

# Empowering entrepreneurial education using undergraduate dissertations in business management and entrepreneurship

Empowering  
entrepreneurial  
education

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## A five-year study (2012–2016)

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### Abstract

**Purpose** – The purpose of this paper is to contribute to the discussion about entrepreneurship education through undergraduate dissertations (UDs). In order to achieve this objective, this paper addresses the problems detected in the degree subject “UD” – which entails the creation of a business plan – and the proposal of improvements in the teaching-learning process of this subject.

**Design/methodology/approach** – Qualitative and quantitative analysis are used. First, the paper reports the problems that occurred during two academic years (2012–2013 and 2013–2014), as well as the solutions to these problems, in the two academic years that followed (2014–2015 and 2015–2016). Second, the improvements achieved are analyzed using descriptive statistics and the Wilcoxon–Mann–Whitney test, based on data drawn from the records and a survey conducted in 2012–2013 (174 responses), and in 2015–2016 (184 responses).

**Findings** – The results outline the positive effects on students’ learning outcomes and academic excellence, a three-stage assessment process, the strengthening of the coordination and supervision systems and the enhancing of entrepreneurial spirit among graduates, with a UD connected to a business incubator.

**Practical implications** – The authors describe the design and implementation of a UD that provides a major step in the students’ entrepreneurial education, emerging, not only, as an opportunity to train and connect skills and knowledge learned about the starting a new venture, but also as a practical experience of entrepreneurship; a first step that introduces the student to entrepreneurship.

**Originality/value** – There are very few examples of concrete subject designs that have undergone in-depth, longitudinal research, focusing on entrepreneurship. Prior research has focused on entrepreneurship primarily as a subject, forgetting the great utility of the UD as active training tool. Thus, this paper breaks new ground by highlighting the role of the UD in entrepreneurial education. In this regard, the UD allows the student to be guided and to actually engage in the real-world practice of entrepreneurship. Specifically, it encourages them to apply their academic knowledge of the field in the context of creating a new business. Moreover, by creating a business plan, students are applying the knowledge and skills learned in the subject of entrepreneurship with other spheres of knowledge and skills.

**Keywords** Entrepreneurship education, Business training, Undergraduate dissertation, Accounting and financial dossier

**Paper type** Research paper

### Introduction

Entrepreneurial education in higher education has made notable progress over time (Fayolle *et al.*, 2018; Hayter *et al.*, 2018; Hindle, 2007) due to the growing interest in everything related to entrepreneurship courses and programs (Audretsch and Link, 2017; Matlay, 2017; Wright *et al.*, 2017). In this vein, education programs try to encourage entrepreneurship and, therefore, promote new venture development (Galvão *et al.*, 2018; Marzocchi *et al.*, 2018). In particular, several studies have analyzed the influence of entrepreneurship education and courses on entrepreneurship training in regard to the creation of new companies and business opportunities (Rae and Wang, 2015; Rideout and Gray, 2013; Weber, 2012).

Furthermore, the number of papers and manuals focused on entrepreneurship education in higher education has increased in recent decades (Mason and Siqueira, 2014). For instance,



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Fiet (2001) focuses his research on the pedagogical aspects of entrepreneurship education, while Solomon and Fernald (1991) highlight the influence of entrepreneurial education in the creation of SMEs. Others authors explore different pedagogical methods for teaching entrepreneurship (Solomon *et al.*, 1994) or use the analysis of business failure as a method for teaching students and future entrepreneurs (Shepherd, 2004).

However, the way in which entrepreneurship education is taught shows a major gap in the academic literature (Kuratko, 2005). Moreover, according to Blenker *et al.* (2014) and Volkmann and Audretsch (2017), the current practice of entrepreneurial education in higher education encompasses a wide range of teaching methods, strategies and pedagogical approaches. However, Higgins *et al.* (2018) state that traditional instructional pedagogical methods are not sufficient to adequately prepare and educate entrepreneurship students. Thus, prior research has focused on entrepreneurship as a subject from a behaviorist perspective where only there is a passive transfer of knowledge from the teacher to the student. In addition, prior research has overlooked the great utility of the undergraduate dissertation (UD) as an active training tool (Tounés *et al.*, 2014). In this regard, our research is informed by demand–competence model pedagogy (Nabi *et al.*, 2017) since it analyzes a pedagogy tool (UD) that includes an important component of real-world experience. Under this scheme, the teaching is more transferable to the actual business environment because it uses problem-based learning (Higgins *et al.*, 2018; Kirkwood *et al.*, 2014; Wenger, 2014), with the aim of enabling business start-ups (Burrows and Wragg, 2013; Jones *et al.*, 2017).

The above-mentioned pedagogical model we are using as a reference fits under the constructivist perspective to entrepreneurial education (Löbner, 2006) and focuses on experiential approaches, highlighting an “interactionist theoretical paradigm,” that entails active problem solving (Nabi *et al.*, 2017). In this framework, learning involves actively participating in the generation of new understanding (Carbery and Hegarty, 2011; Refai *et al.*, 2015) and “teaching is conceived as a strategic intervention to allow for how students organize the resource at their dispose into competences that can be mobilized for action” (Bechard and Gregoire, 2005, pp. 115-116). Finally, according to Nabi *et al.* (2017, pp. 3-5) this pedagogical model “focuses on methods emphasizing ‘communication and discussion’ (e.g. seminar, presentations, debates) and knowledge ‘production’ (e.g. essays, modeling, portfolios).”

More specifically, the Royal Decree 1393/2007 (2007), in which the Organization of Official University Education is established in Spain – modified in part by the Royal Decree 861/2010 (2010), sets up the ordinance and implementation of official university graduate and masters teaching as part of the European Higher Education Area (EHEA). Thus, with regard to graduate studies, the carrying out of UD by the students was established as the cornerstone for achieving the new objectives, competences and skills promoted by the new study plans for EHEA (Mateo, Escofet, Martínez-Olmo, Ventura and Vlachopoulos, 2012; Reguant *et al.*, 2018).

Thereby, the UD plays an essential role in the integral evaluation of the acquisition, development and control of specific and transversal competences obtained by the students throughout their undergraduate studies (Ashwin *et al.*, 2017; Greenbank *et al.*, 2008; Rand, 2016). For this reason, it is configured as an obligatory subject, which must be carried out in the final phase of undergraduate study plans (Boud and Costley, 2007; Calvert and Casey, 2004; Feather *et al.*, 2014) and to which every university must assign freely and autonomously between 6 and 30 European Credit Transfer System (ECTS) credits, which correlates to between 150h and 750h of student work, and entails the presentation of a project of some magnitude (Pepper *et al.*, 2001; Shadforth and Harvey, 2004).

Authors such as Sánchez-Fernández (2013) have noted that there is no standard UD that serves as a global reference model. However, Engström (2015) develops a model for conducting and assessing interdisciplinary UD. Thus, it is possible to argue that UD have

their own traits and characteristics that distinguish and differentiate them from the other subjects that comprise undergraduate studies (Parsons and Knight, 2005; Todd *et al.*, 2004, 2006), which we examine and outline below.

First, Knight and Botting (2016) state that, when students are allowed to choose their own area of research from a restricted list of topics suggested by their tutors the motivation to carry out the UD is far greater. In this regard, Armstrong and Shanker (1983) and Snavelly and Wright (2003) understand that the student, as the main person responsible for their own teaching-learning process, can choose the specific theme, content and orientation of their UD. Ultimately, for Greenbank and Penketh (2009) and Webster *et al.* (2000), the appropriately scoped UD should be carried out solely by the students. This process includes the planning and development of the project.

Nevertheless, from another perspective, other authors argue that too much autonomy could be negative, and highlight that direction-tutelage becomes necessary in this area, through a teacher-tutor (Cook, 1980; Roberts and Seaman, 2018) who can advise and direct the student throughout this laborious process of producing the UD, thereby avoiding, a lack of focus or direction in the project (Vera and Briones, 2015). Finally, other research such as Hernandez-Leo *et al.* (2013) state that the content and theme of the subject can be different for each student and can be proposed by the project tutor, the students themselves or via consensus between the two. In this regard, Armstrong *et al.* (2004) and Stefani *et al.* (1997) argue that it is essential to establish a climate of open dialogue between supervisors and students to ensure that the assessment of any learning task is commensurate with the objectives and learning outcomes.

Second, the presentation of the UD, allows the students to learn and develop research techniques and methodologies for dealing with specific data sets, given that a well-developed project requires the collection of primary (first-hand) data in order to carry out market research, as well as a thorough analysis of this data and already existing secondary sources (Healey *et al.*, 2013).

Third, Webster *et al.* (2000) state that, given its scope and complexity, the UD can be used as an efficient means to evaluate university students enabling the distinction between top students, who achieve a high level of academic excellence from lower performers.

Finally, a distinctive and extremely relevant characteristic of the UD – above all, in business administration and management – is that it provides an important link to the business world that awaits the students at the conclusion of their studies (Malcolm, 2012; Rich, 2010; Smith *et al.*, 2017). To this end, the UD is configured as a point of connection between the academic world and the reality of the business world awaiting the students on finishing their university degrees (Hernandez-Leo *et al.*, 2013; McMurray *et al.*, 2017).

The aim of this study is to analyze the problems detected in the academic years 2012–2013 and 2013–2014, in UDs, in the Business Management and Entrepreneurship (BME) Undergraduate Course at the European University of Madrid, as well as the good practices and improvement plans implemented to correct the problems previously detected, and the results achieved in the subsequent academic years of 2014–2015 and 2015–2016.

### Structure and content of undergraduate dissertation

The “Undergraduate Dissertation” (UD) is a compulsory subject in the fourth year (from September to June) of the BME degree at the European University of Madrid, with a value of 6 ECTS credits. Upon finishing their undergraduate learning, the students complete and present a project on the creation of a company, based on an original and innovative idea, following an established structure and set of rules, and advised and guided by a teacher-tutor.

The UD must be carried out in groups of three people (with the exception of the occasional four-person group where the total number of students is not divisible by 3),

through in-person tutorials and with the support of virtual classrooms, the students plan their projects and coordinate their contributions and data sharing, to put together and produce one single group presentation for each of the activities and for the final presentation of the project. The UD is organized and structured into four phases. In each one, the students must develop the corresponding part of the project, execute the applied activities and, when required, attend face-to-face tutorials or seminars or through the virtual classroom. Below, we outline the contents of each of these phases:

- (1) Phase 1. Introduction to the UD: presentation of the norms and rules for the elaboration and evaluation of the project, as well as the format for the project execution.
- (2) Phase 2. Topic identification and market analysis: define and analyze those aspects of the project to develop related to the market, sector and the competition: the identification and analysis of the market; the analysis of the sector and PESTEL analysis; analysis of the competition, SWOT analysis and Porter's five forces; planned involvement and market study.
- (3) Phase 3. Strategic and operational development: establish the strategies and lines of action in the business plan, in particular, aspects relating to marketing and production; company location, organization and human resources; financial-economic analysis; formal and legal aspects; management of company image, quality and social responsibility.
- (4) Phase 4. Final presentation of the business plan: formalize the final presentation of the project both printed and face-to-face; production of the conclusion, bibliography, sources and annexes; final project format; presentation slides.

Finally, for those projects considered to be apt by the tutor, the students deliver a 15–20 min oral defense of their project in public, including 15–20 min extra for questions from the evaluating Tribunal, questions which the students must answer and defend appropriately. In this respect, Table I indicates those UD activities that are evaluated, as well as the evaluation criteria.

### Material and methods

This work combines qualitative and quantitative research analysis. First, we addressed qualitative research analysis, identifying and outlining the problems occurring during the academic years (2012–2013 and 2013–2014) in 89 UDs and the proposed solutions to these problems and their implementation in the subsequent academic years (2014–2015 and 2015–2016) in 113 UDs. The materials and data used to identify the problems and come up with the proposed solutions correspond to the learning units outlined in Table I, including

Learning units	Activities for evaluation	Evaluation criteria
Phases 1–3	Proposal and topic description form Summary report Phase 2 Summary report Phase 3 Provisional presentation	Interpretation of the information Content Originality Structure of ideas
Phase 4	Final printed presentation of the project	Structuring and quality of the content Originality and viability of the plan Justification for the project Adaptation to the specific norms
Phase 4	Presentation of the project	Professionalism in the presentation Expression, communication Resources used

**Table I.**  
Evaluation of  
undergraduate  
dissertation

all the materials generated by the students (initial proposal, complete UD project, UD presentation, Excel document with the calculations for all parts of the business plan, etc.), course guide for the subject in each academic year and all the marks and comments from the tutor/s and Tribunals (marks and comments for the summary reports, comments and recommendations from the tutor regarding the UD carried out, comments, observations and marks breakdown from the Tribunal regarding the UD and the presentation of the UD, etc.). This is introduced in the material and methods section, as a step prior to the quantitative analysis.

Second, the results section addresses through quantitative research analysis, the descriptive statistics obtained as outcome of the plans for improvement and the Wilcoxon–Mann–Whitney test. The data used come from the course guide for the subject in each academic year, the marks obtained by each student, evaluation committees, Tribunals – this applies to the beginning of the results section, until the Wilcoxon–Mann–Whitney test is mentioned – and a questionnaire put to the students in the last month of the academic year 2012–2013 (174 answers) and 2015–2016 (184 answers) – after the Wilcoxon–Mann–Whitney test is mentioned in the results section.

This exhaustive sample is made up of 89 UDs presented between the years 2012 and 2014 (prior to the implementation of the plans for improvement) and 113 UDs carried out between the years 2014 and 2016 (post-implementation of plans for improvement). All the UDs analyzed deal with the creation of a business plan based on an original and innovative idea, the project is carried out in groups of a maximum of three people. The data collection via questionnaire was obtained at the end of each academic year, as was the case for all other data collected. This questionnaire was validated through a pre-test with five students and five academics with the aim of obtaining reliable measurements of the variables and the scale used was the Likert five-point scale. Questionnaire answers obtained cover at least one member from each of the UD groups analyzed, and responses to the questionnaire were voluntary.

The Wilcoxon–Mann–Whitney test is a non-parametric method for comparing two independent samples, as is the case for the comparison of a sample from the academic year 2012–2013 with another sample from the academic year 2015–2016. This test is the non-parametric equivalent of the *t*-student test, and therefore, recommended and optimal in the case of ordinal variables such as Likert type variables or those variables with scales of 0 to 10 (the student marks in any given subject). Wilcoxon (1945) initially proposed this test for samples of the same size, but Mann and Whitney (1947) extended it to cover samples of different sizes. In short, this statistic allows us to detect the existence of differences between two independent samples of different sizes in relation to one ordinal variable.

The statistical analysis was carried out using the statistics program SPSS 15.0.

### *Problems detected*

According to the EHEA, the UD plays a main role in the integral assessment of the acquisition, development and implementation of competences acquired by the students throughout their undergraduate studies. Despite its importance, many universities have not yet addressed this particular issue with the seriousness it merits. In general, similar institutions have not been provided with the necessary material resource or with an adequate and specialized teaching staff required for the correct teaching of the subject. By way of example, in most cases the number of ECT credits granted for UD-related teaching assignments is absurdly low, and does not accurately reflect the work required from UD tutors.

In addition, there is a problem of focus and interconnection of subject UD with the business sphere, which diminishes the usefulness of the UD as an active training tool. In our view, the UD may be a first step in the students' entrepreneurial education, representing an

opportunity to train and connect skills and knowledge learned about the starting a new venture, and also providing real-world practical experience in the entrepreneurial space.

In particular, the analysis, valuation and assessment of the 89 business plans presented by the students in the 2012–2013 (44 UD) and the 2013–2014 (45 UD) academic years, revealed a series of recurring problems in the two academic years analyzed.

First, the need to increase the requirement level and promote the academic and professional quality (Wood and Breyer, 2017) of the UD “Business Plan” presented by the students to the final evaluating Tribunal was observed. This outcome, derived from the existence of an unacceptably high number of UD considered as not apt –36–37 percent – by the corresponding Tribunal. The projects suffered from numerous problems relating to the structuring and writing of the UD, spelling mistakes, syntax and grammar among others. In addition, students had difficulties developing an economic-financial plan, and justifying pricing policies and sales forecasts. These are questions of vital importance when evaluating the economic-financial viability of the company proposed in the business plan.

In this respect, we noted that similar institutions have not developed and implemented a specific set of rules to encourage good writing, such as the mandatory application of spell-check programs and style correctors. In addition, regarding the planning and development of the economic-financial issues of the business plan, similar institutions do not provide a detailed and thorough economic-financial dossier (created by tutors) that students are required to use. Such a dossier would clarify and homogenize contents for this specific area.

Second, the need to improve the evaluation system of the Tribunal assigned to the UD was observed. This would require the planning and development of a more objective, specific, complete, detailed and better-defined evaluation rubric, in order to eliminate or reduce, in so far as possible, any subjective bias in the valuation and subsequent marking of the different UD being evaluated (Annetts *et al.*, 2013; Roberts and Seaman, 2018). Additionally, the criteria used in Tribunals’ evaluations need to be clearly defined and stated explicitly in the course guide for the subject.

In several similar institutions, we noted that the marking system is deficient due to the fact that the final assessment of UD is carried out by the student’s own tutor and there is no evaluation Tribunal, except in cases where the student opts for First Class Honors. In such cases, the student’s UD is evaluated by Tribunal. In other similar institutions, there is a Tribunal, but one of its members is the student’s own tutor, which in our opinion could skew the evaluation process. Finally, in most cases, we observed that evaluation rubric is very simple and the reasons provided for not apt-failed are not very detailed.

Third, a number of coordination problems between the different teachers-tutors of the subject was found to exist with regard to the monitoring of the different UD groups assigned to each, the setting of the deadlines of the different tasks and activities, as well as the deadline for the final draft (Derounian, 2011; Rowley and Slack, 2004). In this area, we noted the difficulty in effectively forming homogenous UD evaluation Tribunals, when they are made up of teachers from different areas, who had to coordinate to find a time when all were available and which did not coincide with exams for other subjects. However, in similar institutions where there is no evaluating Tribunal, these types of scheduling issues are a relatively minor issue.

Fourth, it was verified that it was necessary to stimulate the interest and motivation of the students in carrying out the UD by making them understand its critical importance as an end of degree project, as well as underscoring the link between their UD and the labor market (Gunn, 2010; Rich, 2010). The end objective would be that the students produce innovative, achievable projects, which can be implemented and serve as a starting point, in practice, for the creation of a real company. Up to now, this has not occurred in the academic years analyzed.



Finally, in some similar institutions, we noted that there is business incubator created with the aim of stimulating entrepreneurship and promoting start-ups. Nevertheless, business-incubators are configured as isolated entities and far from the university organization itself. They are disconnected from the subject (UD) and the corresponding study plans. In our view, this disconnect can be remedied by linking the UD to the business incubator. The UD is thereby configured as an active training tool enmeshed or interconnected with the business incubator so that students can carry out the business plan derived from their particular project and make it real with the support and mentoring of said business incubator. Finally, we have not observed in similar institutions that any award system for the best UD presented to the final evaluating Tribunal was established.

### *Implementation of improvement plans*

Taking into consideration the prior experience of the analysis and valuation of the UD presented in the academic years 2012–2013 and 2013–2014, a series of plans for improvement were implemented in the academic years 2014–2015 and 2015–2016, along with a set of good practices, with the aim of correcting the deficiencies observed:

- (1) First, in relation to the need to increase the level of requirement and academic quality of the UD, two initiatives were put forward:
  - Definition and development of a set of norms for linguistic correctness and the obligatory application of spelling and style correctors:
    - In the degree subjects, for each spelling mistake in an exam, half a point is deducted from the overall score for each exercise, while for the reiteration of punctuation and accent errors up to two points can be deducted, at the discretion of the teacher. However, in the case of assignments that have already been revised – as is the case with the UD subject – in which the student has had access to the linguistic norms (as well as the spelling and style correctors) during the elaboration of the “business plan,” the deductions in the final mark outlined above are doubled, that is to say, one point for each spelling error and up to four points for a reiteration in punctuation and accent errors.
    - With regard to the linguistic norms, the Pan-Hispanic Dictionary of Doubts (PDD) is used as a reference. This dictionary was created by the Association of Spanish Language Academies to clarify the most frequent doubts posed by the Spanish language. Thus, the PDD proposes as the norm, a model of language which corresponds to the way of speaking and writing used by cultured Spanish speakers in formal situations of communication. These doubts are ordered alphabetically, as they would be in a dictionary. Finally, a number of direct links are provided in the course guide to allow the students to consult some of the most visited entries in the PDD.
  - The tutors prepared a detailed and thorough financial dossier, for compulsory use, which complements the subject contents in this specific area, clarifying and homogenizing the planning and development of all the economic-financial aspects of the business plan – initial investment and funding, non-current assets amortization table, loan amortization table, annual accounts forecast, VAT table, cash flow statement, ratio analysis, investment valuation, among others – which must be correctly performed to successfully achieve the objectives of the subject.

- (2) Second, with regard to the evaluation and marking system of the UD's we can highlight three aspects:
- A marking system with three filters was designed. In the first of these, the tutor makes a report with an initial valuation of each of the final tutored UD's. The second filter – through the creation of an evaluation committee made up of different tutors and teachers in the subject – is responsible for taking into account the information provided by each tutor, that is to say, whether each UD is apt or not apt for presentation to the final evaluating Tribunal; it must be pointed out that the function of the committee is not to give a mark, but rather to act as an initial filter to prevent the presentation to the tribunal of incomplete or incorrect UD's or those that do not meet the minimum levels of quality required. Finally, for those UD's considered to be apt for presentation by the evaluation committee, the final evaluating Tribunal decides what mark to give each UD, taking into consideration the quality of the written work and the public oral presentation by the students, as well as the development shown by each student in their defense of the project, with regard to the questions asked by the Tribunal.
  - With the objective of improving the tribunal's evaluation system, a more objective, specific, complete, detailed and better-defined evaluation rubric was designed, so as to reduce the possible subjectivity bias in the valuation and subsequent grading of the UD's. Thus, said rubric awards a 70 percent weighting to the final written draft, and 30 percent to the oral presentation before the Tribunal (this includes the presentation carried out by each student, as well as their defense to the questions posed by the Tribunal; which allows to generate the individual qualification of each student according to the performance both in presentation and in defense of the questions asked by the Tribunal members).
  - Finally, the improved course guide for the subject was completed introducing a clearer, more objective and concise definition of the causes for a not apt-fail, among which can be highlighted: class attendance inferior to 50 percent (for classroom-based formats); failure to carry out the due course assignments; the presentation format is not professional, namely, printing errors, small font, illegible tables, inappropriate template, disparity in font size, use of colors, etc.; absence of the compulsory content stipulated in the course guide, quality of said content and level of development, as well as, the justification for the content and reasoning for it (e.g. not following all the guidelines in the financial dossier); serious and repeated spelling errors (see the norms of linguistic correctness above); plagiarism; inconsistency in concepts across the different parts of the UD and errors in calculation (e.g. carrying out a calculation of costs and determination of prices in the marketing section which is different to that reflected in the financial statement); calculation errors in the Excel document and it is impossible to follow the calculations performed as only the values have been copied not the formulas; the main results of the Excel spreadsheet are not reflected and sufficiently explained in the Word document; one or more of the group members do not actively participate in the group's work forum made available on Virtual Learning Environment (Moodle) for the realization of the UD; and finally, the incorrect use of information sources or conclusions that are unexplained throughout the UD, be it in the main body, annexes or Excel spreadsheets.



- (3) Third, in relation to the coordination problems detected among the different subject tutors regarding the monitoring of the assigned UD groups, the following points were implemented:
- The importance of the subject coordinator as an instrument of control and monitoring is strengthened. In this way, the coordinator plays an essential role in the supervision of the subject matter, through the carrying out of monthly meetings with the tutors, in order to ensure the homogeneity in the deadlines for the periodical presentation of the different tasks and activities programmed throughout the course, as well as controlling the final deadline of the definitive UD, with the aim of preventing students from different groups feeling discriminated against in this respect. Their key role in ensuring that the different tutors apply the instructions contained in the subject guide with the highest rigor and accuracy should also be highlighted.
  - In relation to the difficulty in forming UD evaluation Tribunals, it was decided to postpone their effective constitution until a date after all other subjects' exams had finished, in order to avoid scheduling conflicts between exam dates and presentations of the UDs, and thus make the formations of these tribunals easier.
- (4) Finally, in relation to the need to stimulate the student's interest and motivation in carrying out the UD and to differentiate it from the other degree subjects, the following improvements were implemented:
- A system of awards for the best UDs presented to the final evaluating Tribunal was established – first and second prizes – with their corresponding accrediting certificates along with a small cash sum for the first placed, awarded at a formal prize giving event presided over by the Dean of the Social Sciences Faculty.
  - Likewise, in order to strengthen and encourage, the link between the UD and the professional world, a “Hub emprende” business incubator was created at the Alcobendas campus (Madrid), which provides support and advice to those students who hoped to use their UD as a springboard for the creation of their own real-world business, with the intention of promoting the development of the most achievable, innovative and financially viable projects. In this regard, “Hub emprende” is a co-working space based on mentoring that allows students and future entrepreneurs to further develop their entrepreneurial initiatives with the support of technological resources and specialized training that focus on encouraging launch new start-ups in a solid and sustainable way (Universidad Europea, 2018).

### Findings

The results obtained from the assessment of the improvement plans are presented along with the good practices described above, which are implemented in the last two years of the degree courses 2014–2015 and 2015–2016. In this respect, Table II shows the main results in the analyzed four years. The number of students enrolled (190-197 students) remains relatively stable during the four academic years (2012-2016), though the number of students who abandon the subject without presenting the UD falls substantially between the first two years and the last two years, going from a drop-out rate of 30.52 and 30.61 percent for students enrolled in 2012–2013 and 2013–2014 to 14.5 and 11.17 percent in the years 2014–2015 and 2015–2016, respectively. Likewise, not only are more UDs carried out as a result of the implementation of the improvement plans, but also the quality of these is much higher, which is reflected in a large reduction in the number of fails given by the final evaluating Tribunal, as well as a significant increase in the marks obtained by the students.

**Table II.**  
Academic results of  
UD (2012–2016)

Academic years	2012–2013	2013–2014	2014–2015	2015–2016
Number of students enrolled	190	196	193	197
Students presented/not presented (UD not carried out)	132/58	136/60	165/28	175/22
Total number of UD carried out	44	45	55	58
Apt UDs/not apt for presentation to the Tribunal according to the Evaluation Committee	–	–	45 (81.8%) 10 (18.2%)	47 (81%) 11 (19%)
UDs presented to the final evaluating Tribunal	44	45	45	47
UDs apt/not apt by Tribunal	28 (63.6%) 16 (36.4%)	28 (62.2%) 17 (37.8%)	42 (93.3%) 3 (6.7%)	45 (95.7%) 2 (4.3%)
Apt students/not apt by Tribunal	84 (63.6%) 48 (36.4%)	84 (62.2%) 52 (37.8%)	126 (93.3%) 9 (6.7%)	136 (95.8%) 6 (4.2%)
Fails	48	52	9	6
Passes	57	63	48	45
Lower second class	21	15	60	67
Upper second class	6	6	15	21
First class			3	3
Average year mark	5.22	4.69	6.54	6.69

Table III shows a significant improvement in year 2015–2016 with respect to year 2012–2013, more specifically, the overall satisfaction with the subject, the satisfaction with the work of the teachers, the clarity of the subject content, the clarity and objectivity of the classification for not apt evaluations, the appropriateness of the evaluation process, the UD as a springboard for the creation of a real company, the relevance of the subject to future professional life, the importance of the subject when accessing the labor market, the interest and/or motivation in

**Table III.**  
Student survey 2012–  
2013 and 2015–2016

	Average for year 2012–2013	Average for year 2015–2016	Wilcoxon–Mann– Whitney (Z value)
Overall satisfaction with the subject (1 very dissatisfied–5 very satisfied)	3.82	4.34	–6.68***
Satisfaction with the work of the teachers (1 very dissatisfied–5 very satisfied)	3.81	4.22	–4.97***
The contents of the subject are clear (1 totally disagree–5 totally agree)	3.95	4.41	–6.15***
The causes for not apt-fail are clear and objective (1 totally disagree–5 totally agree)	4.08	4.37	–3.75***
The process of evaluation is appropriate (1 totally disagree–5 totally agree)	4.38	4.52	–2.84**
The UD is a springboard for the real creation of one's own company (1 totally disagree–5 totally agree)	4.05	4.53	–6.79**
The relevance of the subject to future professional life (1 very low–5 very high)	3.83	4.26	–5.93***
The importance of the subject when accessing the labor market (1 very low–5 very high)	3.77	4.18	–5.13***
Interest and/or motivation with the subject (1 very low–very high)	3.98	4.7	–10.27***
Average year mark	5.22	6.69	–9.16***

Notes: \* $p < 0.05$ ; \*\* $p < 0.01$ ; \*\*\* $p < 0.001$

the subject and the average mark of the students in each academic year, show marked increases in the average value obtained in the last of the academic years analyzed.

The Wilcoxon–Mann–Whitney test indicates the existence of significant statistical differences for all variables between the year 2012–2013 and the year 2015–2016 for a  $p < 0.001$ , with the exception of the variable “UD is a springboard for the real creation of your own company” which accounts for significant statistical differences for a  $p < 0.01$ . Thus, the improvement plans for the UD have had a possible impact on the studied variables; that is to say, in the results of the students’ learning, in the benefits and results obtained by the student taking the subject and in the motivation and effort from the students.

### Discussion and conclusions

Based on the literature review, it is clear that there is a lack of concrete subject designs that have been subject to in-depth longitudinal research which focuses on entrepreneurship. Therefore, this is a pioneering research that highlights the role of the UD in entrepreneurial education. Our work highlights the great utility of UD as an active training tool and is grounded in the demand–competence model pedagogy.

In addition, we have not found any papers in the academic literature which contain in-depth longitudinal research, such as that found in our work (we covered a period from 2012 to 2016), nor are we aware of the analysis and exploration of this specific topic by other researchers and/or the development and implementation of improvement plans in similar institutions. Given this gap, we feel that our research is novel, and that it makes a clear contribution to the knowledge of the topic in the area analyzed. It is likely that this gap is due to the short period, the new criteria and guidelines of the EHEA have been in force. Under this new scheme, UD are configured as a key component of the new educational paradigm in the EHEA. Finally, despite its importance, Spanish universities as well as many other universities around the world have not yet addressed this particular issue with the seriousness it merits. Our research can contribute as a starting point for expanding on and completing these studies, as well as the further exploration and analysis of the development and implementation of this topic in other similar institutions.

First, it is important to highlight that the level and “academic excellence” of the UD has increased, which translates to a general improvement in the teaching-learning process (McLean *et al.*, 2017). A substantial increase can be observed in the number of UD considered to be apt by the final evaluation Tribunal – once they have passed the evaluating committee’s filter – passing from 63.6 percent in academic year 2012–2013 to 95.7 percent in the year 2015–2016.

Moreover, there is a considerable increase in the average mark for each academic year (5.22 in 2012–2013 and 6.69 in 2015–2016) and in the number of UD with high grades – lower second, upper second – as well as the awarding of First Class Honors in the last two years, which were previously non-existent. In line with previous studies such as one by Pathirage *et al.* (2007), the students have highly valued the improvement in the course guide of the subject with the inclusion of the norms of linguistic accuracy, spelling and style and the addition of a detailed explanation of the causes for a not apt score. In addition, the production of the financial dossier has been valued as a great support for the completion of the economic and financial plan. In line with our proposal, other authors, such as Serrano-Gallardo *et al.* (2017) highlight as key factors behind the improvement of the UD grades, the modality of teamwork and the presentation at the first summons.

Second, the system of evaluation and grading implemented (Hand and Clewes, 2000) has turned out to be very useful. In particular, the creation of an evaluation committee as an initial filter to establish whether each UD is apt or not apt for presentation to the final evaluating Tribunal. Thus, most of the UD that have achieved an apt from the evaluation committee have gone on to obtain an apt qualification from the final evaluating Tribunal – to be precise

93.1 percent (2014–2015) and 95.6 percent (2015–2016). Through this, a greater efficiency is achieved in the formation and management of the Tribunals, as well as in the assignment of resources in general, given that those UD's that do not surpass the minimum level of quality required cannot be presented. Likewise, the overall number of not-apt UD's awarded by the committee and Tribunal combined, has also fallen slightly, as a consequence of the increase in the quality of the projects carried out by the students.

Furthermore, and in line with research such as that of by Harris and Bell (1994) and Pathirage *et al.* (2007) the planning and development of a more specific, thorough, detailed and better-defined evaluation rubric, has brought about a substantial improvement in the objectivity of the valuation and subsequent classification of the UD's under evaluation. Based on the evaluations made by the Tribunals/tutors and the decrease in the number of reclamations made by the students, it can be stated that the improvement in the detail within the rubric regarding what is required by the subject, along with a more detailed explanation of the reasons behind a fail, have had a very positive effect on the work carried out by the students and their motivation.

Third, the strengthening of the subject coordinators role with regard to monitoring and supervision of the projects (Balla and Boyle, 1994; De Kleijn *et al.*, 2015; Del Río *et al.*, 2017), the increase in the number of periodic meetings with tutors, the improvement in the wording and content of the teaching guide and the reduction in the number of complaints by enrolled students, leads us to believe that the problems in coordination detected between 2012 and 2014 have been reduced, which has been a key driver in the positive performance of the subject.

Fourth, according to our findings the student's interest and motivation for the UD subject has increased throughout the period analyzed (2012–2016). This could be due to the students placing a high value on the award of prizes for the best UD's, perceiving it as the factor in the subject that differentiates it from the other subjects in the degree. In fact, the success of this initiative has been such that the model of prize giving has been copied and put into practice on other degrees taught at the Social Sciences Faculty – finance, tourism or marketing degrees.

Moreover, in line with our results we can assert that the connection with the business incubator has brought about a sustained and increased interest in entrepreneurship and the program's link to the professional and work worlds. Most of the students showed an interest in creating a business, and in the last two academic years an average of three to four real companies have been created from the UD's carried out, which had been impossible to achieve during the period 2012–2014.

Based on the feedback from students, we can affirm that the limited access to relevant information was a pain point that resulted in poor dissertations. In this regard, for instance, the production of economic and financial dossier by the tutors provided excellent support for students and improved UD's in that specific area. Overall, improved student orientation and providing enhanced materials and detailed explanations of the subject requirements helped students substantially when studying and tackling the subject, despite its greater difficulty compared to other subjects in the degree.

Regarding the possibility that students choose their own subjects for the UD, we noted that academic literature is unclear on this topic. Nevertheless, our perception derived from feedback with the students indicates that in cases where student chooses their own subjects with the tutor's support and mentoring, they feel more motivated about their project. Furthermore, they do not feel lost or disoriented when making a choice about their subject focus. Finally, the lack of supporting documentation, students' difficulty in finding or accessing relevant information, etc., are issues that significantly affect the achievement of the UD. This requires providing specific dossiers to students, which is only possible if the student chooses a specific topic from among the mandatory subjects, based on their interests, and with the guidance of their tutor.

Additionally, what is most noteworthy is, without doubt, that all the measures taken have had a positive effect on the attitude and interest of the students in the subject. Students are more motivated and expend more effort on passing the subject. They also have a deeper understanding of its relevance with regard to their future professional lives and their incorporation into the labor market. Moreover, the coordination between teachers has not only sought the harmonizing of the content, development and evaluation of the subject, and the increase in the dissemination of good practices and solutions to common practices, but has also catalyzed an effective collaboration between teachers as they seek out and develop new innovative practices and changes which enrich the teaching-learning process in the subject. Furthermore, the role of the UD is strengthened, as it is a subject with a high potential to positively impact graduates' entry the labor market, where they can deploy the knowledge acquired throughout the degree.

We would also note that the entrepreneurial spirit was clearly instilled in students, with a large number of them considering creating their own business, using the UD as the basis for a business plan for their new company. Finally, it should be highlighted that in 2016 the Madri+d Foundation developed the process for supervision and control of the degree which culminated in a fair and favorable report for its re-accreditation, emphasizing in said report that the UD is one of the strong points that should be highlighted in the degree.

Finally, future research could analyze the effects of incorporating more technology into the UD matrix, specifically, information technologies, communication technologies, simulation platforms, interactive learning platforms, etc. One of the contributions of this paper is that it shows that improved tracking and greater support of projects has a direct and positive impact on students' learning process during the UD, as well as on student satisfaction with their learning outcome. This paper represents a first step in a promising research vector. Future research can focus on issues such as practices to improve tracking, establishing the optimal monitoring and autonomy mix (one of the strong points of UD is to learn from errors, after being corrected by tutors), the relationship between UD learning process outcomes and the periodicity of the tracking, forms of tracking, monitoring formats (in-person vs online), etc. In fact, the large number of outstanding issues to address makes this topic an extremely promising avenue for further research.

In regard to the business incubator, after the end of the UD, once the project shifts over to the incubator, it would be worthwhile to complement the academic mentor with an industry-related mentor. This practice is carried out in many incubators with excellent results, although few university incubators have such mentor. We believe that this could have a very positive impact on the entrepreneurial training of the student. However, it is currently an unexplored question, full of unknowns, which may be another promising and fruitful area to explore.

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