Engineering Students' Engagement in Entrepreneurship Education

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Abstract

Entrepreneurship education is one of the efforts for preparing graduates with the self-employed mindset. Accordingly, various entrepreneurial activities are implemented at the university level. One of the initiatives is to make entrepreneurship education compulsory for all university students. However, the study found that many graduates are not interested to become entrepreneurs and prefer to hunt for employment. Therefore, this study was conducted to explore the university students' engagement while taking a compulsory entrepreneurship course. The case study involved 76 students majoring in engineering. The study was conducted using observation and documentation analysis methods. The results found that students were less engaged in implementing entrepreneurship learning activities. Most students failed to adhere to the due date of assignment submissions. Students were less interested in making marketing posts through social media and less critical thinking in solving their business problems. Overall, the achievement of business objectives was unsatisfactory. The students lack focus and limited time to engage actively in the learning activities. They have many commitments to other courses. The finding of this study can be used for deciding the best ways to promote an entrepreneurial mindset among university students.

Keywords: entrepreneurship, engineering, students, engagement

Introduction

Entrepreneurship education promotes the shift of mindset from job seeker to job creator among university students. Since the 1990s the focus on entrepreneurial mindset is gaining attention to encourage graduates to venture into the field of entrepreneurship as this workforce cannot be entirely absorbed in formal salary wage employment (Jaafar & Abdul-Aziz, 2008). The competition for jobs is intensifying with the increasing number of Higher Education Institutions (HEIs) in Malaysia which produce more graduates every year. Before 1990, there were only seven public universities in Malaysia. Malaysia now has 702 institutions of higher learning, and General Skills Training Institutions (ILKA). This consists of 20 public universities, 267 private institutions of higher learning, 89 community colleges, 82 vocational colleges, 33 polytechnics, 33 ILKA of the Ministry of Human Resources, 11 ILKA of the Ministry of Agriculture and Agro-Based Industry, 19 ILKA of the Ministry of Youth and Sports, 146 ILKA of the Ministry of Rural Development and two other institutions of higher learning (Ministry of Higher Education-MoHE, 2020). The total enrolment of students in higher education institutions increased to 1323,449 in 2019 from only 125,213 in 1995 (MoHE, 2019).

Therefore, the entrepreneurial mindset is increasingly gaining attention with the main motive to prepare the students with the ability to be self-employed after their graduation (Ahmad, 2013). According to Lim, Rich, and Harris (2008) the degree scrolls no longer guarantee graduates a job after graduation. The problem of unemployment also continues to increase as a result of the COVID 19 pandemic (Menon, 2020; Abd Rahman et al., 2020). In a broader context, entrepreneurship education can contribute to sustainable enterprising societies so that they can compete in a highly globalized economy (Cheng, Chan & Mahmood). Futhermore, the Asian financial crisis 1996/1997 and the world economic recession 2010/2011 and, global market uncertainty have raised the awareness to policymakers about the importance of entrepreneurship for sustainable investment in the future prosperity of the country (Ahmad & Buchanan, 2015).

Recognizing the importance of Entrepreneurship Education, various initiatives have been taken to cultivate the entrepreneurial mindset among students in HEIs. Ministry of Higher Education (MoHE) launched the Institute of Higher Education Entrepreneurship Development Policy on 13 April 2010 which aims to promote a more organized and holistic education and development of entrepreneurship among HEIs (MoHE, 2011). Six Strategic Thrusts of the HEI Entrepreneurship Development Policy have been set: to establish an Entrepreneurship Center in each HEI; provide organized and holistic entrepreneurship education and programs; strengthen entrepreneurship development and strengthening programs; establish effective measurement mechanisms; provide a conducive environment and ecosystem for entrepreneurial development; and strengthen the competencies of entrepreneurship educators (Ali and Aede Hatib, 2014). Furthermore, in line with the Malaysian Education Development Plan (PPPM, 2015), the MoHE (2016) has developed the Higher Education Institutions Entrepreneurship Action Plan 2016-2020. It was developed to cultivate the entrepreneurial mindset into the entire higher education system to produce graduates who are holistic, balanced, and

entrepreneurial in line with the National Education Philosophy. Recently, on 19 February 2021, the MOHE launched the HEIs Entrepreneurship Action Plan 2021-2025 and the HEIs Integrated Entrepreneurship Education Guide to producing more entrepreneurs among graduates. The plan aims to transform the entrepreneurial landscape in HEIs from needs-based entrepreneurship to opportunity-based (MoHE, 2021).

In line with the Entrepreneurship Action Plan, there are various entrepreneurship programs introduced in HEIs. For example, since 1989, the Student Entrepreneur Development Program (PPUS) has been launched to cultivate entrepreneurial activities. The main objective of the program is to develop the student's interest in entrepreneurship and thus reduce unemployment among graduates (Ibrahim, Wan Mohd Zaifurin and Noorun Nashriah, 2009). The PPUS activities include student entrepreneurship training which is then replaced with entrepreneurship modules for first-year students of two credits, organizing short-term entrepreneurship courses for final year students, group business encouragement activities on campus, establishing companies, and Student in Free Enterprise (SIFE) community activities to improve the economic status of the local community. Furthermore, the acculturation of entrepreneurship among HEIs students is also implemented through the Graduate Entrepreneur Incubator Program, a joint venture between Bank Pembangunan dan Infrastruktur Malaysia Berhad (SME Bank) and HEIs (Utusan Malaysia, 2005). Malaysian universities are acting actively with issues related to entrepreneurship education with some universities are involved with various entrepreneurial activities by establishing Centers of Enterprising and Small Business Development, while others are operating in more modest ways (Ahmad & Buchanan, 2015). The Malaysian Government has made entrepreneurship courses compulsory for all public university students in the hope of fostering an entrepreneurial mindset among the graduates (Yusoff, Zainol, & Ibrahim, 2014).

Despite various initiatives to develop an entrepreneurial mindset, the results show that HEIs students are still not interested in becoming entrepreneurs even though they show a positive attitude towards entrepreneurship (Norfadhilah and Halimah, 2010). Ibrahim, Wan Mohd Zaifurin, and Noorun Nashriah (2009) concluded that although many students aspire to become entrepreneurs, only a few become entrepreneurs after graduation. According to a tracer study of 2010 graduates, the number who chose to be self-employed was still rather low compared to other employment sectors. Only 5.5% or 4841 graduates from a total of 87,886 were involved in setting up new business ventures (MoHE, 2010). Most of the graduates are like to hunt jobs compared to creating or doing entrepreneurial activities. This situation may be attributed to the engagement of students while taking entrepreneurship courses. The idea of students venturing into the business while they are still pursuing their studies may interfere with students' learning time, affect students' focus on their studies as well as may contribute to students' psychological and physiological problems due to fatigue (Fayolle & Gailly, 2008).

The purpose of this study is to explore the student's engagement while taking the compulsory entrepreneurship course at one of the public universities in Malaysia. Student engagement refers to the degree of attention, curiosity, interest, optimism, and passion that students show when they are learning or being taught, which extends to the level of motivation they have to learn and progress in their education (edglosssary). Students' engagement describes the student commitments as well as their participation in learning activities in order to achieve the intended learning outcomes (Christenson, 2008). In this study, student engagement describes the time and effort students dedicate to activities that are related to the desired outcomes of the entrepreneurship course (Kuh, 2009).

Engagements were measured based on the commitment to completing the individual and group assignments throughout one semester (14 weeks). Specifically, the engagements were observed through three aspects: punctuality in submitting the assignments, passion toward the entrepreneurial learning activities, and overall achievement.

The Fundamentals of Entrepreneurial Acculturation Course

The Fundamentals of Entrepreneurial Acculturation course or APK (the acronym in Malay for Asas Pembudayaan Keusahawanan) is a compulsory course designed for all first-year undergraduate students at UMS except the Faculty of Business, Economics & Accountancy. The discussion about the APK course is based on teaching models and learning processes in entrepreneurship education by Fayolle and Gailly (2008). The model has two levels namely ontology level and education level (Figure 1).
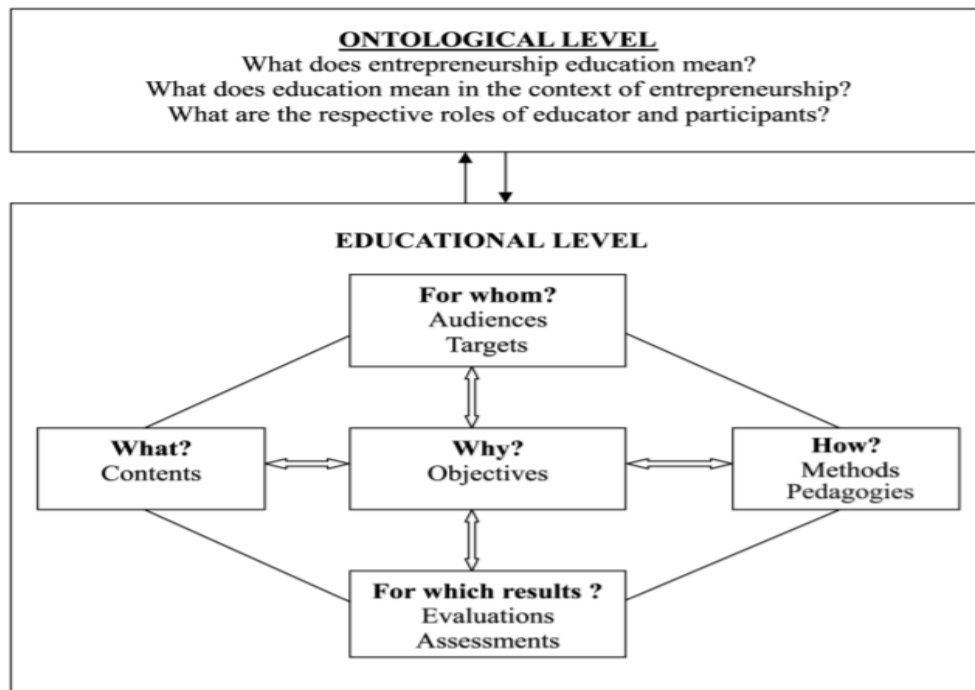
Figure1: Teaching model framework for entrepreneurship education

(Fayolle dan Gailly, 2008, p.572)

The ontology level: This level revolves around three main questions namely the meaning of entrepreneurship education, the meaning of education, and the role of educators and participants.

(i)The meaning of entrepreneurship education includes the development of entrepreneurial attitudes and skills as well as personal qualities. In the context of the APK, the meaning of entrepreneurship education introduces students to the concepts and theories of entrepreneurship, such as creativity and innovation, new business idea generation, and new enterprise management. The APK emphasizes experiential entrepreneurial learning. The course develops students' entrepreneurial mindsets, entrepreneurial skills, essential characteristics, and necessary competency through the whole process from problem-solving, idea generation, and feasibility analysis to projects/activities implementation. Upon completion of this course, students may possess entrepreneurial characteristics and necessary skills to start up a new business in line with Industry 4.0 agenda.

(ii) The meaning of education in the context of entrepreneurship focuses on the concept of 'to educate' rather than 'to teach' to build innate capacities through the active involvement of students. This is also in line with the APK course where students are actively engaged in activities through entrepreneurship projects.

(iii) The role of educators and participants of entrepreneurship education who emphasize their respective awareness of what and why to do something. In the APK, the role of the lecturer is as a learning facilitator and students as active learners who practice self-directed learning which is the active exploration of information related to business from time to time.

The Education Level: This level emphasizes five dimensions.

Dimension 1: The objectives and goals of entrepreneurship education should be elaborated around the transfer and development of specific knowledge, techniques, and skills to enhance the entrepreneurial potential of students. Therefore, the objective is to prepare them to think, analyze and act as entrepreneurs in specific situations and a variety of contexts. All the mentioned elements are achieved through three specific objectives of the APK namely (a) to explain the basic concepts of entrepreneurial knowledge; (b) Exhibit creative and innovative ideas, and (c) implement entrepreneurial projects/activities

Dimension 2: Target group - understanding the profile of the target group of entrepreneurship education is very important in determining the course content that is appropriate to the characteristics of students or program participants. The APK course targets UMS first-year students from all faculties except the Faculty of Business, Economics, and Accounting.

Dimension 3: Content - Depending on the objectives and profile of the participants, the content of each entrepreneurship course should be clearly defined through a combination of three components namely theoretical, professional and spiritual.

(a) Theoretical related to theories and scientific knowledge that are useful to master to understand the phenomenon of entrepreneurship, complement and strengthen the content related to the professional and spiritual dimensions. The content taught alongside that dimension can concern the impact and impact of entrepreneurship or any other question related to phenomena and processes. In the APK course, students are given theoretical exposure through two hours lectures per week for 11 learning units as

follows: Unit 1: concept and development of entrepreneurship; Unit 2: Creativity and Innovation; Unit 3: Business opportunities-idea validation, SEO marketing & google trends; Unit 4: Business Model Canvas (BMC).; Unit 5: Marketing; Unit 6: Digital Marketing (Facebook & Instagram); Unit 7: Digital marketing (WhatsApp, Telegram, email, and website); Unit 8: Financial management; Unit 9: Risk management; Unit 10: Business management; Unit 11: Support systems and legislation.

(b)   The professional aspect of entrepreneurship education is more specific to practical knowledge. Concretely, this aspect depends on three types of knowledge: (1) Know what: what needs to be done to decide and act in a particular situation. For example, what must be done to create a technology company, validate opportunities, conduct market research, and so on. In the APK course, this exposure is given through theory classes and applied in the business projects they run. (2) Know-how: how to handle certain situations. For example how to identify risks and plan a contingency plan. Students in the APK course are required to identify the risks they anticipate in the business through SWOT analysis and preparation to deal with the risks. (3) Know-who: who is a useful person and who is a useful network in a particular context. In the APK course, especially BMC, students will identify the parties involved in their business project such as business partners through the concept of affiliation, dropship, and those involved in production and marketing networks.

(c)   The spiritual dimension consists of know-why and know-when. (1) Know-why: what determines human behavior and actions, attitudes, values , and motivations of entrepreneurs. What leads ordinary human beings to do what entrepreneurs do. Issues on these values are discussed in the APK through the "Ethics" unit and applied in entrepreneurship projects when students are required to think about how they handle ethical issues in their entrepreneurship projects. (2) Know-when: when is the right time to proceed? Is this a good project for me? These are some of the key questions students face. Case studies, interviews with experts, and professionals can form a good way to deal with this. In the APK course, several partnership seminars with entrepreneurs were conducted to provide exposure to students on these questions.

Dimension 4: Teaching and learning methods - The selection of pedagogical methods for each entrepreneurship education course needs to look back at the objectives, target group profile, content, and institutional constraints. Entrepreneurship education uses a learning by doing approach. This is in line with the teaching and learning methods in APK, where students will undertake entrepreneurial projects and gain experience while undertaking projects. In groups of 5 to 6 people, students are given 4 project options, namely:

• Take order and delivery- focuses on one business industry. For example, food and beverage, beauty, household or clothing businesses, and others.

• Gig Economy- Each group member may focus on offering their paid short-term services (freelance) online or within their location (offline). For example, creating advertisements for a local company.

• SULAM- Each group member can volunteer as a consultant to help any local business that has no presence on any digital platforms (i.e. Facebook, Instagram). The member is responsible for helping to establish or to train the local business. Particularly, the student should help the local business to create teaser, soft-sell, and hard-sell postings for their digital platform

• Virtual management- The group could organize a free or profitable virtual (online) event that is interesting and relevant to current needs. The event could be organized using any platform such as Facebook live and Google Meet.

Dimension 5: Assessments should refer back to the objectives of entrepreneurship education and based on assessments focus on the development of awareness, interest, and motivation in the field of entrepreneurship as well as entrepreneurial knowledge and skills. In the APK course, the assessment involves two components namely individual and group assessment. The individual evaluation covers aspects of quiz and content creation, namely the preparation of videos such as product reviews and a flat lay photo. The group evaluation focuses on their business projects, namely pre-pitching (presentation of business ideas), preparation of BMC (planning involves 9 components in BMC, post-pitching (presentation of business experience), and e-business portfolio (final report of the business project) (Table 1).

Table 1: The Assessment in APK

Category	Component	Description
Individual	Quiz	Theoretical knowledge based on 11 topics in the course syllabus.
	Content creation:	1) A product/service review OR advertisement 2) Individual sales achievement 3)Flat lay photography
Group	Planning	1) Pre-Pitching
		2) Business Model Canvas
	Implementation and achievement	3) Post Pitching
		4) Written Business e-portfolio Final Report

For the group assignments, the students were divided into 13 groups with the number of members between five to six students.

Methodology

A case study was carried out at the University Malaysia Sabah. A total of 76 first-year engineering students who attended a course on Acculturation of Entrepreneurship in Semester 1 academic session 2021/2022 were selected as the samples of the study. The mean age of the respondents was 21 years. 60 percent of the respondents were male, and 39 percent female. The study was conducted through observation and documentation analysis. Student engagements were measured through the following indicators:

1) Observation on the punctuality in submitting assignments on the scheduled date- Assignment submitted in the google classroom platform to facilitate the record of the submission dates.

2) The interest in marketing through social media and action toward the identified problems. These were executed through the analysis of the assessment rubrics.

3) The Achievement of business objectives- based on assessment rubrics.

Findings

1. Types and categories of business

All groups selected the 'take order and delivery' business category. The most preferred type of business is food and beverage (10 groups), followed by accessories (2 groups). Only 1 group is interested in a health product-based business.

Table 2: Type and category of business (n=13 groups)

	Description	Frequency (f)	Percentage (%)
	Take order and deliver	13	100
	Gig economy	0	0
Business category	SULAM	0	0
	Virtual management	0	0
	Food and Beverages	10	76
Type of business	Accessory	2	16
	Health product	1	8

2. Punctuality

Punctuality is measured through a student's effort to submit assignments on a specified due date. Online Quiz was opened for 30 minutes through the Schoology platform on the lecture day of week 12. Table 3 shows the majority of students (89.5%) submitted answers after 30 minutes had ended. There were eight students (10.5%) who requested another date because of the internet connection problem. Flat Lay photography recorded the late submission of more than half of the students (58%). Similarly, video creation assignment submissions also recorded more than half of late submissions (56.5%).

Table 4: Individual submissions (n=76)

Component	Description	Due date	Submitted before the due date	Submitted in time	Late submission	No submission
				f (%)		
Quiz	Theoretical knowledge based on 11 topics in the course syllabus.	Week 12	-	68 (89.5%)	8 (9%)	0
Content creation:	1) Flat Lay Photography	Week 7	7 (9%)	23 (30%)	44 (58%)	2 (3%)
	2) Video creation (product review and individual achievement)	Week 14	8 (10.5%)	22 (29%)	43 (56.5%)	3 (4%)

Pre-pitching assignments require students to submit slides for live presentations via video call OR pre-recorded video. Pre-pitching presentations were held in weeks 4 and 5 alternately via google meet. However, all groups are required to submit presentation materials in week 4. All groups were required to be ready in week 4 because the turn for the presentation was chosen randomly by the lecturer. Table 4 shows that most of the groups were ready for presentation in week 4. One group submitted before the due date and eight groups submitted in time. Four groups were requested to present in the 5th week. They failed to complete the presentation material on the scheduled due date.

Business Model Canvas assignment submissions recorded 10 groups failed to submit on the scheduled date. Only three groups were submitted in time. None of the groups submitted earlier than the given due date. The groups that failed to submit unanimously asked for a one-week extension. The reason given was that "they were busy with many mid-semester tests."

Post-pitching was scheduled in weeks 13 and 14. Each group was given a presentation time of 15 minutes. Presentations can be made live on google meet or pre-recorded video. All groups need to submit presentation materials (presentation slides or pre-recorded video) in week 13. However, only seven groups were submitted in week 13. The remaining six groups were requested to submit during the presentation in week 14. The students claimed that they "are busy preparing assignments for other courses."

Written Business e-portfolio Final Report should be submitted in week 14. Only four groups were submitted in time. Nine groups requested another one week's extension. They promised to submit during the study week. However, only five groups submitted as promised. The rest four groups submitted in the first week of the exam.

Table 4: Group submissions (n=13 groups)

Components	Tasks	Due date	Submitted before the due date	Submitted in time	Late submission
			f (%)		
Planning	1) Pre-Pitching	Week 4	1 (8%)	8 (62%)	4 (30%)
	2) Business Model Canvas	Week 7	0	3 (23%)	10 (77%)
Implementation and achievement	3) Post Pitching	Week 13	0	7 (54%)	6 (46%)
	4) Written Business e-portfolio Final Report	Week 14	0	4 (30%)	9 (70%)

3. Passion towards the learning activities

Passion toward the learning activities can be observed from the efforts they showed through the learning activities. One of the APK course objectives is to perform digital business with team members. Therefore, the engagement could be observed through their commitment to execute online marketing. Table 5 shows the rubric used to assess achievement in online marketing. This rubric is part of the assessment in the e-portfolio report related to business execution. Table 5 shows that most groups (77%) used promotional tools and social platforms for marketing at a moderate level only, namely "Using 3 promotion tools or utilize only 3 social platforms". Furthermore, the promotion time frame started from week 4 until week 12 (9 weeks). However, five groups executed their promotions for four weeks only. 10 out of 13 groups were at the level of 'very weak' commitment with an average frequency of posting only one time a week.

Table 5: Marketing/Promotion Strategy (n=13 groups)

Marketing/Promotion Strategy	**Very Weak** **1**	**Weak** **2**	**Fair** **3**	**Good** **4**	**Very Good** **5**
a. Used of Promotional Tools and Social Platforms. Promotional tools (digital/traditional) are such as sales promotion, voucher, lucky draw, discount, free taster, video teaser, soft sell, hard sell. Social platforms are such as Facebook, Instagram, Youtube, Whatsapp, and Telegram, etc.	Using **1** promotion tool or utilize only **1** social platform	Using **2** promotion tools or utilize only **2** social platforms	Using **3** promotion tools or utilize only **3** social platforms	Using **4** promotion tools or utilize only **4** social platforms	Using **more than 4** promotion tools or utilize **more than 4** social platforms
f (%)	0	1 (8%)	10 (77%)	2 (15%)	0
b. Promotion Time Frame	Promotion for **1** week	Promotion for **2** weeks	Promotion for **3** weeks	Promotion for **4** weeks	Promotion for **over 4** weeks
f (%)	0	0	0	5 (38%)	8 (62%)
c. Average Frequency to Post Weekly Average post = total posts/weeks of post **Excluding story	**1** time a week	**2** times a week	**3** times a week	**4** times a week	**More than 4** times a week
f (%)	10 (77%)	2 (15%)	1 (8%)	0	0

Table 6 shows some parts of the evaluation rubrics in the e-portfolio for the passionate entrepreneurial in the aspect of identifying problems and finding solutions. Data show that more than half of the group (62%) are only at the 'fair' level. Half of the groups (54%) were at the 'weak' level in terms of suggesting clear solutions to their business problems. Eight out of 13 groups were at the 'weak' level or unclear future suggestions/ recommendations. Overall, the students lack effort in thinking critically about the best ways to deal with their business problems.

Table 6: Entrepreneurial passionate (n=13 groups)

Entrepreneurial Passionate	**Very Weak** **1**	**Weak** **2**	**Fair** **3**	**Good** **4**	**Very Good** **5**
Problems/Issues Faced	**No** problem or issue identify	**Unclear** problem/issue identify	**Acceptable** problems/issues identify and **short** explanation	**Good** identification problems/issues and **good** explanation	**Very good** identification problems/issues with **detailed** explanation
f (%)	0	0	8 (62%)	5 (38%)	0
Problem-solving	**No** solutions to problems		**Acceptable** solutions to problems	**Good** solutions to problems	**Detailed and creative** solutions to problems
f (%)	0	7 (54%)	5 (38%)	1 (8%)	0
Future Suggestion/Recommendation	**No** suggestion or recommendation	**Unclear** suggestions/ recommendations	**Acceptable** suggestions/ recommendations	**Good** suggestions/ recommendations	**Detailed and creative** suggestions/ recommendations
f (%)	0	8 (62%)	4 (30%)	1 (8%)	0

Examples of these assessments are a small part of the overall teaching and learning activities assessment. However, from these two examples of assessment, it can be concluded that students show less effort to perform activities to a satisfactory level.

4. Overall achievement in business activities

The evaluation rubric in Table 6 shows that 11 out of 13 groups did not achieve all the objectives they had set at the beginning of the business activity. From the aspect of group sales, most of the groups (eight groups) achieved sales at a 'very weak' level of only RM0-499. The engagement numbers for their marketing posts revolved around 'very weak' and 'weak' levels.

Table 6: Company Achievement (n=13 groups)

Company Achievement	Very Weak	Weak	Fair	Good	Very Good
	2	4	6	8	10
a. Objective achievement	Objective **not achieve**	Objective **not achieved** with a reasonable **excuse**	**Some (not all)** objectives achieved	**All** objectives achieved	**All** objectives achieved and **outperform**
f (%)	0	1 (8%)	11 (84%)	1 (8%)	0
b. Group sales (RM)	RM0-499	RM500-999	RM1000-1499	RM1500-RM1999	RM2000 and above
f (%)	11 (85%)	2 (15%)	0	0	0
c. Engagement (Facebook and Instagram) Average engagement = [(Followers+Likes+Share) in Facebook + (Followers+Likes+Share) in Instagram]/2	Average engagement = **0-99**	Average engagement = **100-199**	Average engagement = **200-299**	Average engagement = **300-399**	Average engagement = **400 and above**
f (%)	7 (54%)	5 (38%)	1 (8%)	0	0

Discussion

The findings of this study show that students' engagements in APK were less stimulating. Most students did not meet the due date for the submission of assignments and asked for more extensions. Students faced the challenge of time management due to the commitment of other courses taken in the same semester. According to Janssen (2006), time management is a technique and the way a person organizes, manages, and divides his daily time effectively. These skills are very necessary for a student who has many tasks to perform in a limited period (Norzaini, 2013). Therefore, the APK course should provide exposure to the aspects of effective time management while implementing entrepreneurial projects.

Furthermore, the students showed a lack of effort to execute online marketing. Students lack interest in identifying the problems they faced as well as unable to think critically about the solution. The students were less able to adapt to self-directed learning (SDL), and more inclined to depend on lecturers. According to Hmelo-Silver (2004), SDL emphasizes the process of learning planning, constructing and applying strategies for learning, and using learning resources effectively. Students were not able to give full focus to SDL as they also commit to other courses. As such, students were not able to take full advantage of the various online learning resources about entrepreneurship.

The results of this study support the curiosity about students' involvement in entrepreneurship while they are still pursuing their studies as expressed by Fayolle & Gailly (2008). In this regard, the conditions of students should be considered in planning the most suitable learning activities in an entrepreneurship course.

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