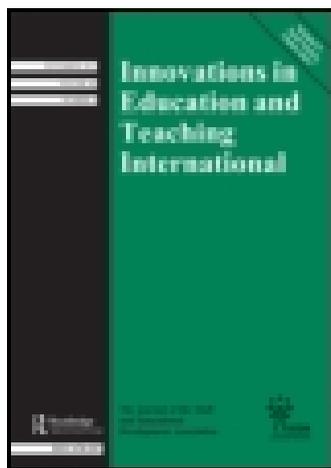


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Fostering students' competence in identifying business opportunities in entrepreneurship education

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Opportunity identification and, in particular, the generation of new business ideas is becoming an important element of entrepreneurship education. Researchers and educators, however, struggle with how opportunity identification competence can be enhanced. The purpose of this study was, therefore, to test the ability of students to generate new business opportunities when they participated in a re-designed entrepreneurship course with specially developed creativity exercises. Pre- vs. post-test comparisons showed the students who followed the course to subsequently have a higher level of divergent thinking, also with respect to the students who did not enrol in the course. The results also indicate that the course has a significant effect on the students' abilities to generate a greater number and more innovative business ideas in the experimental group; while the control group showed no significant changes in business idea generation. The implications of the results for developing opportunity identification competence and entrepreneurship education are presented.

Keywords: entrepreneurship education; opportunity identification; creativity; divergent thinking; business idea generation

Introduction

One of the key elements in the entrepreneurship process is opportunity identification (Ardichvili, Cardozo, & Ray, 2003; Shane & Venkataraman, 2000). Identifying opportunities for new businesses is one of the most important abilities of successful entrepreneurs (Ardichvili et al., 2003). For entrepreneurs and potential entrepreneurs to successfully create and operate new ventures, they must not only develop an intention to start a new business but also create or detect opportunities which others either ignore or fail to notice and exploit these opportunities in a timely and effective manner (Dutta, Li, & Merenda, 2011). Fostering this competence should, therefore, be a key topic in programmes aimed to train future entrepreneurs (Rae, 2003; Saks & Gaglio, 2002). Entrepreneurship education should thus equip students with the knowledge and skills needed to find and create business opportunities (Neck & Greene, 2011).

Despite the importance of opportunity identification, an important but under-researched question is whether and how the individual's ability to identify new business opportunities can be promoted within a classroom setting (Saks &

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Gaglio, 2002). As pointed out by Neck and Greene (2011), the majority of entrepreneurship education programmes focus on the exploitation of existing opportunities and thus, assume that the opportunity has already been identified. Very little is thus done to train students on how to apply idea generation tools and creatively discover or generate new business opportunities. Entrepreneurship research has also shown this competence to often be ignored or receive little attention during entrepreneurship courses (Karimi, Biemans, Lans, Chizari, & Mulder, *in press*). More research on fostering opportunity identification competence via classroom instruction is thus needed (Rae, 2003; Saks & Gaglio, 2002). The present study attempts to fill this gap by providing insight into how the competence of students for opportunity identification can be fostered in the university classroom.

Theoretical framework

Entrepreneurship and opportunity identification

Entrepreneurship is the process of identifying, evaluating and exploiting opportunities with the aim of starting a company or venture growth (Shane & Venkataraman, 2000). This process starts with opportunity identification which can be defined as the ability to identify a good idea and transform it into a business concept to add value for the customer or society and generate revenue for the entrepreneur (Lumpkin & Lichtenstein, 2005). The generation of new business ideas can be seen as the first step of opportunity identification (Dimov, 2007) and as an important part of the entrepreneurial process in which entrepreneurs – based on their ability to identify and anticipate unmet customer needs (i.e. opportunities for entrepreneurial profit) – come up with and offer solutions for unmet needs in the form of ideas for new business ventures (Gabrielsson & Politis, 2012).

Creativity and opportunity identification

The creative process calls upon two types of thinking, namely, divergent thinking and convergent thinking (Guilford, 1967; Hennessey & Amabile, 2010). Divergent thinking facilitates the generation of multiple, novel and original ideas while convergent thinking facilitates the detection of applicable, correct and useful ideas (Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991). In our study, we focus on divergent thinking because it occurs at the start of the creative process.

Creativity can enhance the process of generating new business ideas and identifying business opportunities (Corbett, 2005). And while creativity has hardly been studied within the field of entrepreneurship research, entrepreneurship scholars acknowledge the importance of creativity for the generation of business ideas and identification of business opportunities (Ardichvili et al., 2003; Corbett, 2005; Dimov, 2007; Lumpkin & Lichtenstein, 2005). According to the entrepreneurship literature (e.g. Corbett, 2005; Dimov, 2007; Lumpkin & Lichtenstein, 2005), opportunity identification can be considered as a domain-specific form of creativity. In particular, opportunity identification depends on divergent thinking (Gielnik, Frese, Graf, & Kampschulte, 2012). This means that theories and techniques from the creative domain and from learning creativity can be used in the fostering of opportunity identification competence.

The findings of a comprehensive meta-analysis conducted by Scott, Leritz, and Mumford (2004) suggest that courses aimed at enhancing students' abilities to

identify new business opportunities through creativity should focus on divergent thinking and help students acquire the skills needed for problem identification and idea generation. Training which enhances creativity and promotes divergent thinking may also thus enhance idea generation, and our question becomes which methods of training can lead to the identification of better and/or more new business ideas and opportunities. And in order to answer this question, we developed and tested a specific model and training intervention which draw upon creation theory and problem-solving theories to determine the skills need for individuals to act creatively and identify new business ideas and opportunities.

Idea development process

The creative process has been described in general by many authors (e.g. Kaufman & Beghetto, 2009; Mumford et al., 1991). Although they do not overlap completely with regard to the cognitive processes identified, most of the authors identify at least four key stages in the creative process: (1) problem identification; (2) idea generation; (3) idea evaluation and selection; and (4) planning for implementation. Bragg and Bragg (2005) called these four stages as the idea development process. The first two stages are generally considered part of the idea generation phase and make use of divergent thinking; the latter two stages are generally considered part of the implementation phase with the third stage drawing upon convergent thinking and the fourth stage drawing upon both divergent and convergent thinking.

With the idea generation phase of the idea development process in mind, we developed and tested a training intervention to determine which skills are required for individuals to act creatively and generate new business ideas.

Idea generation training

The two first stages or idea generation phase of the idea development process are discussed below, together with how they relate to business opportunity identification.

In the stage of *problem identification* or problem finding, individuals must recognise, define and strive to understand the problem or opportunity facing them (Amabile, 1997). Problem identification is essentially the initial stage of creative problem-solving. In the case of entrepreneurship, this step focuses on looking for and identifying problems (i.e. 'needs' or 'pains') and thus, business opportunities in the market. Successful entrepreneurs seek out or anticipate problems, changes, trends and opportunities for improvement or innovation (Bragg & Bragg, 2005). There are also techniques to nurture creativity and divergent thinking (e.g. the 5Ws plus H questions: Bragg & Bragg, 2005; Bug Reports: Michalko, 2006), which can then help students seek and shape new business ideas and opportunities.

In the stage of *idea generation* or ideation, individuals produce new ideas or possible solutions for an identified problem. Multiple ideas may be generated and, in the case of entrepreneurship, multiple business ideas. Building on the insights and information gathered in step one, this step in the creative process relies upon a combination of techniques to develop or expand a range of possible solutions for the identified problem. A capacity for idea generation is very important for entrepreneurs because they need original insights and ideas. Such techniques as brainstorming and mind mapping can be applied to help students generate significant amounts

of ideas, which can then be clustered into groups and considered in the next step of the creative process.

Hypotheses

As already mentioned, entrepreneurship can be construed as a creative process and, given the unpredictable nature of entrepreneurship, the creative capacity for divergent thinking should be developed. Divergent thinking is needed to start a business but also deal with problems encountered along the way. For the present intervention study, we drew upon general creativity theory to increase the ability of students to generate business ideas. The model based on this theory is simple for educators to use. It is also simple to develop creativity exercises on the basis of the model and integrate these into an entrepreneurship course. Educators do not need to develop a stand-alone creativity course or programme in order to stimulate divergent thinking and opportunity identification but, rather, simply introduce creativity exercises. As already mentioned, the idea development process consists of both divergent and convergent thinking and follows similar stages as the opportunity identification process. Depending on the purpose of entrepreneurship courses (from generating a new business idea to writing a business plan), educators can focus on a specific stage and adopt the relevant creativity exercises to thereby improve the divergent and/or convergent thinking of students for this stage of the opportunity identification process.

Drawing upon the preceding, we formulated the following hypotheses with regard to the effectiveness of idea generation training when used with higher education agricultural students:

H1: Students who have followed the redesigned entrepreneurship course will have higher (a) divergent thinking scores and (b) business ideas generated after the training than before.

H2: Students who have followed the redesigned entrepreneurship course will have higher (a) divergent thinking scores and (b) business ideas generated than students who have followed the original entrepreneurship course.

Research method

Study context

'Fundamentals of Entrepreneurship' is an elective/or compulsory course taught to bachelor students during the last two years of study in different faculties/departments in Iranian universities. The aims of course are to increase knowledge of entrepreneurship, enhance entrepreneurial attitudes, promote entrepreneurial intentions and encourage students to become job creators as opposed to job seekers.

In a recent study of the effectiveness of existing entrepreneurship courses in Iranian universities (Karimi, Biemans, Lans, Chizari, & Mulder, 2014), teachers were found to not pay sufficient attention to the enhancement of student creativity and ability to generate new business ideas. In the present research, we therefore targeted the idea development process and the idea generation phase of the idea development process via exercises designed for incorporation into existing entrepreneurship courses.

The Fundamentals of Entrepreneurship course was redesigned for purposes of the present research and divided into three parts. In part I, the instructors introduce

the students to the basic concepts, central theories and research related to creativity, innovation, opportunity identification, idea generation and entrepreneurship. The students also gain insight into the characteristics of entrepreneurship and the skills which this needs, but it is also emphasised that everyone can be creative. In part II of the course, the students apply the concepts and theories introduced in part I to complete a total of 12 creativity exercises and activities (e.g. the five Whys, bugs report, problem reversal, brainstorming, elevator pitch, ideas notebook). At the first class meeting during part 1 of the course, the ideas notebook is introduced and explained. The students are instructed to always carry the notebooks with them to jot down any ideas which spring to mind and to note at least five ideas per week. The students turn in the notebooks twice during the course. During the remainder of the course the creative exercises are performed according to the stages of idea development (i.e. problem finding and idea generation). The teachers facilitate the exercise sessions by explaining the exercises to the students and demonstrating how to do them.

In part III of the course, information is presented on the analysis of market potential, financial management and the different parts of a business plan. Small groups of students are asked to prepare and present a business plan which must include the identification of a feasible business opportunity. Each group must also interview an entrepreneur and prepare a report on the interview

The course had 32 sessions held across a period of 16 weeks (i.e. semester). Sessions were held bi-weekly and had duration of two hours. The class had 33 students and was divided into groups of 4–5 students for the small-group (i.e. team) work.

Creativity exercises

To help the students identify problems and opportunities, generate ideas and engage in creative thinking, several creativity exercises and activities were adopted from various sources. These creativity exercises were classified according to the idea generation phase of the idea development process to which they pertained: (1) exercises such as ‘the 5Ws plus H’ and the ‘Bugs report’ pertained to problem identification (stage one); (2) exercises such as brainstorming and picture stimulation pertained to idea generation (i.e. stage two).

A broad range of exercises was introduced, based on the idea that ‘creative ideas are most likely to arise through the use of diverse concepts, multiple features, and multiple strategies’ (Mumford, 2000, p. 316). However, the time span for the course was restricted, which meant that only 12 exercises were practiced in-depth. As already noted, some of the exercises involved just the individual student. The majority of the exercises, however, involved the small group.

Participants and procedure

A quasi-experimental pre-test–post-test control group design was used to determine significant changes in divergent thinking ability and business idea generation across a period of approximately four months (September 2012–December 2012). The participants in the study were 68 undergraduate students of agricultural sciences at a university in Iran. The mean age of the participants was 22.25 years; 28% was male. The majority of the students (90%) did not have prior entrepreneurial experience. It is worth mentioning that prior entrepreneurial experience was measured using a

single question that asked whether participants ‘had started or tried to start their own business in the past’.

The experimental group (33 students: 23 female, 10 male) took the redesigned Fundamentals of Entrepreneurship course as an elective course. The control group (35 students: 26 female, nine male) took the original course instead. Data were collected at the beginning of the first session ($t1$) and at the end of the final session ($t2$) of the course for both groups. And it was clearly explained to the participating students that the data were being collected for research purposes only; participation was voluntary; and responses would not affect their grades for the course.

Measures

Divergent thinking

The Alternative Uses Task (AUT: Guilford, 1967) was used to measure divergent thinking. This type of test is often used in the study of creativity and divergent thinking (e.g. Beaty & Silvia, 2012; Gilhooly, Fioratou, Anthony, & Wynn, 2007; von Stumm, Chung, & Furnham, 2011). And divergent thinking tests have been shown to consistently predict who will produce novel and useful products (Batey, 2007; Guilford, 1967).

The AUT asks participants to list as many new and unusual uses for three different items in a total of 9 min. The responses on the AUT are scored with regard to two components: fluency and originality. *Fluency scores* are obtained by summing the number of ideas produced by each participant for the three objects. Following Gilhooly et al. (2007), *originality* is defined as ‘an idea or suggestion that is infrequent, novel, and uncommon’ and is measured by rating the responses provided on the AUT along a seven-point scale (1 = *not at all original*, 7 = *very original*). The interclass correlation coefficients (ICCs) for the fluency and originality ratings were found to be acceptable at $t1$ and $t2$ (ICCs > .75).

Business idea generation (BIG)

In this test, participants were given a task and were asked to come up with ideas for new products or services to start a new business (for more details, see DeTienne & Chandler, 2004). The judges coded two dimensions of the ideas expressed by the participants: the total number of ideas and the innovativeness of the ideas. To obtain the total number of business ideas generated, the number of non-redundant business ideas was counted. The innovativeness of the business ideas generated by the students was judged using a six-point scale originally developed by Fiet (2002) and later modified by DeTienne and Chandler (2004). The inter-rater agreement between the two judges for both the total number of business ideas generated (ICC of .89 at $t1$ and .92 at $t2$) and the innovativeness of the business ideas generated (ICC of .81 at $t1$ and .85 at $t2$) was excellent.

Results

The descriptive statistics and correlations for the study variables before and after course completion are presented in Table 1.

Table 1. Descriptive statistics and Pearson correlations for total sample (N = 68).

Variable	M	SD	1	2	3	4	5	6	7
1- AUT : Fluency (t1)	11.6	3.32							
2- AUT: Originality (t1)	2.57	.67	.67**						
3- BIG: Number (t1)	2.15	1.21	.25*	.25*					
4- BIG: Innovativeness (t1)	1.77	.59	.19	.31*	.42**				
5- AUT: Fluency (t2)	13.78	3.87	.44**	.21	.26*	.23			
6- AUT: Originality (t2)	3.17	.58	.33**	.34**	.25*	.18	.60**		
7- BIG: Number (t2)	2.54	1.35	.22	.11	.36**	.29*	.31*	.26*	
8- BIG: Innovativeness (t2)	1.85	.66	.18	.19	.42**	.56**	.27*	.31*	.60**

Note: AUT – Alternative uses task; BIG – Business ideas generation.
 * $p < .05$; ** $p < .01$.

To determine if the divergent thinking skills and business idea generation of the students differed across the groups and/or over time (i.e. after completion of the course), a 2×2 (group \times time) repeated measures ANOVAs were conducted.

For the AUT fluency scores (i.e. divergent thinking), the results showed a significant main effect of time ($F_{[1, 67]} = 26.571, p = .000$, partial $\eta^2 = .28$), a significant main effect of group ($F_{[1, 67]} = 7.139, p = .009$, partial $\eta^2 = .098$) and a significant interaction between time and group ($F_{[1, 67]} = 11.763, p = .001$, partial $\eta^2 = .151$). This indicates a group difference in the changes in the fluency scores over time. That is, the fluency scores for both groups improved but those for the experimental group improved significantly more than those for the control group over time (Figure 1).

For the AUT originality scores (i.e. divergent thinking), the results showed a significant main effect of time ($F_{[1, 67]} = 52.656, p = .000$, partial $\eta^2 = .444$), a significant main effect of group ($F_{[1, 67]} = 12.022, p = .001$, partial $\eta^2 = .154$) and a significant interaction between time and group ($F_{[1, 67]} = 43.02, p = .000$, partial $\eta^2 = .395$). The AUT originality scores changed more for the experimental group than for the control group (Figure 2).

The BIG results revealed a significant main effect of time for the number of business ideas generated ($F_{[1, 67]} = 5.473, p = .022$, partial $\eta^2 = .077$). This shows the number of business ideas generated at pre- vs. post-test to differ significantly. A significant main effect of group was also found ($F_{[1, 67]} = 6.996, p = .010$, partial $\eta^2 = .096$). This shows the experimental group to generate more business ideas than the control group on average. Furthermore, the interaction between time and group was significant ($F_{[1, 67]} = 4.046, p = .048$, partial $\eta^2 = .058$), confirming that the experimental group would gain more from the redesigned entrepreneurship course than the control group from the original entrepreneurship course in terms of the number of business ideas generated (Figure 3).

As Figure 4 depicts, the innovativeness of the business ideas generated at $t2$ was greater than at $t1$. However, the results show no significant main effect of time ($F_{[1, 67]} = 1.715, p = .195, \eta^2 = .025$) and a marginally significant main effect of group ($F_{[1, 67]} = 3.275, p = .075$, partial $\eta^2 = .047$). The interaction between time and group was also marginally significant ($F_{[1, 67]} = 3.680, p = .059, \eta^2 = .053$). The experimental group thus gained significantly with regard to the innovativeness of the business ideas generated after participation in the redesigned entrepreneurship course while the control group did not.

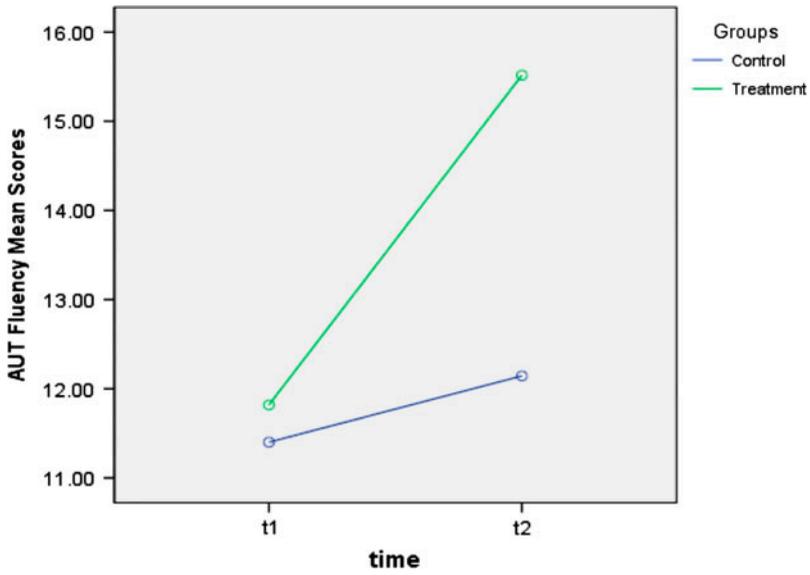


Figure 1. Pre to post change of AUT fluency scores for groups.
Note: A significant interaction between time and group: $F_{(1, 67)}=11.763$, $p = .001$, partial $\eta^2 = .151$.

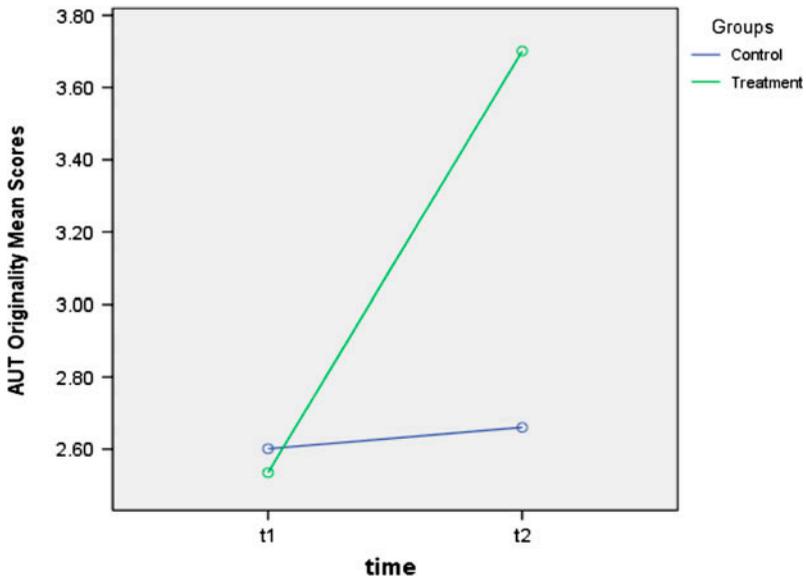


Figure 2. Pre to post change of AUT originality scores for groups.
Note: A significant interaction between time and group: $F_{(1, 67)}=43.02$, $p = .000$, partial $\eta^2 = .395$.

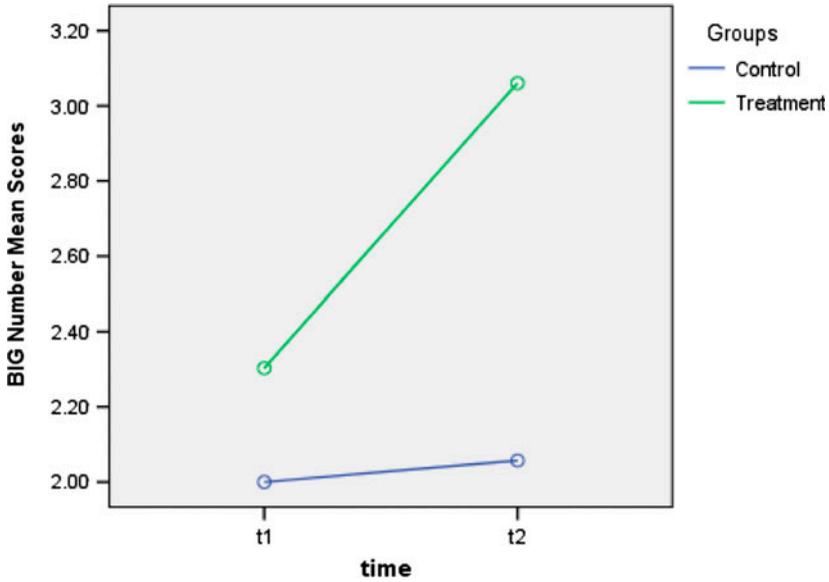


Figure 3. Pre to post change of BIG number scores for groups.
 Note: A significant interaction between time and group: $F_{(1, 67)} = 4.046$, $p = .048$, partial $\eta^2 = .058$.

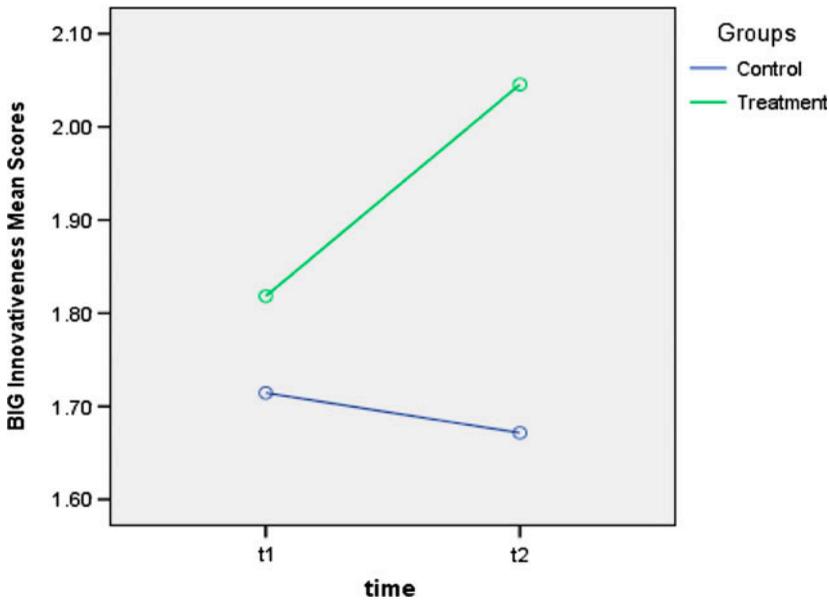


Figure 4. Pre to post change of BIG innovativeness scores for groups.
 Note: A marginal significant interaction between time and group: $F_{(1, 67)} = 3.680$, $p = 0.059$, partial $\eta^2 = .053$.

Table 2. Results of paired *t*-tests for the experimental group ($N = 33$) vs. control group ($N = 35$) at pre-test and post-test.

Scale	Experimental group				Control group							
	Pre-test		Post-test		Pre-test		Post-test		Difference			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i> (32)	<i>p</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i> (34)	<i>P</i>
AUT: Fluency	11.82	3.41	15.52	4.17	4.934	.00*	11.40	3.26	12.09	2.77	1.548	.131
AUT: Originality	2.54	.62	3.70	.78	7.782	.00*	2.60	.72	2.66	.57	.708	.484
BIG: Number	2.30	1.26	3.06	1.54	2.786	.01*	2.00	1.19	2.06	.94	.259	.797
BIG: Innovativeness	1.82	.54	2.05	.69	1.936	.06	1.71	.64	1.67	.58	-.533	.597

Note: AUT – Alternative uses task; BIG – Business ideas generation.

* $p < .01$.

Table 3. *T*-test results for comparison experimental and control groups before and after course participation.

Scale	Pre-test		Post-test		Difference <i>t</i>
	Experimental group <i>M</i>	Control group <i>M</i>	Experimental group <i>M</i>	Control group <i>M</i>	
AUT: Fluency	11.82	11.40	15.52	12.09	4.017 ^{***}
AUT: Originality	2.54	2.60	3.70	2.66	6.306 ^{***}
BIG: Number	2.30	2.00	3.06	2.06	3.267 ^{**}
BIG: Innovativeness	1.82	1.71	2.05	1.67	2.426 [*]

Note: AUT – Alternative uses task; BIG – Business ideas generation.

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

Follow-up *t*-tests for paired samples further showed significant differences over time for the experimental group on the measures of interest in this study (Table 2). A positive, significant difference in divergent thinking as measured by the alternative uses task (AUT) was found at *t*₁ vs. *t*₂ for the experimental group (Fluency: $t_{[32]}=4.934, p = .000$; Originality: $t_{[32]}=7.782, p = .000$). A similarly significant difference was found for the number of business ideas generated at *t*₁ vs. *t*₂ for the experimental group ($t_{[32]}=2.786, p = .009$), but the innovativeness of the generated business ideas only differed marginally (but significantly) after participation in the course ($t_{[32]}=1.936, p = .062$). For the control sample, the paired *t*-tests did not reveal significant differences over time for any of the variables of interest. Therefore, based on these results, students who followed the redesigned entrepreneurship course had higher divergent thinking scores and business ideas generated after the training than before (H1a and b).

Finally, the results of the independent samples *t*-tests for the experimental vs. control groups when compared before and after the course for divergent thinking and business idea generation showed the two groups to not differ significantly before course participation. As shown in Table 3, however, those students who followed the redesigned entrepreneurship course produced higher scores on all of the variables of interest than the students in the control group after following their course. Therefore, on the basis of these findings, students who followed the redesigned entrepreneurship course had higher divergent thinking scores and business ideas generated than students who followed the original entrepreneurship course (H2a and b).

Discussion

The results indicated that students' divergent thinking (as measured by the Alternative Uses Task) increased significantly after the course which included explicit idea generation training. These findings support other research findings indicating that trainings with a focus on the skills of problem identification and idea generation can enhance the creative thinking capacity of students (Dewett & Gruys, 2007; Karpova, Marketti, & Barker, 2011; McIntyre, Hite, & Rickard, 2003; Scott et al., 2004). Some components of creativity, such as personality, appear to be relatively stable and thus not easy to change. Divergent thinking skills, in contrast, appear to be more amenable to change. Our findings also support the premise of Scott et al. (2004), namely, that educators can employ a simple set of strategies to positively influence the divergent thinking of students. An implication arising from these findings is that incorporating a series of short and simple creativity exercises concerned with problem finding and idea generation into existing entrepreneurship courses, as done in the present study, can significantly enhance students' creativity thinking. Even though there is a variety of creativity training programmes currently available, research suggests that the most effective programmes involve a cognitive framework which is centred around the core processes of problem identification and idea generation (Scott et al., 2004). The exercises adapted for this study utilised this approach.

With regard to promoting a capacity for generating business ideas, our results showed training on the specific skills of problem identification and idea generation to generate both a greater number of and more innovative business ideas. These results are in keeping with the results of previous studies showing entrepreneurship education which emphasises creativity to foster the ability of students to identify

business ideas and opportunities (DeTienne & Chandler, 2004). Given that business idea generation is the first step in the opportunity identification and entrepreneurship process, idea generation can be considered a core skill for entrepreneurship. The present results show that this skill is learnable and that individuals can thus develop a capacity for identifying business opportunities.

The ability to generate new ideas and identify innovative business opportunities is clearly fostered by the development of divergent thinking skills. Creativity models and particularly a model of idea generation provide a suitable framework for better understanding how this can best be done. Educators and course planners can learn from inspection of such models to develop educational environments which explicitly promote creativity. They can also learn from creativity models to design entrepreneurship courses which clearly foster divergent thinking and thus an ability to *identify* business opportunities.

The current study had some limitations which provide future research opportunities. A first limitation is that a number of creativity exercises were implemented in the present study, but it is unclear which of the exercises or what components enhanced creativity and business idea generation. The focus in our study was on the overall effectiveness of the redesigned entrepreneurship course as a package. For future training efficiency and the development of curricula, the most effective exercises and elements from these exercises should be identified.

Moreover, the students' divergent thinking and business idea generation were only measured at the end of the final course session and not thereafter. The longitudinal effects of incorporating idea generation training into a course on entrepreneurship are therefore not known. Longitudinal data are nevertheless vital as it is possible that students may need to continually practice the acquired techniques for creative thinking in order to maintain them (Karpova et al., 2011).

Lastly, the focus of the present study was on the capacities of students for divergent thinking and business idea generation. Future research should consider the effect of creativity training on students' ability to evaluate and select a suitable and feasible idea and transform it into a business concept.

Notes on contributors

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