical concepts (leadership, negotiation, finances and accountancy, planning, etc.) attain a better understanding than more current ones (content creation, web, SEO, etc.).

4.3.2 ENTREPRENEURSHIP COURSES MATERIAL

For the analysis on the approach that entrepreneurship training courses must follow (question 31 for students and 16 for teachers), the answers to these questions were coded as follows:

Code	Description
THEOR	Theoretical concepts about setting-up and running a business
ENCOU	Encourage students to set-up and run their own business
MANAG	Strategies on how to manage and ensure the growth of established companies
MARKET	Marketing and finances training
BUS_CREA	Conditions that favour business creation
MOVE_ENTRE	How to move from/make the transition from traditional employment to self-employment
REAL_CAS	Expose and review real cases of entrepreneurship
BUS_PLAN	How to develop a business plan
INNO_CREAT	Training students' innovation and creativity
KIND_BUS	Understanding how different kind of business work
SUCCESS	The competences and skills that make a successful entrepreneur

RESOUR	How to obtain resources for creating students' own business
PROB_SOLV	Develop the problem-solving skills of the students
OVER_FAIL	Teach the students how to overcome failure
WORK_U_PRESS	Teach the students how to work under pressure
IDEA2MARKET	How to bring students' project/ideas to the market

Table 25 - Codes for courses' content analysis

For each response, the mean value of the ratings (1-5) was calculated, eliminating observations that responded to all categories with the same score or that did so incompletely. As can be seen, the students' appraisal for all the categories contains a higher average than that of the teachers, except in the ENCOU category, meaning it is clear that motivation for entrepreneurship is a more significant factor for teachers than for students.

The other categories where a more widespread discrepancy is observed are MANAG, KIND_BUS and above all, RESOUR, the latter being the most outstanding with almost a point difference, so it is clear that obtaining resources is one of the main concerns for students when training for entrepreneurship, while this is markedly less noted for teachers.

COD	Students	Faculty	Difference (Students-Faculty)
THEOR	3,23	2,87	0,36
ENCOU	3,32	3,7	-0,38
MANAG	3,89	3,23	0,66
MARKET	3,78	3,27	0,52
BUS_CREA	3,68	3,12	0,52
MOVE_ENTRE	3,84	3,27	0,57
REAL_CAS	4,06	3,73	0,32
BUS_PLAN	4,18	3,9	0,28

INNO_CREAT	3,81	3,8	0,01
KIND_BUS	3,86	3,23	0,62
SUCCESS	3,93	3,4	0,53
RESOUR	4,25	3,47	0,78
PROB_SOLV	3,81	3,7	0,11
OVER_FAIL	3,95	3,7	0,25
WORK_U_PRESS	3,69	3,27	0,43
IDEA2MARKET	4,31	3,8	0,51

Table 26 - Students and faculty differences in courses' content

These same differences can be seen in both Figure 38 and Figure 39, which show more clearly the discrepancy between students and teachers, despite the fact that there are certain categories in which they agree very much, such as INNO_CREAT or PROB_SOLV. In this regard, there is a discrepancy between these answers and those observed in students' responses to question 29, since, although they valued the skills related to problem solving in a highly positive manner (PROB_SOLV), they did not think thus regarding those related to innovation and creativity (INNO_CREAT), meaning that, once again, it could be viewed that the specific terms are not properly understood/interpreted, suggesting that further training in entrepreneurial culture is necessary. Moreover, IDEA2MARKET and BUS_PLAN are rated quite high by both PhD students and Faculty members.
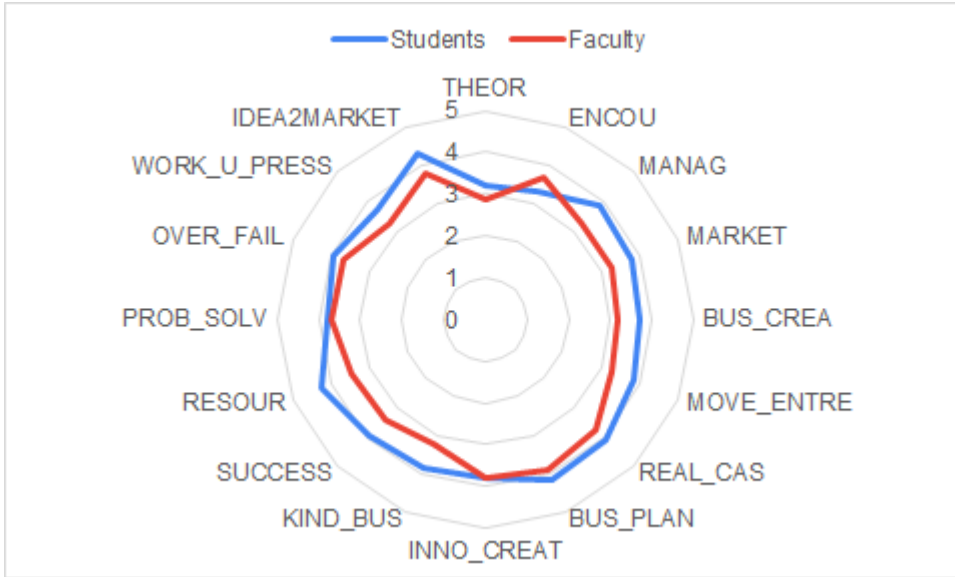
Figure 38 - Students and faculty differences in courses' content
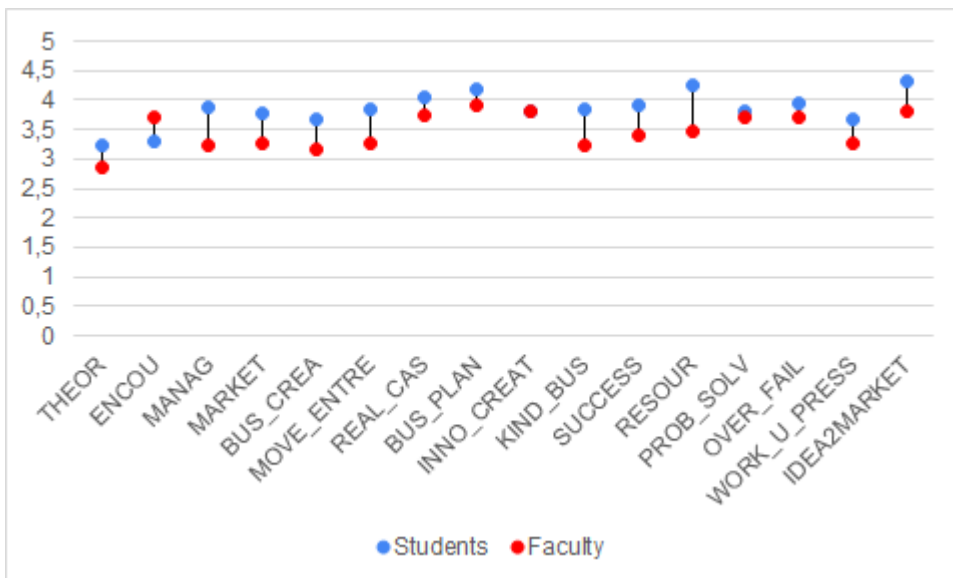

Figure 39 - Students and faculty differences in courses' content (alternative visualization)

5. INTERVIEWS' RESULTS

5.1 STUDENTS' INTERVIEWS

Despite the fact that the majority of the students, 64%, had not previously received any courses on entrepreneurship, still 70% responded that they are willing to enrol on entrepreneurship courses. It is clearly proven that the significance of entrepreneurship may not only be beneficial to individuals exercising entrepreneurial activities but also with regard to for regional competitiveness (P Ex Q14 3).

Furthermore, an overwhelming majority indicated that the entrepreneurship courses at their institutions were not multidisciplinary. An important implication from this result could be that there is less collaboration among departments and therefore the quality of the courses offered may be influenced. This influence may especially affect specific lessons-learned transfer from recent cases of successes and failures as well as further knowledge transfer of new innovations that may be studied in entrepreneurship courses/projects on how to best market these innovations (P Net Q21 2) (P Net Q21 3). When asked regarding what is needed to become an entrepreneur, most interviewees considered material resources and interpersonal skills to be essential (P Ent Q23 5) along with instrumental skills to a lesser extent.

Alongside this, 85% of the respondents indicated that they have not received any support from their universities. However, the support (i.e., either tangible or intangible) is clearly demonstrated by all participants in the interviews to be of the utmost importance (P Ep Insight 1) (P Ep Insight 2) (P Ep Insight 3) (P Ep Insight 5). Nevertheless, (P Ep Insight 3) tangible support from family relatives can have a positive bearing.

Finally, nearly all respondents indicated that they have previously used e-learning platforms such as Coursera, ANSYS and MOOC (P Ep Insight 1) (P Ep Insight 2) (P Ep Insight 3) (P Ep Insight 5). However, on the topic of multidevice accessibility, a respondent noted that if it was only for listening it would be easy to learn on mobile phones, yet when it came to note taking, it was indicated that they would rather use a laptop (P Ep Insight 3).

All in all, the need for accessible and hybrid flexible entrepreneurship courses is observed to be of extreme importance for all participants. In the following table the main themes drawn based on the participants needs and requirements are presented along with their implications.

Main themes	Corresponding main node code	Implications
Interest in learning entrepreneurship	Ex	Although there is a lack of previous experience in entrepreneurship courses, it is stated among participants that it is beneficial both for the individual as well as economic growth to turn innovations and ideas from dreams to reality.
Recognition of importance for collaboration and interaction	Net	An obvious need for the collaboration among university departments as well as university-industry collaboration. A focus on practical cases for business setup and real-world cases are also recognized to be of importance.
Support (tangible and intangible)	Ent	The support from both universities as well as the PhD student's environment is acknowledged to be vital. Yet, to the extent of participants' knowledge, they are not aware of any support activities that the universities offer to their entrepreneurship journey.
Hybrid flexibility	Ep	Nearly all participants indicated the use of e-learning platforms and would continue to do so in the future. However, the existing methodologies are lacking either quality or are not comprehensive or optimal. Therefore, new courses/methodologies based on e-learning must overcome quality issues and be comprehensive.

Table 27 - Thematic analysis of students' interviews

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5.2 FACULTY INTERVIEWS

Even though 91% of the respondents to the faculty survey stated that they did not teach any entrepreneurship courses, 9% specified that they did teach courses that included programming, macroeconomics, and entrepreneurship was part of these courses. In the interviews, however, it is acknowledged that entrepreneurship must be emphasised as the main subject (F Ex Q6 2). Aside from the foregoing, a noticeable interest in gaining experience to teach entrepreneurship from all participants is displayed (F Ex Q6 1) (F Ex Q6 2) (F Ex Q6 3).

Additionally, a considerably high percentage of respondents stated that the entrepreneurship courses at their universities were not multidisciplinary and included only a single department. An important implication from this result could be that there is less collaboration among departments and therefore the quality of the courses offered may be influenced. This influence may especially affect specific lessons-learned transfer from recent cases of successes and failures as well as further knowledge transfer of new innovations that may be studied in entrepreneurship courses/projects on how to best market these innovations (F Net Q13 3).

Moreover, nearly half of the respondents indicated that they have not been involved in a technology-based company or a university-company partnership. There seems to be a shortfall, at least amongst the respondents, in creation of a spin-off or the transfer of knowledge from lab-based innovations to the market, highlighting the lack of experience of entrepreneurship. Collaboratively working in tandem the industry is the only way to move forward, due to the accumulation of data regarding case studies and lessons-learned (F Net Q15 3).

Finally, an overwhelming consensus about the importance of teaching entrepreneurship via e-learning methods is achieved (F Ep Insight 1) (F Ep Insight 3) (F Ep Insight 3). Nevertheless, the success of e-learning may still depend on the quality of its features such as content, mentors, etc. (F Ep Insight 2).

In conclusion, despite lack of experience in teaching entrepreneurship, low collaboration among universities departments and industry-university interaction, an urgent need for change is observed amongst all participants. In the following table the main themes drawn based on the participants needs and requirements are presented along with their implications.

Main themes	Corresponding main node code	Implications
Interest in teaching entrepreneurship	Ex	Despite the lack of previous experience of participants in teaching entrepreneurship, an overarching interest is expressed in imparting the entrepreneurship courses. Suggesting an obvious demand for teaching entrepreneurship courses.
Recognition of importance for collaboration and interaction	Net	The need for interactive courses where students and instructors co-construct the directions and objectives of courses is recognised by all participants. In addition, the collaboration with industry actors as well as other inter-university and inter-departments is highly acknowledged. Therefore, the dominant influence of interdisciplinarity is clearly manifested.
Support (tangible and intangible)	Ent	A discernible effect of support from the social environment both tangible (resources, setting up the business etc.) and intangible (e.g., encouragement) is distinctly visible among all interview participants. An important lesson to be drawn is that the absence of tangible and intangible support from the social environment may affect the entrepreneurial journey of PhD students.

| Hybrid flexibility | Ep | The importance of e-learning platforms is widely acknowledged among all participants, especially in times of an active pandemic (COVID-19). Apart from that, its flexibility not only in terms of time plus also multidevice accessibility make it appealing. However, its success depends on the quality of its features e.g., teaching materials, mentors etc. |

Table 28 - Thematic analysis of faculty interviews

6.   CONCLUSIONS

The prodPhD project addresses the introduction of entrepreneurship training in doctoral programmes in different disciplines, designing innovative teaching methodologies and creating a platform for teaching entrepreneurship. The necessary starting point was to discover the state of the art and the needs and perspectives of the agents involved (students and teachers). This is the objective of this work package.

6.1.   STATE-OF-THE-ART ANALYSIS:

Regulations

Recognition of entrepreneurship as a driver of economic growth and job creation is reflected in EU regulations with the 2012 Action Plan, which identifies entrepreneurship as an important driver of social cohesion and sustainability. Subsequent regulations underscore the importance of entrepreneurship education for greater competitiveness and the role of universities.

Entrepreneurship training

The literature on entrepreneurship and university-level entrepreneurship education is growing considerably both in the United States and in Europe.

The scientific literature reflects interest in finding an adequate entrepreneurship education, which requires knowledge of the aims and objectives of entrepreneurship education interventions, the alternative forms entrepreneurship education interventions can take, and the need to train trainers.

There are several approaches to curriculum design. Most emphasize the importance of teaching students how to discover, evaluate, and seize opportunities.

Universities contribute to the development of entrepreneurship through education and the fostering of entrepreneurial attitudes in young people, by developing teaching and learning practices, involving stakeholders inside and outside the university, and creating an enabling institutional environment.

Students in entrepreneurship programmes increase their competences and strengthen their intention to become self-employed, with a significant positive impact on the likelihood of their creating businesses in the future.

6.2. NEEDS AND REQUIREMENTS ANALYSIS

The sample consisted of 111 students who responded to the online survey. Their gender distribution was relatively even. Most of them were between 26 and 30 years old and were in their first year of doctoral studies, mostly in applied sciences. Their geographical origins varied, although most of them were from Poland and more specifically the Gdańsk University of Technology.

Most of them expressed an intention to continue in academics after finishing their PhD studies or to seek employment in the private sector.

Financial opportunities for entrepreneurs and the circumstance of their family's owning a business already were the main factors reported as reasons for starting a business. The most cited reason for entrepreneurship was the possibility of having a flexible job and earning money, although in students' opinion entrepreneurship involves risks and entrepreneurs have to work very hard to get results.

A high percentage of the students surveyed (64%) answered that they had not received any training. However, most of them agreed to receive training and would be willing to spend two hours a week on it.

More than half of the respondents (52%) did not know if there were any training courses in entrepreneurship at their university or if there were orientation units, and a higher percentage (95%) did not know about the existence of incentives for entrepreneurship. Only 6% participated in entrepreneurship incentives.

Students pronounced instrumental skills, especially in relation to decision making, problem solving, leadership, and strategic planning, very valuable for entrepreneurship. They valued training in these skills very positively also; in their opinion, training should especially emphasize

planning, resource procurement and management, product presentation and sales strategies, and examples of business success.

The additional analysis of the responses to the students and faculty members' surveys unearths the need to increase the syllabus offered in entrepreneurial culture linked to new digital concepts (content creation, web, SEO, etc.). In DigComp framework, one of the 5 facets established is that of 'digital content creation' which is taught within the framework of four descriptors or title (Developing, Integrating and re-elaborating, Copyright and Licences and Programming) which must be taken into account for the design of doctors' syllabuses.

Alongside the foregoing, the facets of Information and Data LIteracy, Communication and Collaboration and Digital Safety, using the DigComp framework [34] a fifth facet entitled 'Problem Solving' comes into play that has been appraised by the survey's respondents, yet it is not known whether they have included in their responses the digital viewpoint proposed by DigComp, and which is broken down into four descriptors : Technical Problems, Identifying needs and responses, Creativity using digital technologies and Identifying digital skills gaps.

In 2016, the European Commission launched the European Entrepreneurship Competence (EntreComp) framework "designed to help understand what is meant by entrepreneurship as a key skill for lifelong learning. It is intended to support and inspire actions to improve the entrepreneurial capacity of European citizens and organisations" [35]. Within this framework three skills areas are defined: 'Ideas and opportunities', 'Resources' and 'Into action'. In the area entitled 'Ideas and resources' 5 skills are developed: Spotting opportunities; Vision; Valuing ideas; Ethical and sustainable thinking and Creativity. With regard to creativity, in this survey they were asked about this and it turned out to be the skill, alongside innovation, that was the most highly rated. In EntreComp, creativity is developed using 5 threads: Be curious and open, Develop ideas, Define problems, Design value and Be innovative. These 5 axes must be borne in mind in the training of the doctorate students. The three skills areas encased in EntreComp, with their levels of proficiency and progression can be queried (alongside the rest of the entrepreneurial skills) in the appendix of the original publication [36]. Undoubtedly, EntreCopm, and certain other ideas on how to implement it [37], must act as a referential framework for devising training syllabuses for doctors.

Insomuch as the conclusions that may be extracted from the analysis of students and professors' appraisal being able to provide an approach that should be followed in the entrepreneurial training courses, it is particularly noteworthy that significant differences and similitudes have been observed that must be borne in mind. Firstly, the differences would be linked to the highest rating that the students given to all aspects relating to their own training, with the exception of the option to 'encourage students to set-up and run their own business'. In this case, it seems

evident that, from the faculty's standpoint, training geared towards encouraging entrepreneurship and corporate management is of greater importance than it is to the students.

Other educational aspects in which significant differences were noted between the students and faculty members on 'how to obtain resources for creating students' own businesses', with the training related to 'Strategies on how to manage and ensure the growth of established companies', or 'Understanding how different kind of business work'. It is particularly noteworthy that the training on 'How to obtain resources for creating students' own businesses' obtains such a different rating between both stakeholders, clearly stressing that knowledge on the obtaining of resources is fundamental for the students when studying, whilst from the viewpoint of the faculty members, the role of this knowledge in the syllabus is of lesser significance.

With regard to the prioritising of syllabus needs for both groups, some of the aspects that the students consider priority are similar to the faculty members' beliefs; an example of the foregoing is if we bear in mind the first five categories, four of them are shared both by students as well as faculty members, these being namely: 'how to bring students' project/ideas to the market', 'how to develop a business plan', 'outline and review real cases of entrepreneurship' and 'teach the students how to overcome failure', although the order varies for each one of these. For the students, the knowledge areas they deem priority in their educational training are on 'how to bring students' project/ideas to the market', whilst for the faculty members, the teaching of this subject falls in second place., with the most important being 'how to develop a business plan'. A further striking difference insofar as the prioritisation is related to educational training is on 'How to obtain resources for creating students' own business', which stands in second place in the needs expressed by the students, while the faculty members do not consider this even in their top five priorities. On the other hand, the teaching staff consider teaching on 'Training students' innovation and creativity' as placed third in terms of their prioritisation, while the students do not consider this essential, as it is not listed in the top five of their priorities.

The analysis of the interviews complements and matches a certain amount of the survey's results. In terms of courses' methodology, almost all students agree that they should be more interactive and afford them the opportunity to collaborate with people from other disciplines and universities. They also appreciate the possibility to work with mobile phones and other devices to improve the accessibility of the contents and develop new learning methodologies. The interviewed faculty members also share this interest in collaborative and multidevice platforms and environments as they might attract more students and facilitate innovative teaching methods.

Regarding the content of the courses, the students' responses are in line with the results of the survey. In particular, they believe that the most important abilities to learn are how to find

material resources to convert your idea into a business, and interpersonal skills, such as communications skills or leadership. Some of them also highlight marketing or finances as items that must be taught, yet they also think that they are tasks that other people (employees or partners) can perform. Innovation skills such as web design, content creation or data analysis are not listed amongst the students' priorities. These results match the responses they gave in the survey, as the most highly rated abilities were interpersonal, followed by instrumental and then, conceptual ones. Also, this seems to bolster the analysis of the Question 29 of the survey, where the students considered courses should mainly focus on how to attract resources and how to bring your idea to the market.

In general, it seems that the students are more focused on the idea and how to make a business from these tools rather than on the specific steps they need to achieve their goals (knowledge about marketing, management, business creation, etc.). In both interviews and surveys, it also appears that digital competences are not considered important to the students, which, as stated above, might be due to a lack of knowledge on the concepts or due to the fact that they acquire through their curriculum. Overall, courses on entrepreneurship should include collaborative methodologies and students from different disciplines and universities, meaning they can use others' knowledge and have different perspectives. In terms of content, they must include modules on how to find resources and how to communicate effectively.

7. REFERENCES

[1] R. E. Freeman, and D.L. Reed. "Stockholders and stakeholders: A new perspective on corporate governance", *California Management Review*, vol. 25, no. 3, pp. 88-106, 1983

[2] European Commission. Entrepreneurship 2020 Action Plan: Reigniting the entrepreneurial spirit in Europe. COM, 2012

[3] Council of the European Union. Council conclusions on entrepreneurship in education and training. Adopted conclusions of the Education, Youth, Culture and Sport Council meeting, 2014

[4] European Parliament. Promoting youth entrepreneurship through education and training. Text adopted P8_TA, 2015

[5] European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a new skills agenda for Europe. COM, 2016

[6] European Commission. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on a renewed EU agenda for higher education. COM, 2017

 [7] U. Hytti and C. O'Gorman, "What is 'enterprise education'? An analysis of the objectives and methods of enterprise education programmes in four European countries", *Education+ training*, vol. 46, no. 1, 2004

[8] A. Gibb, "In pursuit of a new 'enterprise' and 'entrepreneurship' paradigm for learning: creative destruction, new values, new ways of doing things and new combinations of knowledge" *International Journal of Management Reviews*, vol.4, no.3, pp.233-269, 2002

[9] M. Nicotra, M. M. Del Giudice and M. Romano, "Fulfilling University third mission: towards an ecosystemic strategy of entrepreneurship education", *Studies in Higher Education*, vol.1, no. 11, 2021

[10] J. Cope, "Toward a dynamic learning perspective of entrepreneurship", *Entrepreneurship Theory and Practice*, vol. 29, no. 4, pp. 373-3, 2005

[11] D. Bienkowska and M. Klofsten, "Creating entrepreneurial networks: academic entrepreneurship, mobility and collaboration during PhD education". *Higher Education*, vol. 64, no. 2, pp 207-222, 2012

[12] A. Muscio and L. Ramaciotti, How does academia influence Ph. D. entrepreneurship? New insights on the entrepreneurial university. *Technovation*, no.82, pp. 6-24.2019

[13] F. T. Rothaermel, S. D. Agung and L. Jiang," University entrepreneurship: a taxonomy of the literature", *Industrial and Corporate Change*, vol. 16, no. 4, pp. 691-791, 2007

[14] J. P. Béchard, and D. Grégoire, " Entrepreneurship education research revisited: The case of higher education", *Academy of Management Learning & Education*, vol. 4, no. 1, pp. 22-43, 2005

[15] S. Karimi, H.J., Biemans, T. Lans, M. Chizari and M. Mulder, The impact of entrepreneurship education: A study of Iranian students' entrepreneurial intentions and opportunity identification, *Journal of Small Business Management*, vol. 54, no.1, pp. 87-209, 2016.

[16] C. Hartshorn and P. D. Hannon, "Paradoxes in entrepreneurship education: chalk and talk or chalk and cheese? A case approach", *Education+ training*, vol. 47, no. 8-9, 616-627, 2005

[17] T. Davey, P. Hannon and A. Penaluna, "Entrepreneurship education and the role of universities in entrepreneurship: Introduction to the special issue", 2016

[18] W. N. Almobaireek, and T.S. Manolova, Who wants to be an entrepreneur? Entrepreneurial intentions among Saudi university students. *African Journal of Business Management*, vol. 6, no. 11, pp. 4029-4040, 2012.

[19] Z. Arasti, M.K. Falavarjani, and N. Imanipour, A Study of T*eaching Methods in Entrepreneurship Education for Graduate Students.* Higher education studies, vol 2, no. 1, pp. 2-10, 2012

[20] Z. Peng, G. Lu, and H. Kang, Entrepreneurial intentions and its influencing factors: A survey of the university students in Xi'an China. *Creative education*, vol 3, no. 8, pp. 95, 2013.

[21] S. Zappe, K. Hochstedt, E. Kisenwether, and A. Shartrand, Teaching to innovate: Beliefs and perceptions of instructors who teach entrepreneurship to engineering students. *Intern*ational *Journal of Engineering Education,* vol 29, no,1, pp. 45-62, 2013

[22] I. Lindh, and S. Thorgren, Entrepreneurship education: the role of local business. *Entrepreneurship & Regional Development*, vol. 28, no.5-6, pp. 313-336, 2016

[23] E. A. Rasmussen, and R. Sørheim, "Action-based entrepreneurship education", *Technovation*, vol. 26, n.2, pp.185-194, 2006

[24] R. M. Groves, F.J. Fowler Jr, M.P. Couper, J.M., Lepkowski, E. Singer and R. Tourangeau, Survey *methodology* (Vol. 561). John Wiley & Sons., 2011

[25] R.L. Hurt and E..J. McLaughlin,. An *applied introduction to qualitative research methods in academic advising.* NACADA Journal, vol. 32, no. 1, pp., 63-71, 2012

[26] D. Joye, C. Wolf, T.W. Smith and Y.C. Fu, *Survey methodology: challenges and principles*. The SAGE handbook of survey methodology, 3-15, 2016

[27] P. M. Nardi, Doing *survey research: A guide to quantitative methods*. Routledge, 2018

[28] L.R. Harris and G.T. Brown, Mixing interview and questionnaire methods: Practical problems in aligning data. *Practical Assessment, Research, and Evaluation*, vol. 15, no. 1, 2010

 [29] L.M. Given (Ed.), *The Sage encyclopedia of qualitative research methods*. Sage publications, 2008

[30] J. Seikkula-Leino, E. Ruskovaara, M. Ikavalko, J. Mattila, and T. Rytkola, Promoting entrepreneurship education: the role of the teacher? *Education+ training*, 2010.

[31] S.Z. Ahmad, and R.F. Buchanan, R. F. Entrepreneurship education in Malaysian universities. *Tertiary Education and Management*, 21(4), 349-366, 2015

[32] V. Braun, V. Clarke, N., Hayfield, and G. Terry G. Thematic Analysis. In: Liamputtong P. (eds) Handbook of Research Methods in Health Social Sciences. Springer, Singapore. https://doi.org/10.1007/978-981-10-5251-4_103, 2019

[33] V. Braun, and V. Clarke. "Using thematic analysis in psychology." Qualitative research in psychology vol. 3, no. 2, 77-101, 2006

[34] EUROPEAN COMMISSION. JOINT RESEARCH CENTRE. INSTITUTE FOR PROSPECTIVE TECHNOLOGICAL STUDIES., 2013. DIGCOMP: a framework for developing and understanding digital competence in Europe. [en línea]. LU: Publications Office. Available at: https://data.europa.eu/doi/10.2788/52966.

[35] EUROPEAN COMMISSION. JOINT RESEARCH CENTRE., 2020. DigComp at work: the EU's digital competence framework in action on the labour market: a selection of case studies. [en línea]. LU: Publications Office. Available at: https://data.europa.eu/doi/10.2760/17763.

[36] EUROPEAN COMMISSION. JOINT RESEARCH CENTRE., 2016. EntreComp: the entrepreneurship competence framework. [en línea]. LU: Publications Office. Available at: https://data.europa.eu/doi/10.2791/160811.

[37] EUROPEAN COMMISSION. JOINT RESEARCH CENTRE., 2018. EntreComp into action: get inspired, make it happen. [en línea]. LU: Publications Office. Available at: https://data.europa.eu/doi/10.2760/574864.

APPENDIX 1: READING GUIDE FOR COMPLETING THE BIBLIOGRAPHIC DATABASE

This document refers to the instructions for completing the spreadsheet and bibliographic database for WP2.

Document access

To achieve these objectives, you must supply the bibliographic database as well as the associated spreadsheet, which contains some additional fields related to content analysis.

The process consists of the following steps:

1. Open the 'Literature Read' spreadsheet accessible at the following link: https://docs.google.com/spreadsheets/d/1am9tkEHGvsfPhT5vbjoYwz2uJhrQ4GKE/edit#gid=688849947
2. Select the document to be analysed (the originals will be collected in the shared folders in Google Drive). Make sure that the document is not already being analysed by another researcher. Check the 'reading status' field on the spreadsheet.
3. Once you have selected the document fill in the empty fields as indicated below.
4. Once all the fields have been filled in, change the 'reading status' field to 'read'.

Description of the fields

Source

Source where the document was obtained

- Previous Erasmus + and MSCA projects
- Cordis
- Google Scholar
- WoS
- Scopus
- Eric Database
- Web of the European Commission
- Universities' repositories

Reading status. Drop-down field with the following values: Empty/In process of reading/Read

Document situation. If this field is empty, it means that no one has selected this document to be analysed. When you select the document for reading, you must change this value to 'in process of reading' while performing the analysis and change it to 'read' once you have completed the analysis.

Researcher. Free text field

Enter your name when you indicate in the 'reading status' field that you have started to analyse the document.

Document type. Drop-down field with the following values

- Journal article
- Meeting proceedings
- Miscellaneous
- Policies and regulations
- Pre-print
- Working paper
- Report
- Standards and guidelines

Author(s). Free text field

Authors of the document (in the case of multiple authorship, separated by semicolons (;)).

Ex: Abadal, Ernest; Melero, Remedios

Title. Free text field

Enter the title of the document (journal article, report, book chapter, book...) in the original language.

Year published

Enter all four digits.

Publication name (Journal). Free text field

Title of the journal or bulletin in which the document is published.

Conference/Meeting. Free text field

Location data (name, date, place, etc.) if the document analysed is a conference or meeting.

Pe: X EDICIC Meeting, Barcelona (Spain), July 2019

Book title. Free text field

When analysing a chapter of a book, include the title of the parent book.

Organizations. Free text field

Institutions to which the authors of the document belong (in the case of multiple institutions, separated by semicolons).

Countries. Free text field

Countries of the participating institutions (in the case of multiple countries, separate by semicolons).

Abstract. Free text field

If the document includes an English abstract, use this abstract.

If the abstract is in another language, translate it into English.

If the document does not contain an abstract, summarize the document's contents in English.

Topic. Free text field with the various terms related to the project

You may include several terms separated by semicolons (;).

Objective of the analysed document or research questions. Free text field

Objective as indicated in the document itself. If the objective is not specified, please indicate the research question.

Usefulness. Free text field

Please indicate how this document can be useful for research. For example: This document is useful for achieving one of the objectives, for establishing the state of the art, for the methodology (quantitative or qualitative), etc.

Link. Free text field

Link to the document. It should already be included.

Additional Information. Free text field

In this additional field you may enter a note of anything you consider of interest that cannot be included in any of the previous fields.

Location folder. Free text field

Shared folder in which the document is located.

APPENDIX 2: STUDENT SURVEY

Introduction

Social network tools and procedures for developing entrepreneurial skills in PhD programmes (prodPhD) is a project funded by the European Commission's H2020 funding programme, subprogramme: 'Science with And For Society' H2020-SWAFS-2018-2020 (reference: 101005985). The main objective of the prodPhD project is to implement innovative social network-based methodologies for teaching and learning entrepreneurship in PhD programmes. The multidisciplinary teaching and learning methodologies to be developed will allow entrepreneurship education to be introduced in any PhD programme, providing students with the knowledge, skills, and motivation to engage in entrepreneurial activities. The methodology will be conceived to develop experiential knowledge. Academics, entrepreneurship experts, and mentors will be involved in its development and implementation.

This survey aims to gather information about your experiences and involvement in entrepreneurship activities and education. Entrepreneurship refers to the practice of starting business ventures based on the development of new products and/or services.

This survey takes approximately 10 minutes to complete. It is voluntary and all personal data will be anonymized. Personal information, such as your name and email address, is requested so that we can conduct follow-up interviews with a small sample of students. At the end of the survey, you will be given the option to opt out of being contacted for a follow-up interview. If you agree, you can provide your contact details. Otherwise, you do not have to provide any contact information. Identifying information will not be released in any way.

If you continue and respond to the questions below, you are agreeing to be included in this survey. If you do not wish to continue, you may close your browser now.

Instructions

Please take your time to answer each question as honestly and as accurately as possible.

You will need to click on the arrow button at the end of each page to save it and move on to the next.

Please be sure to click the 'Submit' button on the last page to complete the survey.

Section 1: Demographic information

1. Please specify your age group:

> Under 25

26-30
31-35
Over 35

2. Please specify your gender:
Female
Male
Other
Prefer not to say

3. In which university are you pursuing your PhD?

4. In which year of your PhD are you?

First
Second
Third
Fourth or higher

5. What is your discipline/area?

Humanities: art, history, languages, literature, music, philosophy, religion, theatre
Social sciences: anthropology, education, geography, law, political science, psychology, sociology
Business: economics, accounting & finance, management, marketing
Natural sciences: biology, chemistry, geology, mathematics, physics
Health sciences: medicine, nursing, physiotherapy, pharmacy
Applied sciences: computer science, engineering
Other. Specify:

6. Please write the full official name of your PhD programme:

Section 2: Career intentions

7. What would you like to do when you finish your PhD?

Find a job in academia (if you do not check 'Start my own business', please skip to question 10)
Find a job in the public sector (if you do not check 'Start my own business', please skip to question 10)
Find a job in a non-profit organization (if you do not check 'Start my own business', please skip to question 10)
Start my own business (if you check this option, please answer questions 8 and 9)

Find a job in a business (if you do not check 'Start my own business', please skip to question 10)

Do not know yet (if you do not check 'Start my own business', please skip to question 10)

Other. Specify: (if you do not check 'Start my own business', please skip to question 10)

8. Please select the factors that have contributed to your intention to start a business:

My parents/family have a business of their own
My friends own or are planning to start a business of their own
My professors have encouraged me to set up a business
University courses and initiatives have encouraged me to start my own company
Government policies that support entrepreneurs
Financial opportunities for entrepreneurs
Other. Specify:

9. Please select your motivation(s) for being an entrepreneur:
To satisfy a market need
To solve a social problem
To create something of my own
To have more flexibility and independence
To have more free time
To make money
To head up an organization
To create jobs
To follow a family tradition
To gain social status
To pursue my passion for entrepreneurship
Other. Specify:

Section 3: Business prospects and background

10. Do you own any kind of enterprise or are you part of a business partnership?

Yes
No (if you answer no, please skip to question 13)

11. Did you receive any kind of support from the university when setting up your company?
Yes
No (if you answer no, please skip to question 13)

12. What kind of support did you receive?

13. Please rate your view of an entrepreneur's job on a scale from 1 to 5 where 1 is 'strongly disagree' and 5, 'strongly agree':

I believe being an entrepreneur is risky
I think having a company can be very hard
I believe entrepreneurship might be a fun career option
I think being an entrepreneur is too stressful
I believe being an entrepreneur gives you more freedom than other jobs
I believe it is a hard but rewarding job
I believe that the results of my thesis could be used to create a spin-off/tech start-up

Section 4: Information on entrepreneurship courses

14. Have you ever taken a course on entrepreneurship as either an elective or a compulsory course during previous studies (before you started your PhD)?

Yes
No (if you answer no, please skip to question 16)

15. Where?
University: undergraduate degree
University: master's degree
Non-university training programme
Courses, workshops, chats, clubs
Other. Specify:

16. Would you be interested in attending additional entrepreneurship training modules during your PhD studies?
Yes
No (if you answer no, please skip to question 18)

17. How much time would you spend on additional entrepreneurship training modules?
1 hour per week
2 hours per week
3 hours per week
4 or more hours per week

Section 5: Alternative entrepreneurship training

18. Does your university offer seminars, workshops, or conferences on entrepreneurship?

Yes
No (if you answer no, please skip to question 20)
I don't know (if you answer no, please skip to question 20)

19. Have you attended any of the seminars, workshops, or conferences described in Q18?

> Yes
> No

20. Does your university have orientation units on entrepreneurship for students (e.g., incubators, entrepreneurship associations, science parks)?

> Yes
> No (if you answer no, please skip to question 23)
> I don't know (if you answer no, please skip to question 23)

21. Have you used the aids/facilities/services described in Q20?
> Yes
> No (if you answer no, please skip to question 23)

22. For what purpose have you used this service?

23. Does your university have any other incentives for entrepreneurial activities (e.g., awards, financial aid, entrepreneurship contests)?

> Yes
> No (if you answer no, please skip to question 26)
> I don't know (if you answer no, please skip to question 26)

24. Have you participated in any of the incentives/activities described in Q23?
> Yes
> No (if you answer no, please skip to question 26)

25. In what kind of initiatives have you participated?

26. Does your university have any other initiatives related to entrepreneurship that are not mentioned above?
> Yes
> No (if you answer no, please skip to question 28)
> I don't know (if you answer no, please skip to question 28)

27. What are they?

Section 6: Entrepreneurship competences

28. Please rate your entrepreneurship skills on a scale from 1 to 5 where 1 is 'no competence' and 5, 'advanced competence':

Instrumental skills (problem solving, decision making, risk managing, finances and accounting)

Interpersonal skills (leadership, team management, networking, negotiation, business ethics)

Systemic skills (business opportunity identification, creativity, innovation)

29. Please rate the level of importance of the following skills for entrepreneurs on a scale from 1 to 5 where 1 is 'not important at all' and 5, 'very important':

Project development
Teamwork
Problem solving
Budgeting
IT competences
Web design
Decision making
Data management
Creativity
Data analysis
Search engine optimization
Finances and accounting
Advertising and promotion
Content creation
Leadership
Strategic planning
Negotiation
Risk management
Legal structures
Market research

Section 7: Importance of entrepreneurship training

30. Please rate your level of agreement with the following statements on a scale from 1 to 5 where 1 is 'strongly disagree' and 5, 'strongly agree':

I believe that training in entrepreneurship is very important regardless of one's specialization field

I believe that essential entrepreneurship skills cannot be taught in a class

I believe entrepreneurship training can develop skills that will be useful in the future

I believe entrepreneurship training is only important if you want to start a business

Section 8: Evaluation of entrepreneurship courses

31. Please rate your level of agreement with the following statements on a scale from 1 to 5 where 1 is 'strongly disagree' and 5, 'strongly agree': I believe that courses on entrepreneurship should focus on...

This project has received funding from
European Union's Horizon 2020
research and innovation programme
under grant agreement № 101005985

Theoretical concepts behind setting up and running a business
Encouragement for students to set up and run their own business
Strategies for managing and ensuring the growth of established companies
Training in marketing and finance
Conditions that favour business creation
How to move/make the transition from traditional employment to self-employment
Presentation and review of real cases of entrepreneurship
Business plan development
Training in innovation and creativity
Understanding how different kinds of business work
The competences and skills that make a successful entrepreneur
How to obtain resources to create my own business
Problem-solving skills
Dealing with failure
 How to work under pressure
How to bring my project/ideas to the market

32. Please describe how entrepreneurship courses can stimulate your entrepreneurship initiative:

Contact details for follow-up interview

Are you willing to be contacted for a follow-up interview?

>Yes (if you answer yes, please continue to the following questions)
>No (if you answer no, you may submit your survey now)

If yes:

>Please enter your first name.

>Please enter your last name.

>Please enter your university-assigned email address.

>Please list an alternate email address, if you have one (optional).

APPENDIX 3: FACULTY SURVEY

Introduction

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This survey is to gather information about your experiences and involvement in entrepreneurship activities and education. Entrepreneurship refers to the practice of starting business ventures based on the development of new products and/or services.

This survey takes approximately 10 minutes to complete. It is voluntary and all personal data will be anonymized. Personal information, such as your name and email address, is requested so that we can conduct follow-up interviews with a small sample of faculty members. At the end of the survey, you will be given the option to opt out of being contacted for a follow-up interview. If you agree, you can provide your contact details. Otherwise, you do not have to provide any contact information. Identifying information will not be released in any way.

If you continue and respond to the questions below, you are agreeing to be included in this survey. If you do not wish to continue, you may close your browser now.

Instructions

Please take your time to answer each question as honestly and as accurately as possible.

You will need to click on the arrow button at the end of each page to save it and move on to the next.

Please be sure to click the 'Submit' button on the last page to complete the survey.

Section 1: Demographic information

1. Please choose the option that best describes your situation:

> PhD programme director
> Teacher in doctoral programmes
> Teacher in bachelor's degree programmes
> Department director
> Vice chancellor

Dean
Other. Specify:

2. Please specify your gender:

Female
Male
Other
Prefer not to say

3. At what university are you employed?

4. What is your discipline/area?

Humanities: art, history, languages, literature, music, philosophy, religion, theatre
Social sciences: anthropology, education, geography, law, political science, psychology, sociology
Business: economics, accounting & finance, management, marketing
Natural sciences: biology, chemistry, geology, mathematics, physics
Health sciences: medicine, nursing, physiotherapy, pharmacy
Applied sciences: computer science, engineering
Other. Specify:

5. Please state the name of your current department:

Section 2: Entrepreneurship courses and experiential training

6. Are you teaching or have you ever taught any courses on entrepreneurship?

Yes (if you answer yes, please respond to questions 7 and 8 and skip question 9)
No (If your answer is no, please skip to question 9)

7. What was the topic of the course(s)?

Entrepreneurship
Corporate entrepreneurship
International entrepreneurship
Digital entrepreneurship
Other. Specify:

8. What were the main aims of the course(s)?

To teach theoretical concepts
To encourage students to set up and run their own business

prodPhD

This project has received funding from
European Union's Horizon 2020
research and innovation programme
under grant agreement № 101005985

To teach general business skills

9. Would you be interested in teaching entrepreneurship courses to PhD students if you were offered the opportunity?

Yes (please skip to question 11)
No

10. Why was your answer to Q9 'no' (e.g., I am not interested in the subject, I do not think it is useful, It is too much work)?

11. Please mark the entrepreneurship opportunities/initiatives that your university offers for PhD students:
Seminars/webinars
Workshops
Conferences
Incubators
Science parks
Entrepreneurship associations
Awards
Financial aid
Entrepreneurship contests
Other. Specify:

12. Are you participating or have you ever participated in a technology-based company or at least transferred research results to a company?

13. Does entrepreneurial training at your university involve coordination among several departments/knowledge fields (i.e., multidisciplinary projects)?

Yes
No (please skip to question 15)

14. Please describe the interdepartmental collaboration or multidisciplinary projects.

15. Please describe any significant barriers, obstacles, or challenges that you encountered in offering graduate entrepreneurship education opportunities (e.g., administrative or logistic barriers, lack of resources, etc.):

16. What experiences in entrepreneurship education do you believe it is the most important to offer PhD students interested in entrepreneurship?

Section 4: Entrepreneurship courses

17. Please rate your level of agreement with the following statements on a scale from 1 to 5 where 1 is 'strongly disagree' and 5, 'strongly agree': I believe that courses on entrepreneurship should focus on...

Theoretical concepts behind setting up and running a business

Encouragement for students to set up and run their own business

Strategies for managing and ensuring the growth of established companies

Training in marketing and finance

Conditions that favour business creation

How to move/make the transition from traditional employment to self-employment

Presentation and review of real cases of entrepreneurship

Business plan development

Training in innovation and creativity

Understanding how different kinds of business work

The competences and skills that make a successful entrepreneur

How to obtain resources to create my own business

Problem-solving skills

Dealing with failure

How to work under pressure

How to bring my project/ideas to the market

Contact details for follow-up interview

Are you willing to be contacted for a follow-up interview?

Yes

No

If yes:

Please enter your first name:

Please enter your last name:

Please enter your university-assigned email address:

APPENDIX 4: STUDENTS INTERVIEW GUIDE

Warming-up questions

1. Why or why not have you had courses on entrepreneurship? How were they? Were they useful? Would you like to have more? Would you change or add anything? (a couple of quick questions depending on responses)

Networking

2. Would you like that your classes were more interactive? How would you like to have the opportunity to collaborate with students from other programmes and universities (e.g. projects, contribution in conferences, etc.)?

Entrepreneurship

3. Do you have any relatives or colleagues who own or have owned a business?

4. If you were to proceed an entrepreneurial career, would your family, spouse, friends and immediate circle support you? Would they help you or on the contrary try to discourage you? What would be their reaction?

5. What do you think about entrepreneurship and the creation of a business? In case you had it, has entrepreneurial training changed your perception about it?

6. What are the needs of being an entrepreneur?

7. Have you considered starting your own business?

    a. If they are considering starting their own business, ¿why and what do you think it could gain from it (personally, socially and professionally)?

    b. If they are not considering starting their own business ¿why not?, ¿have you ever considered it?

Platform

8. Have you any experience with e-learning platforms? If yes, how it was? What were the best and the worst things?

9. Talking about e-learning and e-learning platforms, would you find useful if you could use the platform and access the courses and other services from your mobile phone?

APPENDIX 5: FACULTY INTERVIEW GUIDE

Warming-up

1. Do you have any experience teaching entrepreneurship?
2. What do you think students can gain from entrepreneurship training?

Networking

3. Would you like that your classes were more interactive? Do you think it would be positive for the students to collaborate with students and professors from other programmes and universities (e.g. projects, contribution in conferences, etc.)?

Entrepreneurship

4. What do you think about entrepreneurship and the creation of a business?
5. From your point of view, what role plays the social environment of the students in their intention to create a business?
6. What do you think are the needs of being an entrepreneur?
7. What do you think the students can learn from setting-up their own company? What do they can gain personally, socially and professionally?

Platform

8. Have you any experience with e-learning platforms? If yes, how it was? What were the best and the worst things?
9. Talking about e-learning and e-learning platforms, would you find useful if the students could use the platform and access the courses and other services from their mobile phones?