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ORIGINAL ARTICLE

The impact of entrepreneurship education in European universities: an intention-based approach analyzed in the Spanish area

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Abstract In the context of the wide-ranging social and economic changes that have been occurring in industrialized countries over recent decades, contemporary higher education institutions are seeing their missions expanded by the assignment of a further responsibility to provide a socio-economic boost, taking the form of the channelling of future generations of working population towards entrepreneurial goals in accordance with the new needs of the productive sector. In this context, the present study is aimed to analyze the impact of experiences of entrepreneurship education in the University on undergraduates' career behaviour as explained by intention-based models. Self-report data was collected from a sample of 800 Spanish university students, and PLS analyses showed a positive effect of education on perceived entrepreneurship feasibility, which in turn affected entrepreneurial intention and behaviour. Otherwise, perceived desirability was not related with the remaining variables in the model. Implications of these results and limitations of the study are discussed.

Keywords Entrepreneurship · Entrepreneurship education · Intention models · European universities · Spanish universities · Socio-economic welfare

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1 Introduction

Beyond the several functions performed by universities in the current knowledge society, it is largely assumed that the educational level acquired must qualify college students to practice a professional activity, which in turn must satisfy the demands of human capital required by the productive sector, in order to contribute to the socioeconomic welfare. From this point of view, universities have generally been institutions at the service of the labour market, including both the employment needs of students, and the qualified labour needs of public or private enterprises and institutions recruiting recent college graduates. Actually, graduates' employability rates are one of the criteria most often considered by novice students when choosing an university (James et al. 1999; Ivy 2001; Moogan et al. 2001; Ali-Choudhury et al. 2008).

To fulfil this transactional requirement, most university academic programmes in Spain have been centred so far on training wage-earner professionals (Vázquez et al. 2006, 2009a, b, 2010), this prevalent approach becoming insufficient since unemployment, flexibility and over-qualification have become the more representative descriptors of young people's work insertion over the last decade in this country (García-Montalvo 2007; National Institute of Statistics [INE] 2008; García-Montalvo and Peiró 2009) and Europe in general (Eurostat 2009; Organization for Economic Co-operation and Development 2009a, b).

For this reason, in the middle of the process of adaptation of the Spanish university system to the requirements of the new European Higher Education Area (EHEA), it is important to reconsider whether the transformations undertaken, both in the university aims and in the way in which these must be reached, will really enable a better response to the social needs and expectations frequently assigned to public universities in terms of employability and socioeconomic welfare. Such a reflexion is especially important at a time when university institutions find more and more reasons to adopt a market orientation (Rodríguez et al. 2003; Cambra-Verdún and Cambra-Fierro 2007), given the increasing competitiveness of higher education marketplace, the dependence on public financing, and the relevance of service quality criteria (Alves and Raposo 2004; Duarte et al. 2010).

In short, higher education institutions face the challenge of orienting its formative offer to the new labour demands (Llano 2003; Mora 2003; Flavián and Lozano 2004; Michavila 2009; Zabalda 2009), looking for innovative ways to make the most of the human capital generated and transform it in economic and social utility.

Looking for this purpose, entrepreneurship can be seen as a promising option of work insertion and professional development of recent university graduates, at the service of broader objectives of sustainable socioeconomic welfare. Not in vain, in the context of the wide-ranging social and economic changes that have been occurring in industrialized countries over recent decades, new, small enterprises have become a key element in creating employment, innovation and social welfare in all modern, competitive economies (e.g., Blau 1987; Acs et al. 1994; Thurik 1999; Audretsch et al. 2002; Audretsch 2003; Bosma et al. 2008). This is true to such an extent that encouragement for entrepreneurship is currently at the heart of a host of

requirements and public standards in the countries of the European Union (EU), in an effort that has reached out to affect economic, social, educational, and employment policies (European Commission 2000a, b, 2008; Enterprise Directorate General 2003).

From this framework, the purposes of this study are to provide a global overview of entrepreneurship education in European and Spanish universities and analyze its impact on undergraduates' career behaviour as explained by entrepreneurial intention-based models (Shapero and Sokol 1982).

2 Frameworks for entrepreneurship education in the European area

In the EU countries, governmental interest in entrepreneurship education began to be explicit in the Lisbon European Council, in March 2000, which set the objective of developing a dynamic enterprising culture and fostering new firm creation as source of sustainable competitiveness in Europe (European Commission 2000a). From this framework, it was contemplated, among others, the need of revising the European educational system and including entrepreneurship into the group of basic competences to be taught from the school to the University.

Later in the same year, the *European Chapter for Small Enterprises* (European Commission 2000b), currently renewed by the *Small Business Act* (European Commission 2008), also stressed the objective of encouraging entrepreneurial initiatives by young people and developing training programmes for small enterprises by educational institutions, particularly at secondary and university levels, in so far as they are focused towards service of individuals and society.

This objective has been integrated in different political programmes developed over the last decade in Europe as supportive frameworks for new and small enterprises (Decision 2000/819/CE of the Council; European Commission 2004; Decision 2006/1639/EC of the European Parliament and of the Council), education (European Union 2001, 2002, 2009) and employment (European Commission 2005).

An outcome of the political developments mentioned has been the inclusion of the sense of initiative and entrepreneurship in an *European Framework on Key Competences for Lifelong Learning* to be trained from both formal and informal educational systems (Recommendation 2006/962/EC of the European Parliament and of the Council). In this framework, the entrepreneurship competence is defined as *"(...) an individual's ability to turn ideas into action. It includes creativity, innovation and risk-taking, as well as the ability to plan and manage projects in order to achieve objectives"* (p. 17).

The advisability of promoting entrepreneurial mindsets as part of the academic mission of national education systems has extended to the current *Bologna Process* aimed to build a modern degree structure adapted to the professional profiles required by the current EU society. In this context, the project *Tuning educational structures in Europe* (González and Wagenaar 2003), devoted to the identification of learning results and desirable competences in several thematic areas, has included entrepreneurship into the group of systemic transversal competences to be trained along all levels of university higher education.

According to these specifications, European guidelines remark three fundamental objectives of entrepreneurship training programmes in the University (Enterprise Directorate General 2002, 2008a):

- developing entrepreneurial drive among students and raising their awareness of self-employment as a career option;
- providing the technical and business skills that are needed to identify and exploit business opportunities, set up a new firm and manage its growth; and
- promoting the development of personal qualities that are relevant to entrepreneurship, such as creativity, risk-taking and responsibility.

Despite this political commitment, advances in entrepreneurship education don't follow the same pattern in all regions of the European continent. Based on the results of the *Survey of entrepreneurship in higher education in Europe* carried out with samples of most European countries (Enterprise Directorate General 2008b), it is estimated that more than half of Europe's students at the higher educational level don't have access to entrepreneurship education. This means that about 11 million students have no opportunity to engage in curricular or extracurricular activities that can stimulate their entrepreneurial spirit.

The survey also leads to conclude that, whereas more and more European universities have nowadays some institutional system to disseminate the entrepreneurial culture and give support to new venture creation, entrepreneurship education at a curricular level seems to be influenced by geographic location. In general, students in the countries members of the EU have better access to entrepreneurship education than students in non-member countries or in those which have recently joined the EU. That is, more institutions in Western Europe offer entrepreneurial education compared to Eastern Europe.

However, the study doesn't support the assumption that entrepreneurship education in the last countries is less elaborate than in the former. In fact, it seems that more institutions in Eastern Europe have a broader model of entrepreneurship education, with more institutions having entrepreneurial professors and degrees, placing the strategic responsibility at the top-management, and providing recognition for achievements in the discipline.

3 The reach of entrepreneurship education in Spain

The Spanish educational system has begun to take the first steps towards the fulfilment of the purposes marked by the European Commission with regard to entrepreneurship education. Thereby, most public universities have developed and implemented specific extracurricular mechanisms to give support to potential entrepreneurial initiatives emerged from the heart of the own institutional fellowship, in the form of an increasing number of University-Enterprise foundations, business chairs, spin-off programmes or specific institutional programmes and centres on entrepreneurship (Directorate General of Small and Medium Enterprise Policy [DGPYME] 2006; National Agency for Quality Assessment and Accreditation [ANECA] 2007).

From this extracurricular approach, entrepreneurship education is concerned to raising, support an accompaniment services for potential and nascent entrepreneurs, in order to drive them towards successful start-ups. Revision of several descriptions of best practices on this matter in Spanish universities (e.g., Ruíz et al. 2004; Placer and Vázquez 2005; Liñán 2007; Corduras et al. 2008; Toledano and Urbano 2008; Sierra 2010) point to three categories of institutional support to promote entrepreneurship: motivational, formative and instrumental.

Motivational support is concerned to actions oriented to raise students' awareness of business start-up as an alternative career choice, thus including motivation and encouragement actions, receptivity to students' interests, spreading campaigns, etc.

Formative support embraces actions devoted to improve access of undergraduates to sources of information and training in entrepreneurship competences, besides formal academic programmes. It includes information about business creation, services of counselling, entrepreneurship training courses, etc.

Finally, instrumental support refers to provision of resources for business start-up, including mentorship and monitoring, business plan assistance, financial resources, etc.

On the other hand, it seems that efforts made to develop specific entrepreneurial competences and foster favourable attitudes towards entrepreneurship through the own academic curricula are yet insufficient and unsatisfactory. In this sense, whereas political awareness has resulted in a significant increment of isolated formative actions, both their range and methodological refinement are very limited (DGPYME 2006).To be precise, formal instruction in knowledge and abilities concerning new venture creation is usually limited to academic plans of degrees related to Business and Technical areas, it being practically absent in the curriculum of other disciplines, specially within Humanities and Health Sciences (DGPYME 2006; Vázquez et al. 2006, 2009a).

Likewise, some studies carried out in Spanish universities point to the conclusion that students of all types of faculties and degrees perceive a general under-consideration of entrepreneurship issues in the university agenda, and express a global desire of a greater curricular and extracurricular treatment of the enterprising spirit (Vázquez et al. 2006, 2009a, 2010).

This lack of entrepreneurship education in Spanish universities is due to many factors affecting most institutions of higher education in European countries, particularly the shortage of human and financial resources, the rigid organizational structure of higher education institutions, the poor multidisciplinary tradition in the organization of academic programmes, and the low motivation and training of professors in entrepreneurship issues (Enterprise Directorate General 2008a, b).

From this evidence, it should be a priority concern the identification of useful mechanisms to facilitate the emergence of entrepreneurial interest and initiatives among undergraduate students. In this sense, while many previous studies suggest that learning experiences provided by formal educational systems affect the development of entrepreneurial vocations in students (e.g., Smith et al. 2006; Soutaris et al. 2007; Matlay 2008), there are less evidence about the specific mechanisms though which higher education impacts on the entrepreneurial preferences and choices of people. To fill this gap, in this paper we propose a

model to evaluate the attitudinal and intentional effects of entrepreneurship education in the University.

4 The effects of entrepreneurship education on entrepreneurial intention and behaviour. Hypotheses

Shortages in university entrepreneurship education are congruent with the poor involvement of young graduates in business initiatives. For example, in Spain, only 7.3% of new enterprises created in 2009 were initiated by entrepreneurs younger than 25 years old, and the average age of entrepreneurs were nearly 40 years old. What is more, despite that 35.3% of Spanish entrepreneurs rely on higher education, they tend to start their business years after finishing the university degree (de la Vega et al. 2009). A similar pattern of results has been observed in other European countries with a similar economic level (European Commission 2007; Bosma and Levie 2009). On these lines, justification of greater entrepreneurship education in universities is inherent in the potential outcomes derived from it in students.

The Model of the Entrepreneurial Event (Shapero and Sokol 1982) has been one of the approaches most often applied over the last few decades to the study of entrepreneurial behaviour in university environments (Krueger 1993; Krueger et al. 2000; Peterman and Kennedy 2003; Veciana et al. 2005; Liñán and Santos 2007; Guerrero et al. 2008; Vázquez et al. 2009b; Fitzsimmons and Douglas 2011). From this framework, it is assumed that the most immediate antecedent of new firm creation underlies in the intention to carry out such behaviour.

In psychological literature, intention is assumed to capture the motivational factors that influence the behaviour. That is to say, it is an indicator of how hard people are willing to try in order to behave in a specific manner to achieve a goal. For this reason, intention appears as a good predictor of planned behaviour (Ajzen 1991), especially if this is difficult to perform and demands a great amount of resources. In fact, meta-analyses have shown empirically that intention predicts behaviour successfully, and explains 30% or more of the variance in it, this figure over the 10% typically explained by other direct measures (Kim and Hunter 1993).

New businesses emerge over time and involve considerably planning. Nascent entrepreneurs don't launch their new firms in an automatic manner as a conditioned response to a stimulus, but starting a business is a complex career decision reflecting some degree of cognitive processing. Since entrepreneurship clearly represents planned, intentional behaviour (Bird 1988; Katz and Gartner 1988), it seems useful to research it by using formal intent models (Krueger et al. 2000). In conclusion, as entrepreneurial intention involves a deep commitment to new venture creation, the more the intention to start a business, the more the likelihood of performing such a behaviour (e.g., Shapero and Sokol 1982; Krueger 1993; Krueger et al. 2000). From this view, we propose the following hypothesis to explain the emergence of entrepreneurship career choices among future university graduates:

H1: Entrepreneurial intention directly influences entrepreneurial behaviour.

Shapero and Sokol's model (1982) also states that the formation of an entrepreneurial intention is in turn determined by individuals' attitudes

towards the feasibility and desirability of creating a new venture, which convey the potential effects of other endogenous or exogenous variables such as education.

First, perceived feasibility refers to the perceptions that new venture creation is realizable and personally controllable (Shapero and Sokol 1982). It reflects the degree to which the potential entrepreneur considers entrepreneurial prospects to be easy to reach, taking into account personal competences and availability of external resources (Krueger 1993; Krueger et al. 2000; Peterman and Kennedy 2003; Guerrero et al. 2008; Vázquez et al. 2009b; Fitzsimmons and Douglas 2011). Also, it involves the perceived chances of success in achieving the objectives of the new firm (Krueger 1993; Peterman and Kennedy 2003; Vázquez et al. 2009b).

By its hand, perceived desirability can be defined as the personal attractiveness of starting a business (Shapero and Sokol 1982). More specifically, it refers to the degree to which the individual has a favourable or unfavourable evaluation of the entrepreneurial behaviour (Krueger 1993; Krueger et al. 2000; Peterman and Kennedy 2003; Veciana et al. 2005; Guerrero et al. 2008) and finds the outcomes of starting a business to be attractive and potentially beneficial (Vázquez et al. 2009b; Fitzsimmons and Douglas 2011).

Several previous studies back up a positive relationship between perceived feasibility and desirability and the entrepreneurial intentionality of university undergraduates (e.g., Krueger et al. 2000; Guerrero et al. 2008; Vázquez et al. 2009b; Fitzsimmons and Douglas 2011). In short, it seems that young students choose entrepreneurial careers when they feel competent for self-employment and anticipate positive outcomes in such pursuits. Therefore, the second hypothesis states that:

H2: Perceived feasibility and desirability directly influence entrepreneurial intention.

In the context of the previous hypotheses, the Model of the Entrepreneurial Event (Shapero and Sokol 1982) argues that perceived feasibility and desirability affect entrepreneurial behaviour indirectly, by total mediation of intention. In the same line, some studies have found that attitudes involved in the formation of entrepreneurial intentions help to predict future behaviour (Carter et al. 2003; McGee et al. 2009). Based on this previous evidence, we propose the following hypothesis:

H3: Perceived feasibility and desirability indirectly influence entrepreneurial behaviour, through their effect on entrepreneurial intention.

Among the potential precursors of perceived feasibility and desirability in new venture creation, academics agree that entrepreneurship attitudes and intentions are perceived dimensions and, such as, vary between individuals and situations, and can be modelled through learning experiences and specific incentives (Robinson et al. 1991; Dyer 1994; Krueger and Brazeal 1994; Krueger et al. 2000; Soutaris et al. 2007; Liñán et al. 2008).

In this respect, Krueger and Brazeal (1994) advance that entrepreneurship education should improve people's knowledge and self-confidence and show the rewards of business start-up initiatives, thus fostering perceived feasibility and desirability of entrepreneurial behaviour. Likewise, Soutaris et al. (2007) hold

that availability of support and resources should influence on attitudes determining entrepreneurial intentions and behaviours. Based on this perspective, previous research has analysed successfully the influence of university education on attitudes towards self-employment as conceptualized by the Model of the Entrepreneurial Event (Toledano and Urbano 2008; Vázquez et al. 2009b).

In short, taking into account the universities' responsibility as sources of progress and growth through the professional training of qualified labour for the diverse functions required by the socioeconomic reality, these institutions should provide the formative resources and institutional supports needed to favour competence and control feelings of students when considering the alternative of starting an enterprising project. Also, it would be expected that the transit through University encouraged students to view new venture creation as a work option highly desirable and beneficial in an increasingly complex labour market. From this view, we hypothesize that:

H4: Experiences of entrepreneurship education directly influence perceived feasibility and desirability.

Finally, there is also evidence of the positive effect of entrepreneurship education at the university on entrepreneurial intentions and behaviours (e.g., Liñán and Rodríguez 2005; Soutaris et al. 2007; Corduras et al. 2008). Based on the predictions of Shapero and Sokol's model (1982), we propose in this work that such an influence of experienced entrepreneurship education might be distal on intentions and behaviours, by total mediation of attitudes:

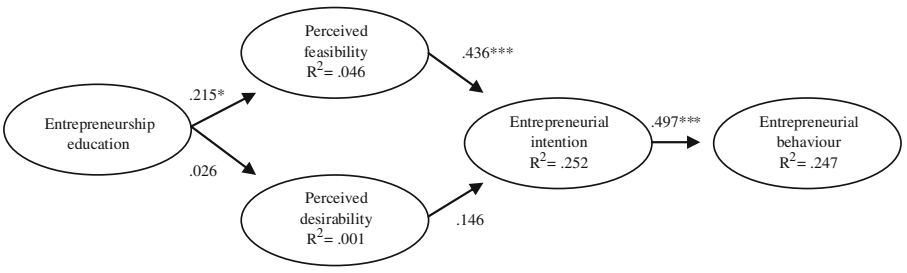
H5: Experiences of entrepreneurship education indirectly influence entrepreneurial intention and behaviour, through their effect on perceived feasibility and desirability.

According to the hypotheses proposed, the research model used is presented in Fig 1.

5 Research methodology

5.1 Sampling method

We used a survey approach to test the hypotheses of the model. In order to make it possible the generalization of results to different institutional contexts, the study



Note. *$p < .05$; ** $p < .01$; *** $p < .001$

Fig. 1 Research model

sample consisted of undergraduate students at two Spanish universities with different tradition, size and international prestige: the Complutesian University of Madrid and the University of León.

Established in the XVI century, and with more than 87.000 students, the Complutesian University of Madrid is one of the universities of reference in Spain, occupying favourable positions in many international classifications—such as the *Academic Ranking of World Universities* of the Shangai Joao Tong University[1]—based on research quality criteria, formative capacity and demand, availability of physical and human resources, international presence, etc.

On its part, the University of León belongs to the majority group of Spanish universities of less age and moderate dimensions, it being composed of nearly 13.000 students after 30 years of history.

Despite the discrepancies described, both universities fit the requirements of the research, since they are engaged in several initiatives aimed to foster entrepreneurship among students, in the form of business chairs and specific institutional foundations and programmes. Thus, according to the research purposes, it was ensured the exposure of students in the study to some degree of entrepreneurship education.

Once justified the choice of the two universities mentioned, data collection was performed from February to June 2010. Participants were registered from the final year of former First and Second Cycle that are being phased out in Spain, in order to provide evidence of the state of the matter in students with enough previous university experience and derive recommendations of use in determining the structure of the new Bachelor-level degrees suited to the EHEA.[2]

The total sample comprised 800 university students (400 from each university), ensuring a criterion of representativeness of 95% (being e = ±5%; $p=q = 0.50$).

Participants were selected through a procedure of stratified sampling, in accordance with the real distribution of students by field of study in each university. Based on this procedure, 53.1% of respondents indicated a main academic background on Social Sciences and Law, 14.6% on Technical Subjects, 12.3% on Health Sciences, 11.3% on Experimental Sciences, and 8.8% on Humanities.

Among the total of participants, 530 were females (66.3%) and 270 males (33.8%), aged 18 to 48 years old, the mean age being 23.16 (SD = 3.14).

5.2 Measures

In gathering data for the study, we developed a self-reporting questionnaire following a careful procedure to ensure an adequate content validity of scales. Specifically, we used a deductive approach based on the operational definition of the theoretical constructs arising from an in-depth review of the specialist literature on the topic and other similar tools for measurement, intended to identify specific

[1] Available in http://www.arwu.org

[2] The new Bachelor-level degrees suited to the EHEA began to be implemented in some Spanish universities along academic courses 2008–09 and 2009–10, completing the 47.8% of the process to be ended in the course 2010–11 (Ministry of Education 2009).

indicators upon which to build up the scales. Similarly, the final version of the questionnaire was the product of refinement of the items included on the basis of the opinions of three experts in the field about the suitability of the indicators proposed for measuring the variables of interest.

Data collection was based on a procedure of collective voluntary self-administration of the final questionnaire to groups of students. This was done in the context of timetabled university classes randomly selected for each knowledge area, after obtaining approval from the academic member of staff responsible in all cases and in the presence of a researcher trained for this end.

The questionnaire administered comprised various scales for measuring the variables included in the model: experienced entrepreneurship education, perceived feasibility, perceived desirability, entrepreneurial intention and entrepreneurial behaviour.

Experienced entrepreneurship education was assessed through 5 items about the perceived implication of home university in related actions. From a previous revision of the most frequent initiatives implemented in the universities surveyed, these actions were related to motivational (e.g., 'campaigns to raise the entrepreneurial spirit') and formative ('business start-up counselling') institutional support. For each item, participants had to answer on a Likert-type scale ranging from 0 (*not implicated at all*) to 10 (*very implicated*).

To assess perceived feasibility we asked students about their perceptions of competence to execute 7 typical entrepreneurship activities, for example, 'to identify a business opportunity in the market' or 'to gather the resources needed to pursue a business opportunity'. For each entrepreneurial activity, responses were ranged on a Likert type scale from 0 (*completely incapable*) to 10 (*perfectly able*).

Perceived desirability was measured by using a scale of 3 items referred to potential rewards derived from becoming an entrepreneur (e.g., 'economic incomes'). Respondents were asked to report their degree of accordance with the possibility to obtain each outcome on a Likert-point scale from 0 (*strongly disagree*) to 10 (*strongly agree*).

Entrepreneurial intention was measured with two items about undergraduates' preferences for self-employment and likelihood of starting a business at the end of higher education. Accordance responses were ranged on a Likert scale from 0 (*strongly disagree*) to 10 (*strongly agree*).

Finally, to assess entrepreneurial behaviour participants were asked to report their degree of accordance with two statements about their involvement in specific actions oriented to new firm creation (e.g., 'gathering resources'). Again, they had to use a Likert scale from 0 (*strongly disagree*) to 10 (*strongly agree*).

5.3 Data analysis

The data collected was analyzed through SPSS 17.0 for correlational and descriptive purposes. Then, the partial least squared (PLS) technique was used to test the proposed model.

The PLS method consists of a statistical modeling-based technique through structural equations that allow for the simultaneous estimation of a group of equations, by measuring the concepts (measurement model or outer model) and the

relationships between them (structural model or inner model), and it has the capacity to address concepts not directly observable. Unlike covariance-based methods, PLS aims to maximize the variance explained by indicators and latent variables. A series of iterative factorial analyses is performed through the ordinal least squares (OLS) estimation technique, combining linear and multiple regression for path analyses.

Based on this procedure, the estimation of the model is carried out in two stages, as recommended by Anderson and Gerbing (1988). For reflective measures of constructs, the first stage involves the evaluation of the strength of the measurement model, by looking at individual item reliability, internal consistency and construct validity. Once verified the measurement model's reliability and validity, the second stage focus on the estimation of fit parameters for the structural model, thus informing about the fulfillment of hypotheses through standardized path coefficients and R^2 index. Likewise, global fit of the model in terms of predictive relevance is estimated through a *jackknife* procedure based on the test Stone-Geiser (Geisser 1974; Stone 1974). In these terms, the Q^2 statistic represents a measure of how well observed values are reconstructed by the model and its parameters estimates.

6 Results

6.1 Correlational and descriptive analysis

Table 1 presents the means, standard deviations and correlation coefficients among the study variables. As expected, most variables were positively correlated, thus showing a significant relationship between experiences of entrepreneurship education in the University and results in terms of perceived feasibility and desirability and entrepreneurial intentions and behaviours. Only correlation between entrepreneurship education and perceived desirability was not significant, thus suggesting a poor effect of education on expected outcomes from self-employment.

An inspection of mean scores discloses a poor assessment of the motivational and formative supports provided by the universities surveyed to satisfy the entrepreneurial aspirations of undergraduates, with an average score of 2.71 in the education

Table 1 Means, standard deviations (SD) and correlations among variables

	1	2	3	4	5
1. Entrepreneurship education	–				
2. Perceived feasibility	.22**	–			
3. Perceived desirability	.04	.32**	–		
4. Entrepreneurial intention	.15**	.46**	.29**	–	
5. Entrepreneurial behaviour	.26**	.35**	.09*	.46**	–
M	2.71	5.15	6.81	4.01	1.16
SD	2.00	2.14	2.14	2.54	1.96

*$p<.05$; **$p<.01$

scale, under the intermediate value of 5. In the same line, participants reported a generalized low preference for entrepreneurship as a career choice, the mean values being of 4.01 and 1.16 in the entrepreneurial intention and behaviour scales.

Otherwise, students felt relatively confident in the feasibility of starting their own business, with an average score of 5.15 in that scale. Furthermore, participants assessed positively the outcomes attributed to self-employment career choices, with an average score of 6.81 in the perceived desirability scale.

6.2 Evaluation of the measurement model

As previously mentioned, the first stage of PLS modeling involves assurance that the measures used reflect the underlying theoretical constructs, by looking at items' reliability and scales' internal consistency and construct validity.

As displayed in Table 2, all items loadings were above the minimum level 0.5 for acceptability (Barclay et al. 1995; Chin 1998a, b). The significance of loadings was further verified through a bootstrap procedure with 200 sub-samples, for obtaining

Table 2 Indicators for measurement model evaluation

Item/scale	Loadings (0)	Communality	*t*	α	ρ_c	AVE
Entrepreneurship education				.732	.738	.586
Raising the entrepreneurial spirit	.849	.721	7.50***			
Receptivity to students' interest	.563	.317	1.70*			
Information about business creation	.810	.656	6.76***			
Entrepreneurship counselling	.560	.314	2.04*			
Entrepreneurship training courses	.559	.312	2.12*			
Perceived feasibility				.914	.932	.663
To identify a business opportunity	.765	.571	13.52***			
To gather resources	.787	.619	16.41***			
To manage a new business	.885	.783	27.22***			
To organize the production functions	.890	.792	33.36***			
To commercialize products	.835	.697	17.80***			
To administrate and do the accounts	.774	.599	14.43***			
To recruit and manage the workforce	.750	.562	12.58***			
Perceived desirability				.846	.907	.765
Economic incomes	.895	.801	20.51***			
Work security and stability	.889	.790	18.59***			
Social prestige and approval	.839	.704	12.67***			
Entrepreneurial intention				.713	.871	.772
Preference for entrepreneurship	.831	.690	17.72***			
Probability of entrepreneurship	.923	.852	55.84***			
Entrepreneurial behaviour				.855	.932	.873
Gathering resources	.939	.882	40.16***			
Start-up activities	.930	.865	24.80***			

*$p<.05$; **$p<.01$; ***$p<.001$

significant *t*-statistic values at 0.95 level (based on $t_{(199)}$, two-tailed test). Likewise, communalities were well above the minimum 0.25 (Bollen 1989), the latent constructs explaining between the 31.2% and the 88.2% of variance in their respective observed indicators.

Regarding the internal consistency of scales, the examination of the Cronbach's alpha (α) and the composite reliability (ρ_c) reveals values exceeding the minimum threshold of 0.7 (Nunnally 1978; Nunnally and Bernstein 1994; Barclay et al. 1995; Hair et al. 1998), what ensures that the occurrence of random error of measures was minimized.

Convergent validity was tested by the index Average Variance Extracted (AVE). In all cases, values were above the minimum benchmark of 0.5 (Fornell and Lacker 1981), meaning that 50% or more variance of the indicators was accounted for. Next, we checked the correlation matrix of latent variables, with the squares roots of AVE values as diagonal elements, and no problem was detected, thus suggesting adequate discriminant validity.

6.3 Evaluation of the structural model

Once analyzed the reliability and validity of the measures, PLS technique was used to assess the explanatory power of the hypothesized relationships among constructs (Fig. 1).

Statistical significance of path coefficients was tested by performing a bootstrapping with 200 subsamples, to obtain the *t*-statistic values associated to these predictive links (Chin 1998a). Table 3 shows the direct and indirect effects obtained by this procedure.

According to hypothesis 1, it was confirmed a direct effect of entrepreneurial intention on entrepreneurial behaviour, explaining 24.85% of variance.

Hypotheses 2 and 3 were only partially supported, as results confirmed a direct effect of perceived feasibility on entrepreneurial intention, and indirect on

Table 3 Direct and total effects

	Direct effects			Total effects		
	Coef.	Variance	*t*	Coef.	Variance	*t*
Intention → behaviour	.497	24.85%	6.44***			
Feasibility → intention	.436	21.36%	4.89***			
Feasibility → behaviour				.216	7.73%	3.39***
Desirability → intention	.146	4.23%	1.5			
Desirability → behaviour				.072	0.62%	1.52
Education → feasibility	.215	4.51%	1.94*			
Education → desirability	.026	0.07%	0.22			
Education → intention				.048	0.67%	1.49
Education → behaviour				.048	0.96%	1.37

*$p<.05$; **$p<.01$; ***$p<.001$

entrepreneurial behaviour totally mediated by entrepreneurial intention. These effects explained 21.36% of variance in intention and 7.73% of variance in behaviour. Nevertheless, effects of perceived desirability on entrepreneurial intention and behaviour didn't reach statistical significance.

Likewise, there was a positive direct effect of experienced entrepreneurship education on perceived feasibility, explaining a reduced 4.51% of variance. The effect of education on perceived desirability wasn't significant, hipothesis 4 being only partially confirmed. Hipothesis 5 was not supported, since there weren't any indirect effect of entrepreneurship education on intention and behaviour.

Beyond the analysis of the magnitude and significance of path coefficients, R^2 indexes for entrepreneurial intention and behaviour were above the minimum threshold of 0.10 (Falk and Miller, 1992), the overall model explaining 25.2% of variance in intention and 24.7% in behaviour.

Finally, the jackknife Q^2 statistic for predictive relevance was .180 for entrepreneurial intention and .212 for behaviour, concluding a relatively low overall fit of the model.

7 Conclusions

Entrepreneurial activities act as one of main driving forces for economic and social development world around. European governments have become increasingly aware of that in the last decade and a great amount of political measures have been suggested to include entrepreneurship education as part of academic curricula in higher education institutions (European Commission 2000a, b, 2008; Enterprise Directorate General 2003). However, most high level programmes seem to be much more centred on training wage-earner managers or technicians, than offering qualified and responsible entrepreneurs and enterprises to society (Enterprise Directorate General 2008b; Vázquez et al. 2006, 2009a, b, 2010).

From this evidence, it should be a priority concern the identification of useful mechanisms to facilitate the emergence of entrepreneurial interests and initiatives among undergraduate students. In this sense, this study was aimed to analyze the impact of experiences of entrepreneurship education in the University on undergraduates' career behaviour as explained by entrepreneurial intention-based models (Shapero and Sokol 1982).

On these lines, and consistent with the long tradition of theoretical models that set intention as the principal antecedent of planned behaviour (Ajzen 1991), a direct positive effect was found from entrepreneurial intention upon the degree of involvement shown by students in early activities relating to putting into practice a business idea. Also, perceptions of feasibility were the principal predictor of entrepreneurial intention and mediated the influence of this variable on start-up behaviour, whereas perceived desirability didn't affect entrepreneurial intention and behaviour.

This finding leads to the conclusion that a feeling of personal competence associated with the perceived viability of entrepreneurial behaviour constitutes among future university graduates the principal determinant of their professional involvement in such prospects. Nevertheless, perceptions of desirability in terms of

outcome expectations act in a relatively independent way in defining the entrepreneurial potential of university students. This is because the context is one of moderate preferences for self-employment as a feasible career choice and faint positive attitudes towards the results of such an effort, which don't appear to translate adequately into short-term business achievements because of the obstacles in the process perceived.

Beyond the results described, our model included higher education as a precursor of entrepreneurship attitudes, intentions and actions. In general, the results obtained made it clear the very limited involvement of the Spanish universities analyzed in motivational and formative initiatives as perceived by students, together with a predictive link between that entrepreneurship education and perceived feasibility. Nevertheless, that effect wasn't extensible to perceived feasibility or entrepreneurship intention and behaviour. In brief, very little influence from higher education in universities over the encouragement of entrepreneurial initiative among students was detected.

In the light of this evidence, it is possible to reach the conclusion that perceived institutional support acts as an environmental factor providing information on the viability of business start-up rather than promoting career decisions on this point. This conclusion is not surprising, in view of the large amount of previous evidence confirming the limited current involvement and effectiveness of Spanish and European educational institutions in this short of objectives (DGPYME 2006; Vázquez et al. 2006, 2009a, b, 2010; Bosma et al. 2008; Enterprise Directorate General 2008b; de la Vega et al. 2009; Corduras et al. 2010), supporting the idea that the responsibility for enhancing the entrepreneurial spirit has for the moment not been widely taken on board by the universities of our continent.

While it is true that little solid support was found for the initial approach involving an intention-based model applied to the developing of entrepreneurial initiatives in contexts of higher education, it is possible to point to certain practical implications of the work described here. Particularly, the pattern of results reaffirms the need to reinforce the joint work of universities, public authorities and other community agencies in the design of specific procedures applicable to the setting up of an integrated strategy for entrepreneurship education.

In view of these converging aims, the climate of change currently reigning thanks to the progressive establishment of new degree programmes adapted to the EHEA offers an excellent opportunity to work on the design of teaching programmes meeting the requirements to encourage entrepreneurship. To serve this curriculum planning effort, and by way of suggestions for good practices, the empirical model arising from the work described above sets the stimulation of an individual feeling of competence as an entrepreneur at the very heart of any educational intervention.

8 Limitations and future research

The reach of the results obtained in the study carried out should be interpreted in the light of certain methodological limitations, which leave the door open for further work in this field.

First, it should be noted that majority of scales used for measuring the variables in the model were drawn up ad hoc for the purposes of this research. Hence, they will require future validation to check their usefulness for the purposes assigned to them in this work. While such advances are awaited, although the preliminary statistical analyses carried out provided some evidence of the reliability and validity of the questionnaire used, the capacity of the measurement model put forward to account for the predictive relationships between variables hypothesized is subject to a considerable refinement of the indicators initially proposed. This is because it eventually involved the drawing up of scales composed of only a few items.

Furthermore, despite the usefulness of the comparative cross-sectional design used in understanding the aspirations and work projects of future university graduates, further longitudinal analyses are needed to give an account of the development of initial processes of selection of entrepreneurial careers into the tangible form of new successful enterprises in the market-place. This would be by means of following up the entrepreneurial sequence as it develops over time among the same group of students.

At the same time, the limited prominence attributed in the present work to university institutions in channelling the entrepreneurial potential of students over the short term presupposes a need to accept the existence of other sorts of triggers for such nascent entrepreneurial initiative. Hence, there is justification for the view that it is appropriate to expand the investigation focus adopted here through the inclusion of other endogenous or exogenous factors with a potential to cause direct influences or moderate many of the relationships hypothesized between variables. Such a line of work would constitute a more decisive advance towards the identification of the personal, behavioural and environmental processes likely to be affected by higher education in attempts at encouraging student entrepreneurial initiatives.

Changing the angle, while the fact that the empirical study was carried out in two different Spanish universities demonstrates that the conclusions drawn from it are sufficiently solid, further studies are required to allow generalization of the results to other Spanish or European institutions. It would even be appropriate to consider other models of tertiary education with the aim of gaining greater precision in the identification of the factors in curriculum planning or the institutional environment itself that determine the level of effectiveness attained in encouraging entrepreneurial initiative in the young.

Finally, in respect of the methodology applied to the analysis of the data recorded, it is essential to point out that, while procedures based on a model of structural equations permit assessment of the degree to which certain empirical results are consistent with the theoretical model previously hypothesized, they cannot in any way provide evidence to support the idea that only one single representation of reality is possible on the basis of the data available. Hence, the cross-sectional nature of the design used means that the conclusions put forward in this work must be interpreted as evidence of statistically significant relationships between variables, rather than as inferences of causal links between them. For these purposes, further research based on longitudinal experimental studies is required. This would also allow isolation of the effects of other types of exogenous or endogenous variables that may interfere in the achievement of entrepreneurial goals by university students.

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