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Exploring student diversity

Entrepreneurial Intent & Self-efficacy, Personal Characteristics, Creativity, and the Link to Performance in Entrepreneurship and Innovation Training

Karin Beukel

Department of Food and Resource Economics
University of Copenhagen

Summary. Teaching Innovation and Entrepreneurship for natural science or business students is a complex process, where not only knowing the theories of entrepreneurship, the elements of a business plan and financial planning is needed, but also skills in identifying opportunities in the market or exploring own creativity to come up new ideas for future startups can become crucial. Using applied teaching therefore also becomes and exploration of students own personal characteristics. In this paper I investigate the broader skillset and characteristics of the students enrolled in an innovation and entrepreneurship course. To understand the students I focus on studying the variation in a number of innovation and entrepreneurship related factors, namely entrepreneurial intent, entrepreneurial self-efficacy, personal characteristics (i.e. their profile in terms of extraversion/introversion, intuiting/sensing, thinking/feeling, and perceiving/judging.), and their creativity. The results show a highly varied group of students. The work is explorative and based on data gathered at University of Copenhagen (UCPH), the data analysis mainly consists of descriptive data and correlations. Finally I reflect on how the findings direct future teaching in entrepreneurship and innovation.

Entrepreneurship, design thinking and teaching

In their seminal paper, Shane and Venkataraman (e.g. 2000) define entrepreneurship as the as *"the examination of how, by whom, and with what effects opportunities to create future goods and services are discovered, evaluated, and exploited. . . . . . the field involves the study of sources of opportunities; the processes of discovery, evaluation, and exploitation of op-*

portunities; and the set of individuals who discover, evaluate, and exploit them." (p. 218 Shane and Venkataraman, 2000). Entrepreneurship is therefore a rather slippery concept (Blundel and Lockett, 2011) which not only in research but also when teaching can take many forms. The Innovation and entrepreneurship elective master-course I teach at UCPH takes its departure in this definition of entrepreneurship, and therefore also takes the students through a process which includes investigating different search processes to seek the discovery of opportunities, iteration processes that enables the student to evaluate the opportunities identified, and applied learning of the skills that are needed to exploit the opportunities identified. This process is, in the case of this course, build around the design thinking process (extensive literature has been published on design thinking, e.g. Brown, n.d.), and also on teaching based on design thinking (e.g. Glen, Suciu, and Baughn, 2014). However, despite the extensive literature little is known of how students of different characteristics perform in such a course setting. Luthje and Franke even suggests that *"empirical research has seldom explored students as entrepreneurial subjects"* (p.138, Lüthje and Franke, 2003). In this short report I take a first steps in uncovering some of the students enrolled in this elective course – from the perspective of entrepreneurship, I focus on their entrepreneurial intent, entrepreneurial self-efficacy, personal characteristics and creativity. In an explorative manner, I examine how these different elements are correlated, and whether there are characteristics that are correlated with higher performance.

Method

To study the students enrolled in entrepreneurship teaching, I choose the setting of the Innovation & Entrepreneurship course held at UCPH fall 2015. This course is offered twice a year at UCPH, and has been running for +5 years, and is the main course on innovation and entrepreneurship to students enrolled at the faculty of Science. During fall 2015 the situation of the course was of particular interest, during this semester a collaboration with Copenhagen Business School (CBS) had been initiated, meaning that the course was a mix of students from both CBS and UCPH. The students are all at master level. In total 69 students were enrolled, 28 from UCPH and 41 from CBS. The course was held from the beginning of September to end October with sessions on Monday afternoons from 13-17 and Wednesdays from 9-17.

A number of tests and surveys were conducted during the course, which is the basis for the data presented in this report. In the group formation process (which is held at second teaching session, meaning early September) the students filled out a form in which they self-assessed their skills in project management and business, as well as their intended workload for the course. In the beginning of the course, at home, the students had also filled out a personality test (JTI - Jung Type Test). This JTI-test is a test which takes approx. 40minutes to fill out, and then a person's individual characteristics are suggested. The last day of the course, the students did a *creativity* test, they filled out a questionnaire which contained questions on *entrepreneurial intent and entrepreneurial self-efficacy*. Their final presentation, which is a presentation of the innovation and entrepreneurship project that the students have invented during the course, were done in front of a panel consisting of three experts (two generalists and one expert belonging to the subject field of the startup proposed), as well as the three teachers that were in charge of the course. The panel assessed the performance, and it is based on these evaluations that the group performance is measured. Below I describe the variables.

Variable description

Performance: Performance is a measure based on five Likert scale questions concerning the project that the students had worked on during their course. The experts evaluated each project based on how innovative it was, how implementable, how market oriented it was, the potential of the team, and the potential of the project. The measure is therefore a project group measure. The test of the scale is adequate with a cronbach alpha=0.85, why the individual questions are summed to one measure *performance*.

Entrepreneurial intent: Entrepreneurial intent is a widely used construct in management research to study the likelihood of individuals becoming entrepreneurs (Bird, 1988; Carr and Sequeira, 2007; Lüthje and Franke, 2003; Thompson, 2009). In this study we rely on scale used in previous studies and explore the construct based on 6 Likert scale type questions concerning the degree to which the respondent have intentions of becoming entrepreneurs (Cronbach alpha=0.88).

Creativity: To measure the students creativity level we use the widely acknowledged divergent thinking test (McCrae, 1987). Students performed the test during the last day of the course.

Entrepreneurial Self-efficacy: To measure the student's entrepreneurial self-efficacy we used a construct based on 19 Likert scale type questions (Cronbach alpha=0.88). Entrepreneurial self-efficacy is a measure of a person's (here a student) own belief in her/his ability in becoming an entrepreneur (Bandura, 1997).

Personal characteristic: At UCPH there are several persons in the carrier team that are skilled JTI-testers and educators. These persons are part of course to help minimize group work troubles, so groups can focus on the teamwork while knowing the "up-and downsides" of their group members. In this report we use the results from the test the student conducted at home. The test focuses on four dimensions *Extraversion/Introversion, Intuiting/Sensing, Thinking/Feeling, and Perceiving/Judging*.

Project Management Skills: At the beginning of the course we had students answer on a 5-point Likert scale their self-perceived project management skills. Business Knowledge: Students rated their own business knowledge on a 5-point Likert scale. Level of Ambition: At the second class students were asked to rate their level of ambition for the course (5-point Likert scale).

Gender: A dummy variable taking 2 if female, and 1 if male.

Age: The age in years of the student.

UniversityBusinessSchool: This variable takes 1 if the student is from UCPH and 0 if from CBS.

Results and Discussion

In Table 10.1 and Figure 10.1 the descriptive statistics of the variables are presented. As expected with an elective course we observe that the students enrolled in the programme is highly engaged, having a mean of 3.85 on a

5 point scale. No students rate themselves below 3. As the descriptive data also suggests, the course was divided almost equally between female and male students, and students with an average age of 25 years. To examine the students' entrepreneurial intent we use the measure *Entrepreneurial Intent*. Descriptive statistics show that 47% of the students 'somewhat strongly agree' or 'strongly agree' that they are ready to do anything to be an entrepreneur. This percentage is slightly higher than what has been observed in other studies internationally (e.g. see paper by Luthje and Franke 2003 that reports on 7 international studies of entrepreneurial intent). Table 10.1 and the histograms in Figure 10.1 also show the diversity of the students in terms of several of the central elements of entrepreneurship and innovation.

Entrepreneurial self-efficacy, the students follow a normal distribution in terms of their own perception of their entrepreneurial skills (See Table 10.1 and Figure 10.1, min=2.368, max.=4.368, mean=3.246). Banduro (1997) argues that self-efficacy can be obtained by applied learning or if persuaded (e.g. from teachers or experts). The questionnaire was done at the end of the training, thereby suggesting that even after the master elective programme not all students felt entirely prepared, having high self-efficacy, to solving entrepreneurial tasks, and this even despite that 47% (as explained above) are eager to become entrepreneur (entrepreneurial intent).

For studying the personality traits of the student we used the tests based on the JTI-typology, there were four different continuums explored: 1) Extraversion versus introversion, where 57% of the students are extrovert, 2) Sensing versus intuiting, where 48% of the students are sensing, 3) Thinking versus feeling, where 37 % of the students were thinking more than sensing, and 4) Judging versus perceiving, where 48% of the students were more judging than perceiving. As the descriptive data shows, three out of the four continuums are almost dividing the class, whereas there is a majority of students that rely more on feeling than thinking. One could think that a class on entrepreneurship would have an overweight of extrovert students, as entrepreneurship often requires heavy investment in networking, however, the data presented here shows that this is not the case.

If we look at the creativity test, the results show a minimum score of 4, maximum value of 16 and a mean of 8 (std. dev of 2.0), suggesting a normal distribution.

In Table 10.2 pairwise correlations are presented. As expected, and following a rich literature stream the correlation between entrepreneurial self-efficacy and entrepreneurial intent is highly correlated. Also the correlation between being a business school student and assessing own business

knowledge is positive and significantly correlated, as expected. Interesting we can also observe that there are certain personality traits that differs according to being a business (CBS) versus being a natural science students (UCPH), UCPH are correlated with being sensing, whereas CBS students correlates with being intuiting. In Table 10.2 we can also see that higher levels of ambition are positively correlated with judging rather than perceiving. The correlations also shows that having a high level of ambition is correlated with entrepreneurial intent, this is interesting, this shows that the students that entered the course with high level of ambitions (as this was the time the ambition question was asked), also were the students that at the end of the course has the intention of becoming entrepreneurs. The data does not tell us that this intention of becoming entrepreneur was developed during the course, it might therefore very well be that the students that had the intention to become entrepreneurs, also from the very beginning were the ones with a high level of ambition for the course. Both explanations could be plausible, and neither are ruled out. Lastly I looked at whether receiving a high performance in the end of the course where related to any of the measures explored. As the projects were done in groups, the rating of the performance was also based on the group performance. The pairwise correlations shows that at a 5% level no variables are correlated with higher performance. However, it also shows that there is positive correlation between entrepreneurial self-efficacy (0.2508) and Creativity (0.1548), two variables that we could expect could be correlated with higher performance.

Implications for teaching

The descriptive results presented in this report showed a highly diversified group of students, with a strong desire to becoming entrepreneurs. In a teaching situation this should be taken into account in the way groups are formed and the types of applied learning processes I as a teacher make the students engage in. First, in terms of setting the most optimal teams, acknowledging the fact that they are a highly diversified group, makes the process important. It is therefore not only a process of ensuring that students with a variety of educational backgrounds end up in the same groups, but there is also a need for ensuring that they accept each other's personal differences and are able to see the benefits of being different, having different competencies will help in the complex process of developing ideas,

assessing them, and implementing them. Doing this is also about making the individual students aware of their own profiles as well as how their profile stands out different from others. Second, entrepreneurship and innovation is not only about generating great ideas, it is also about developing the ideas into business opportunities, as well as setting up a firm. These three elements are very different, and it is likely that students with different profiles will be better at certain elements than others, assigning groups where different profiles are present is therefore essential. Finally, in the evaluation of what the individual student has learned about entrepreneurship and innovation, I as a teacher should also ensure that the students are evaluated based on the curriculum taught. If only basing grades on the projects they come up with, the grade will be much related to the idea generating process, and therefore linked to certain traits that only some students possess. Instead grading and examination should be partly relying on the curriculum as such, giving also the students that does not have a creative mindset an opportunity to perform equally well to the very creative students.
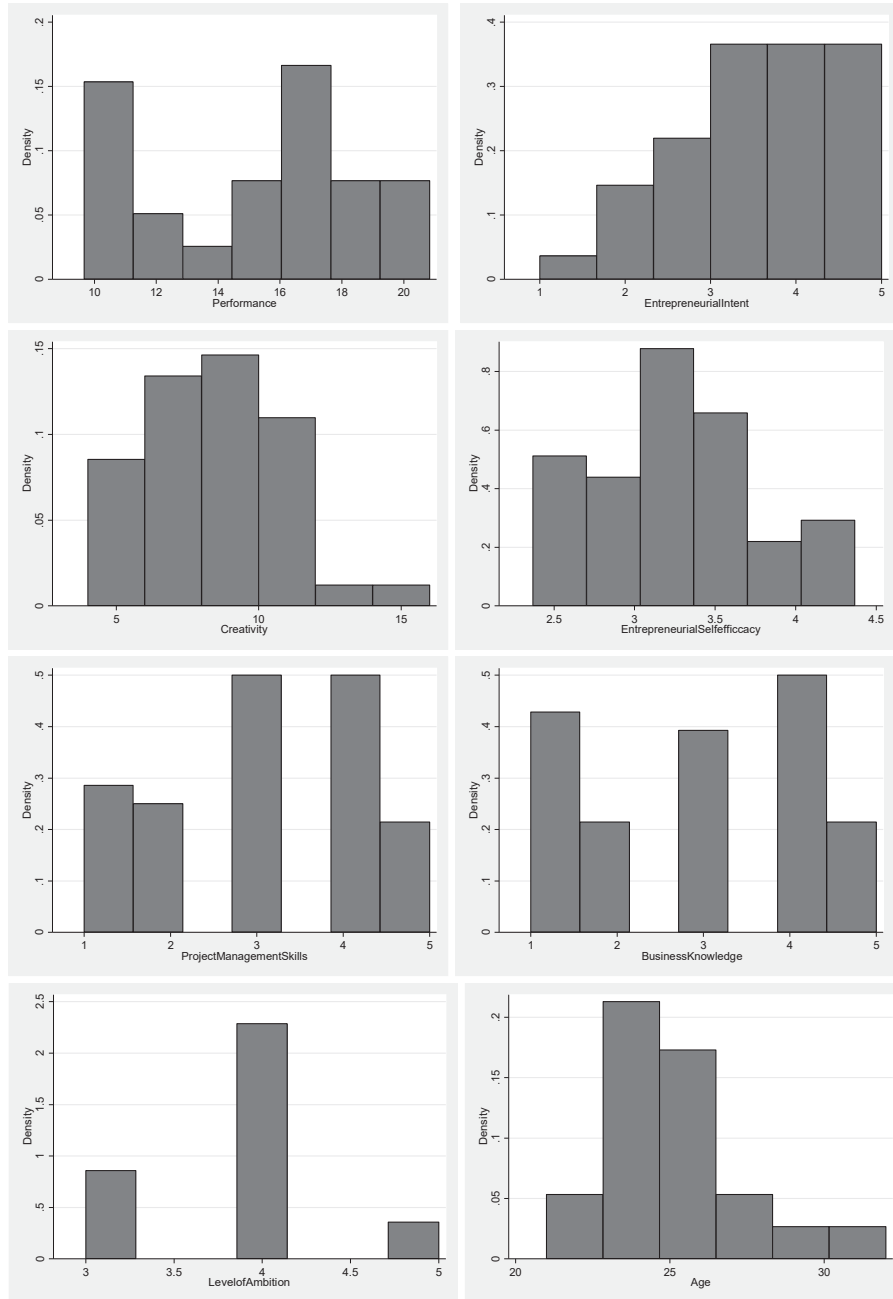
Tables and Figures

Fig. 10.1: Histograms

Variable	Obs	Mean	Std. Dev.	Min	Max
Performance	49	15.173	3.619	9.666	20.833
Entrepreneurial Intent	41	3.504	.905	1	5
Creativity	41	8.048	2.459	4	16
Entrepreneurial Selfefficacy	41	3.246	.512	2.368	4.368
ExtraversionIntroversion	46	.565	.501	0	1
SensingIntuiting	46	.478	.505	0	1
ThinkingFeeling	46	.369	.488	0	1
JudgingPerceiving	46	.478	.505	0	1
ProjectManagementSkills	49	3.061	1.265	1	5
BusinessKnowledge	49	2.918	1.381	1	5
LevelofAmbition	49	3.857	.577	3	5
Gender	41	1.634	.487	1	2
Age	41	25.048	2.438	21	32
UniversityBusinessSchool	55	.363	.4854	0	1

Table 10.1: Descriptive statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1 Performance	1													
2 Entrepreneurial Intent	-0.0396	1												
3 Creativity	0.1548	0.2749	1											
4 Entrepreneurial Selfefficacy	0.2508	**0.5006**	0.3074	1										
5 ExtraversionIntroversion	0.0471	-0.2691	**-0.4033**	0.0352	1									
6 SensingIntuiting	-0.1232	-0.1380	-0.1360	-0.1891	-0.1260	1								
7 ThinkingFeeling	0.0673	-0.0883	-0.1756	0.0663	0.0356	0.0784	1							
8 JudgingPerceiving	0.1706	0.2205	-0.2947	0.0854	0.0496	**0.3902**	-0.0118	1						
9 ProjectManagementSkills	-0.1531	0.1975	0.0363	0.2725	0.0928	-0.1253	-0.0237	-0.0546	1					
10 BusinessKnowledge	-0.1552	0.0539	0.0604	**0.3451**	0.0596	**-0.4008**	-0.2727	-0.1160	0.3723	1				
11 LevelofAmbition	0.1549	**0.3835**	0.2517	0.0426	-0.0363	0.0791	0.0747	**0.3022**	0.1834	-0.1455	1			
12 Gender	-0.1736	-0.0343	0.0986	-0.1565	0.0164	0.2582	-0.4667	0.2102	-0.0060	-0.1007	0.0104	1		
13 Age	-0.2965	**0.3527**	-0.0129	0.2184	-0.0861	-0.2606	0.1890	-0.1375	0.1898	-0.1264	0.0731	-0.1738	1	
14 UniversityBusinessSchool	0.1369	0.2452	0.1258	-0.0546	-0.2440	**0.4342**	0.1810	0.1691	-0.2728	**-0.6790**	0.0623	0.1253	0.1474	1

Table 10.2: Pairwise correlations. Correlations in bold are statistically significant at the 0.05 level or lower.

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