

Original Research Paper

Self-Perceived Entrepreneurship Skills for Undergraduates of Private University in Malaysia

Leow Meng Chew, Lau Siong Hoe, Tan Choo Kim and Lillian Wang Yee Kiaw

Faculty of Information Science and Technology, Multimedia University, Melaka, Malaysia

Article history

Received: 09-03-2016

Revised: 12-05-2016

Accepted: 02-06-2016

Corresponding Author:

Lillian Wang Yee Kiaw
Faculty of Information Science
and Technology, Multimedia
University, Melaka, Malaysia
Email: ykwang@mmu.edu.my

Abstract: This study was conducted on a random group of undergraduates in one of the private university in Malaysia to assess the self-perceived entrepreneurial skills of the undergraduates. As there was no standard instrument for this purpose, a simple questionnaire consisting of twelve questions was devised and used. The results were analyzed and reported by running the data in a few common statistical tests including the one-sample t-test, independent samples t-test and the one-way ANOVA. The perceived entrepreneurial skills were compared among the academic age groups and between genders. The study concluded that students in the private university are moderately confident that they are equipped with entrepreneurial skills to face the challenges upon graduation and in life. There were observable effect of the university endeavor in instilling entrepreneurial skills among its students specifically in term of the students' perception of themselves equipped with these entrepreneurial skills. Students were also found to be more confident that they were having more entrepreneurial skills as they mature through the academic years. Males were found to be more entrepreneurial compared to females. Future works along the line include expanding the survey to more samples from other universities and longitudinal study after graduation.

Keywords: Entrepreneurship Developments, Gender Studies, Improving Classroom Teaching, Entrepreneurship Education, Game-Based Learning

Introduction

Entrepreneurial skills are essential for any individual to live a sustainable and independent life. They are also important for the well-being of the society social-economically. Therefore, ways to assess the entrepreneurial skills of the community are important for the policy-makers to decide if more effort should be made to develop this area. We observe more proactive efforts in many local universities in Malaysia to instill entrepreneurial knowledge in the students.

This study attempts to assess the self-perceived entrepreneurship skills among information technology undergraduates in Multimedia University, Malaysia. As the students were exposed to entrepreneurial knowledge in various subjects directly such as the Technopreneur Venture, Contemporary Management and Entrepreneurship and indirectly through components inside technical subjects, they are expected to have at least basic entrepreneurial skills in later part of their undergraduate study. Random samples of undergraduates were selected from

Multimedia University (Melaka Campus), one of the private universities in Malaysia. A set of 12-question Likert-scale entrepreneurship skills questionnaire was developed and administered for the assessment. The result for 123 respondents was collected and analyzed.

Background

Entrepreneurship

Research suggests that undergraduate entrepreneurship teaching and learning is positively linked to entrepreneurship job creation, leadership, economic growth and technological innovation (Charney and Libecap, 2000; KPECHE, 2016; Rubin, 2011). The importance of developing entrepreneurial skills for the goals of supporting continuous growth economically and enhancing social well-being of the countrymen cannot be denied. On a more specific concern, the perception of having entrepreneurial skills was shown to be positively correlated to actual entrepreneurial behaviors such as starting new business (Koellinger *et al.*, 2005; Arenius and Minniti, 2005).

Therefore, assessment of the perception on entrepreneurial skills is important in understanding the social evolution of one society.

Renowned American economist T. W. Schultz defined the term “entrepreneurship” as a process of an individual adjusting to society. However, as time goes by, the meaning of the word assume a more specific definition. Entrepreneurship can be defined by describing what entrepreneurs do. For example: “Entrepreneurs use personal initiative and engage in calculated risk-taking, to create new business ventures by raising resources to apply innovative new ideas that solve problems, meet challenges, or satisfy the needs of a clearly defined market.” But as the following definitions state, entrepreneurship is not restricted to business and profit: “Entrepreneurship involves bringing about change to achieve some benefit. This benefit may be financial but it also involves the satisfaction of knowing you have changed something for the better (Lily *et al.*, 1991). “Entrepreneurship is essentially the act of creation requiring the ability to recognize an opportunity, shape a goal and take advantage of a situation. Entrepreneurs plan, persuade, raise resources and give birth to new ventures” (Richard *et al.*, 1991).

Nadim and Anders (2007) assume a more practical definition of entrepreneurs as those persons (business owners) who seek to generate value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets. Another definition on the same line is by Agbim and Oriarewo (2012), that says “entrepreneurship development is the process of actualizing an innovative intention by an individual or group of individuals in either a new or old enterprise through networking to acquire the requisite capabilities that will enhance the success of the venture in the face of environmental uncertainties”. OECD (2007) similarly defines the term entrepreneurship by the term “entrepreneurial activity” as the enterprising human action in pursuit of the generation of value, through the creation or expansion of economic activity, by identifying and exploiting new products, processes or markets. “Entrepreneurship” is thus defined as the phenomenon associated with entrepreneurial activity.

Entrepreneurship is becoming a critical factor in contributing to economic sustainability and solving social problems (i.e., unemployment, income distribution disparities) (Kenneth, 2013; Arne and Tove, 2013; EC, 2012; 2013; Lackeus, 2013; Martin *et al.*, 2013), as perceived by the world. This can be seen with observation of the recent thrust of many countries and global initiatives on entrepreneurial development (Arne and Tove, 2013; EC, 2012; 2013; Greene and Rice, 2011). Many countries are including the entrepreneurial skill development in their education system (Vican and Luketić, 2013; CBSE, 2013; Lackeus *et al.*, 2013; Arpiainen *et al.*, 2013; Jones and Penaluna, 2013; O'Connor, 2013) and

some are providing entrepreneurial support in the government policies (Mitchelmore and Rowley, 2010; O'Connor, 2013; Williams-Middleton, 2013).

Entrepreneurial Skills

The Based on the definitions above, as entrepreneur conducts activities in entrepreneurship, the skill sets relevant to entrepreneurial activities thus become important factors in determining the successful of any entrepreneur endeavor, defined by getting some monetary or non-monetary benefits from the business (Maxwell, 2003; Lechner *et al.*, 2006; Morris *et al.*, 2012; Sánchez, 2011; Sarasvathy and Venkataraman, 2011). Hence, assessing entrepreneur skills becomes an important area of study. Being a relatively young discipline, there are yet to be a standard instrument used for this purpose. Nevertheless, many researchers attempt at identifying the set of skills that can be universally called the “entrepreneurship skills”.

The one notable source of the relevant information was by the Canadian Foundation for Economic Education (1996) in their report for Youth Entrepreneurship Program. According to them, at the beginning stage, the strategic skills (vision, goal orientation, creativity, risk-taking and opportunity orientation skills) are important to determine the visionary direction of the entrepreneur, this also includes skills to goal-setting, observing opportunities, identifying needs and determining potential market. At the start-up and growth stage, tactical skills (planning, communication, marketing, interpersonal, management, analytical, team-building and personal effectiveness skills) are more relevant. This is because the entrepreneur needs to capitalize and realize the venture in small steps, communicate thoughts and ideas, identify and manage markets and competitive edges, communicate feelings and achieving mutual understandings among stakeholders. They will also need to administrate, control and monitor business operations, analyze statistics and costing for the business. Personal maturity and effectiveness is needed for time-management, discipline and decision-making process. Team-building is needed for leading team to grow. This inventory of skills are quite exhaustive.

William *et al.* (2007), on the other hand, suggested that there are 17 skills that are critical to individual seeking to embark on entrepreneurial activities. The study categorized the skills into four categories namely the technical skills (operational, supplies/raw materials, office or production space, equipment/plant/technology), managerial skills (management, marketing/sales, financial, legal, administrative, higher-order), entrepreneurial skills (business concept, environmental scanning, advisory board and networking), personal maturity skills (self-awareness, accountability, emotional coping, creativity). The 17 chosen skills were based on literature mainly

from (Lichtenstein and Lyons, 1996; 2001; Lyons and Lyons, 2002; Lyons, 2003). In the discussion, the authors suggested that more research needs to be done to confirm the possibility for other relevant skills that are crucial for entrepreneurs especially during the later phases of an entrepreneurial lifetime. This was because the listed 17 skills are seemed to be critical particularly during the start-up phase of a business but may not be the most critical skills to carry the business into later phases. Kenneth (2013) used 3 similar categories (technical, entrepreneurial and personal maturity) but asserted that these categories are actually belonging to managerial skills, even though he contended that the split may be necessary as the entrepreneurship become a discipline on itself.

Hence, we see that there are no standard set of skills identified supporting the entrepreneurial activities thus far, but the general categories are reasonably useful as a guideline to determine the practical skill sets that can be used for this study.

Entrepreneurship Development in Multimedia University, Malaysia

Since 2000, entrepreneurship was getting more emphasis in Malaysia educational settings. In support of the government endeavor in encouraging Small and Medium Enterprises (SMEs), Multimedia University prides itself as one of the leading university in Malaysia giving ample emphasis on the development of student's entrepreneurial potential. Students in the Information Technology domain, for example, are required to pass subjects involving heavy entrepreneurial elements such as Contemporary Management and Entrepreneurship, Technopreneur Venture, Introduction to Cyberpreneurship and other subjects with lighter entrepreneurial components such as Software Engineering, Principles of Marketing, Financial Management, Resource Management Techniques, Management and Ethics and Professional Conducts. The effort of the university in incorporating entrepreneurial components can be traced to some of its networking subjects when the university has chosen to use networking academic modules that include building a successful networking entrepreneur as one of the goal in its learning objectives. In this study, effort to cultivate entrepreneurial skills was done through game-based learning approach using a role-playing game. It has thus been an interesting question to know if the university intention has been well received by the students.

Research Methodology

Based on the literature review for the entrepreneurship skills, a 12-question Likert-scale questionnaire is designed. The set of skills selected for testing is based on a set of relevant skills developed via playing a role-playing game on networking, as part of another study in which this study form a component of. Player of the game started as a fresh

graduate growing through a series of events to finally become an expert computer network personnel. Elements of entrepreneurship are cultivated and promulgated in the growing process to "produce" an optimal expert toward the end of the game. Interested readers may refer to the correspondence author for more details on other subjects of study along similar line. As these questions are set for self-perceived characteristics, the questions are phrased to be of respondent's self-understanding (the statement about oneself). The questions are phrased in the context of university undergraduates because the subjects are university students taking computer major. The 5-scale Likert style was adopted for the questions labelled from "Very Untrue", "Untrue", "Neutral", "True" and "Very True", scaled from 1 to 5 respectively.

The questions are validated by statistic academician before being finalized. The suggestion given was that the questions should also be phrased negatively and included as a way to minimize acquiescence and extreme response biases. However, referring to report from Sauro and Lewis (2011), there is no significant advantages of phrasing the questions negatively. According to them, two disadvantages of this approach are respondents accidentally agreeing with negative items (mistakes) and researchers forgetting to reverse the scales (miscoding). Therefore, the positive tone of the questions are maintained as it is. The questions are as below.

Evaluate Yourself through the Following Statements

- I solved problem with proper planning and organization
- I communicate my thought with my friends easily.
- I can usually understand the problem I am dealing with correctly
- I have the technical abilities to solve most of the networking related problems
- I love learning new things and always curious about many things
- I can analyze problem logically and reason through the solution consistently
- I am always full of energy and vitality to deal with events in my life
- I like to solve my problems as soon as possible when I have one
- I am creative in problem-solving
- I like to seize opportunities that come my way and make things happen
- Punctuality is important to me
- I can follow orders from my superior/leader when working in a project

Referring to Table 1, the skills are grouped into categories based on William's suggestion (William *et al.*, 2007), as indicated by the skills in the brackets. The questions with their corresponding evaluation factors are listed in the table.

Table 1. Entrepreneurial skill list and description

Question No.	Entrepreneurial skill assessed	Description
1	Planning and organizing skills (Managerial skills)	The ability to think ahead and implement projects considering the pitfalls and challenges of doing so
2	Communication skills (Managerial and entrepreneurial skills)	The ability to express thought and to comprehend others effectively
3	Communication skills + Technical skills (Managerial, technical and entrepreneurial skills)	The ability to comprehend problems (particularly technical networking problems)
4	Technical skills	The ability to solve technical problems relevant to networking
5	Learning skills (Entrepreneurial and personal maturity skills)	The ability to engage in knowledge acquisition process effectively when required to solve any particular problem
6	Analysis and problem-solving skills+ Technical skills (Managerial, technical, personal maturity and entrepreneurial)	The ability to analyze and come out with effective solution when facing challenges (technically or socially)
7	Self-motivation (Personal maturity and entrepreneurial skills)	The ability to sustain ones interest in specific areas especially when facing continuous challenges
8	Responsiveness and flexibility (Personal maturity, technical, managerial and entrepreneurial skills)	The ability to provide timely feedback or reply in dealing with issues and is able to adapt easily to difficult situations to achieve goals
9	Innovativeness and creative abilities (Personal maturity, technical and entrepreneurial skills)	The ability to come out with new ideas and solutions based on existing solutions or a new problem
10	Entrepreneurial abilities (Entrepreneurial skills)	The ability to take risk and work ones way through to get a new business running successfully
11	Self-discipline and ethical behaviors (Personal maturity and entrepreneurial skills)	The ability to carry out responsibilities according to promise and respecting the needs of others
12	Self-discipline and ethical behaviors (Personal maturity and managerial skills)	The ability to carry out responsibilities according to promise and respecting the needs of others

A consent letter to participate in the study was administered to the students during the lecture hours. The web link to the questionnaire was then shown on the projector and the students are requested to fill in the questionnaire at home within few days. A follow-up reminder was given on the subsequent lecture session on the following week.

The data were then checked and fed into the SPSS for analysis. A few tests were run and results compiled and tabulated into presentable format. The analysis were done for the results and conclusion drawn.

Results

The reliability test returned a Cronbach's alpha value of 0.805. This indicates high level of internal consistency. The item-total statistics table is provided in Table 2. From the table, removing almost all of the questions will result in lower Cronbach's alpha (Question 11 resulted with slight but insignificant increase). Therefore, none of the question should be removed.

There are a total of 123 respondents participated in the Entrepreneurship Self-test. These respondents were students of the lecture class of 183 students for the subject TOS2461 Operating Systems. The subject is a compulsory subject for all the IT students regardless of their major. An invitation to participate was distributed in the class inviting voluntary participation in the study. 123 students responded to the invitation. 70 students

were first year students (56.91%); 14 students were in second year (11.38%) and 39 students were in their final year (31.70%). 101 of these respondents were male (82.11%) and 22 were female (17.89%). The overall result is shown in Table 3.

The means for all the questions are above the middle score of 3.0. As all the questions are phrased positively, the respondents were perceiving themselves as possessing these characters. Looking at the percentile, eight out of twelve modes were at 4.0, indicating that most respondents were at the higher end of being quite confident that they possessed the skills assessed.

The highest mean (4.11) goes to question 5 (I love learning new things and always curious about many things), corresponding to learning skills. Respondents felt they can learn new knowledge without difficulty to solve problems they are not familiar with. This is followed closely by the mean for questions 12 (4.08) (I can follow orders from my superior/leader when working in a project), corresponding to self-discipline and ethical behaviors. Respondents felt they can follow instructions easily. It should be noted that these are the two questions with means higher than 4.0 and both were at 4.0 at the 25th percentile. Most respondents seemed to be confident that they were relatively skilled in learning new knowledge and following orders.

The lowest mean (3.11) and second lowest mean (3.16) is differed by 0.05, for question 4 (I have the technical abilities to solve most of the networking related

problems) and question 9 (I am creative in problem-solving) respectively. Question 4 corresponds to technical skills while question 9 corresponds to innovativeness and creative abilities. Even though these are lowest means, they are still over the middle score of 3. Hence, respondents perceived that they were doing satisfactorily with technical networking skills and being moderately innovative and creative in problem-solving. It should be noted that for both these questions, the 50th percentile is at 3.0, which further supported the previous conclusion.

The highest variance is with question 8 (variance of 0.809 and standard deviation of 0.899) (I like to solve my problems as soon as possible when I have one), corresponding to responsiveness and flexibility. Respondents' responses were highly varying when it comes to being responsive to challenges. This is followed by question 7 (variance of 0.743 and standard deviation of 0.862) (I am always full of energy and vitality to deal with events in my life), corresponding to self-motivation. Respondents' responses were also highly varying when it comes to sustaining motivation to face life problems.

Table 4 shows the results of running a one-sample t-test with varying test values. We can see that all the questions are having means greater than or equal to 3.0 with significant p-values. Nine out of the twelve questions had means greater than or equal to 3.5. Three questions had means 4.0. This table further supported that respondents were at least moderately confident that they were possessing the entrepreneurial skills assessed.

We next try to look into the relationship between academic years and genders to the respondent's responses.

The academic age group comparison is shown in Table 5. Overall comparison among the three academic age groups showed that the perceived entrepreneurial skills were highest for all the skills for third year students. Third year students were relatively more confident than their juniors as perceiving themselves as possessing all the 12 skills assessed. Second year students perceived themselves having relatively lowest overall skills among the 3 groups, shown in the lowest means for nine out of twelve skills assessed. However, the difference in means were insignificant between those of the second year and the first year students except for self-discipline and ethical behaviors (question 11 and 12). From these we can see that the longer time in the university seemed to increase the confidence of student's self-perceived entrepreneurial skills. This was in disagreement with the findings by Miller (1987) for African students that found the duration of time spent in the school was negatively related to the student's perceived entrepreneurship skills, postulated as due to the need to spend more time with work as the age

increased. In contrast, Malaysian students seemed to be developing their entrepreneurial skills in the university while they are studying, with clearer indication of these skills when they are in the later year of their study.

From Table 5, the highest mean is for third year students for question 5 (4.41 ± 0.715) (I love learning new things and always curious about many things), corresponding to learning skills. The second highest mean is for question 12 (I can follow orders from my superior/leader when working in a project), also for third year students (4.23 ± 0.627), corresponding to self-discipline and ethical behaviors. The highest mean for second year students is also for question 5. The highest mean for first year students was for question 12. Therefore, respondents perceived themselves as having good learning skills and have the abilities to be self-disciplined and to maintain good ethical behaviors.

The lowest mean among the 3 groups is for question 9 (I am creative in problem-solving) for first year students (2.97 ± 0.780), corresponding to creative and innovative abilities. The lowest mean for third year students was for question 4 (3.26 ± 0.785) (I have the technical abilities to solve most of the networking related problems), corresponding to technical skills. Both these questions were lowest for second year students with same mean of 3.07 ± 0.730 and 3.07 ± 0.616 respectively. Therefore, respondents were having relatively less confidence in themselves possessing creative and innovative abilities and having good technical skills, among the skills assessed.

Table 6 shown the result of running the ANOVA. The high p-values indicate that the means are not significantly different among the three academic age groups for question 1, 2, 4, 7, 8 and 11. The rest of the questions show p-value less than 0.05, indicate that there are at least one pair of the mean values differs significantly.

The Tukey Test was run for question 3, 5, 6, 9, 10 and 12 to identify the significant differences and results are presented in Table 7. The scores for third year respondents for question 3 were higher significantly compared to second year respondents. The scores for third year respondents for question 5 were higher significantly compared to second year respondents. The scores for third year respondents for question 6 were higher significantly compared to second year respondents. The scores for third year respondents for question 9 were higher significantly compared to second year respondents. The scores for third year respondents for question 10 were higher significantly compared to first and second year respondents. The scores for first and third year respondents for question 12 were higher significantly compared to second year respondents. These support the finding that third year respondents were having better entrepreneurial skills.

Table 2. Item-total statistics

	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Squared multiple correlation	Cronbach's alpha if item deleted
Question 1	39.87	23.344	0.531	0.388	0.784
Question 2	39.70	23.442	0.503	0.328	0.787
Question 3	39.82	23.951	0.552	0.489	0.784
Question 4	40.23	24.358	0.409	0.319	0.795
Question 5	39.24	24.313	0.469	0.370	0.790
Question 6	39.80	24.224	0.509	0.483	0.787
Question 7	39.81	22.924	0.546	0.411	0.782
Question 8	39.59	24.048	0.376	0.256	0.800
Question 9	40.18	23.886	0.456	0.354	0.791
Question 10	39.80	24.770	0.382	0.279	0.798
Question 11	39.46	25.365	0.267	0.346	0.809
Question 12	39.26	24.522	0.460	0.374	0.791

Table 3. Descriptive analysis

Q. No.	Variable	Mean	Std. Dev.	Std. Error	Variance	Perc. (25%)	Perc. (50%)	Perc. (75%)
1	Planning and organizing skills (Managerial skills)	3.47	0.813	0.073	0.661	3	4	4
2	Communication skills (Managerial and entrepreneurial skills)	3.64	0.831	0.075	0.691	3	4	4
3	Communication skills + Technical skills (Managerial, technical and entrepreneurial skills)	3.52	0.694	0.063	0.481	3	4	4
4	Technical skills	3.11	0.791	0.071	0.626	3	3	4
5	Learning skills (Entrepreneurial and personal maturity skills)	4.11	0.722	0.065	0.522	4	4	5
6	Analysis and problem-solving skills + Technical skills (Managerial, technical, personal maturity and entrepreneurial)	3.54	0.693	0.062	0.48	3	3	4
7	Self-motivation (Personal maturity and entrepreneurial skills)	3.53	0.862	0.078	0.743	3	3	4
8	Responsiveness and flexibility (Personal maturity, technical, managerial and entrepreneurial skills)	3.76	0.899	0.081	0.809	3	4	4
9	Innovativeness and creative abilities (Personal maturity, technical and entrepreneurial skills)	3.16	0.814	0.073	0.662	3	3	4
10	Entrepreneurial abilities (Entrepreneurial skills)	3.54	0.749	0.068	0.562	3	4	4
11	Self-discipline and ethical behaviors (Personal maturity and entrepreneurial skills)	3.88	0.806	0.073	0.649	3	4	4
12	Self-discipline and ethical behaviors (Personal maturity and managerial skills)	4.08	0.697	0.063	0.485	4	4	5

Table 4. One-sample t-test

Q. No.	Test value	P-value	Mean diff	95% CI of the Difference	
				Lower	Upper
1	3.5	0.699	-0.028	-0.174	0.117
2	3.5	0.060	0.142	-0.006	0.291
3	3.5	0.746	0.020	-0.103	0.144
4	3.0	0.113	0.114	-0.027	0.255
5	4.0	0.107	0.106	-0.023	0.235
6	3.5	0.559	0.037	-0.087	0.160
7	3.5	0.715	0.028	-0.125	0.182
8	3.7	0.490	0.056	-0.104	0.217
9	3.2	0.611	-0.037	-0.183	0.108
10	3.5	0.509	0.045	-0.089	0.178
11	4.0	0.096	-0.122	-0.266	0.022
12	4.0	0.198	0.081	-0.043	0.206

Table 8 shows the means for each question based on gender. Male respondents had the highest mean for questions 5 (4.13±0.702) (I love learning new things and always curious about many things), corresponding to learning skills. Female respondents, however, had the highest mean for question 12 (4.09±0.750) (I can follow orders from my superior/leader when working in a project), corresponding to self-discipline and ethical behaviors. Female respondents perceived following instructions as the most commonly accepted characteristic among all the characteristics assessed. Male respondents, however, perceived learning as the most commonly accepted characteristic among all the entrepreneurial skills assessed.

There are two questions (question 4 and 9) with similar means as the lowest mean for male respondents (3.22±0.782 and 3.22±0.808 respectively). Question 4 (I have the technical abilities to solve most of the networking related problems), correspond to technical skills. Question 9 (I am creative in problem-solving), correspond to creative and innovative abilities. Female respondents had the lowest mean for question 4 (I have the technical abilities to solve most of the networking related problems), corresponding to technical skills. Male and female respondents perceived themselves as most lacking in technical skills. However, male respondents also perceived themselves as lacking in innovative and creative abilities.

From the table, male respondents were scoring higher for seven out of twelve questions compared to female respondents. Female respondents were scoring higher for four out of twelve questions compared to male respondents. Both sexes were having the equal mean (3.64) for one of the questions (question 2). Therefore, we see that male respondents perceived themselves as having more entrepreneurial skills compared to female students. These findings were in line with the finding of Athayde (2009; 2012) that found that British male students demonstrated higher entrepreneurship skill competencies and also in line with findings by Steenekamp *et al.* (2011) on girls having some entrepreneurial skills that were higher than the boys.

Table 5. Academic age group comparison

Q. No.	First year	Second year	Third year
1	3.4±0.788	3.36±0.745	3.64±0.873
2	3.54±0.846	3.5±0.650	3.87±0.833
3	3.44±0.694	3.29±0.469	3.74±0.715
4	3.04±0.824	3.07±0.616	3.26±0.785
5	3.97±0.701	3.93±0.616	4.41±0.715
6	3.47±0.675	3.29±0.611	3.74±0.715
7	3.44±0.927	3.5±0.760	3.69±0.766
8	3.74±0.928	3.64±0.842	3.82±0.885
9	2.97±0.780	3.07±0.730	3.54±0.790
10	3.39±0.728	3.29±0.611	3.92±0.703
11	3.83±0.816	3.57±0.938	4.08±0.703
12	4.09±0.737	3.64±0.497	4.23±0.627

Table 6. One-way ANOVA

Q. No.	Sum of squares	Mean square	F	Sig.
1	1.662	0.831	1.262	0.287
2	3.030	1.515	2.238	0.111
3	3.135	1.567	3.385	0.037
4	1.171	0.585	0.934	0.396
5	5.319	2.659	5.473	0.005
6	2.849	1.425	3.067	0.050
7	1.571	0.786	1.058	0.350
8	0.354	0.177	0.216	0.806
9	8.184	4.092	6.767	0.002
10	8.292	4.146	8.263	0.000
11	3.030	1.515	2.388	0.096
12	3.564	1.782	3.844	0.024

Table 7. List of results for Tukey tests

Year	N	Subset for alpha = 0.05	
		1	2
Question 3			
2	14	3.29	
1	70	3.44	3.440
3	39		3.740
Sig.		0.972	0.058
Question 5			
2	14	3.930	
1	70	3.970	3.970
3	39		4.410
Sig.		0.972	0.058
Question 6			
2	14	3.290	
1	70	3.470	3.47
3	39		3.74
Sig.		0.578	0.311
Question 9			
2	14	2.970	
1	70	3.070	3.070
3	39		3.540
Sig.		0.8850	0.075
Question 10			
2	14	3.2900	
1	70	3.3900	
3	39		3.920
Sig.		0.8630	0.058
Question 12			
2	14	3.6400	
1	70		4.090
3	39		4.230
Sig.		1.000	0.715

Table 8. Gender mean comparison

Question No.	Male	Female
1	3.49±0.795	3.41±0.908
2	3.64±0.832	3.64±0.848
3	3.59±0.681	3.18±0.664
4	3.22±0.782	2.64±0.658
5	4.13±0.702	4.00±0.816
6	3.56±0.699	3.41±0.666
7	3.50±0.844	3.64±0.953
8	3.72±0.929	3.91±0.750
9	3.22±0.808	2.91±0.811
10	3.57±0.779	3.41±0.590
11	3.85±0.829	4.00±0.690
12	4.08±0.688	4.09±0.750

Table 9. Two-sample t-test based on gender

Q. No.	p-value	Mean diff.	Std. error difference	95% CI of the difference	
				Lower	Upper
1	0.693	0.076	0.192	-0.304	0.456
2	0.971	0.007	0.196	-0.381	0.396
3	0.011	0.412	0.160	0.096	0.728
4	0.002	0.581	0.179	0.226	0.936
5	0.451	0.129	0.170	-0.208	0.466
6	0.343	0.155	0.163	-0.168	0.478
7	0.519	-0.131	0.203	-0.534	0.271
8	0.320	-0.186	0.185	-0.561	0.188
9	0.107	0.309	0.190	-0.068	0.685
10	0.351	0.165	0.176	-0.184	0.514
11	0.436	-0.149	0.190	-0.524	0.227
12	0.943	-0.012	0.165	-0.337	0.314

Table 9 shows the two-sample t-test for the gender. From the table, question 1, 2, 5, 6, 7, 8, 9, 10, 11 and 12 (ten out of twelve questions) were showing equal means with 95% confident of the given mean differences. Therefore, there seemed to be not much difference in the perceived entrepreneurial skills between the sexes. Question 3 and 4 were showing differences for the means. For both questions, the mean for male respondents were higher than the female respondents. For question 3 (I can usually understand the problem I am dealing with correctly), corresponding to communication and technical skills, we are 95% confidence that the difference was between 0.096 and 0.728. For question 4 (I have the technical abilities to solve most of the networking related problems), corresponding to technical skills, we are 95% confidence that the difference was between 0.226 and 0.936. Therefore, male respondents were more confident in perceiving themselves as possessing communication and technical skills as compared to the female respondents.

Discussion

Based on the responses of the questionnaire, all the university students perceived themselves as possessing, at least moderately, all the entrepreneurial skills assessed. Five of these skills were perceived as moderate while seven of the skills were perceived as more confidently possessed by the students. Learning new knowledge was perceived as the most common skill followed by following instructions. The perceived most lacking skills were technical skills followed by creative problem-solving.

These observations show that the effort of the university in instilling entrepreneurial skills among the undergraduates produces positive results in terms of the students being more aware of the entrepreneurial skills taught and their relevance to them when stepping into the industry upon graduation. In other words, from the students' perception, they were quite confident that they were entrepreneurial. This finding however, should be

validated with a post-hoc study assessing the students' entrepreneurial skills by third party, such as the industrial employers in order to see the correlation of student's perception and their actual entrepreneurial traits demonstrated. Based on the observation from Koellinger *et al.* (2005), higher perception of the students having entrepreneurial skills directly correlated to the actual entrepreneurial behaviors, specifically on starting up new business for instance. Therefore, the findings from this study can predict that there will be significant entrepreneurial behaviors observable in coming years as the current respondents graduated into the society.

It is interesting to note the most common skills and the most lacking skills as perceived by the students. These seemed to be complementary skills. The lack in technical skills that can be complemented by the ability and willingness to learn; the lack of creative problem-solving skills that can be complemented by following instructions by superiors. Relating these observations back to the categories of skills necessary for entrepreneur proposed by William *et al.* (2007), the technical skills (belonging to the technical skills category) are complementary to the learning skills (personal maturity and managerial skills category); creative problem-solving skills (personal maturity, technical and entrepreneurial skills category) complements the ability to follow instructions (personal maturity and managerial skills category).

This observation may suggest that the students may have subconsciously balance their perceived most lacking skills with their most common skills. The reason for doing this may prompt for probing research into the nature of these skills and why were they perceived as most common and most lacking simultaneously. This observation also leads to the questioning of the entrepreneurial skills as tending toward acquisitive rather than inquisitive aspect of knowledge learning process and prompt for the question of how to best educate entrepreneurs or even the question if these skills can be taught in conventional learning institutions at all given that many of these skills involve learners demonstrating

advanced thinking skills in dealing with uncertainties, which by definition, cannot be fully expressible (and therefore assessable) by anything known. In other words, can entrepreneurial skills such as learning skills and creative problem-solving skills (specifically those in the personal maturity category) be learnt “more” to enable learners to be more mature, perceivably?

We observe no significant difference among the academic years in term of the most common entrepreneurship skills with learning new knowledge and ability to follow instruction as the two most common skills for all three academic age groups. The skills perceived as most lacking was the technical skills followed by the creative problem-solving, as perceived by all three academic age groups. It should be noted that the results of the study also indicated that third year students showed higher perceived entrepreneurial skills compared to their juniors.

Undergraduates perceived themselves better equipped with entrepreneurial skills as they matured in their university life. This is possibly due to their maturity toward the importance of entrepreneurship as they were growing nearer to graduation and stepping nearer into the work life. There were not much changes in the perception of the students in term of their specific entrepreneurial skills throughout the academic ages.

Gender differences were not significant for the perceived entrepreneurial skills. Nevertheless, male students perceived themselves as being more entrepreneurial compared to female students. Female students perceived following orders as the most common skill while male students perceived learning skills as the most common skill. Male students perceived technical skills and creative problem-solving as the two most lacking skills while female students perceived technical skills as the most lacking skill among themselves.

Male student population has always been greater than the female student population in the information technology field worldwide. Despite this fact, the observations on entrepreneurial skills as perceived by the students in term of gender shown similarity in term of the most lacking skill. It is interesting to note that male students perceived ability to learn new knowledge as common while female students perceived following orders as the most common skill among themselves. Male students appeared more independent and female students appeared to be more dependent on others when faced with new challenges.

Future Works

Future works along the direction of this study could be two-folded. First, the same methodology should be applied to other populations including the students from public universities and other private universities in Malaysia and foreign countries in order to make more

general inferences about the perception of students in entrepreneurial skills. Second, third party test should be conducted for the assessment of the entrepreneurial skills among the respondents who took the test in this study to observe the actual entrepreneurial skills in action in order to compare what the students claimed and their actual entrepreneurial performance. Longitudinal study can also be carried out to observe these students after graduation to study the effect of the entrepreneurial skills in the actual life.

Conclusion

This study concluded that there were observable effect of the university endeavor in instilling entrepreneurial skills among its students in term of the students' perception of themselves equipped with these entrepreneurial skills. Thus, existing measures in cultivating entrepreneurship should be maintained and encouraged.

Acknowledgement

This study is supported by Multimedia University, Malaysia under the grant MMUI/150068.

Author's Contributions

Leow Meng Chew: Led the study, collected the data and did all the analysis. He also produced the manuscript in its original form and revised it into its final form.

Lau Siong Hoe: Participated in research design.

Tan Choo Kim: Reviewed the draft questionnaire and provided suggestions to improve it. Review the draft manuscript.

Lillian Wang Yee Kiaw: Reviewed the draft manuscript. In charge of publication correspondence.

Ethics

This article is original and contains unpublished materials. The corresponding author confirms that all of the other authors have read and approved the manuscript and no ethical issues involved.

References

- Agbim, K.C. and G.O. Oriarewo, 2012. Spirituality as correlate of entrepreneurship development. *J. Res. Nat. Dev.*, 10: 115-126.
- Arenius, P. and M. Minniti, 2005. Perceptual variables and nascent entrepreneurship. *Small Bus. Econom.*, 24: 233-247. DOI 10.1007/s11187-005-1984-x
- Arne, K.L. and N. Tove, 2013. Evaluation of Entrepreneurship Education in Namibia. An Evaluation of the Implementation of Entrepreneurship Education and the role of NAMAS.

- Arpiainen, R.L., M. Lackéus, M. Täks and P. Tynjälä, 2013. The sources and dynamics of emotions in entrepreneurship education. *Trames*, 17: 331-346. DOI: 10.3176/tr.2013.4.02
- Athayde, R., 2009. Measuring enterprise potential in young people. *Entrepreneurship Entrepreneurial Theory Pract.*, 33: 481-500.
- Athayde, R., 2012. The impact of enterprise education on attitudes to enterprise in young people: An evaluation study. *Educ. Train.*, 54: 709-726. DOI: 10.1108/00400911211274846
- CBSE, 2013. *Entrepreneurship*. Shiksha Kendra, 2, Community Centre, Preet Vihar, Delhi, 110 092, India.
- Charney, A. and G.D. Libecap, 2000. Impact of entrepreneurship education. *Insights: A Kauffman research series*. Kauffman Center for Entrepreneurial Leadership, Kansas City, MO.
- EC, 2012. "Effects and impact of entrepreneurship programmes in higher education. European Commission.
- EC, 2013. *Entrepreneurship education: A guide for educators*. DG Enterprise and Industry, ICF GHK, Bruxelles.
- Greene, P.G. and M.P. Rice, 2011. The Experience in the United States: A University Perspective. In: *Global Perspectives on Technology Transfer and Commercialization: Building Innovative Ecosystems*, Butler, J.S. and D.G. Gibson (Eds.), Edward Elgar, Cheltenham, UK, pp: 364-381.
- Jones, C. and A. Penaluna, 2013. Moving beyond the business plan in enterprise education. *Educ. Train.*, 55: 804-814.
- KPECHE, 2016. *Entrepreneurship in American Higher Education*. Kauffman Panel on Entrepreneurship Curriculum in Higher Education, Kansas City, Mo.
- Kenneth, C.A., 2013. The relative contribution of management skills to entrepreneurial success: A survey of Small and Medium Enterprises (SMEs) in the trade sector. *IOSR J. Bus. Manage.*, 7: 8-16.
- Koellinger, P., M. Minniti and C. Schade, 2005. I think I can, I think I can: Overconfidence and Entrepreneurial Behavior. 501 Discussion Papers, German Institute of Economic Research, DIW Berlin.
- Lackéus, M., M. Lundqvist and K.W. Middleton, 2013. How can entrepreneurship bridge between traditional and progressive education? *Proceedings of the ECSB Entrepreneurship Education Conference in Arhus, May 29-31, Denmark*.
- Lackéus, M., 2013. Links between emotions and learning outcomes in entrepreneurial education. *Proceedings of the Nordic Academy of Management Conference in Reykjavik, Aug. 21-23, Iceland*.
- Lechner, C., M. Dowling and I. Welpé, 2006. Firm networks: External relationships as source for the growth competitiveness of entrepreneurial firms. *Entrepreneurship Regional Dev.*, 1: 1-16.
- Lichtenstein, G.A. and T.S. Lyons, 1996. *Incubating New Enterprises: A Guide to Successful Practice*. 1st Edn., Aspen Institute, Washington, ISBN-10: 0898431875, pp: 242.
- Lichtenstein, G.A. and T.S. Lyons, 2001. The entrepreneurial development system: Transforming business talent and community economics. *Economic Dev. Q.*, 15: 3-20. DOI: 10.1177/089124240101500101
- Lily, C., M.L. Kretchman and W.E. Jennings, 1991. *Entrepreneurship: Creating a Venture*. 1st Edn., Nelson Thomson Learning, Toronto, ISBN-10: 047179564X, pp: 178.
- Lyons, T.S., 2003. Policies for Creating an Entrepreneurial Region. In: *Main Streets of Tomorrow: Growing and Financing Rural Entrepreneurs*, Federal Reserve Bank of Kansas City, New York, pp: 97-105.
- Lyons, T.S. and J.S. Lyons, 2002. Assessing entrepreneurship skills: The key to effective enterprise development planning? *Proceedings of the 44th Annual Conference of the Association of Collegiate Schools of Planning, (CSP' 02)*, Baltimore, Maryland, pp: 21-24.
- Martin, B.C., J.J. McNally and M.J. Kay, 2013. Examining the formation of human capital in entrepreneurship: A meta-analysis of entrepreneurship education outcomes. *J. Bus. Ventur.*, 28: 211-224. DOI: 10.1016/j.jbusvent.2012.03.002
- Maxwell, T.P., 2003. Integral spirituality, deep science and ecological awareness. *Zygon*, 38: 257-276. DOI: 10.1111/1467-9744.00499
- Miller, D., 1987. Strategy making and structure: Analysis and implications for performance. *Acad. Manage. J.*, 30: 7-32. DOI: 10.2307/255893
- Mitchelmore, S. and J. Rowley, 2010. Entrepreneurial competencies: A literature review and development agenda. *Int. J. Entrepreneurial Behav. Res.*, 16: 92-111. DOI: 10.1108/13552551011026995
- Morris, M.H., C.G. Pryor and M. Schindehutte, 2012. *Entrepreneurship as Experience: How Events Create Ventures and Ventures Create Entrepreneurs*. 1st Edn., Edward Elgar Publishing, Cheltenham, ISBN-10: 1781005184, pp: 352.
- Nadim, A. and H. Anders, 2007. *A framework for addressing and measuring entrepreneurship*. Entrepreneurship Indicators Steering Group, Paris.
- OECD, 2007. *Micro-policies for growth and productivity*. OECD.
- O'Connor, A., 2013. A conceptual framework for entrepreneurship education policy: Meeting government and economic purposes. *J. Bus. Ventur.*, 28: 546-563. DOI: 10.1016/j.jbusvent.2012.07.003
- Richard, B.W., W.R. Gary and L.W. Smith, 1991. *Entrepreneurship: The Spirit of Adventure*. 1st Edn., Harcourt Brace Javanovich, Toronto, ISBN-10: 0774713259, pp: 409.

- Rubin, C., 2011. Are entrepreneurs born or taught? Inc.com.
- Sánchez, J.C., 2011. University training for entrepreneurial competencies: Its impact on intention of venture creation. *Int. Entrepreneurship Manage. J.*, 7: 239-254. DOI: 10.1007/s11365-010-0156-x
- Sarasvathy, S.D. and S. Venkataraman, 2011. Entrepreneurship as method: Open questions for an entrepreneurial future. *Entrepreneurship Theory Pract.*, 35: 113-135. DOI: 10.1111/j.1540-6520.2010.00425.x
- Sauro, J. and J.R. Lewis, 2011. When designing usability questionnaires, does it hurt to be positive? *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, May 07-12, ACM, Vancouver, BC, Canada, pp: 2215-2224. DOI: 10.1145/1978942.1979266
- Steenekamp, A.G., S. van der Merwe and R. Athayde, 2011. Application of the Attitude Toward Enterprise (ATE) test on secondary school learners in South Africa. *South African J. Economic Manage. Sci.*, 14: 314-332.
- Vican, D. and D. Vuletić, 2013. Self-assessment of croatian elementary school pupils on the entrepreneurial initiative. *Management*, 18: 57-79.
- William, L.S., S. Ken and E.E. Douglas, 2007. Entrepreneurial skills assessment: An exploratory study. *Int. J. Manage. Enterprise Dev.*, 4: 179-201. DOI: 10.1504/IJMED.2007.011791
- Williams-Middleton, K., 2013. Becoming entrepreneurial: Gaining legitimacy in the nascent phase. *Int. J. Entrepreneurial Behav. Res.*, 19: 404-424. DOI: 10.1108/IJEBr-04-2012-0049