

The role of creativity in entrepreneurship: an empirical study on business undergraduates

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Received 24 August 2016
Revised 6 February 2017
Accepted 16 February 2017

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Abstract

Purpose – The purpose of this paper is to analyse the creativity level of business administration undergraduates who have attended an entrepreneurship seminar in contrast to those that have not.

Design/methodology/approach – Using two samples of Spanish students, the factors that condition the creation of new start-ups are analysed. A survey following the creativity items from the Kirton Adaption-Innovation (KAI) inventory was employed for a start-up seminar students and a control sample. Non-parametric tests were carried out on the responses.

Findings – The results show that Spanish business students' entrepreneurial intentions are not conditioned by entrepreneurial courses, parental self-employment or by their creativity level. However, there are differences in creativity level by genders for their future ability to start-up a company.

Practical implications – There are no external constraints on not being an entrepreneur, who plays a fundamental role in the future of a country and it is a way to reduce current youth unemployment rates. Social and educational implications are also presented.

Originality/value – The use of the KAI inventory as a proxy of creativity index is original in the research. Moreover, this study contributes to a better understanding of the factors in becoming an entrepreneur, through exposure to creativity, growing up around businesses and awareness of individual creativity index. Integration of university courses with entrepreneurship actions will be of interest to the society development.

Keywords Higher education, Gender, Entrepreneurial intention, Creativity, Entrepreneurial education, KAI inventory

Paper type Research paper

Introduction

Entrepreneurship may be a solution to create new jobs for young people in times of crisis as the entrepreneurial behaviour of economic actors within an economy is supposed to potentially create new employment opportunities (Kuckertz and Wagner, 2010). Many governments boost entrepreneurial initiatives through new laws. In that same line, universities are offering nowadays more courses in entrepreneurship. However, some studies support the argument that the entrepreneurial attitude is greatly influenced by a country's cultural heritage (Martz *et al.*, 2003), as well as by sociological (Stanworth *et al.*, 1989) and educational (Korhonen *et al.*, 2011) determinants. In some countries such as Spain, one of the nations with the highest youth unemployment rate in the world, the culture of entrepreneurship is not generalized. Indeed, the early-stage entrepreneurial activity rate (TEA) between the ages of 18 and 65 is 5.5 per cent, one of the lowest in Europe, according to GEM 2014 global report. This report also explains that the main motivation for avoiding entrepreneurship is the fear of failure. A total of 64 per cent of failed entrepreneurs did not want to try again (Global Entrepreneurship Monitor, 2015). Moreover, in Spain there is a low level of proactivity, related to their entrepreneurial intentions (de los Ríos Berjillos *et al.*, 2015).



The European Commission has published a report known as EntreComp (Bacigalupo *et al.*, 2016) about the entrepreneurship competence framework “to address skills challenges that Europe is currently facing”. One of the competences highlighted on that report for employability and competitiveness is entrepreneurship and creativity which is a fundamental trait for an entrepreneur. This spirit of innovation is intimately linked to originality and both are in relation with creativity, but only a few universities prepare new professionals with those skills. Indeed, there is a “current narrow view on the role of universities in knowledge-based economies” (Van Der Steen and Enders, 2008). However, many university students could reject this issue of being entrepreneurs because they could feel that they are not creative, they do not have creativity.

Bearing all these things in mind, entrepreneurial initiatives for undergraduate students could alleviate youth unemployment while creating new ventures and jobs. Thus, the objective of this paper is to analyse an entrepreneurial course and the level of creativity on a sample of undergraduate students, focussing on their intentions to start-up a business and the factors conditioning their entrepreneurial intentions. Those intentions are likely to translate into subsequent potential entrepreneurial behaviour (Kuckertz and Wagner, 2010). We hypothesize a significant difference in the creativity level between the students enrolled in the entrepreneurial course and those that did not feel the need to start up a new business idea in line with Goldsmith and Kerr (1991). Other factors found in prior studies, such as gender or parental self-employment status, will also be studied. The methodology used is based on non-parametric testing.

The first contribution of this paper is that this research uses the Kirton Adaption-Innovation (KAI) inventory as a proxy of creativity index after a proposal of a creative activity. KAI is a cognitive style measure to explore and describe problem-solving, teamwork and creativity. Thus, it can be used as a creativity index, following Dr Kirton's own definition of creativity as a capacity for initiating change (Kirton, 2003). Second, this study focusses on students, potential entrepreneurs as the number of papers about this group is scarce. Third, we test the KAI index of potential entrepreneurs as a creativity proxy after attending an entrepreneurial seminar, the initial stages of a start-up company, when more creativity is needed, for example, to define the purpose of the business. Finally, the results may be useful for policy-makers and university managers because there is a gap between real business and academic subjects in the entrepreneurial topic.

Theoretical foundations and hypotheses development

Entrepreneurship has been for a long time a topic of study due to its positive implications for economic growth (Quadri, 2000) and job creation (Malchow-Møller *et al.*, 2011). Moreover, in a period of global economic stagnation, entrepreneurship plays a key role for many governments in boosting economic development. State universities, as centres of knowledge, should also “contribute to the economic growth of the regions where they are located” (Rodeiro *et al.*, 2012, p. 93). However, that profile is not common for universities in non-Anglo-Saxon countries, like Spain, more traditional and conservatively teaching oriented, although this trend is changing and many European universities have technological and industrial centres in order to foster the start-up of spin-offs.

Furthermore, not only are start-up companies important for universities, but the academic support of entrepreneurs is also significant (for a literature review about this topic see Baptista *et al.*, 2012), so many universities offer entrepreneurial courses in their different Bachelor degrees. The literature so far suggests that entrepreneurial education is a key factor to boost future successful entrepreneurs (Souitaris *et al.*, 2007; Vij and Ball, 2010; Von Graevenitz *et al.*, 2010) because they could demystify the fear of failing, problems to start a business up, legal barriers or bootstrapping (Politis *et al.*, 2010). However, this link is not clear. For example, there is empirical evidence that there was a connection between

university support of entrepreneurship and the entrepreneurial level of activity in Spain and UK in the twentieth century (Tortella *et al.*, 2011), while Coduras *et al.* (2008) find evidence of no significant statistical relationship between both variables in present times. A positive effect has been shown between entrepreneurial education and training and the entrepreneurial capacity but as an indirect enabler via cultural and social norms (Díaz-Casero *et al.*, 2011); while a negative effect has been observed between entrepreneurship programmes and the intention to become an entrepreneur (Oosterbeek *et al.*, 2010), although students' attitude could be a modulator for a positive relationship (Packham *et al.*, 2010). So now the challenge is to find out the kind of courses that universities should provide to boost, support and help young entrepreneurs to be successful, for example, with courses closer to real life as some studies suggest (Nab *et al.*, 2010; Taatila, 2010).

Yet, another important issue is that most of the academic research has been focussed on adult entrepreneurs but not on students, who will be the future potential ones (Goldsmith and Kerr, 1991; Turker and Selcuk, 2009). Some critics argue that it is not the same to have the experience to become an entrepreneur as to have the intention to become one, although there is a consensus related to the link between the intention to start up a business and the behaviour to be an entrepreneur (Hamidi *et al.*, 2008) according to the theory of planned behaviour (Ajzen, 1991). There are many factors that condition entrepreneurial intentions (person's attitude, psychological, family, social, etc.) and although it is difficult to specify all of them, it is only logical that entrepreneurship programmes raise entrepreneurial intentions among the students because they develop the entrepreneurial skills and the necessary knowledge for entrepreneurs (Maiyo *et al.*, 2016; Turker and Selcuk, 2009). However, this topic has yielded mixed results (Bae *et al.*, 2014) with papers that show a positive relationship (e.g. Souitaris *et al.*, 2007) and others that do not (Murdock *et al.*, 1993; Oosterbeek *et al.*, 2010). Hence, our first hypothesis can be stated as follows:

H1. Students' entrepreneurial intentions are higher for those attending an entrepreneurship seminar.

Also, we are interested in analysing the influence of family support on their entrepreneurial intentions since the existing literature is not conclusive, but although it is difficult to measure the impact of external influences on students' entrepreneurial intentions, there are some studies linking the role of family and the entrepreneurial leadership development of students (Bagheri and Pihie, 2010; Fitzsimons and O'Gorman, 2005; Henderson and Robertson, 2000). Moreover, individual attachment to family business values are strongly formed concepts that motivate entrepreneurial direction (Tarling *et al.*, 2016). However, there are some of those studies stating that the student's intention to become an entrepreneur is not affected by parents' self-employment status used as a proxy of family support (Chen *et al.*, 1998; Wilson *et al.*, 2007). The way to measure family support in this paper, following other studies, is the parental self-employment status. We hypothesize that students with at least one self-employed parent have near models to learn how to run their own business and this fact could condition positively their idea to be entrepreneur. Thus, our second hypothesis is:

H2. There are differences in entrepreneurial intentions depending on the parental self-employed status.

Currently, there is a worldwide trend in higher education to include creativity as a key content to make entrepreneurial courses effective (Lautenschläger and Haase, 2011) and to increase the level of entrepreneurial intention (Zampetakis and Moustakis, 2006). However, its effectiveness is questioned (Scott *et al.*, 2004) and there is little explicit attention given to creativity in the entrepreneurship literature (Nielsen and Stovang, 2015). There are thousands of definitions about creativity as it is a quite ambiguous concept, but there is a trend to consider creativity as a critical skill for the entrepreneur. In other words, "creativity

is now also deemed a core success factor with organizational creativity resulting in higher levels of quality and customer satisfaction” (Fillis and Rentschler, 2010, pp. 64-65).

There are, at least, two schools of thought about creativity. According to one of them, creativity is a skill that is almost like a muscle that can be trained while the other one states that creativity is something we are or not born with and, in that case, efforts to improve it are almost futile. Following this first school, creativity can be affected by educational efforts (Hamidi *et al.*, 2008; Penaluna *et al.*, 2010) so that, due to the economic crisis and the lack of job creation from firms, entrepreneurial courses at universities are essential in order to boost students to self-employment. In spite of the importance of this skill, the link between the entrepreneurial training in creativity and the fact of being more creative when starting a business up is not clear, although there are some interesting attempts (see e.g. the review in Kozlinska, 2012 and her creativity map for entrepreneurial training). In Spain, this is crucial because “the level of entrepreneurs with creative capability present values of a low magnitude” (García-Tabuenca *et al.*, 2011). Usually, universities neglect the creativity value in the degree syllabus as “it is a mystical phenomenon involving a spiritual process which does not sit comfortably with academic scrutiny” (Fillis and Rentschler, 2010, p. 51). Indeed, entrepreneurial creativity courses at universities are relatively scarce.

There is evidence that students who enrolled in an entrepreneurship course perceived themselves as more creative after the course and did better on generating more and a greater range of ideas than students not enrolled in the course both in pre- and post-tests (Schmidt *et al.*, 2012). However, empirical evidence also shows that creativity is not directly associated with the viability of the business idea although it is fully mediated by those opportunity search strategies that are creative and based on knowledge acquisition (Heinonen *et al.*, 2011). Finally, innovative business behaviour can be depicted as an act of creativity, so a connection is established between entrepreneurship and innovative business practices. Hence, our third hypothesis is the following:

H3. The level of students’ creativity depends on their intentions to be entrepreneurs.

Additionally, some papers point out that the creativity level is related to gender although results are not conclusive (see e.g. the review of Baer and Kaufman, 2008; Sanz de Acedo Baquedano and Sanz de Acedo Lizarraga, 2012). Some studies highlight a kind of stereotype about the perception that to be an entrepreneur is a masculine characteristic (Ahl, 2006) and this stereotype could condition the entrepreneurial intentions of men and women (Gupta *et al.*, 2008). In fact, one of the ideas with the greatest support in recent literature is that there is no gender difference but the environmental and cultural effect can explain it whenever those differences exist (Cheung and Lau, 2010; Matud *et al.*, 2007). In consequence, the fourth hypothesis of our study is:

H4. There are no differences in creativity level depending on gender.

In order to attain our objective, we first make the assumption that in the business context, creativity is often translated into idea development, new product innovations and adapting or improving existing innovations (Kirton, 1976; Ward, 2004). That is, creativity is related to originality and innovations (Kleiman, 2008) so the KAI inventory will be used to measure the creativity of undergraduate students. Moreover, as intentions are the most important predictor of behaviours (Ajzen and Fishbein, 1977), entrepreneurial intentions of current university students are keystones to future self-employment development.

Methodology

The setting

We conducted the test study with second-year undergraduate students from the Business Administration degree, all enrolled in the compulsory subject of Management Accounting,

randomly assigned in two groups: one did an entrepreneurship seminar while the other group did not. The seminar took place once every fortnight during a two hour session with the students split in halves, so they had one hour with half of the enrolled students and another hour with the other half.

The objective of the entrepreneurship seminar, included as an assignment on the subject, was to develop a project of a company start-up during the semester, taking into account all the theoretical topics learnt in class (business plan, budget, break-even point, etc.). The seminars' contents were:

- Session 1: entrepreneurship and entrepreneur. What and who?
- Session 2: management accounting for entrepreneurship.
- Session 3: company creation (part I): company's name; place; business description – products and services; draw the value chain; establish objectives; identify potential courses of action; evaluate alternative strategic options; and select alternative courses of action.
- Session 4: company creation (part II): revenue drivers, costs, organizational structure, cost centres, inventories valuation, customer's description and competitors description.
- Session 5: a real company budget from a speech of a director manager of Ferrovial (an important, large Spanish facility service company).
- Session 6: the company's budget with sales forecast for three years, manufacturing costs, products inventory valuation, raw materials purchasing forecast, raw materials inventories valuation and break-even point.
- Session 7: business plan.
- Session 8: oral presentation of the projects about the start-up companies.

In each session, a brief talk was given by the lecturer on the topic and then the students, working in groups in a computer lab, applied the theoretical contents to their specific business project. The last session was completely devoted to the student teams' oral presentations, evaluated by the lecturer and an entrepreneur.

The sample

The convenience sample finally consisted of 78 second-year undergraduate students enrolled in two classes of Management Accounting taught by the same lecturer, to avoid lecturer-bias.

All students attending the last session of the subject were asked to complete a paper-and-pencil questionnaire containing sections on demographic data (gender and age) and transition to entrepreneurship (parents' self-employment and also intention of starting their own company), together with the 32 items from the KAI inventory. This assesses the creative style of a person (adaptors vs innovator) during problem solving, since it offers valuable clues about people's risk-taking propensity and opportunity discovery (Kirton, 1976, 2003). Only 36 students (46 per cent of the final sample) out of 55 enrolled students in the test group attended that final session. A control group also of second-year students from the same degree and year was considered, but only 42 (54 per cent of the total sample), out of the original 64 enrolled students attended the last session. None of the present students refused to answer the questionnaire, 55 per cent being male, with average age 20.47 years (SD = 1.74 years).

Missing data at both the item and variable levels of the KAI inventory pose a problem (Roth, 1994) so standard analysis techniques cannot immediately be used to analyse an incomplete data set because most statistical procedures require a value for each variable/item (Allison, 2000). In our case, missing values from multiple-item scales were replaced

using the person mean substitution approach, which substitutes the mean across remaining scale items for that individual, but rounded to the nearest integer (Huisman, 2000). Scores were not computed where more than 25 per cent of scale items were missing and therefore two respondents' results were excluded from the analysis.

Measures

As was previously mentioned, the students filled in a questionnaire where they were asked whether their parents were self-employed and also whether they would like to start their own company to measure the intention to entrepreneurship. All of those are dependent variables. We also asked for the student's age and gender.

We also measured and controlled for an individual's propensity to innovate addressing the required cognitive capabilities, recognizing entrepreneurial opportunities and we considered them as independent variables. To do so, we resorted to the well-known KAI inventory, developed by Michael Kirton in 1976, comprised of 32 items measuring the degree of difficulty that such a task would entail on a five-point Likert-type scale from very easy to very hard. The KAI inventory is an instrument to analyse characteristics of people that produce qualitatively different solutions to seemingly similar problems. Indeed, following Kirton (1976, p. 622) "adaption-innovation is a basic dimension of personality relevant to the analysis of organizational change, in that some people characteristically adapt while some characteristically innovate". KAI inventory has been tested in other papers (Marcati *et al.*, 2008) but, to our best knowledge, not related to creativity. We have decided to use this creativity measure because it is a more indirect and a more objective index about creativity related to business. The idea of innovation-adaptation is what real businesses actually do when managers – the future role of our students – have to make decisions about their companies every day. The KAI index is useful for business, not for creativity in general.

The KAI inventory differentiates individuals on the basis of adaptive and innovative cognitive styles. Whereas adaptors are characterized as doing things "better" (incremental improvements), innovators try to do things in a creative way, "differently" (radical improvements). Although both characteristics may be assumed to be important in creative professions, the innovative style may be thought of as the one more closely related to creativity of the two. Moreover, this "concept" of creativity as a cognitive characteristic can be learnt while creativity as a personal characteristic cannot. That is the reason why we do not use any other creativity index such as Torrance Test of Creative Thinking (Torrance, 1974) or the Test for Creative Thinking – Drawing Production (Urban and Jellen, 1996). In order to avoid subjectivity biases, neither do we use a self-assessed perception of creativity like the one used in Heinonen *et al.* (2011).

In the current global business world, changes are continuous and quick so managers, or future managers in our case, should know not only how to adapt to the social and economic environment, but also to innovate in order to achieve competitive advantages to continue in the market.

Reliability was tested using Cronbach's alpha measure. Alpha's results were 0.836 for our test group while it was 0.83 for the control group, so they both show a high consistency.

Statistical methods

Results for each Likert-type item, like the present case, may be analysed separately or item responses may be tallied to create a score for a group of items. There are many approaches available to test differences between groups on small independent samples with unknown distribution such as Wilcoxon-Mann-Whitney test, Wilcoxon signed-rank test or Kruskal-Wallis test (Cohen *et al.*, 2000). In our case, we want to analyse responses to the KAI items with groups (students who did the entrepreneurship seminar vs the control group) being the independent

variable so the Wilcoxon-Mann-Whitney test at 0.05 significance level will be used. This test provides the same type of results as a *t*-test for independent samples, but based on the ranks and not the means of the responses, as they would have no statistical meaning being Likert-type responses.

In the case of analysing the answers to KAI items across the students' entrepreneurial intention (with the five possible answer options: definitely will, likely to, do not know, likely not to and definitely will not) Kruskal-Wallis test had to be used. This test provides the same type of results as an analysis of variance, but based on the ranks.

Finally, when the effects of more than one categorical independent variable (also called factors) are considered together over and a single normally distributed interval dependent variable, a factorial ANOVA may be used. Factorial ANOVA also enables us to examine the interaction effect between the factors. An interaction effect is said to exist when differences on one factor depend on the level of another factor.

Results and discussion

Theoretically, KAI scores may range from 32 to 160, but the minimum value for the 76 students of our sample was 55 and the maximum value was 126, so the subjects do not occupy the full spread. Besides, their mean score was 82.29, much smaller than the theoretical one of 96 (Kirton, 1976) and also smaller than the first study about KAI and entrepreneurship with 102.3 (Goldsmith and Kerr, 1991). Therefore, the respondents were in mean value more adaptor-inclined than expected, a fact that may explain the lack of entrepreneurship spirit in Spain, in line with the GEM report as we mentioned before. Also, students who did the entrepreneurship seminar and those who did not show a similar mean result: 82.829 vs 82.244 (see Table I). But those that did not take the entrepreneurship seminar are somehow more homogenous in the KAI index as their standard deviations, ranges and kurtosis are smaller. In other words, those that did take the seminar are less similar to each other.

Figure 1 shows the values that are affected by several outliers.

Results for the Wilcoxon-Mann-Whitney test were obtained using R (v. 2.1.5) for each of the items individually considering the two groups, those students who did the entrepreneurship seminar and the control group, obtaining the result that neither any of the items nor the KAI turn out to be significant (see Table II), because all *p*-values are higher than the significance level 0.05. Therefore, *H1* is rejected, that is, students' entrepreneurial intentions are not higher for those attending an entrepreneurship seminar. This result is in line with other studies such as Oosterbeek *et al.* (2010) in the Netherlands, although with opposite results as the seminal paper of Goldsmith and Kerr (1991). However, there is empirical evidence that individuals with a university education are more likely to recognize good business opportunities (Ramos-Rodriguez *et al.*, 2010).

Trying to find an explanation about factors that condition entrepreneurial intentions, it is interesting to point out that, in our sample, there are no differences in the median value of KAI index between students with self-employed parents and those employed (Wilcoxon statistic = 0.9308, *p*-value = 0.6279 > $\alpha = 0.05$). Hence, we also reject the *H2*, there are no differences in entrepreneurial intentions depending on the parental self-employed status. Our results contradict some studies such as Bagheri and Pihie (2010) or Tarling *et al.* (2016) that link the role of family in entrepreneurial leadership development of university students,

Table I.
KAI descriptives
by groups

Seminar	<i>n</i>	Mean	SD	Median	Min.	Max.	Range	Skew	Kurtosis
Yes	35	82.629	12.154	84	55	126	71	0.898	3.603
No	41	82.244	10.777	82	61	114	53	0.886	1.994

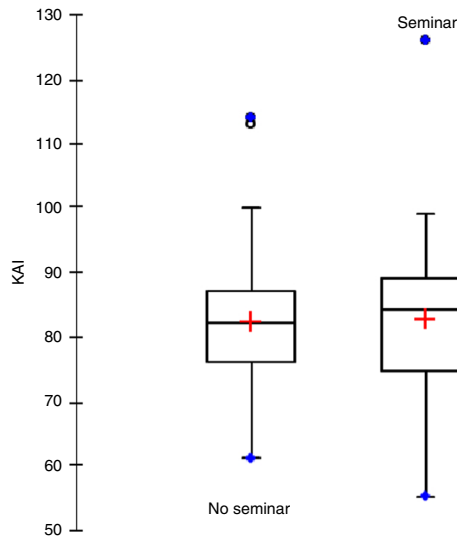


Figure 1.
KAI values box
plots by groups

while they are in line with Chen *et al.* (1998) and Wilson *et al.* (2007) that state student's intention to be entrepreneurs is not affected by the family situation. This point is very interesting for boosting undergraduates to be entrepreneurs because parents' status – a non-decided situation from students – does no matter in order to start up a business.

In the case of analysing the answers to KAI items across the students' entrepreneurial intention as can be seen in Table III, the *p*-values turned out to be significant (smaller than 0.05, in italic) only for items number 1 (has original ideas), 16 (is methodical and systematic) and 19 (is consistent). Analysing the answer values for each significant item, they are higher for students who did the entrepreneurial seminar than for those who did not in item 1, while the opposite occurs for items 16 and 19. This may mean that students who have attended the entrepreneurship seminar could realize that having original ideas is more important than for those who have not attended the seminar. Our results are aligned with Politis *et al.* (2010) that gives evidence that in a university milieu there are more formal possibilities for engaging in creative and flexible ways of acquiring resources. Nevertheless, the students who have not attended the entrepreneurial seminar are more consistent, methodical and systematic than those who have. It may be that to start-up a company you need to be less methodical and systematic than to be working for others.

So, we cannot reject the null hypothesis of the medians being equal across the groups of different entrepreneurial intentions for most of the items of the KAI and we conclude that the four groups are identical populations at 0.05 significance level with just slight differences. This means that there are not significant differences in the creativity index by entrepreneurial intention, so *H3* is also rejected. In other words, there is no impact of students' creativity level on intentions to be an entrepreneur. This result is opposite to the paper of Zampetakis and Moustakis (2006) and Schmidt *et al.* (2012).

The first three analysed hypotheses consider the course attendance, the parental self-employed status and the different entrepreneurial intentions separately, although all three factors might affect the KAI value simultaneously. In fact, we can see in Figure 2 that there is interaction between the three factors because the simple effects of one change as the levels of the other factor are changed (the lines connecting the points are not parallel).

As the independent variable (KAI values) is normally distributed ($W=0.9439$, p -value = 0.002155) and variances are homogeneous (Bartlett's *K*-squared = 0.5457, $df = 1$,

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Table II.
The Wilcoxon-
Mann-Whitney
test by group

Item	<i>U</i> -statistic	<i>p</i> -value
Q1	687.5	0.5793
Q2	822.5	0.3604
Q3	756	0.8469
Q4	715.5	0.8061
Q5	734.5	0.9727
Q6	675	0.4998
Q7	744	0.9507
Q8	792.5	0.5632
Q9	884.5	0.1088
Q10	905.5	0.0692
Q11	768	0.7513
Q12	686	0.5736
Q13	761	0.8073
Q14	594.5	0.1088
Q15	694.5	0.6353
Q16	911	0.0657
Q17	899	0.0868
Q18	764.5	0.7668
Q19	801	0.4986
Q20	635.5	0.2664
Q21	704	0.7135
Q22	656.5	0.3924
Q23	753.5	0.8663
Q24	788.5	0.5971
Q25	796.5	0.5348
Q26	898	0.0858
Q27	683	0.5565
Q28	698	0.6721
Q29	714	0.7935
Q30	684	0.5637
Q31	623	0.2094
Q32	638.5	0.2881
KAI	709	0.7708

p-value = 0.4601), a factorial ANOVA was run. It can be seen in Table IV there are no significant main effects (we had already rejected *H1-H3*) and no significant interaction. Therefore, there is no simultaneous effect of the three factors on the KAI value. Thus, creativity is neither affected by taking the entrepreneurship seminar, nor parents' self-employment status, nor entrepreneurial intention.

In relation with *H4*, women, with a mean score of 78.64 (SD = 9.55) were in average more adaptor-inclined than men, whose mean was 85.33 (SD = 11.91). As Figure 3 shows, those values are affected by a male respondent outlier even though male KAI values distribution is right skewed (male skewness = 1.23) while female distribution is left skewed (female skewness = -0.31).

Results for the Wilcoxon-Mann-Whitney test were obtained for each of the items individually by gender (see Table V). Only four items turn out to be significant (*p*-values smaller than 0.05), which are (in italic) number 9 (likes to vary set routines at a moment's notice), 13 (prefers changes to occur gradually), 27 (likes the protection of precise instructions) and 30 (likes bosses and work patterns which are consistent). Hence, we reject the null hypothesis of the medians being equal across the genders for those four items. Analysing results for each significant item, we find that male values are higher than female ones. It means that male students love changes in their routine although they prefer those

Item	K-W statistic	<i>p</i> -value
Q1	<i>10.9784</i>	<i>0.0118</i>
Q2	0.4549	0.9287
Q3	0.5686	0.9036
Q4	0.6512	0.8846
Q5	0.878	0.8307
Q6	3.2088	0.3605
Q7	6.1184	0.106
Q8	3.509	0.3196
Q9	3.398	0.3342
Q10	3.9298	0.2691
Q11	1.3699	0.7126
Q12	3.273	0.3514
Q13	5.0709	0.1667
Q14	1.4139	0.7023
Q15	1.253	0.7403
Q16	<i>13.9868</i>	<i>0.0029</i>
Q17	1.8484	0.6045
Q18	6.9432	0.0737
Q19	<i>12.7434</i>	<i>0.0052</i>
Q20	0.1148	0.99
Q21	4.766	0.1898
Q22	4.0977	0.2511
Q23	1.3444	0.7186
Q24	0.1268	0.9884
Q25	1.4674	0.6898
Q26	2.0185	0.5686
Q27	1.1311	0.7696
Q28	2.3121	0.5102
Q29	2.2437	0.5234
Q30	3.1814	0.3645
Q31	2.0771	0.5566
Q32	1.7254	0.6313
KAI	1.137	0.7682

Table III.
Kruskal-Wallis rank
test by entrepreneurial
intention

Note: *p*-Values smaller than 0.05 are given in italics

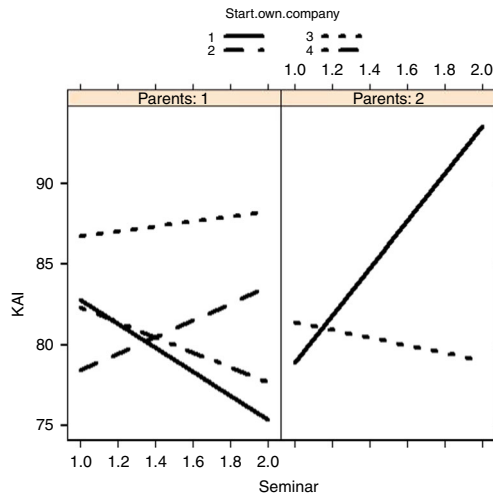
changes to occur gradually. Our results show a gender bias related to innovative behaviour, in line with Reuvers *et al.* (2008) and Stoltzfus *et al.* (2011).

Besides, the *p*-value of KAI value is also significant, so we can conclude that the genders are non-identical populations at 0.05 significance level. In fact, the mean value of KAI index for females (78.64) is lower than the male one (85.33). Therefore, male students are in mean value more creative than the female students, in line with other studies (Phipps, 2012; Wilson *et al.*, 2007). This is unfortunate news concerning women because novel and useful ideas are the lifeblood of entrepreneurship (Ward, 2004). Thus, we accept hypothesis four.

Conclusions, limitation of the study and further research

The objective of this paper was to analyse the relation between entrepreneurial intentions and some conditionings that undergraduate university students from a Business Administration Bachelor degree may have in order to start up a company when they finish their studies. The main conclusion is that students' entrepreneurial intentions are not conditioned by entrepreneurial courses, parental self-employment, or by their creativity level. It means that there are no external constraints for not being an entrepreneur. However, there are differences in creativity level by genders. In particular, creativity

Figure 2.
Start own company:
seminars: parents'
interaction plots



	df	Sum sq.	Mean sq.	F value	Pr(> F)
Seminar	1	3	2.79	0.020	0.8870
Parents	1	64	64.47	0.472	0.4940
Start.own.company	1	381	127.20	0.945	0.4244
Seminar: parents	1	24	23.87	0.175	0.6770
Seminar: start.own. company	3	168	56.10	0.417	0.7417
Parents: start.own. company	2	395	197.30	1.466	0.2386
Seminar: parents: start.own.company	1	440	440.20	3.271	0.0753
Residuals	63	8,478	134.60		

Table IV.
ANOVA results

Notes: Being: seminar = take the entrepreneurship seminar; parents = parents' self-employment status; start.own.company = entrepreneurial intention

teaching efforts should be oriented to female students as they are more adaptor-inclined. This means that mixed gender groups of undergraduates could work together in order to put entrepreneurship projects into practice. Moreover, it is interesting to point out that parents' self-employment status is not a determinant in order to become an entrepreneur. This result could be a boost to many students in their move to entrepreneurship because their parents' work status and their level of creativity are not restrictions to start up a business.

Our results shed light on interesting implications for all the stakeholders involved in entrepreneurship. Perhaps new syllabus could be readjusted to boost creativity in undergraduate university students. Universities may enhance performance and encourage entrepreneurial motivations in a creative and innovative learning environment as part of an essential education for a new era. Indeed, intervention at the undergraduate level provides a different perception of entrepreneurship for future business experience and hence could alter the labour market. Business/entrepreneurship incubators should play a pivotal role fostering university students to self-employment. Additionally, when students practice business plans, budgets, and legal contracts as in real life, they could gain more self-confidence in order to become entrepreneurs if they have more skills to interact with current dynamic market.

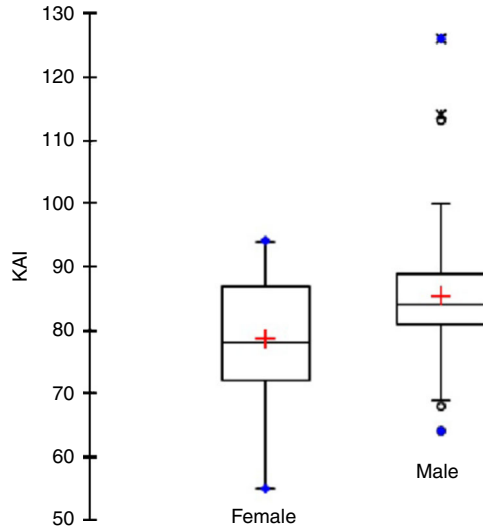


Figure 3.
KAI values box
plots by gender

Item	<i>U</i> -statistic	<i>p</i> -value
Q1	835	0.1558
Q2	884	0.0513
Q3	708	0.991
Q4	761	0.5586
Q5	731.5	0.802
Q6	587.5	0.1772
Q7	643	0.4465
Q8	731.5	0.813
Q9	479	<i>0.0093</i>
Q10	539.5	0.0587
Q11	726	0.86
Q12	624.5	0.3419
Q13	<i>522.5</i>	<i>0.038</i>
Q14	577.5	0.1309
Q15	738	0.7504
Q16	633.5	0.4075
Q17	685	0.7924
Q18	556.5	0.0729
Q19	577.5	0.1431
Q20	570.5	0.1218
Q21	584	0.16
Q22	570.5	0.1328
Q23	552	0.0694
Q24	560	0.1056
Q25	591	0.1941
Q26	609	0.2683
Q27	470	<i>0.008</i>
Q28	667	0.6437
Q29	642.5	0.4456
Q30	<i>503.5</i>	<i>0.0226</i>
Q31	571.5	0.1208
Q32	543	0.067
KAI	501	<i>0.0291</i>

Table V.
Wilcoxon-Mann-
Whitney test
by gender

Note: In *italics*, all the significant items as *p*-value < 0.05

Finally, this survey could be a help for university lecturers and managers to offer more effective creativity courses at higher education level mixing student groups by gender. This course may break the “vicious circle” whereby some undergraduates, perceiving themselves as less creative, do not have any intention of engaging in an entrepreneurial activity, which requires creativity. Lecturers’ interventions could be also to focus on reducing gender stereotypes (Sweida and Reichard, 2013) and promoting an adequate climate for creativity (Birdthistle, 2008).

This paper is not out of limitations although it provides avenues for future research, which could examine the generality of the results through a bigger sample, with more countries and different area undergraduate students. Our results may have been influenced by the Spanish learning culture. A longitudinal study could also provide evidence on the changing patterns over time. Furthermore, the KAI index is a tool to value creativity but there are others, such as personality tests and exercises of creativity. In future research, a mix of creativity values will be used. Cross-cultural aspects should be taken into account and students from different countries will be analysed.

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