ENTREPRENEURIAL LEARNING PERFORMANCE OF VULNERABLE SENIOR HIGH SCHOOL STUDENTS: A PRELIMINARY STUDY FROM DEEP SOUTH THAILAND

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Article History
Received: 23 December 2022 **Revised:** 18 January 2023 **Published:** 30 January 2023

ABSTRACT

Due to the weak economic development and poverty in the Deep South of Thailand resulting from continuing insurgency, the entrepreneurship human resource development is apparently needed for achieving the country ambition on social sustainability and economic growth. This research has thus attempted to preliminarily investigate the entrepreneurial learning performance of vulnerable senior high school students who are expected to be self-reliant after graduation. A total of 146 target students participated in a pilot project. Firstly, entrepreneurial knowledge, skills, and mindset were introduced to the students by adopting STEAM4INNOVATOR as a training model. Secondly, the students were encouraged to form team and create the prototype that met the needs within school. Pitching assessment form and interview were tools for assessment. The study revealed that student's entrepreneurial knowledge was at fairly good level. The entrepreneurial skill, as in team, was arguably at satisfied level. The students could identify pain points, formulate challenge statement, propose a solution and potential impact, and initially test the proposed solution or prototype with their relevant target users. Accordingly, the research displays that entrepreneurship human resource development among vulnerable young population is possible and highly recommended as a key to socio-economic development in Deep South Thailand.

Keywords: Entrepreneurship, Entrepreneurial Learning Performance, Deep South Thailand, Vulnerable Student

CITATION INFORMATION: Chanarnupap, S., Nuanjunkong, N., Vanichanon, A., Jansoon, N., Sae-Tae, R., & Poonsin, T. (2023). Entrepreneurial Learning Performance of Vulnerable Senior High School Students: A Preliminary Study from Deep South Thailand. *Procedia of Multidisciplinary Research, 1*(1), 19.

INTRODUCTION

In this twenty-first century, the global economy is driven by the innovative technology. Innovation-driven entrepreneurship, by its huge contributions to the economic growth (Mahfud, Triyono, Sudira, & Mulyan, 2020), has become attractive for many countries including Thailand. Thailand strategy for national competitiveness enhancement together with other strategies directing to the ultimate goal of being a developed country with security, prosperity and sustainability, requires entrepreneurial human resources. Such development is substantially essential for southernmost Thailand. By the effect of prolonged 15-year insurgency, Deep South Thailand particularly Pattani, Narathiwat, and Yala Provinces has encountered with weak economic development and abundant poverty (Benbourenane, 2012). Remarkably, more than 7,000 children in the three southernmost provinces have been orphaned by militant violence since the turmoil erupted in the region in January 2004 (Bangkok Post, 2014). Entrepreneurial education, therefore, is arguably the powerful tool to improve the life quality of those vulnerable young citizens. The development on entrepreneurship skills is also hopeful for promoting prosperity of people with low-income status (Cho, 2015; Darisi & Watson, 2017; European Union and the Committee of the Regions, 2018).

Entrepreneurship should be educated for the people in all ages. By training at youth, the skills, networks, and confidence developed through entrepreneurship program were transferable to the adulthood (Darisi & Watson, 2017). Entrepreneurial competency including entrepreneurial knowledge, skill, and attitude has been studies at various study levels (Tsakiridou & Stergiou, 2014; Gamede & Uleanya, 2017; Venesaar, Malleus, Arro, & Toding, 2021). It was accounted that the entrepreneurial competence was a set of knowledge, skills and attitudes influencing the pleasure and ability to accomplish a value created entrepreneurial job (Ernest, Matthew, & Samuel, 2015). Due to its broad concept and its dependence on type of task and condition (Kaur & Bains, 2013), it thus seems to be a difficulty to define exactly what should be for the entrepreneurial competency. The entrepreneurial knowledge, for example, involves one's understanding on entrepreneurship, role of entrepreneur, and determinants of successful entrepreneurship. Meanwhile, the entrepreneurial skills concern to creativity, analyzing, motivating, networking, adaptability, and financial management. Sense of initiative, risk-taking propensity, self-efficacy, need for achievement, and structural behavior have been classified as the entrepreneurial attitude (European Commission, 2012). Diverse definitions for entrepreneurial competency have been provided in literatures. The previous finding showed that entrepreneurship program helped improve the student's skill on creativity, innovation, communication and interaction, problem solving, decision-making, and risk confrontation (Tsoli & Babalis, 2021). Having those entrepreneurial characteristics, people are able to tolerantly deal with vagueness and changing situations and survive at this disruptive period of the world (Scarborough & Cornwall, 2016; Kholilah, Wafaretta, & Syariati, 2019).

STEAM4INNOVATOR is a training course developed by National Innovation Agency, Thailand (NIA) for a purpose to develop a capability on innovation and entrepreneurship of inhabitants especially youthful generations for being the effective innovators (National Innovation Agency, 2020). This learning model integrates the knowledges on STEAM which comprises of science (S), technology (T), engineering (E), art (A), and mathematics (M) with those on

business and entrepreneurship. The four systematic procedures leading to a creation of innovative product and distribution, in conforming to the need of the target group, are assembled in the course. In the first stage known as "Insight", the participants are trained to identify precisely the real problems or the needs of the target group. In the second step termed "Wow Idea", they are encouraged to present the different ideas for solving the problem happened for the target group. The innovation-promising idea is then chosen based on the value and economic feasibility. The sketch of the best idea is accomplished in this stage. The production of prototype and the design of business model and network are implemented in the third step called "Biz Model". At the last step refers to "Production and Diffusion", the trainees are practiced on how to present the unique feature of the product through branding tool. Knowledge and skills related to product presentation and pitching are additionally developed for the practitioners at this stage. All four stages could be repeated as necessary - for a research and development of the final product.

Accordingly, this research aims to disclose preliminarily the entrepreneurial learning performance of vulnerable senior high school students in Deep South Thailand by adopting STEAM4INNOVATOR as a training model. The research lays on the assumption that entrepreneurship human resource development among vulnerable young students is possible and could be a key for improving the life quality.

MATERIALS AND METHODS

With voluntary attention, a free boarding school in the southern border provinces of Thailand involved in the research. This school has recruited students affected by the unrest situation and disadvantaged from the poverty. Almost all students were seen as vulnerable. Some were orphaned, homeless, marginal, or abused. Some were victims in substance abuse problems and/or involved in insurgency. Many came from needy poor background. The majority were Malay Muslims speaking Jawi language in their daily lives. Their academic performance was slightly low. The relevant target group of this research was senior high school students (Aged 16-18) as they were expected to be self-reliant after graduation. The number of 146 students was selected by a purposive sampling method (Table 1).

Table 1 The characteristics of the student participants

Grade Level	Population	Study Program		Total
		Science-Mathematics	Art-Vocation	
Grade 10	54	23 of 26	25 of 28	48
Grade 11	70	27 of 29	28 of 41	55
Grade 12	45	14 of 15	29 of 30	43
Total	**169**	**64 of 70**	**82 of 99**	**146 (86.39%)**

The target students were invited to engage in the two-phase preliminary project (Figure 1). During Phase 1, the basic knowledge and skills as well as entrepreneurial mindset were introduced to the students by adopting STEAM4INNOVATOR as a training model (Figure 2 A, B, C). A multiple-choice test contained 10 basic questions (Modified from National Innovation Agency, 2020) focusing on the entrepreneurial knowledge was employed for assessment. The

scores were collected and then analyzed according to the published formula (Nasir & Hadijah, 2019) for a learning improvement known as normalized gain (<g>). Univariate analysis (2-way ANOVA) was utilized for testing the effect of grade level, study program, and their interaction on normalized gain. In order to determine the difference between pre-test and post-test, data were submitted to a paired sample t-test analysis. All statistical analyses were performed at the significant level (α) of 0.05. At the end of this phase, a questionnaire, with 5-point Likert scale (Bringula et al., 2012), on satisfaction with entrepreneurial learning activity adapted from literature (Chung, Huang, Cheng, & Lou, 2020) was employed for evaluation of the training course overall picture.

Next, during Phase 2, the students were encouraged to form team for the prototype development that met the needs within school. They were voluntarily divided into 12 heterogeneous groups in term of grade level and study program. In this way, students from Science-Mathematics study program could work alongside with students from Art-Vocation study program. In addition, the mixture of Grade 10, 11, 12 students in a team could also enhance their learning experience. It was found that the students tended to group with their dormitory mates as recommended by the school. Accordingly, 6 male teams and the other 6 female teams were formed for mission. Each team was approximately the same size. The students managed to work together after school under the supervision of dorm teacher supervisors. At least 12 dorm teacher supervisors have engaged closely in coaching and overseeing their students throughout the project. At the end of this phase, pitching assessment form and group interview were utilized for assessment. Their created prototypes were evaluated based on 3 main criteria - 1) background knowledge associated to the prototype, 2) creativity and possibility, and 3) potential impact or value. The duration of the entire preliminary research project was 9 months from April - December 2022.

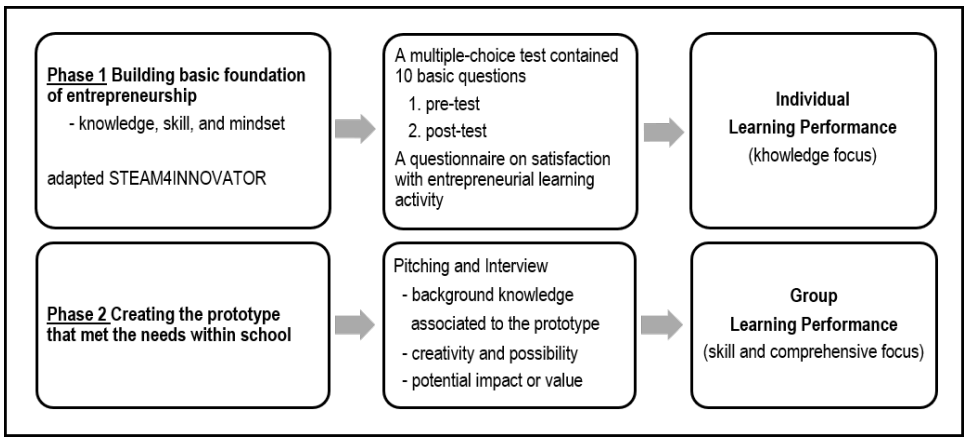

Figure 1 The research conceptual framework

Figure 2. Student's learning related to the 4 stages of STEAM4INNOVATOR

Results

The research disclosed preliminarily the entrepreneurial learning performance of vulnerable senior high school students in Deep South Thailand. It was found that the entrepreneurial knowledge of the students was at fairly good level (Table 2). However, the learning performance was not significantly different between pre-test and post-test (P = 0.194) and the class normalized gain was of low improvement (<g> = -0.30). Furthermore, the difference of grade level and the study program did not affect student's entrepreneurial learning performance. The results illustrated that interaction between the grade level and the study program did not affect student learning improvement (P = 0.327). Further analysis represented that difference in grade level and study program did not individually influence the student learning progress (P = 0.886 and P = 0.342, respectively). The survey of student satisfaction on the overall picture of the training course presented the student agreement on the benefit of the course in strengthening their innovative capability, entrepreneurship, and teamwork (Table 3). It could be implied that the positive attitude towards the entrepreneurial course was represented for our participants.

Table 2 Entrepreneurial knowledge learning achievement of the students

Grade Level	Science-Mathematics Study Program		Art-Vocation Study Program	
	Learning achievement*	**Verbal interpretation**	**Learning achievement ***	**Verbal interpretation**
Grade 10	5.39 ± 0.45	Fairly good	3.50 ± 0.35	Fair
Grade 11	5.52 ± 0.81	Fairly good	4.84 ± 0.20	Fairly good
Grade 12	5.18 ± 0.39	Fairly good	5.10 ± 0.80	Fairly good
All Grade Levels	**5.37 ± 0.17**	**Fairly good**	**4.48 ± 0.86**	**Fairly good**

Value = Mean ± SD (0.00-1.99 = poor, 2.00-3.99 = fair, 4.00-5.99 = fairly good, 6.00-7.99 = good, 8.00-10.00 = excellent) *, average of pre-test and post-test

Even though the above information displayed that the student individual's perception based on the multiple-choice question assessment was fairly good level, the student group's practical

skill in Phase 2 was at satisfied level. From pitching practice and interview, it was found that the students, as in team, could identify pain points, formulate challenge statement, propose a solution and potential impact, and initially test the proposed solution or prototype with their relevant target users. For example, female team 'A' pointed out that there were overcrowded of water hyacinths (*Eichhornia crassipes* (Mart.) Solms) surrounded the school. Water Hyacinth is an invasive plant which endangers the ecosystem because its existence reduces native species and biodiversity (Tobias, Conrad, Mahardja, & Khanna, 2019; Harun, Pushiri, Amirul-Aiman, & Zulkeflee, 2021). Aquatic ecosystem destruction happens because of a degraded water quality which results from a rapid growth and an ability to spread over the water surface of this invader. Massive water hyacinth mat covered the water surface reduces water quality by decreasing sunlight penetration and dissolved oxygen level as increasing turbidity, leading to the reduction of fish and other aquatic organisms living in the area. Moreover, the alive weeds which block water flow as well as the dead ones causes river silting that increases the risk of flooding. Accordingly, a challenge statement of this team was to transform water hyacinths into useful products. This could impact to some degree of water pollution reduction. Some student members from Art-Vocation study program applied their craftsmanship skills and led the rest for product development learning. Eventually weave handbags made from water hyacinths grew around the school were created and used in real lives by the students themselves (Figure 3). In the interview, students were asked to think about other forms of water hyacinth product that potentially met the needs of the marketplace. Some student members from Science-Mathematics study program proposed an idea that natural bubble wrap made from water hyacinths could be developed for commercial and/or green economic purposes. Local group enterprises could be the relevant target users of this bubble wrap as it helps in logistics of their fragile products. This is environmentally friendly since the common plastic bubble wrap will be replaced by natural-derived one. The current proposal received an acceptance from the school and students to continue working on it.

Table 3 The analysis of student's satisfaction on the training course

Item		**Mean**	**S.D.**	**Verbal interpretation***
1.	The learning course helped me to understand more on innovation.	4.10	0.72	Agree
2.	The learning course strengthened my innovative skill.	4.02	0.78	Agree
3.	The course strengthened my ability to identify the true problem or need of the target group.	4.02	0.71	Agree
4.	The course triggered my imagination and provided me the opportunity to present the new ideas.	4.18	0.75	Agree
5.	The course strengthened my ability to select the promising idea for innovation.	4.15	0.75	Agree
6.	It reinforced my competency to design the prototype.	3.96	0.76	Agree
7.	It improved my understanding on business planning.	4.03	0.87	Agree

Item		Mean	S.D.	Verbal interpretation*
8.	By the course, I realized the benefit to publicize the prototype or product.	3.83	0.82	Agree
9.	By the course, I realized the benefit to create the prototype or product with a unique character.	4.00	0.84	Agree
10.	The activity fostered me to work well as a team.	4.44	0.73	Agree
	Total	**4.07**	**0.16**	**Agree**

* 1.00-1.50 = extremely disagree, 1.51-2.50 = slightly agree, 2.51-3.50 = moderately agree, 3.51-4.50 = agree, 4.51-5.00 = extremely agree

Figure 3 Student practice and products derived from Phase 2

DISCUSSION & CONCLUSIONS

In discussion, the research scrutinized that the students' skill on practice was relatively more prominent than that on academic testing. This is possibly because all students studied here had low socioeconomic status and were classified as the vulnerable group, therefore the school have intensively fostered the student practice related to daily-life problem solving and vocational skill, for their well-being in the future. By this continuous practice, practical skill has gradually been embedded in students and shone out during our entrepreneurship-practiced activities. With their low improvement in knowledge acquisition, the activities which integrated both theory and practice through experience-based learning should be reiteratively carried out. In order to improve student entrepreneurial learning performance, the core of STEAM4INNOVATOR or other related contents should be repeated through the next practices. As mentioned in literatures, continuous and iterative learning helped enhance the student ability on entrepreneur (Wei, Liu, & Sha, 2019). The theory, integrated with a practice through experience-based learning, boosted the students' accomplishment in their professional practice (Wrenn & Wrenn, 2009). Moreover, larger scale than school such as at the community, the province, the country, or the world should be the context for student to practice entrepreneurial skill through real-world problems, as this helped develop and sustain entrepreneurial capacities and mindsets (Nooh, 2020; Kubberoed & Hagen, 2015). For entrepreneurship, entrepreneurial attitude related to personal characteristics such as innovation, risk taking, need for achievement, self-

confidence, locus of control, networking, life-long learning, and the ability to identify opportunities was needed (Slettli, 2019; Mahfud, Triyono, Sudira, & Mulyani, 2020; Eliyana et al., 2020). It has been suggested that the learning course that facilitated the dynamic iterative loop of learning experience via knowledge-sharing and collaborative interaction among grouped members promoted metacognitive thinking which was advantage for the development of entrepreneurial mindset (Slettli, 2019). Badzińska (2019) also referred that iterative and participatory co-creation process during business model generation promoted student accomplishment on the learning outcomes and built the entrepreneurial mindset. Teamwork therefore could be vital for our vulnerable young students to make a new step on entrepreneurship human resource development.

Our research illustrated that study levels and programs did not affect the student learning improvement related to entrepreneurial knowledge, representing the homogeneous learning performance among students from different study levels and study programs. This homogeneity in term of learning ability could be benefit for grouping design in the second phase of our project in which the students were encouraged to work in team. For collaborative learning approach, the homogenous group tended to improve individual's learning capability and the student's confidence rather than the heterogeneous one (Pinto, 2012). From our grouping design, in spite of the homogeneity on learning ability, each student group was comprised of members from different study programs (Science-Mathematics and Art-Vocation programs). Some degrees of difference on individual's experience and skill still existed within a group. This could also be advantage for developing entrepreneurial learning performance because it enabled students to share together their different experiences and integrate knowledge from various fields such as science, mathematics, art, technology, engineering and vocation. This kind of teamwork design thus supported the research goal to develop student's entrepreneurial competency by the integration of STEAM with the field of business and entrepreneurship. It was previously accounted that difference of study filed as well as background and culture provided the chance for students to experience the same issue from various perspectives and exchange their different opinions, which was the effective strategy motivating the students to successfully solve the real business problems (Badzińska, 2019). Another research argument was that open-minded attitude motivated initially the student learning, which led to the entrepreneurial achievement (Eliyana et al., 2020). It thus could be a promising sign for the student future success on entrepreneurial learning as our finding displayed the optimistic attitude of the students towards the entrepreneurship and innovation course. Notably, teachers were seemingly change agent for entrepreneurial competency embedment into the students. In this project, teachers were mentors for all entrepreneurship activities afterwards. For entrepreneurship education, mentor supported the mentee's achievement for the course and other benefits such as improving confidence, improving skill on communication, planning and self-learning (Babatunde, 2019). To develop the competent teacher sustainably promote quality education in the school and thus the country for this modern era (Simonović, 2021).

Overall, according to our objective to study the student entrepreneurial learning performance, it could be concluded that the student performance was at a promising level for intensive development. The research reflected high possibility of entrepreneurship human resource development among vulnerable young population and recommended that entrepreneurial education could be key to social sustainability and economic growth in the Deep South of Thailand.

It could be suggested, for our vulnerable students whose socioeconomic status and background academic performance were of low category, that entrepreneurship development process should be based on comprehensive and skill focus through the combination of both theory and practice at a continuous and iterative learning environment. Formative assessment and feedback reflection for learning progress were recommended for our students. The research highlighted the advantage of corporative learning among team members coming from different study programs since this strategy enabled students to share together their different experiences and integrate knowledge from various fields such as science, mathematics, art, technology, engineering and vocation. This teamwork thus supported the research concept to develop student entrepreneurial competence through the integration of STEAM with the field of business and entrepreneurship. It also recommended to practice teacher as a mentor or coach for all next entrepreneurial activities for closely supporting the student during the activities and for sustainable entrepreneurship-innovation education in school. The school concrete policy to routinely engage students in entrepreneurial learning environment by various methods such as entrepreneurial educational implementation in classroom, co-curriculum activities, and/or extra-curriculum activities should be planned and implemented.

ACKNOWLEDGMENTS

The authors are grateful to the National Research Council of Thailand (NRCT) for providing the financial support for this research (Fund No. N73B650430). We also thanks to National Innovation Agency, Thailand for a generous permission and all supports for the research team in dealing with STEAM4INNOVATOR.

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Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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