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**EFFECTIVENESS OF TYPOLOGY AND  
LEARNING ENVIRONMENT IN DEVELOPING  
ENTREPRENEURIAL COMPETENCIES:  
A COMPARATIVE STUDY**

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**ABSTRACT**

The introduction of entrepreneurship course as a core module in higher education institutions (HEIs) under the Malaysia Education Blueprint (MEB) 2015–2025 has not increased entrepreneurship initiatives. This is partly attributed to ineffective implementation of entrepreneurship skills in the HEI curriculum. Although attempts were made to delineate the central phenomena of entrepreneurship learning to develop entrepreneurial competencies and intention, there was no consistent outcome. This comparative study used empirical data to investigate the contribution of multidisciplinary learning environment and the use of “Through” methodology as an entrepreneurial education pedagogy to develop entrepreneurial competencies and intention among students. A two-phase stratified single-stage cluster sampling

approach was adopted that involved stratifying the entire population of 260 second-year degree students into learning environment strata and partitioning the strata into mutually exclusive entrepreneurial education pedagogy clusters. Data was collected from every single subject within the clusters. Descriptive analytical statistics was used in gauging the effectiveness of the research learning environment and typology pedagogy. The findings revealed that even though entrepreneurial intention remains a challenge, multidisciplinary learning environment that involves students from different disciplinary programs doing entrepreneurial ventures such as experiential learning and taking calculated business risks are most effective in inculcating entrepreneurial competencies. This study has shown that having the appropriate learning environment and typology pedagogy, including consideration of the psychological appeal of students are essential in nurturing entrepreneurial competencies among students. The outcome of this study provides a better understanding for both, HEI academicians and the Ministry of Higher Education (MOHE) in making entrepreneurship learning more relevant to produce students with entrepreneurial competencies.

**Keywords:** Comparative study, learning environment, learning method, entrepreneurial competencies, entrepreneurial intention.

## INTRODUCTION

The Malaysian government has introduced entrepreneurship as a core module in HEIs under the Malaysia Education Blueprint (Higher Education) 2015–2025. Despite the introduction, there has been relatively little changes in business ownership rate and early-stage entrepreneurial activity (GEM, 2017). This phenomenon has been attributed to several factors such as millennials being less entrepreneurial (Dobson et al., 2017), declining entrepreneurial attitude and perception of Malaysians (SME Corporation Malaysia, 2016), and lack of entrepreneurial competence (Benamar, 2016). One interesting finding states that the decreasing rate of entrepreneurial activity is due to the ineffective implementation of entrepreneurial skills in the HEI curriculum (Gerber, 2014). Although attempts have been made to describe clearly the central phenomena of entrepreneurship learning at HEI settings in creating entrepreneurial competencies and intention

among students, there has been no consistent outcome. However, generally it has been agreed that using a “Through” methodology to provide students first-hand experience in entrepreneurial activities is most effective compared to a learning and teaching culture of didactic education (“About” type) and instilling students with entrepreneurial knowledge and skills (“For” type) (Lackéus, 2015).

However, within the context of these approaches lies the environment in which self-learning and self-interest are cultivated. Past literature such as Taatila (2010) asserts that a dynamic and productive entrepreneurial ecosystem provides a platform for acquiring knowledge through a cyclical process of motivated learning. In the cyclical entrepreneurial learning process, empowerment attained from inner-directed personal interest creates a strong internal motivation leading to the development of enterprising, and tacit learning as the by-product of the surrounding environment in which the student operates. This process continuously enhances and develops new knowledge in the cyclical process resulting in the development of entrepreneurial competencies (Taatila, 2010).

Accordingly, having the right pedagogical approach without considering the environmental conditions is akin to equipping students with the best tool without an appropriate user manual. Although environmental conditions or hygiene factors may not stimulate internal motivation, they modulate demotivation when absent (Herzberg et al., 1959). Nonetheless, setting up a multidisciplinary learning environment in HEIs is always a challenge due to conflicting schedules and timetables set across different academic disciplines. As such it is not unusual for individual academic disciplines to conduct their own lessons for common subjects that could otherwise be leveraged across all disciplines. Such arrangements although more convenient and requires less coordination is at the expense of more intense resource requirements and inefficient systems. Higher cost is incurred from unnecessary duplication of administrative overheads and inconsistency in module delivery. More importantly is its effect on students. Would having dedicated single-disciplinary class benefit students? Or, would they gain more in a collaborative multidisciplinary class that cuts across all academic disciplines?

This longitudinal research was initiated to achieve three objectives.

The first is to compare and evaluate the effectiveness of using “Through” methodology as a form of pedagogy in developing students’ entrepreneurial competencies. The second objective is to determine the effect of a multidisciplinary learning environment in fostering entrepreneurial skills and the final objective is to evaluate the transformational effect of entrepreneurial traits based on a combination of “Through” methodology in a multidisciplinary learning environment.

## **LITERATURE REVIEW**

### **Entrepreneurial Intention and Competencies**

According to Gorgievski and Stephan (2016), individuals who develop entrepreneurial intentions up to the point of taking entrepreneurial action exhibit similar patterns and characteristics with factors such as emotions, surrounding environment, and perceptive responses to circumstances as being antecedents to developing this intention. Rantanen and Toikko (2013) further postulated that individuals developing these intentions would do so consciously and in a pragmatic manner. However, the cultivation of an enterprising mindset is not a quick fix solution. This can only be achieved through a series of transitional changes in the individuals’ behaviour and attitude.

Although COVID-19 pandemic has upended the social-economic development of countries resulting in many aspects of private and public life moving online (Liguori & Winkler, 2020), the essence that goes towards developing entrepreneurial intentions remains unchanged. Ratten and Jones (2020) postulated that the COVID-19 crisis presented an opportune time to pay more attention to the importance of entrepreneurship education for society. This was supported by Bhatia and Levina (2020) who stated that many schools felt that formal education still had a place in the world of entrepreneurship. These schools have taken the necessary steps to update their offerings in meeting the needs of today’s students. In this respect, the educational environment plays an important role in indoctrinating students with the necessary knowledge and skills to help them know that they have the capability to successfully carry out the necessary actions which are more likely to develop entrepreneurial

intentions.

These capabilities in the form of entrepreneurial competencies are measurable or observable knowledge, skills, and attitude. Such competencies include interrelated personality skills, traits, and knowledge possessed by entrepreneurs (Man et al., 2002), and psychological skills such as analytical skills, leadership, creativity, innovation, negotiation, communication, problem-solving, adaptability, critical thinking, flexibility, exposure to technological change, and the ability to identify opportunities (Taataila, 2010). In the context of this study, entrepreneurial competencies are defined as a combination of knowledge, skills, and attitude where students utilizing these competencies possess the inclination to act in an entrepreneurial way. It conforms to the model developed by Heinonen and Poikkijoki (2006) which categorizes a broad dimension of entrepreneurship that serves as a framework where both attitude and skills are placed under non-cognitive entrepreneurial skills as compared to knowledge under cognitive skills.

Non-cognitive entrepreneurial skills comprise personality traits that are observable but cannot be objectively measured. These include attitude and skills such as perseverance, executive functioning, metacognition, and self-regulation (Almlund et al., 2011). In Heinonen and Poikkijoki's (2006) model, the attributes of self-awareness and self-confidence form the attitude in its non-cognitive category. Having such inner-directed mindset would lead to self-awareness and self-confidence that build trust and belief in one's own abilities motivating the individual to act in transforming creative ideas into action. Critical thinking forms part of such a mindset that enables a person to conceptualize, analyze, synthesize, and evaluate information derived from observations, on-the-job learning, and reflections that serve to build one's belief and actions. For instance, an entrepreneur who started a business and failed would have far better insight when it comes to starting a new business compared to someone who has had no business experience. Shane (2003) posited that such self-efficacy increased a person's willingness to pursue entrepreneurial opportunities. Hence, critical thinking was used as a non-cognitive entrepreneurial skills construct in the assessment of entrepreneurial competencies of the respondents in the study.

Conversely, cognitive entrepreneurial skills are core skills that an

individual uses to read, learn, think, remember and pay attention to, which are usually related to intelligence and the ability to solve abstract problems. These personal traits are developed through knowledge acquired in social settings which given the right environment could translate into entrepreneurial skill sets (Daykin, 2018). Social skills such as the ability to interact, communicate in verbal and non-verbal ways, and having the capacity to adapt to new situations are intrinsic to cognitive entrepreneurial skills that are acquired through the process of socialization.

In this process, individuals employ interpersonal acts to communicate and interact with others. These sharing and bantering sessions in social settings eventually lead to the development of common social interests and over a period of time could result in more tangible actions such as pursuing a new business venture (Leary, 1957). As such social skills was used as a cognitive construct for this study where we measured its development in the research setting of a multidisciplinary learning environment together with the use of “Through” methodology.

### **Entrepreneurial Education and Experiential Learning**

The typologies of entrepreneurial education can be categorized into three forms of pedagogy - “About”, “For” and “Through” (O’Connor, 2013). “About” refers to a content-laden and theoretical approach also known as didactic which is commonly practised in many educational institutions. “For” methodology aims to instil in students the required entrepreneurial knowledge and skills by way of performing tasks, activities, and projects while “Through” is an experiential learning approach which enables students to obtain hands-on experience in entrepreneurial activities (Lackéus, 2015). Although there are some overlapping activities between “For” and “Through” approaches as both methodologies require students to perform tasks and activities to attain competency skills, the main difference is that the “Through” approach allows the actual practice of entrepreneurship to be conducted under “safe” conditions (Truell et al., 1998). In pursuit of our research objectives, we adopted the “Through” methodology as our research setting enabled students to run real businesses with emphasis on experiential learning or learning through doing in a “safe” campus environment.

Experiential learning emphasizes action/reflection and experience/

abstraction which comprises a learning process that requires active participation. It is not only relevant in the classroom but also in many other areas of learning (Kolb & Kolb, 2011). Experiential learning adds an additional element to the existing structure found in HEIs. Through a well-designed experiential learning program, students can apply the knowledge and skills that they have learned to grow professionally, personally and add value to society (Awaysheh & Bonfiglio, 2017). Correspondingly, several studies had shown that experiential learning was suitable to be implemented in entrepreneurship modules to enhance students' entrepreneurial mindset and intention (Lindberg et al., 2017; Scheepers et al., 2018). Similarly, Duval-Couetil et al. (2016) pointed out that entrepreneurial education was more effective when combined with experiential learning which required students to actively participate and reflect on their experiences. In other words, experiential learning could instil critical thinking skills and positive perceived behavioral control in students.

On the other hand, Rae (2010) held that people did not necessarily change their behaviour with experience. Miller and Maellaro (2016) concurred that experiential learning did not necessarily guarantee that students would achieve the desired outcome in studies and that modification was required in the experiential learning model. With reference to this, several researchers had identified challenges in experiential learning and highlighted the need to further enhance its effectivity (Nooghabi et al., 2011).

### **Multidisciplinary Environment**

A multidisciplinary environment is one that brings together students from different disciplines such as technology and business where students are taught by way of integrating the different disciplines to complete assignments (Homouda & Ledwith, 2016). In view of this, Croci (2016) pointed out that entrepreneurship is interdisciplinary in nature in the sense that it does not only focus on a discipline but a combination of several other disciplines together. Duval-Couetil et al. (2016) observed that students who participated in an entrepreneurship multidisciplinary program tended to put a higher rating on their own entrepreneurial ability than students who participated in intradisciplinary programs. This could partly be attributed to the high participation associated with a multidisciplinary learning environment which led to improved learning performance, better generation of

innovative ideas (Ventura & Quero, 2013), and development of soft skills such as teamwork, communication, leadership, negotiation, and adaptability (Nandan & London, 2013).

However, a multidisciplinary education model is difficult to put into action since it requires collaboration and synchronization of the respective academic disciplines' program schedule. Students' timetable from different programs require alignment to ensure that everyone fits into the semester curriculum. Despite the challenges, it is crucial for educators to overcome implementation difficulties to ensure that students can obtain adequate education.

## **METHODOLOGY**

### **Research Settings and Conceptual Framework**

As this research intended to investigate the impact of both multidisciplinary learning environment and the use of “Through” methodology as pedagogy on the development of social values and critical thinking skills as entrepreneurial competencies and the resulting entrepreneurial intention, a research setting was conceptualized encompassing entrepreneurial intention as the dependent variable, social values and critical thinking skills as the independent variables within a multidisciplinary environment and “Through” methodology (denoted by a rectangular box in Figure 1). As illustrated in Figure 1, multidisciplinary environment and “Through” methodology are within the dotted lines indicating their existence simply as part of the research setting and not as variables. The inclusion of a multidisciplinary environment and “Through” methodology highlighted the purpose of this research which focused on the development of the stated variables exclusively in the stated research settings.

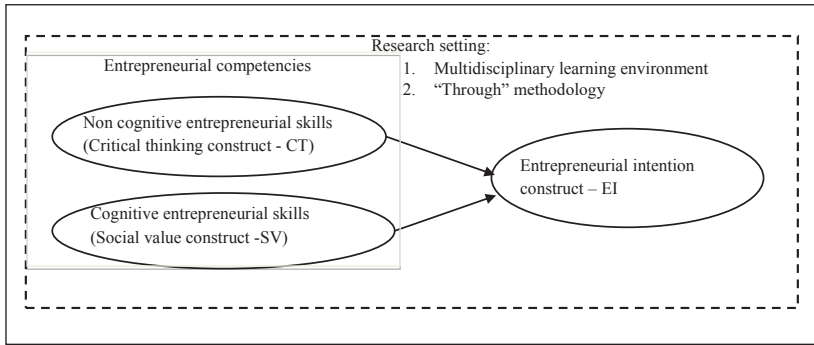
This research setting was based on several implications from past literature, notably within an entrepreneurship education environment, with social values and critical thinking skills as the primary catalysts for the development of entrepreneurial competencies. Hence, Figure 1 indicates how changes in both social values and critical thinking skills within these learning approaches would help determine the most



effective manner of developing entrepreneurial competencies. Single disciplinary learning environment was added to the research setting primarily as a control to compare and assess the effective deployment of a multidisciplinary learning environment and the use of “Through” methodology.

**Figure 1**

*Constructs within a Research Setting*



**Hypotheses Development**

Past literature has expounded the need for reassessing entrepreneurial education as the current pedagogical entrepreneurship education is ineffective in developing entrepreneurial competencies. However, it is unclear as to why or how an education environment is ineffective given conflicting outcomes of past studies. On one side, studies have advocated using “Through” methodology as an effective way of developing entrepreneurial competencies. Yet, other studies have postulated the importance of multidisciplinary environment as an encasing medium or channel upon which inner-directed knowledge, skills and attitude are manifested. However, there is a lack of empirical studies that evaluate the effectiveness of different approaches in developing entrepreneurial competencies and intention.

For this study, data collected from pre- and post-curriculum over a period of eight months was examined for the effectiveness of using “Through” methodology in developing entrepreneurial tendencies

among students. In this regard, we believe that in a controlled environment where other factors are equal, “Through” methodology with its experiential learning would be more effective in producing entrepreneurial competencies. The second hypothesis was formulated based on the diversity of students from various disciplinary backgrounds. Accordingly, between students studying in single disciplinary class (SDC) and those in multidisciplinary class (MDC), we hypothesized that MDC with its richer diversity would gain better insights from an environment promulgating higher entrepreneurial competencies. In formulating our final hypothesis, we took cognizant of the inconclusive outcomes related to experiential learning. As much as there were proponents on the positive development of entrepreneurial competencies (Duval-Couetil et al., 2016; Lindberg et al., 2017), there were also opponents who held thoughts on the ineffectiveness of experiential learning (Nooghabi et al., 2011; Miller & Maellaro, 2016).

We are of the view that although experiential learning is part of “Through” pedagogy, the environment factor plays an equally important role in developing the inner interest and contributing towards the development of entrepreneurial competencies. The two-factor theory by Herzberg et al. (1959) attributed hygiene factor as one of the two primary factors of job satisfaction that is extrinsic in nature. Proper management of this factor such as good working conditions could prevent dissatisfaction at the workplace. Whilst hygiene factor applies to various areas that are extrinsic to an individual, it is used for the purpose of this research to represent the multidisciplinary environment of which students interact. In this regard, we hypothesized that students going through experiential learning as part of “Through” methodology in a multidisciplinary environment would benefit most in adopting real-world knowledge that serves as a vital ingredient towards developing entrepreneurial competencies.

Past literature has postulated that the cultivation of an enterprising mindset as complex as there is no one hypothesis which supports the formation of entrepreneurial intention. It is influenced by a multitude of factors such as self-efficacy (Hsu, 2011), attitude (Lüthje & Franke, 2003), and behaviour (Gieure et al., 2020) which collectively form entrepreneurial competencies under Heinonen and Poikkijoki’s (2006) broad dimensions of cognitive and non-cognitive entrepreneurial model. Accordingly, education institutions play an important

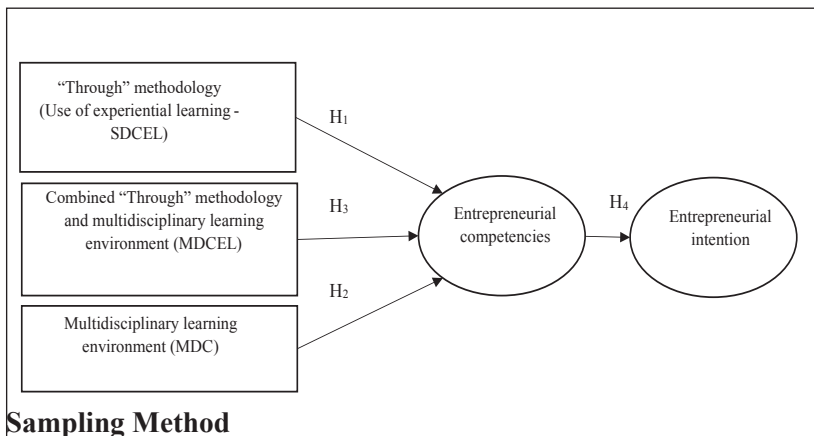
role in raising the knowledge and skills as well as increasing the entrepreneurship intentions of individuals (Bhatia & Levina, 2020; Davey et al., 2011; Jones et al., 2011). Given the conflicting outcomes of past literature in the use of different pedagogical methodologies and learning environment to develop entrepreneurial competencies, the hypotheses developed for this research are based on the following assertions:

- H<sub>1</sub> : “Through” methodology is a more effective pedagogy in producing entrepreneurial competencies.
- H<sub>2</sub> : Multidisciplinary class with its rich diversity promotes enhanced entrepreneurial competencies.
- H<sub>3</sub> : The combination of “Through” methodology and multidisciplinary class provides an optimum learning environment to develop entrepreneurial competencies.
- H<sub>4</sub> : Having strong entrepreneurial competencies will eventually lead to the formation of entrepreneurial intentions.

These hypotheses are illustrated in the conceptual framework (Figure 2). The rectangular boxes illustrate the different research settings used in developing entrepreneurial competencies and are not a representation of constructs that are embedded in each of the settings.

**Figure 2**

*Conceptual Framework*



**Sampling Method**

The actual experiment was carried out using a two-phase stratified single-stage cluster sampling approach (Hilson et al., 2015). The first phase involved the process of stratification where the entire population was segregated into sub-population strata which were individually more homogenous allowing for better estimates. This technique reduced the possibility of sample bias thereby ensuring that appropriate populations were represented in the sample. The second phase employed a single-stage cluster sampling by partitioning the strata into mutually exclusive clusters. Data was then gathered from every single subject within the clusters.

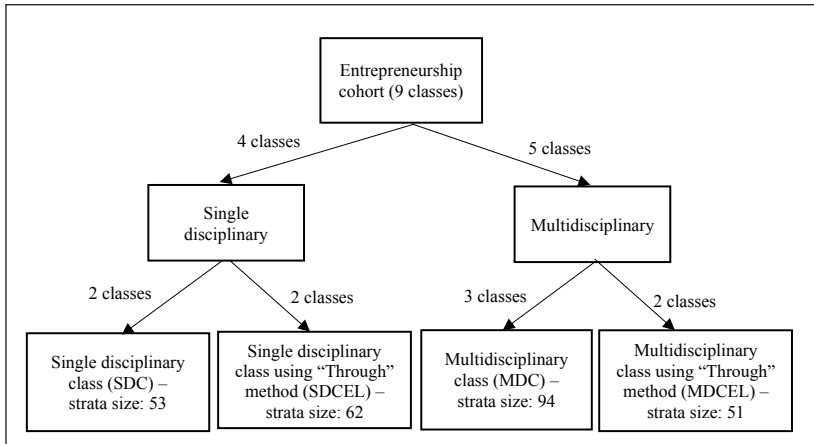
Following this sampling method, 260 students drawn from the entire population were segregated into two sub-population strata which comprised single-disciplinary and multidisciplinary classes that were made up of four and five classes respectively of approximately 30 students per class. Whilst students in a single-disciplinary class (SDC) were from a single homogeneous academic discipline, a multidisciplinary class (MDC) consisted of a diverse group of students from different disciplinary backgrounds. In the second phase, the sub-population of SDC was clustered according to the type of activities performed in class. Two of the four SDCs were designated as pure SDCs. They were given the basic didactic entrepreneurship and business simulation education which were also taught to all the other classes involved in the entrepreneurship course. The remaining two SDCs classified as SDCEL were given an additional task to participate in experiential learning running a cart business at the institution campus as advocated by the “Through” methodology. Likewise, the sub-population of MDC was segregated into a cluster of three MDCs and another cluster of two MDCELs that were entrusted with the additional role of running a cart business (“Through” methodology).

The designation of SDC served two purposes. First, the SDC was used as a control group or class where all students were from a single homogeneous academic discipline. The control class served as an evaluation group in research study, specific statistical experiments in comparing group for the assessment of results drawn from the group that was being treated or studied (Writeawriting, 2016). Accordingly, the control class was assessed against other SDCs having an additional element of experiential learning (SDCEL) employed as part of

“Through” methodology. Having these types of settings allowed us to compare the development of entrepreneurial competencies and intention in their respective research settings. The result was used to gauge the effectiveness of “Through” methodology and supportability of our first hypothesis ( $H_1$ ). Second, the control class of SDC with its homogeneous cohort was similarly used in the testing of our second hypothesis ( $H_2$ ). This was carried out by comparing the development of entrepreneurial competencies and intention in an SDC homogeneous environment with that of a multidisciplinary environment (MDC). Of the four designated SDCs, half of these classes which comprised 62 students were assigned SDCEL classes while the rest remained as SDCs. Likewise, 51 students or two out of five MDCs were selected to participate in an experiential learning activity (MDCEL) (Figure 3).

**Figure 3**

*Research Settings Formulated based on Stratified Single-Stage Cluster Sampling Method*



Students were assessed on the changes in entrepreneurial competencies represented by the cognitive entrepreneurial skills construct of students’ social values (SV), and non-cognitive entrepreneurial skills construct of students’ ability to think clearly and rationally (CT), and the contribution of these competencies towards developing entrepreneurial intention (EI). Classes were randomly selected to participate in multidisciplinary learning environment and experiential learning via “Through” methodology in managing a cart business

setup within the institution's campus. Sampling data was analyzed using descriptive-analytical statistics. As advocated by Mehta and Nerurkar (2018), comparison of the different approaches was carried out based on the appropriate reporting of data as mean, median, or frequency with central tendencies and reporting of variability as standard deviation (SD), standard error (SE) or confidence interval (CI). T-test was used as inferential statistics and as a hypothesis testing tool in testing assumptions applicable to the population (Hayes, 2021).

## **ANALYSIS AND RESULTS**

Prior to the actual experiment, a pilot test was conducted to gain better insight into the factor structure of the model using SPSS factor analysis. This exercise was carried out a semester prior to the actual test, involving a total of 125 students from four randomly selected classes. Using similar stratified approach as the actual experiment, the classes were segregated into two single disciplinary classes and two multidisciplinary classes. A single and a multidisciplinary class were randomly selected to participate in experiential learning. The collected data was validated for homogeneity, linearity, outliers, and normality. The variables that formed the model were tested for internal consistency and reliability. The analysis was carried out using a combination of SPSS descriptive statistical measures of dispersion analysis and independent samples t-test to gauge the variability of the response data.

### **Descriptive Analytical Statistics**

In the actual experiment, results drawn from the variance of mean values showed that students who had completed the curriculum regardless of class discipline possessed a higher entrepreneurial intention (EI SDC Pre = 3.73, Post = 3.82; MDC Pre = 3.47, Post = 3.50; SDCEL Pre = 3.35, Post = 3.36; MDCEL Pre = 3.56, Post = 3.75) and social values (SV SDC Pre = 3.34, Post = 3.39; MDC Pre = 3.38, Post = 3.57; SDCEL Pre = 3.38, Post = 3.50; MDCEL Pre = 3.61, Post = 3.92) mean values (Table 1). The application of t-test showed that despite an increase in EI mean value post curriculum, there was no statistically significant mean-variance. The p-values of all constructs were greater than the threshold alpha value of 0.05 (EI

SDC p-value = 0.61; MDC p-value = 0.75; SDCEL p-value = 0.32; MDCEL p-value = 0.11) for significance (Table 2). Thus, it could be inferred that although there was a general increase in EI mean value post curriculum, the increase was considered not statistically significant enough to cause a change in students’ entrepreneurial intention. The outcome did not support the fourth hypothesis (H4) that competencies derived from an increase in knowledge, skills, and ability adopted from the experiment would lead to the formation of entrepreneurial intention.

**Table 1**

*Mean Value Analysis*

	Mean Analysis															
	SDC				MDC				SDCEL				MDCEL			
	Pre		Post		Pre		Post		Pre		Post		Pre		Post	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
EI	3.73	0.61	3.82	0.59	3.47	0.71	3.50	0.77	3.35	0.70	3.36	0.73	3.56	0.55	3.75	0.62
SV	3.34	0.53	3.39	0.64	3.38	0.65	3.57	0.65	3.38	0.60	3.50	0.68	3.61	0.63	3.92	0.62
CT	3.81	0.47	3.68	0.54	3.70	0.47	3.71	0.49	3.69	0.47	3.66	0.50	3.71	0.49	3.91	0.48

*Notes:*SDC - Single disciplinary class, SDCEL - Single disciplinary class methodology using “Through”,MDC - Multidisciplinary class, MDCEL - Multidisciplinary class methodology using “Through”, EI - Entrepreneurial intention, CT -Critical thinking, SV - Social values

**Table 2**

*Independent-samples t-test on Construct Variance under Different Research Settings*

	Equal Variances Assumed							
	SDC		MDC		SDCEL		MDCEL	
	<i>t</i>	<i>p</i> -value	<i>t</i>	<i>p</i> -value	<i>t</i>	<i>p</i> -value	<i>t</i>	<i>p</i> -value
Entrepreneurial intention (EI)	-0.51	0.61	-0.33	0.75	-1.00	0.32	-1.63	0.11
Social values (SV)	-1.96	0.06	-2.47	0.01	-0.07	0.94	-2.53	0.01
Critical thinking (CT)	0.86	0.40	-0.34	0.74	-0.32	0.75	-2.10	0.04

*Notes:* SDC -Single disciplinary class, SDEL - Single disciplinary class using “Through”methodology, MDC- Multidisciplinary class, MDCEL - Multidisciplinary class using “Through” methodology

In the case of cognitive entrepreneurial skills, the t-test revealed that

despite SV's higher mean value across both SDC and MDC settings for post curriculum, its mean-variance was significantly higher only in the multidisciplinary learning environment (MDC p-value = 0.01) and not in the single disciplinary environment (SDC p-value = 0.06). However, the non-cognitive entrepreneurial skills of CT yielded a modest albeit insignificant mean-variance increase (p-value = 0.74). The single disciplinary environment fared worse. SDC registered a CT mean value drop for post curriculum (SDC Pre = 3.81, Post = 3.68, p-value = 0.40) despite going through the same regiment.

This phenomenon was attributed to the homogeneity of SDC where the dynamism of cross-learning among students from various academic disciplines was basically missing. It was evidenced by the assessment that MDC had a positive impact in fostering cognitive entrepreneurial skills among students. The significantly higher SV mean value for post curriculum for MDC indicated the importance of socialization in developing social interest through communicating and interacting with students from different academic disciplines. These interpersonal acts allowed students to acquire better entrepreneurial social abilities because of better exposure.

However, as much as the outcome of our assessment on cognitive entrepreneurial skills laid credence to our research hypothesis ( $H_2$ ), the same cannot be said for the development of non-cognitive entrepreneurial competency. The statistically non-significant CT mean-variance inferred that the modest increase in non-cognitive entrepreneurial skills could not be attributed to the MDC learning environment. We deduced from these results that MDC was conducive for the development of social values skills and only partially for critical thinking skills development thus rendering our overall research hypothesis ( $H_2$ ) as partially supported.

However, our findings on the effect of "Through" methodology in developing entrepreneurial competencies proved inconclusive ( $H_1$ ). Although there is a general increase in overall mean value for post curriculum, we could not attribute the increase to the use of "Through" methodology. This was due to two reasons. One, the mean-variance in the SV construct for both SDC (Pre = 3.34, Post = 3.39, p-value = 0.06) and SDCEL (Pre = 3.38, Post = 3.50, p-value = 0.94) were not significant. The CT construct (SDC Pre = 3.81, Post = 3.68, p-value =



0.40; SDCEL Pre = 3.69, Post = 3.66, p-value = 0.75) yielded similar results. With both SDC and the group that participated in experiential learning (“Through”) having non-significant mean-variance readings for both research constructs, we deduced that using “Through” methodology as a pedagogy in a single disciplinary class would not have any effect in the development of entrepreneurial competencies. Two, although both SV (Pre = 3.61, Post = 3.92, p-value = 0.01) and CT (Pre = 3.71, Post = 3.91, p-value = 0.04) mean-variance in MDCEL were significant, they could not be attributed exclusively to the effect of “Through” methodology due to the presence of a multidisciplinary learning environment. Thus, further delineation of this phenomenon was required.

This phenomenon was examined by comparing the mean-variance of both SV and CT constructs between MDC and MDCEL research settings at the start of the curriculum (pre) with the process repeated at the end of the curriculum (post). Using MDC as a control class and given a similar multidisciplinary learning environment in both settings, any significant mean-variance increase in the constructs for post curriculum arising from MDCEL would highly likely be attributed to the use of “Through” methodology. The outcome (Table 3) revealed that the mean value increase for both SV (Pre = 3.61, Post = 3.92) and CT (Pre = 3.71, Post = 3.91) constructs in MDCEL setting were significantly higher for post curriculum (SV pre-curriculum p-value = 0.09, post curriculum = 0.00; CT pre-curriculum p-value = 0.68, post curriculum = 0.00).

Whilst there was no evidence to suggest the effectiveness of using “Through” methodology in a single disciplinary environment, the approach had proven effective in a multidisciplinary learning environment. Empirical evidence has shown that students studying in a multidisciplinary learning environment possess a diverse repertoire of skills sets that could be exploited in hands-on activities such as experiential learning. As such incorporating “Through” methodology as pedagogy in a multidisciplinary learning environment allowed students to practise the actual running of a business in a real-life environment whilst continually learning from peers in different academic disciplines. It fully supported our hypothesis (H3) that exposure to such learning environment enabled these students to develop the necessary competency skills.

**Table 3**

*Independent-samples t-test between MDC and MDCEL*

	Independent T-Test (between MDC and MDCEL)							
	Equal Variances Assumed							
	Pre-curriculum				Post curriculum			
	MDC	MDCEL	<i>t</i>	<i>p</i> -value	MDC	MDCEL	<i>t</i>	<i>p</i> -value
Entrepreneurial intention (EI)	3.47	3.56	1.50	0.14	3.50	3.75	-2.74	0.01
Social values (SV)	3.38	3.61	1.71	0.09	3.57	3.92	-3.00	0.00
Critical thinking (CT)	3.70	3.71	-0.41	0.68	3.71	3.91	-4.29	0.00

*Notes:* MDC- Multidisciplinary class, MDCEL - Multidisciplinary class using “Through” methodology

Asides from the findings on entrepreneurial competencies, it is important to note that there is no significant change in the mean-variance of EI construct (SDC Pre = 3.71, Post = 3.82, *p*-value = 0.61; MDC Pre = 3.47, Post = 3.50, *p*-value = 0.75; SDCEL Pre = 3.35, Post = 3.36, *p*-value = 0.32; MDCEL Pre = 3.56, Post = 3.75, *p*-value = 0.11). The inference from this result is that although there is an overall increase in EI mean value for post curriculum, the increase is not considered statistically significant enough to have been attributed to the research’s learning approaches.

**DISCUSSIONS**

It is apparent from the study that having an enriched entrepreneurship curriculum fortified by a combined approach of “Through” methodology and multidisciplinary learning environment has a direct effect on developing entrepreneurial competencies among students. The outcome of this study supports past findings such as Presutti et al. (2008), and Botha et al. (2019) that postulate a positive relationship between recurring entrepreneurial actions and entrepreneurial competencies. The nature of iterations in a dynamic multidisciplinary real-life business environment increases the learning curve as tasks are often repeated. Students exposed to such an environment learn faster reducing the amount of time needed to achieve course learning outcomes. Therefore, a multidisciplinary environment with experiential learning acts as a natural learning accelerator in acquiring both cognitive and non-cognitive entrepreneurial skills and

in the process transform the way students think and act. Accelerated learning is a multidimensional ‘brain-based’ approach to learning which incorporates techniques to engage many parts of the brain, to maximize the way people learn (Serdyukov, 2008). The engagement of students in a multidisciplinary environment with experiential learning effectuates a holistic learning experience that includes intellectual, emotional and multisensory aspects. It creates an atmosphere where information is absorbed and retained in a natural multisensory fashion. As activities in an entrepreneurship class are entrepreneurially inclined, it is logical to expect knowledge, skills, and abilities built within a social setting of the curriculum to be entrepreneurial in nature. The difference between learning entrepreneurship and other subjects is that entrepreneurship does not isolate talents. In the real world, it is not realistic to expect homogeneity in an organization simply because the lack of desired skills could not generate the required management prowess critical to sustaining a competitive advantage in business.

Another revelation arising from this project is that although the students were required to complete a 10-hour workweek of running a cart business, most of them exceeded the requirement with many doing as many as 20 hours a week. When asked the question “*What is the reason for working additional hours over and above the requirement?*”, the responses received were the freedom in managing their own business, and the opportunity of earning profits that could be used to pay tuition fees and other financial commitments. The response prompts a thought that many educators make the mistake of trying to execute a change which they believe would lead to the desired outcome without considering the psychological appeal of students affected by the change. According to Mutunga (2017), psychological appeals are triggers that promote certain aspects of an object that makes it interesting or attractive to a person. Having such appeal would not only help motivate students to take the desired action, it can also be designed to tug the heartstrings of a person increasing his or her interest making it easier for students to take the initiative in adopting the necessary entrepreneurial competencies. Setting the right conditions would create better student engagement resulting in their commitment to meet the desired learning outcome with an enhanced sense of their own well-being. Thus, “What’s in it for me?” appropriately reflects the situation that unless the change benefits the students in some way it would not lead to the generation

of self-interest.

### **Theoretical and Practical Implications**

One theoretical implication arising from the study is the importance of iterative process in developing entrepreneurial traits among students. During the duration of the experiment, MDCEL was determined as the most influential in transforming students' social values and critical thinking. Taatila (2010) posited the creation of internal motivation from inner-directed personal interest leading to the development of enterprise through an entrepreneurial learning cycle. Whilst Taatila's (2010) entrepreneurial learning cycle is supported, this phenomenon can be better explained using the two-factor theory of motivation which states that satisfaction in an organization is driven by motivators that are intrinsic to an individual, and hygiene factors that are external in nature (Herzberg et al., 1959). Our experiment has shown that using the "Through" methodology is synonymous to motivators in the two-factor theory where students given the empowerment in making real-life decisions during experiential learning including raising their own capital and managing a cart business served to motivate their inner self-interest to acquire and develop intrinsic on-the-job knowledge. However, the use of "Through" methodology without a multidisciplinary learning environment is akin to an absence of hygiene factors. This explains the phenomenon of an ineffective "Through" methodology contribution in a single disciplinary learning environment. It also explains the partial supportability of the hypothesis in a multidisciplinary learning environment without "Through" methodology. The lack of these factors limits the exposure of students to other disciplines and real-life experiences stifling their ability to develop cognitive and non-cognitive entrepreneurial abilities. In a multidisciplinary learning environment, hygiene factors serve as surroundings where cognitive entrepreneurial knowledge is acquired through learning from one another in a diverse and dynamic ecological system comprising talents from various academic disciplines. Coupled with a "Through" methodology of real-life business enterprise, students can tap into one another's knowledge, skills, and abilities constantly and iteratively in a cyclical pattern to develop entrepreneurial competencies over a period of time. For example, culinary students adopting accounting and marketing knowledge from engaging with business students, and

presentation skills from mass communication students, and in turn externalizing their culinary skills to others in making confectionaries for experiential learning.

From the practical implication standpoint, the outcome of the study attests to the first two waves of the Malaysia Education Blueprint 2015–2025 (Higher Education) regarding the direction in building entrepreneurial momentum through the introduction of experiential learning (Wave 1: 2015) and using the combination of “Through” methodology in a multidisciplinary learning environment as an enhanced MPU framework and entrepreneurship programmes (Wave 2: 2016–2020) in nurturing students’ entrepreneurial competencies (Ministry of Education, 2015).

However, these two approaches would not be enough to support the Blueprint’s third wave (2021–2025) of enhancing educational institutions’ innovation ecosystem efficiency, and effectiveness especially under the current Covid-19 pandemic. One, most businesses are affected by the Movement Control Order (MCO) implemented by the Malaysian government to curb the spread of the disease. The closure of education campuses is a result of the measures and the subsequent transitioning of classroom education to online learning caused setbacks in the execution of experiential learning in a “safe” campus environment. The sudden unplanned change has caught both students and HEIs unprepared to substitute on-campus experiential learning with alternatives such as online trading. Although there are many e-commerce sites, these sites unlike a campus environment do not provide a natural safety net specially designed to assist students in developing entrepreneurial competencies and “fail first” resiliency that are critical in experimenting with innovations and learning adaptability.

Second, higher education institutions are facing financial pressure due to lower student enrolment and a looming economic recession. According to a survey (Hunter, 2020), 55 percent of Malaysia’s private higher education institutions were making trading losses and around 44 percent were technically, financially insolvent with rising debt levels. As a result, HEIs are finding it increasingly challenging to continue supporting and nurturing entrepreneurial competencies in entrepreneurship programmes. Even though it is possible to apply

for grant from funding platforms such as Cradle and the Malaysian Global Innovation & Creativity Centre (MAGIC), most of these grants are specifically given to innovations and not for developing entrepreneurial competencies which is key to formulating the next generation of entrepreneurs. This gap can be bridged by having relevant stakeholders such as the Ministry of Higher Education, public and private funding platforms, and HEIs working together and overcoming barriers that serve as impediments to support the MEB's third wave. This study has shown that we are on the right track. Albeit the current pandemic, appropriate action must be taken in the remaining four years to ensure the success of the MEB's third wave of entrepreneurial transformation.

### **CONCLUSION, LIMITATIONS, AND FUTURE RESEARCH DIRECTIONS**

A final remark, the strength of transformation from the development of cognitive and non-cognitive entrepreneurial skills over the course of the research project is not significant enough to cause an inner-directed mindset shift that would have made a student, a nascent entrepreneur. This phenomenon is attributed to the reason that students taking up programs in tertiary studies already have the desire to venture into the corporate world. There is also the consideration of high start-up costs and ingrained business risks that can be daunting to one with limited business experience and financial strength. Therefore, for these students, securing employment is the easiest means of achieving their physiological needs. Whilst entrepreneurship can help develop one's competencies to be enterprising, it serves more as an actualization than a physiological need for undergraduate students. In circumstances where a graduate cannot secure a job over a prolonged period or in the case of job attrition, the physiological needs may then change, making entrepreneurialism a reality. When this happens, the entrepreneurial seeds planted during their tertiary education years would augur well for these individuals.

This study was undertaken in a HEI due to the lack of resources that would have enabled it to be conducted on a larger scale. The approach used required meticulous planning in combining classes of different disciplines to create a multidisciplinary learning environment and

segregating classes into different pedagogical methodologies to facilitate the research experiment. It required intense coordination and administrative action including interacting and coordinating with class instructors, students, and the institution's management team. One of the advantages of the Malaysian education system is that the education guidelines are uniformly applied across all HEIs. In this regard, we are confident that the study outcomes can be generalised to other HEIs in Malaysia.

The current Covid-19 pandemic has upended and disrupted traditional classroom methods of teaching and learning with emphasis given to online learning as a new method of education. As this study was undertaken prior to the pandemic, future studies may consider adopting a similar approach to examine the phenomenon and the effectiveness of online learning in developing student's entrepreneurial competencies and intention.

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