



Research Article

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The Effect of Experiential Learning Program on Entrepreneurial Mindset: A Quasi-Experimental Study

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Abstract

This study aimed at verifying the effect of experiential learning program on entrepreneurial mindset. This study was based on a quasi-experimental design. The subjects were 113 undergraduate students, in which without randomization, fifty-eight and fifty-five students were grouped to a treatment group and a control group, respectively. The subjects in the treatment group received the experiential learning intervention during six weeks. Meanwhile, the subjects in the control group received the problem-based instructional method. All subjects completed the entrepreneurial mindset scale at two measurement times (i.e., pre-test and post-test). Based on Shapiro-Wilk test, data were found not to be normally distributed. Hence, data were then analyzed using the non-parametric tests. Based on data analysis, the undergraduate students who involved in the experiential learning program had a higher entrepreneurial mindset than those who did not involve in the program. In addition, the undergraduate students who involved in the experiential learning program had an increased entrepreneurial mindset. This study provided a theoretical implication, in which it extended the literature of the Implicit Theory of Intelligence (ITI) and the Experiential Learning Theory (ELT) by providing the synthesis of both theories in the higher education context. This study also had a practical implication for the lecturers who have an interest in entrepreneurship education. According to our findings, the entrepreneurial mindset could be enhanced by the experiential learning program (i.e., the experiential learning intervention).

Keywords: experiential learning intervention, entrepreneurial mindset, quasi-experimental study

1. Introduction

Entrepreneurship has been acknowledged as the key to economic growth (Rauch & Hulsink, 2015; Manimala & Thomas, 2017; Deveci & Seikkula-Leino, 2023). In this context, the presence of entrepreneurs and new ventures encourages the economic growth (Rauch & Hulsink, 2015). Gorman et al. (1997, p. 70) stated that “entrepreneurship can be taught, or at least encouraged, by entrepreneurship education”. It has been pointed out for a long time until now that entrepreneurship education provides competencies for individuals to start and run a new venture (e.g., McMullan & Long, 1987; Fiet, 2001; Manimala & Thomas, 2017; Deveci & Seikkula-Leino, 2023). Therefore, entrepreneurship education not only prepares the new ventures but also the entrepreneurs for starting and running new ventures (McMullan & Long, 1987; Fiet, 2001; Manimala & Thomas, 2017). Entrepreneurship education, in turn, is also aimed at developing the entrepreneurial mindset (i.e., the mindset of entrepreneur) for individuals (Deveci & Seikkula-Leino, 2023).

The development of entrepreneurial mindset has become the focus of attention of higher education institutions in carrying out their entrepreneurship education (Larsen, 2022; Jackson et al., 2023). In fact, over the last 10 years, higher education institutions have established the entrepreneurial mindset as one of the learning outcomes of their entrepreneurship education (Larsen, 2022). Indeed, the entrepreneurial mindset allows individuals to behave entrepreneurially regarding the environmental challenges (Larsen, 2022). It also encourages individuals to be persistent, proactive, and comfortable in facing environmental challenges (Larsen, 2022). Therefore, the entrepreneurial mindset is not only an important predictor for entrepreneurial action (for an example, starting and running a new venture), but also a prerequisite for facing the environmental challenges (Larsen, 2022).

The entrepreneurial mindset can be successfully enhanced through the intervention [for an example, a program implementation] (Jackson et al., 2023). Previous intervention studies (e.g., Lindberg et al., 2017; Hultén & Tumunbayarova, 2020; Rodriguez & Lieber, 2020) showed the effectiveness of the experiential learning program in enhancing the entrepreneurial mindset. Instead of the entrepreneurial mindset as an outcome variable (Tuckman & Harper, 2012), previous intervention studies in Indonesia found that the experiential learning program was successful in increasing the other outcome variables, namely, entrepreneurial attitudes and entrepreneurial intention (Bernardus et al., 2020a), and problem-solving ability (Hulaikah et al., 2020). Meanwhile, by using the cross-sectional design, Bernardus et al. (2023) found that the experiential learning was positively related to the entrepreneurial mindset. However, the finding did not indicate the cause-effect relationship (Bernardus et al., 2023). Following up on Bernardus et al.’s (2023) finding and in order to examine the cause-effect relationship, this study aimed to verify the effectiveness of the experiential learning program in enhancing the entrepreneurial mindset. Specifically, this study was intervention study and intended to answer the following research questions:

1. Did the subjects in the treatment group have a higher entrepreneurial mindset than the subjects in the control group?
2. Did the subjects in the treatment group have an increased entrepreneurial mindset, whereas the subjects in the control group have an unchanged entrepreneurial mindset?

2. Literature Review and Research Hypotheses

2.1 *The Effect of Experiential Learning Program on Entrepreneurial Mindset*

Theoretical support for this study consists of the Kolb’s Experiential Learning Theory [the Kolb’s ELT] (Kolb, 2015; Bernardus et al., 2023) and the Dweck’s Implicit Theory of Intelligence [the Dweck’s ITI] (Bernardus et al., 2022). Experiential learning is based on the Kolb’s ELT, whereas entrepreneurial mindset is based on the Dweck’s ITI. According to the Kolb’s ELT, persons who are highly involved in the experiential learning program tend to strongly implement their knowledge in the real-life

contexts based on their own experiences and the others' experiences (Bernardus et al., 2023). On the other hand, referring to the Dweck's ITI, the entrepreneurial mindset of any person can or cannot be improved (Bernardus et al., 2022). However, the findings of previous intervention studies (e.g., Lindberg et al., 2017; Hultén & Tumunbayarova, 2020; Rodriguez & Lieber, 2020) tend to show that the entrepreneurial mindset was effectively improved by the experiential learning program.

Hultén and Tumunbayarova (2020) point out that the experiential learning program is suitable for building a learning climate that supports the entrepreneurial mindset. For an example, the experiential learning program develops a mental framework (i.e., a mental framework is shaped from experience), in which a mental framework helps the student to think and act more creatively (Lindberg et al., 2017). For the students with a high entrepreneurial mindset, they are confident that learning from experience make them possible to improve how they behave [i.e., they respond the failure by action for improvement instead of by losing the persistence] (Hultén & Tumunbayarova, 2020). Therefore, it is possible to enhance the entrepreneurial mindset by using the experiential learning program as an intervention, and we hypothesize that the experiential learning intervention effectively enhances the entrepreneurial mindset.

In addition, the entrepreneurial mindset is a multi-dimensional construct (Bernardus et al., 2022), in which it has six sub-constructs, namely elaborating mindset (ELAM), implementing mindset (IMPLM), alertness to opportunity (EM_AO), risk propensity (EM_RP), ambiguity tolerance (EM_AT), and creativity-bricolage (EM_CR) (Bernardus et al., 2022, 2023). As a scale, the entrepreneurial mindset is a multi-dimensional scale (Bernardus et al., 2022), which consists of six sub-scales, namely ELAM, IMPLM, EM_AO, EM_RP, EM_AT, and EM_CR (Bernardus et al., 2022, 2023).

2.2 Research Hypotheses

The research hypotheses are formulated based on the preceding discussion. They are also formulated to achieve the aim of this study. Accordingly, we then examine the between-group comparisons for the pre-test and post-test scores of entrepreneurial mindset sub-scales (i.e., ELAM, IMPLM, EM_AO, EM_RP, EM_AT, and EM_CR). Referring to previous studies (e.g., Ko & Park, 2018; Khademan et al., 2020; Kivelä et al., 2020; Tinôco et al., 2021; Girard et al., 2023), the expected findings for those between-group comparisons are that: (1) at the beginning of the experiential learning program (before the treatment does), the treatment group and the control group will have the same entrepreneurial mindset sub-scales, and (2) at the end of the experiential learning program (after the treatment does), the treatment group will have the higher entrepreneurial mindset sub-scales than the control group (see Appendix 1). Accordingly, we then use the scripts of directional research hypotheses (Tuckman & Harper, 2012; Cho & Abe, 2013; Creswell & Creswell, 2018; Babbie, 2021), and the wordings are as follows:

Hypothesis 1a (H1a). The treatment group and the control group will have the same ELAM pre-test score.

Hypothesis 1b (H1b). The treatment group and the control group will have the same IMPLM pre-test score.

Hypothesis 1c (H1c). The treatment group and the control group will have the same EM_AO pre-test score.

Hypothesis 1d (H1d). The treatment group and the control group will have the same EM_RP pre-test score.

Hypothesis 1e (H1e). The treatment group and the control group will have the same EM_AT pre-test score.

Hypothesis 1f (H1f). The treatment group and the control group will have the same EM_CR pre-test score.

Hypothesis 2a (H2a). The treatment group will have the higher ELAM post-test score than the control group.

Hypothesis 2b (H2b). The treatment group will have the higher IMPLM post-test score than the control group.

Hypothesis 2c (H2c). The treatment group will have the higher EM_AO post-test score than the control group.

Hypothesis 2d (H2d). The treatment group will have the higher EM_RP post-test score than the control group.

Hypothesis 2e (H2e). The treatment group will have the higher EM_AT post-test score than the control group.

Hypothesis 2f (H2f). The treatment group will have the higher EM_CR post-test score than the control group.

The same as above, we also examine the within-group comparisons for the pre-test and post-test scores of entrepreneurial mindset sub-scales. Referring to previous studies (e.g., Ko & Park, 2018; Khademian et al., 2020; Kivelä et al., 2020; Tinôco et al., 2021; Girard et al., 2023), the expected findings for those within-group comparisons are that the entrepreneurial mindset sub-scales will increase in the treatment group but they will not change in the control group (see Appendix 1). Accordingly, we also use the scripts of directional research hypotheses (Tuckman & Harper, 2012; Cho & Abe, 2013; Creswell & Creswell, 2018; Babbie, 2021), and the wordings are as follows:

Hypothesis 3a (H3a). There will be an improvement in ELAM scores (pre- to post-test) for students who receive experiential learning intervention.

Hypothesis 3b (H3b). There will be an improvement in IMPLM scores (pre- to post-test) for students who receive experiential learning intervention.

Hypothesis 3c (H3c). There will be an improvement in EM_AO scores (pre- to post-test) for students who receive experiential learning intervention.

Hypothesis 3d (H3d). There will be an improvement in EM_RP scores (pre- to post-test) for students who receive experiential learning intervention.

Hypothesis 3e (H3e). There will be an improvement in EM_AT scores (pre- to post-test) for students who receive experiential learning intervention.

Hypothesis 3f (H3f). There will be an improvement in EM_CR scores (pre- to post-test) for students who receive experiential learning intervention.

Hypothesis 4a (H4a). There will be the same in ELAM scores (pre- and post-test) for students who do not receive experiential learning intervention.

Hypothesis 4b (H4b). There will be the same in IMPLM scores (pre- and post-test) for students who do not receive experiential learning intervention.

Hypothesis 4c (H4c). There will be the same in EM_AO scores (pre- and post-test) for students who do not receive experiential learning intervention.

Hypothesis 4d (H4d). There will be the same in EM_RP scores (pre- and post-test) for students who do not receive experiential learning intervention.

Hypothesis 4e (H4e). There will be the same in EM_AT scores (pre- and post-test) for students who do not receive experiential learning intervention.

Hypothesis 4f (H4f). There will be the same in EM_CR scores (pre- and post-test) for students who do not receive experiential learning intervention.

3. Method

3.1 Design and subjects

This research was intervention study based on a quasi-experimental design [i.e., a non-equivalent pre-test and post-test control-group design] (Campbell & Stanley, 1963; Tuckman & Harper, 2012; Creswell & Creswell, 2018; Babbie, 2021). Accordingly, the researchers arranged the treatment and control groups, and administered pre- and post-test for both groups, but we did not randomly assign the subjects to each group (Campbell & Stanley, 1963; Tuckman & Harper, 2012; Creswell & Creswell,

2018; Babbie, 2021).

In this study, random assignment of subjects was not possible due to practical constraint (West et al., 2008; Handley et al., 2018), in which the researchers did not have the power to randomly assign the subjects (Miller, 1980). The subjects were 113 undergraduate students taken from two universities, one located in Malang City and the other in Surabaya City, both in the East Java Province of Indonesia. Without randomization of subjects, we assigned 58 undergraduate students taken from a university located in Malang City to the treatment group, whereas 55 undergraduate students taken from a university located in Surabaya City to the control group (see Appendix 1).

3.2 Intervention procedure

The intervention was based on the experiential learning program. This program was designed by the researchers. It was also based on the four essential components of experiential learning, namely, concrete experience, reflective observation, abstract conceptualization, and active experimentation (Kolb, 2015; Butler et al., 2019; Bernardus et al., 2020a). The intervention was delivered during six weeks and followed four steps as follows:

1. *Concrete experience* (week 1 to week 2). The subjects participated in the concrete experiences (Butler et al., 2019). The subjects watched a series of videos about the concrete entrepreneurial opportunities. The researchers composed those videos and prepared the links of videos.
2. *Reflective observation* (week 3). The subjects reflected the concrete experiences (Butler et al., 2019). Based on the videos, the subjects identified types of entrepreneurial opportunities, and answered the reflective questions about entrepreneurial opportunities, for an example "what was the most important entrepreneurial opportunity, why?"
3. *Abstract conceptualization* (week 4). The subjects developed a logical concept based on the concrete experiences (Butler et al., 2019). The subjects developed a future business idea and identified the entrepreneurial opportunities that underlying it.
4. *Active experimentation* (week 5 and week 6). The subjects applied a logical concept to a new situation (Butler et al., 2019). The subjects presented a future business idea with the entrepreneurial opportunities that underlying it. The audiences were the other subjects, in which they acted as if they were the potential consumers.

Meanwhile, the subjects in the control group received the problem-based instructional method, instead of the traditional instructional method as found in previous experimental studies (e.g., Lindberg et al., 2017; Hulaikah et al., 2020; Tinôco et al., 2021). Details of the intervention can be accessed at the following link <https://penerbit.uc.ac.id/product/intervensi-pembelajaran-entrepreneurship-berbasis-experiential-learning/>.

3.3 Measures

In this study, the entrepreneurial mindset was an outcome variable (Tuckman & Harper, 2012). We used the Indonesian adaptation of the entrepreneurial mindset scale, which has been developed by Bernardus et al. (2022, 2023). This scale has been successfully verified regarding its validity and reliability (Bernardus et al., 2022, 2023). By using this scale, we assessed the entrepreneurial mindset at two measurement times (i.e., before an intervention as a pre-test, and after an intervention as a post-test).

As mentioned above, the entrepreneurial mindset scale consists of six sub-scales (Bernardus et al., 2022, 2023). The two sub-scales (i.e., ELAM and IMPLM) were each measured using four items taken from Bernardus et al. (2023). The remaining sub-scales were measured using items which taken from Bernardus et al. (2022). Overall, this scale consists of 31 items (i.e., the adapted items in *Bahasa Indonesia*). Subjects answered the 31 items on a five-point Likert scale. In addition, the validity of the scale was achieved by the developer of scale (Bernardus et al., 2022, 2023), whereas the reliability of

this scale at both measurement times was verified by Cronbach's alpha value (e.g., Taber, 2018; Bischoff et al., 2020). Cronbach's alpha value was acceptable [e.g., Taber, 2018; Bischoff et al., 2020] (see Appendix 2).

3.4 Data analysis

We used the Shapiro-Wilk test to evaluate the normality of the data (Kim, 2015; Rietveld & van Hout, 2017; Kwak & Park, 2019). As the results (see Appendix 3), data were found not to be normally distributed. Hence, data were then analyzed using non-parametric tests. The between-group comparisons were analyzed using the Mann-Whitney-U test, whereas the within-group comparisons were analyzed using the Wilcoxon Signed-Ranks test, both using a significance level of 5% (Siegel, 1957; Kim, 2015; Rietveld & van Hout, 2017; Kwak & Park, 2019).

4. Results

4.1 Demographics

Table 1 shows that among the subjects, seventy (62%) were females, whereas forty-three (38%) were males. In treatment group, forty-two (72%) subjects were female, whereas sixteen (28%) subjects were male; in control group, twenty-eight (51%) subjects were female, whereas twenty-seven (49%) subjects were male. Next, twenty-three (20%) subjects were older than 20 years old, whereas ninety (80%) subjects were 20 years old and younger. In treatment group, twenty (34%) subjects were older than 20 years old, whereas thirty-eight (66%) subjects were 20 years old and younger; in control group, three (5%) subjects were older than 20 years old, whereas fifty-two (95%) subjects were 20 years old and younger.

Table 1: Demographic Characteristics of Subject

Demographic Characteristic	Categories	Frequency	Frequency in Treatment Group	Frequency in Control Group	Percentage of Frequency	Percentage of Frequency in Treatment Group	Percentage of Frequency in Control Group
Gender	Female	70	42	28	62	72	51
	Male	43	16	27	38	28	49
	Total	113	58	55	100	100	100
Age (year)	> 20	23	20	3	20	34	5
	< = 20	90	38	52	80	66	95
	Total	113	58	55	100	100	100

4.2 Test of Hypotheses

Table 2 shows the between-group comparisons for the pre-test and post-test scores of entrepreneurial mindset sub-scales. The statistically insignificant differences were found between the treatment and control groups regarding the ELAM pre-test scores ($z = -0.325$, $p = 0.746$), the IMPLM pre-test scores ($z = -0.812$, $p = 0.417$), the EM_AO pre-test scores ($z = -0.631$, $p = 0.528$), the EM_AT pre-test scores ($z = -0.516$, $p = 0.606$), and the EM_CR pre-test scores ($z = -0.208$, $p = 0.835$). However, a statistically significant difference was found between the treatment and control groups regarding the EM_RP pre-test scores ($z = -2.344$, $p = 0.019$). Therefore, all the hypotheses regarding the between-group comparisons for the pre-test score, except for H_{id}, were supported.

As also shown in Table 2, the statistically significant differences were found between the treatment and control groups regarding the ELAM post-test scores ($z = -2.965$, $p = 0.003$), the IMPLM post-test scores ($z = -3.735$, $p = 0.000$), the EM_AO post-test scores ($z = -2.615$, $p = 0.009$), the EM_RP

post-test scores ($z = -3.573$, $p = 0.000$), and the EM_CR post-test scores ($z = -2.712$, $p = 0.007$). However, a statistically insignificant difference was found between the treatment and control groups regarding the EM_AT post-test scores ($z = -1.931$, $p = 0.053$). Based on the results, all the hypotheses regarding the between-group comparisons for the post-test score, except for H2e, were supported. However, referring to previous studies (e.g., Yanagida et al., 2019; Kivelä et al., 2020; All et al., 2021), the between-group comparison can be based on the gain score (i.e., the post-test score minus the pre-test score) instead of the post-test score. Accordingly, a statistically significant difference was found between the treatment and control groups regarding an EM_AT gain score ($z = -2.266$, $p = 0.023$). This result was considered to support H2e (see Yanagida et al., 2019; Kivelä et al., 2020; All et al., 2021).

Table 2: The Between-Group Comparisons of the Pre-test and Post-test Scores using Mann-Whitney-U Test

Entrepreneurial Mindset Sub-construct	Group	n	Mean Rank	Sum of Ranks	Mann-Whitney-U	Z	P-value
ELAM (pre-test)	Treatment	58	56.043	3250.50	1539.5	-0.325	0.746
	Control	55	58.009	3190.50			
IMPLM (pre-test)	Treatment	58	59.379	3444.00	1457.0	-0.812	0.417
	Control	55	54.491	2997.00			
EM_AO (pre-test)	Treatment	58	58.871	3414.50	1486.5	-0.631	0.528
	Control	55	55.027	3026.50			
EM_RP (pre-test)	Treatment	58	50.060	2903.50	1192.5	-2.344	0.019
	Control	55	64.318	3537.50			
EM_AT (pre-test)	Treatment	58	55.466	3217.00	1506.0	-0.516	0.606
	Control	55	58.618	3224.00			
EM_CR (pre-test)	Treatment	58	57.621	3342.00	1559.0	-0.208	0.835
	Control	55	56.345	3099.00			
ELAM (post-test)	Treatment	58	65.647	3807.50	1093.5	-2.965	0.003
	Control	55	47.882	2633.50			
IMPLM (post-test)	Treatment	58	67.914	3939.00	962.0	-3.735	0.000
	Control	55	45.491	2502.00			
EM_AO (post-test)	Treatment	58	64.776	3757.00	1144.0	-2.615	0.009
	Control	55	48.800	2684.00			
EM_RP (post-test)	Treatment	58	67.526	3916.50	984.5	-3.573	0.000
	Control	55	45.900	2524.50			
EM_AT (post-test)	Treatment	58	62.741	3639.00	1262.0	-1.931	0.053
	Control	55	50.945	2802.00			
EM_CR (post-test)	Treatment	58	65.086	3775.00	1126.0	-2.712	0.007
	Control	55	48.473	2666.00			

Table 3 shows the within-group comparisons for the pre-test and post-test scores of entrepreneurial mindset sub-scales. In treatment group, the statistically significant differences were found between pre- and post-test scores regarding ELAM ($z = -6.671$, $p = 0.000$), IMPLM ($z = -6.625$, $p = 0.000$), EM_AO ($z = -6.482$, $p = 0.000$), EM_RP ($z = -6.150$, $p = 0.000$), EM_AT ($z = -6.313$, $p = 0.000$), and EM_CR ($z = -5.640$, $p = 0.000$), showing higher post-test score. Therefore, all the hypotheses regarding the treatment group (i.e., H3a to H3f) were supported. At the same time in control group, a statistically insignificant difference was found between the pre- and post-test scores regarding EM_RP ($z = -1.860$, $p = 0.063$). However, the statistically significant differences were found between the pre- and post-test scores regarding ELAM ($z = -6.271$, $p = 0.000$), IMPLM ($z = -6.439$, $p = 0.000$), EM_AO ($z = -5.624$, $p = 0.000$), EM_AT ($z = -4.671$, $p = 0.000$), and EM_CR ($z = -3.774$, $p = 0.000$), with lower pre-test score. Therefore, all the hypotheses regarding the control group, except for H4d, were not supported.

Table 3: The Within-Group Comparisons of the Pre-test and Post-test Scores using Wilcoxon Signed-Ranks Test

Group	Entrepreneurial Mindset Sub-construct (post-test scores minus pre-test scores)	Mean of Negative Ranks	Sum of Negative Ranks	Mean of Positive Ranks	Sum of Positive Ranks	Z	P-value
Treatment	ELAM	0.00	0.00	29.50	1711.00	-6.671	0.000
	IMPLM	0.00	0.00	29.00	1653.00	-6.625	0.000
	EM_AO	0.00	0.00	28.00	1540.00	-6.482	0.000
	EM_RP	6.50	26.00	28.67	1405.00	-6.150	0.000
	EM_AT	5.50	11.00	28.35	1474.00	-6.313	0.000
	EM_CR	9.60	48.00	26.75	1177.00	-5.640	0.000
Control	ELAM	20.00	20.00	27.64	1465.00	-6.271	0.000
	IMPLM	0.00	0.00	27.50	1485.00	-6.439	0.000
	EM_AO	8.70	43.50	26.34	1132.50	-5.624	0.000
	EM_RP	17.81	320.50	25.02	625.50	-1.860	0.063
	EM_AT	13.18	145.00	28.42	1080.00	-4.671	0.000
	EM_CR	22.68	249.50	26.29	1025.50	-3.774	0.000

5. Discussion, Implications, and Limitations

5.1 Discussion

Overall, our findings showed that the undergraduate students who involved in the experiential learning intervention (i.e., program) had a higher entrepreneurial mindset than those who did not involve in the program. The findings demonstrated the effectiveness of the experiential learning program. Our findings also showed that the undergraduate students who participated in the experiential learning program had an increased entrepreneurial mindset. The findings indicated that the intervention (i.e., the experiential learning program) had a positive effect for improving the entrepreneurial mindset. These findings are consistent with the previous similar findings (e.g., Lindberg et al., 2017; Hultén & Tumunbayarova, 2020; Rodriguez & Lieber, 2020), which examining the effect of the experiential learning program on the entrepreneurial mindset. These findings also strengthen the principle of cause and effect regarding the effect of experiential learning program on entrepreneurial mindset.

Before the experiential learning program started, the five sub-scales (i.e., ELAM, IMPLM, EM_AO, EM_AT, and EM_CR) were the same between the undergraduate students who participated in the program and those who did not participated in the program (i.e., H1a, H1b, H1c, H1e, and H1f were supported). The findings demonstrated the homogeneity in the pre-intervention (see Ko & Park, 2018; Khademian et al., 2020; Kivelä et al., 2020; Tinôco et al., 2021; Girard et al., 2023). However, before the experiential learning program started, the undergraduate students who involved in the experiential learning program had a lower EM_RP than those who did not involve in the program (i.e., H1d was not supported). This result indicated the heterogeneity in the pre-intervention regarding the EM_RP. Nonetheless, after the experiential learning program started, the EM_RP of undergraduate students who participated in the program positively changed (i.e., H3d was supported), whereas the EM_RP of those who did not participate in the program significantly unchanged (i.e., H4d was supported). Therefore, this result could be considered to compensate the heterogeneity in the pre-intervention regarding H1d.

Meanwhile, after the experiential learning program started, the five sub-scales (i.e., ELAM, IMPLM, EM_AO, EM_AT, and EM_CR) of undergraduate students who did not participate in the program significantly changed (i.e., H4a, H4b, H4c, H4e, and H4f were not supported). Nonetheless, those five sub-scales of them were lower than the same five sub-scales of those who participated in the program (i.e., H2a, H2b, H2c, H2e, and H2f were supported). In other words, regarding the effectiveness of the experiential learning intervention (see Appendix 1), an expected finding of

number 2 (i.e., the control group will have a lower entrepreneurial mindset than the treatment group) should be prioritized over an expected finding of number 4 (i.e., in control group, the entrepreneurial mindset will not significantly change). Therefore, the results could also be considered to compensate those unsupported hypotheses (i.e., H4a, H4b, H4c, H4e, and H4f).

5.2 Theoretical and practical implications

Referring to Bernardus et al. (2023), this study extended the literature of the Kolb's ELT and Dweck's ITI, by providing the synthesis of both theories in the higher education context. Specifically, our results supported the existing literature on 'the experiential learning–entrepreneurial mindset relationship' (see Rodriguez & Lieber, 2020; Bernardus et al., 2023). As an intervention, the experiential learning program was an effective predictor for improving the entrepreneurial mindset. As an outcome variable of an intervention, the entrepreneurial mindset was measured as a multi-dimensional scale. Hence, the treatment effect of experiential learning program on the entrepreneurial mindset was multi-dimensionally examined. This study had a practical implication for the lecturers who have an interest in entrepreneurship education. This study provided an insight to the lecturers about the importance of improving the entrepreneurial mindset of their undergraduate students. Again, the undergraduate students have achieved an improvement in their entrepreneurial mindset after they participated in the experiential learning program. Therefore, this study recommended that improving the undergraduate students' entrepreneurial mindset would be effective when the lecturers implemented the experiential learning program.

5.3 Limitations of research and directions for future research

Limitations of this study and future research directions are as follows. *First*, as previous studies have done (e.g., Ko & Park, 2018; Bernardus et al., 2020a; Hulaikah et al., 2020; Hultén & Tumunbayarova, 2020; Khademian et al., 2020; Kivelä et al., 2020; Rodriguez & Lieber, 2020; Tinôco et al., 2021; Girard et al., 2023), this study was based on a quasi-experimental design instead of a randomized controlled design. Therefore, our findings (for an example, the experiential learning program was effective in enhancing the entrepreneurial mindset) cannot be fully attributed to the treatment effect, due to the non-randomized allocation of subjects to either the treatment group or the control group (Girard et al., 2023). Future studies are expected to conduct the randomized controlled design as the best standard for evidence-based studies (Gubbins & Rousseau, 2015). *Second*, the long-term effect of experiential learning program on entrepreneurial mindset was not verified in this study. Therefore, it is recommended for future studies to follow-up on the post-test by measuring the entrepreneurial mindset after the post-test (Kivelä et al., 2020; All et al., 2021), for example one month, two months, and three months after the post-test (Salim et al., 2020). *Third*, this study found a statistically significant difference between the treatment and control groups regarding entrepreneurial mindset based on non-parametric tests. Due to the statistical power, this difference needs to be interpreted with caution (Kanyongo et al., 2007; Sullivan & Feinn, 2012), in which non-parametric tests were found to have less statistical power than parametric tests (Kanyongo et al., 2007). *Fourth*, sample size is relatively small, and therefore the generalization of our findings in the other subjects and settings is limited (Kivelä et al., 2020). Therefore, our findings need to be verified in other subjects and settings with relatively large sample size to increase both the statistical power (Kanyongo et al., 2007; Sullivan & Feinn, 2012) and the external validity of this study (Rodriguez & Lieber, 2020). *Fifth*, this study did not control the potential extraneous variables such as gender, age, and prior entrepreneurial exposure (Rodriguez & Lieber, 2020; Bernardus et al., 2020b). Therefore, future studies are suggested to control those extraneous variables to increase the internal validity of this study (Campbell & Stanley, 1963; Tuckman & Harper, 2012).

6. Conclusion

This study provided the evidence to recommend that the experiential learning program was an effective program to enhance the entrepreneurial mindset of undergraduate students. Overall, our findings supported the research hypotheses. We found that the undergraduate students who were involved in the experiential learning program had a higher entrepreneurial mindset than the undergraduate students who were not involved in this program. We also found that the undergraduate students had an increased entrepreneurial mindset after joining the experiential learning program compared to before they joined the program.

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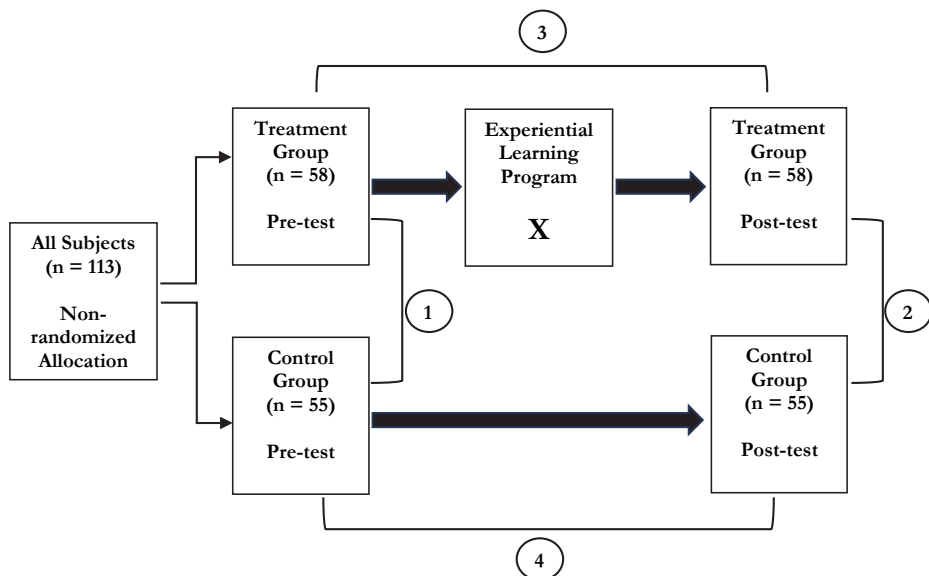
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Appendix 1: Study Design (adapted from Campbell & Stanley, 1963; Tuckman & Harper, 2012; Creswell & Creswell, 2018; Babbie, 2021).



Expected findings for the between-group and within-group comparisons are as follows (adapted from Ko & Park, 2018; Khademian et al., 2020; Kivelä et al., 2020; Tinôco et al., 2021; Girard et al., 2023):

- The treatment group and the control group will have the same pre-test score.
- The treatment group will have the higher post-test score than the control group.
- In the treatment group, the post-test score will be higher than the pre-test score.
- In the control group, the post-test score and the pre-test score will be the same.

Regarding the effectiveness of the experiential learning program, the expected finding of number 2 should be prioritized over the expected finding of number 4 (see Ko & Park, 2018; Khademian et al., 2020; Kivelä et al., 2020; Tinôco et al., 2021; Girard et al., 2023).

Appendix 2: Cronbach's Alpha, Number of Items, Mean, and Standard Deviation [SD] for the Entrepreneurial Mindset Scale and its Sub-scales at Two Measurement Times (n = 113)

Entrepreneurial Mindset Scale and Sub-scale	Cronbach's Alpha	Number of items	Mean	SD
Entrepreneurial Mindset Scale (pre-test)	0.793	31	111.646	8.731
Entrepreneurial Mindset Scale (post-test)	0.841	31	127.442	9.047
ELAM (pre-test)	0.580	4	14.442	1.880
ELAM (post-test)	0.594	4	17.407	1.735
IMPLM (pre-test)	0.711	4	14.451	2.079
IMPLM (post-test)	0.568	4	17.425	1.563
EM_AO (pre-test)	0.716	5	17.690	2.435
EM_AO (post-test)	0.772	5	20.611	2.512
EM_RP (pre-test)	0.773	4	14.796	2.540
EM_RP (post-test)	0.767	4	16.681	2.281
EM_AT (pre-test)	0.596	6	21.531	2.940
EM_AT (post-test)	0.645	6	24.442	2.715
EM_CR (pre-test)	0.828	8	28.735	3.868
EM_CR (post-test)	0.820	8	30.876	3.839

The table shows detailed information regarding the Cronbach's alpha, number of the items, mean, and SD at two measurement times (i.e., the pre-test and the post-test). The Cronbach's alpha for the entrepreneurial mindset scale and its sub-scales ranged from 0.568 to 0.841. The internal consistency of the entrepreneurial mindset scale at two measurement times was good [i.e., the Cronbach's alphas were 0.793 and 0.841] (Taber, 2018; Bischoff et al., 2020). Next, the internal consistency of the entrepreneurial mindset sub-scales (i.e., IMPLM at pre-test, EM_AO at two measurement times, EM_RP at two measurement times, and EM_CR at two measurement times) was also good (Taber, 2018; Bischoff et al., 2020). However, the Cronbach's alpha for the such sub-scales (i.e., ELAM at two measurement times, IMPLM at post-test, and EM_AT at two measurement times) was lower than a cut-off value of 0.70 (Taber, 2018). Referring to Taber (2018), the Cronbach's alpha for those such sub-scales was considered acceptable; therefore, the internal consistency of those such sub-scales was sufficient.

Appendix 3: The Shapiro-Wilk Test of Normality for the Pre-test and Post-test Scores in Each Group

Entrepreneurial Mindset Sub-construct	Group	n	Mean	SD	Shapiro-Wilk Statistic	p-value
ELAM (post-test)	Treatment	58	17.931	1.226	0.899	0.000
ELAM (post-test)	Control	55	16.855	2.013	0.937	0.006
ELAM (pre-test)	Treatment	58	14.466	1.657	0.940	0.007
ELAM (pre-test)	Control	55	14.418	2.105	0.917	0.001
IMPLM (post-test)	Treatment	58	17.983	0.982	0.897	0.000
IMPLM (post-test)	Control	55	16.836	1.833	0.948	0.018
IMPLM (pre-test)	Treatment	58	14.655	1.831	0.880	0.000

Entrepreneurial Mindset Sub-construct	Group	n	Mean	SD	Shapiro-Wilk Statistic	p-value
IMPLM (pre-test)	Control	55	14.236	2.309	0.943	0.012
EM_AO (post-test)	Treatment	58	21.259	1.763	0.953	0.025
EM_AO (post-test)	Control	55	19.927	2.981	0.967	0.129
EM_AO (pre-test)	Treatment	58	17.793	1.852	0.938	0.006
EM_AO (pre-test)	Control	55	17.582	2.942	0.963	0.093
EM_RP (post-test)	Treatment	58	17.431	1.428	0.861	0.000
EM_RP (post-test)	Control	55	15.891	2.719	0.947	0.017
EM_RP (pre-test)	Treatment	58	14.448	1.930	0.945	0.010
EM_RP (pre-test)	Control	55	15.164	3.029	0.930	0.003
EM_AT (post-test)	Treatment	58	25.017	1.951	0.957	0.037
EM_AT (post-test)	Control	55	23.836	3.248	0.966	0.120
EM_AT (pre-test)	Treatment	58	21.362	2.680	0.879	0.000
EM_AT (pre-test)	Control	55	21.709	3.207	0.962	0.080
EM_CR (post-test)	Treatment	58	31.759	2.805	0.919	0.001
EM_CR (post-test)	Control	55	29.945	4.531	0.986	0.756
EM_CR (pre-test)	Treatment	58	28.966	2.629	0.959	0.050
EM_CR (pre-test)	Control	55	28.491	4.861	0.946	0.015

The normality test was conducted for the pretest and post-test scores in both the treatment and control groups using the Shapiro-Wilk test (Kim, 2015; Rietveld & van Hout, 2017; Kwak & Park, 2019). The table shows the results at the significance level of 0.05 for each Shapiro-Wilk statistic. Most of the variables were not normally distributed (i.e., the p-values were lower than 0.05), and therefore, nonparametric statistical tests were used to analyze those variables. However, such variables (i.e., EM_AO [post-test of control group], EM_AO [pre-test of control group], EM_AT [post-test of control group], EM_AT [pre-test of control group], EM_CR [post-test of control group], and EM_CR [pre-test of treatment group]) were normally distributed. In order to fulfil the assumptions of testing for the between-group and within-group comparisons, nonparametric statistical tests were still used for those normally distributed variables (Siegel, 1957; Kim, 2015; Rietveld & van Hout, 2017; Kwak & Park, 2019).