Interdisciplinary Research Review

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Editorial Note

The Interdisciplinary Research Review (IRR) was established with academic cooperation by the Nakhon Pathom Rajabhat University, The Royal Society of Thailand Committee of Interdisciplinary Research and Development, Rajabhat University (Western Group), and Rajamangala University of Technology Rattanakosin. This Issue, Volume 17 Number 5 (September – October 2022). This issue contains of four interesting articles in multidisciplinary fields: (1) Assessing street greenery using imagery of Google Street View, (2) The process of teaching and learning to create students' identity, (3) Local government involvement in post-pandemic development initiatives for the Lao Khrang Ethnic Group of Nakhon Pathom Province, and (4) Bachelor of Technical Teacher Education versus Bachelor of Technical-Vocational Teacher Education: A comparative analysis of technical teacher education curricula.

The Editorial Board of the IRR encourages anyone to submit articles for evaluation and review. The processes of submission, review and publication of articles are described on the journal's website, https://www.tci-thaijo.org/index.php/jtir. The Editorial Board and Committees of the IRR sincerely thank all peer reviewers who have sacrificed their time to help us produce a better journal, and also wish to thank all teachers, researchers and other academicians for submitting their valuable research to this journal. Finally, we thank readers of our journal who help to spread the knowledge and benefits gained to others. With your feedback and suggestions, we will strive to improve the quality and relevance of the IRR.

Yongyudh Vajaradul
Editor
Interdisciplinary Research Review

Assessing street greenery using imagery of Google Street View

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Abstract

The streets at the old moat of Nakhon Ratchasima City Municipality (NCM) are a critical point of urban landscape. NCM people interact with streetscape in terms of well-being. This paper proposes the application of Google Street View (GSV) for surveying street greenery. This study focused on 15 streets at the old moat of NCM using 49 sampling points for designing and analyzing Green View Index (GVI) and Sky View Factor (SVF) on analysis of GSV images. GVI was used for estimating the percent of vegetation cover and SVF was used for quantifying the ratio of sky cover. According to the result, the GVI calculations were found between 1.41 – 44.18 percent that drivers or walkers could see green cover in the low percent (or < 50 percent). SVF value is between 0.73 – 0.86 that drivers or walkers could see clearly sky on 15-street at the old moat of NCM. These results show that all streets at the old moat of NCM should improve vegetation cover. Moreover, the application of GSV for surveying street greenery will be an alternative tool for geospatial workers or planners in green cities.

Keywords: Street greenery, Google street view, green view index, sky view factor

1. Introduction

The greenness of urban roads has been one important measure of healthy vegetation in urban where inhabitants have very requirements in the present time [1]. Similarly, street plant communities were so required for urban landscape and urban ecology in providing well-being, healthy, and growing sustainable urban [2, 3]. Thus, the cover of trees and plants has been set in urban planning and development to reduce urban heat with improving conditions of urban environment [4]. Moreover, the study of street greenery reflects the sensory benefits of urban greenery [5, 6]. Although, there are few current studies on urban greenery that focuses on human perspective and considers street greenery [1]. Presently, photos are explored in Google Street View (GSV) which has become cardinal source for geospatial analytics, insight perception, and decision support [7]. Especially, the assessment of street green-based GSV is so interesting as examples of research by Xiao *et al.* [1], Ki and Lee [6], and Ito and Biljecki [8]. There were two patterns for mapping urban trees: point and polygon features [9]. Then, the accuracy assessment of the map was checked by driving and walking surveys or both two integrated approaches in true ground [10] because, in fact, surveying trees on road needs a high cost of time and effort [11].

This study aims to introduce the application of GSV imagery for surveying street greenery on 15 streets at the old moat of Nakhon Ratchasima City Municipality (NCM), Nakhon Ratchasima Province of Thailand. The old moat of NCM was

selected as the study area because it has been planned for development as Korat Smart City under the Memorandum of Understanding (MOU) in Korat Smart City Project according to the concept of smart and safe city to the city of happiness, including the development of city greenness [12, 13]. Moreover, GSV images were selected because it is publicly accessible and given the basic road networks forming cities and the interactions of people and environment [13]. At the same time, this study provides ground data of NCM vegetation cover on streets at the NCM-old moat and will help to plan true field surveys and save time and budget. Basically, urban road intersections have signs according to traffic rules that are so essential element of road design such as intersection design and operation of locations for movement of motorists, cyclists, and pedestrians; signal timing for crossing walking through investigating a concept e.g., road safety, mobility, more vibrant, accessible public spaces [14]. Interestingly, trees may help road preserving sight lines at intersections [15].

2. Material and Methods

2.1 Study area and sampling points on NCM streets

This study focuses on 15 streets at the old moat of NCM in Nakhon Ratchasima Province, located in the northeastern region of Thailand. The study location has geographic coordination between 14°58′48.74′′ – 14°58′11.41′′ N and 102°5′50.52′′ – 102°6′51.164′′ E (Figure 1). There were 49 sampling points on 15 streets at the NCM-old moat that were used for GVI and SVF calculation as Table 1. Moreover,
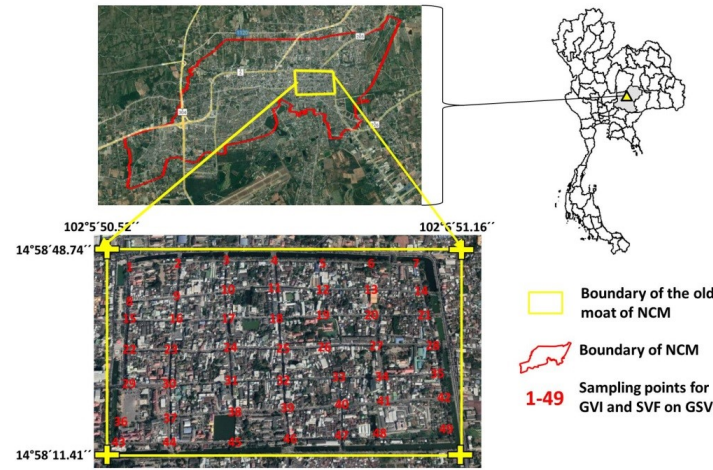
Figure 1: Study area and sampling points for GVI and SVF calculation on NCM streets.

(a) 4 horizontal directions   (b) 3 vertical directions
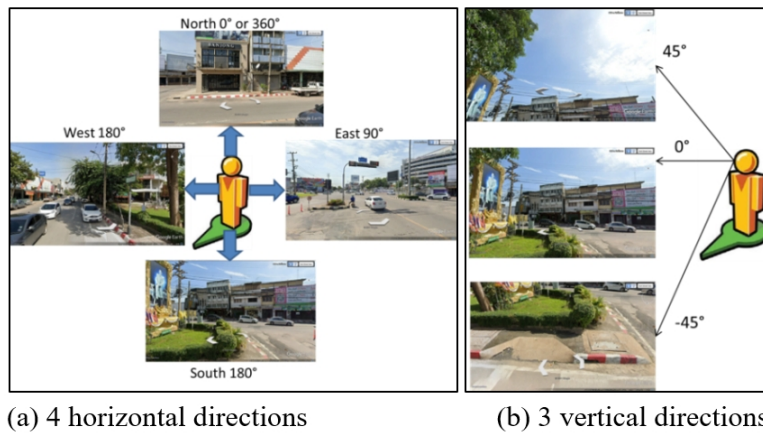
Figure 2: Example of GSV images for GVI calculation.

the area used for the study includes most build-up areas and streets that consist of extraordinarily cultural places such as Thao Suranaree monument and 6 significant temples (Bueng, Sakaeo, Bon, E-San, Phra Narai Maharat, and Phayap) [13].

2.2 Analysis GVI and SVF on NCM streets

2.2.1 Calculating GVI

Generally, GVI values were calculated using multiple Tencent Street View (TSV) images and the GVI equation [5]. GVI indicates the percent of green cover from the relationship between observation and position of person and viewpoint of greenness [6]. So, GVI can be calculated by GSV image (6 horizontal directions and 3 vertical directions at each sample site) as the equation [2, 3]:

$$GreenView = \frac{\sum_{i=1}^{6} \sum_{j=1}^{3} Area_{g\_ij}}{\sum_{i=1}^{6} \sum_{j=1}^{3} Area_{t\_ij}} \times 100\% \quad (1)$$

Where $Area_{g\_ij}$ is the number of green pixels in a GSV image from each sample site-based view of each camera direction and vertical angle, and $Area_{t\_ij}$ is the total number of pixels in each

GSV image (overall 18 GSV images) to one sampling point. This GVI indicates the relationship between greenery cover and an eyesight of person in GSV images. This study modified GVI methods of [2] and [3]. This GVI calculation based on GSV image for 4 horizontal directions (north (0° or 360°), east (90°), south (180°) and west (270°)) and 3 vertical directions (45°, 0° and -45°) at each sampling points as shown in Figure 2 (this modified SVF method was used in the research of [16]. And then these GSV images were used for GVI calculation with the formula (1) above.

2.2.2 Calculating SVF

The first step of SVF was calculated by digital cameras and was mounted with fisheye lens [17], for example, Steyn' method [18] and pixel counting methods [19]. Presently, GSV online is used for supporting the SVF calculation to overcome highly time and expense consumption in field collection. Various geophysical parameters of SVF were measured by ratio of the sky visible from a certain position [20]. And then SVF was calculated by portioning the synthetic fisheye photo into n annular rings, which was done by summing up the contribution

Table 1. Sampling points for GVI and SVF calculation on 15 NCM streets.

Sampling points	Latitude	Longitude	Road name	Sampling points	Latitude	Longitude	Road name
1	14.978965	102.098106		29	14.973095	102.098605	
2	14.979282	102.100663		30	14.97315	102.100642	
3	14.979380	102.103056		31	14.973276	102.103595	
4	14.979405	102.105461		32	14.973367	102.105984	
5	14.979379	102.109191		33	14.973473	102.108638	
6	14.979252	102.111457		34	14.973517	102.110670	
7	14.979147	102.112742		35	14.973636	102.113346	
8	14.977201	102.098284		36	14.971369	102.098720	
9	14.977413	102.100687		37	14.971678	102.100836	
10	14.977753	102.103033		38	14.971905	102.103726	
11	14.978037	102.105581		39	14.971964	102.106056	
12	14.977896	102.109360		40	14.972190	102.108702	
13	14.977836	102.111255		41	14.972320	102.110753	
14	14.977664	102.112986		42	14.972558	102.113450	
15	14.976202	102.098349		43	14.970482	102.098662	
16	14.976264	102.100665		44	14.970584	102.100975	
17	14.976336	102.103214		45	14.970655	102.103861	
18	14.976438	102.105754		46	14.970747	102.106234	
19	14.976503	102.108579		47	14.970788	102.108604	
20	14.976519	102.110689		48	14.970751	102.111290	
21	14.976542	102.113073		49	14.970831	102.113449	
22	14.974711	102.098430					
23	14.974755	102.100620					
24	14.974898	102.103324					
25	14.974848	102.105921					
26	14.975058	102.108749					
27	14.975041	102.110607					
28	14.975049	102.113224					

Legend: Polsean, Yommarat, Ussadang, Chomphon, Mahatthai, San-Prasit, Kamhaengsongkram, Chumphon, Jaggree, Manat, Prajak, Kudun, Pollarn, Vatcharasarid, Chainarong
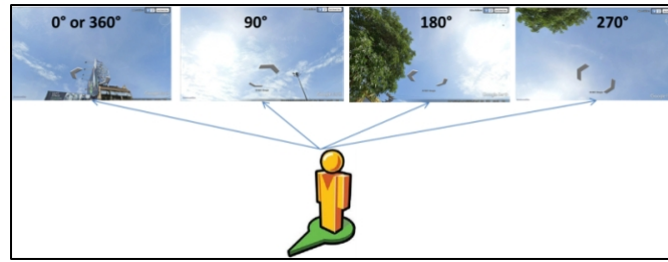

Figure 3: Example of the GSV images for SVF calculation.

of each ring [21] as formula below:

$$SVF = \frac{\pi}{2n} \sum_{i=1}^{n} \sin\left(\frac{\pi(2i-1)}{2n}\right)\left(\frac{p_i}{t_i}\right) \qquad (2)$$

Where $\frac{p_i}{t_i}$ is the portion of the number of sky pixels and the total number of pixels in ring i.

In addition, this study decided to mainly used and modified GVI method of [2, 3] and SVF method concentrated on concept of [21], for exploring NCM roads' greenness because they are in accordance with this purpose of study. This study modified SVF methods of [21]. We retrieved GSV images from Google Earth using rotating 4 directions of sky view 0° or 360°, 90°, 180° and 270° as in Figure 3 (this modified SVF method was used in research of [16]). And then the sky views from GSV were used for SVF calculation with formula (2) above.

3. Results and Discussion

3.1 Results of GVI

GVI shows the percent of vegetation cover in GSV images between 0 – 100 percent. The 0 value has not green cover while the 100 value defines full green cover in GSV image. The average of GVI calculations on 15 streets at the old moat of NCM was found between 1.41 – 44.18 percent (as in Table 2), drivers or walkers could be seen green cover in the low percent (or < 50 percent). Pollarn road shows the highest green value and Vatcharasarid road has the lowest green value. In other words, at that time, drivers or walkers on Pollarn road could see green cover higher than on other studied roads. In a comparison of GVI between this paper and other papers, the GVI values in Boston from Li et al. (2017; 2015) showed the range of GVI from 5.22 to 36.05 which is higher than our studied area. For this reason, roads in Boston include a lot of trees on street than on the streets at the old moat of NCM.

3.2 Results of SVF

SVF shows the ratio of sky cover in GSV images between 0 – 1. The 0 value has full obstruction (e.g., building, tree canopies, electric poles and lines) while the 100 value defines full sky cover in GSV image. For the results of SVF calculation, we found that average of SVF value on 15 streets at the old moat of NCM is between 0.73 – 0.86 (Table 3), drivers or walkers

Table 2. Results of GVI on 15 streets at the old moat of NCM.

Road name	No. of sampling points	GVI							Total	Average
		1	2	3	4	5	6	7		
1. Polsean	7 (1-7)	19.75	10.96	12.45	9.34	9.78	14.65	60.16	127.75	18.25
2. Yommarat	7 (8-14)	8.97	3.24	4.12	2.12	3.45	3.23	51.25	74.26	10.61
3. Ussadang	7 (15-21)	2.13	2.15	2.11	1.23	1.12	2.12	51.43	61.06	8.72
4. Chomphon	7 (22-28)	2.16	1.15	1.19	2.01	2.16	2.12	52.16	60.94	8.71
5. Mahatthai	7 (29-35)	10.45	2.18	1.17	2.06	1.13	2.15	50.12	67.20	9.60
6. San-Prasit	7 (36-42)	8.90	2.32	1.25	2.16	1.15	2.18	52.13	67.93	9.70
7. Kamheangsongkram	7 (43-49)	10.45	9.05	12.68	9.57	8.18	10.31	51.34	102.01	14.57
8. Chumphon	5 (1,8,15,22,29)	19.75	8.97	2.13	2.16	15.45	0.00	0.00	46.30	9.26
9. Jaggree	4 (2,9,16,23)	10.96	3.24	2.15	2.26	0.00	0.00	0.00	16.3	4.09
10. Vatcharasarid	4 (23,30,37,44)	1.15	2.18	2.32	2.18	0.00	0.00	0.00	5.65	1.41
11. Manat	6 (3,10,17,24,31,38)	12.45	4.12	2.11	1.19	1.17	9.34	0.00	29.19	4.87
12. Prajak	4 (4,11,18,25)	9.34	2.12	1.23	2.01	0.00	0.00	0.00	12.69	3.17
13. Chinarong	4 (25,32,39,46)	2.01	2.06	2.16	8.92	0.00	0.00	0.00	6.23	1.56
14. Kudun	6 (6, 13,20,27,34,41)	14.65	3.23	2.12	2.12	2.15	2.18	0.00	24.33	4.06
15. Pollarn	6 (7,14,21,28,35,42)	60.16	51.25	51.43	52.16	50.12	52.13	0.00	265.09	44.18

Table 3. Results of SVF on 15 streets at the old moat of NCM.

Road name	No. of sampling points	SVF							Total	Average
		1	2	3	4	5	6	7		
1. Polsean	7 (1-7)	0.85	0.95	1.00	1.00	0.95	0.80	1.00	5.55	0.79
2. Yommarat	7 (8-14)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	0.86
3. Ussadang	7 (15-21)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	0.86
4. Chomphon	7 (22-28)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	0.86
5. Mahatthai	7 (29-35)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	0.86
6. San-Prasit	7 (36-42)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	6.00	0.86
7. Kamheangsongkram	7 (43-49)	1.00	0.95	0.92	0.95	0.75	0.75	0.75	5.12	0.73
8. Chumphon	5 (1,8,15,22,29)	0.85	1.00	1.00	1.00	1.00	0.00	0.00	3.85	0.77
9. Jaggree	4 (2,9,16,23)	0.95	1.00	1.00	1.00	0.00	0.00	0.00	2.95	0.74
10. Vatcharasarid	4 (23,30,37,44)	1.00	1.00	1.00	1.00	0.00	0.00	0.00	3.00	0.75
11. Manat	6 (3,10,17,24,31,38)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	5.00	0.83
12. Prajak	4 (4,11,18,25)	1.00	1.00	1.00	1.00	0.00	0.00	0.00	3.00	0.75
13. Chinarong	4 (25,32,39,46)	1.00	1.00	1.00	1.00	0.00	0.00	0.00	3.00	0.75
14. Kudun	6 (6, 13,20,27,34,41)	0.80	1.00	1.00	1.00	1.00	1.00	0.00	4.80	0.80
15. Pollarn	6 (7,14,21,28,35,42)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	5.00	0.83

could see almost clear sky on 15 streets at the old moat of NCM. The highest SVF value is shown at Yommarat Road, Ussadang Road, Chomphon Road, Mahatthai Road, and San-Prasit Road. These values mean drivers or walkers could see almost clear sky (or does not have obstruction cover).

4. Conclusions

The GVI calculations were found between 1.41 – 44.18 percent and SVF value is between 0.73-0.86. These results show that vegetation cover should be improved on 15 streets at the old moat of NCM. Moreover, the application of GSV for surveying street greenery will be an alternative tool for geospatial workers or planners in green cities. This study can help to explore street greenery-based GVI in preliminary surveying before the field survey. These data will help to plan the field survey by saving time and budget. In a traditional survey, we used remote sensing images and aerial photos for surveying street trees which is limited and missed some trees due to the resolution of imagery.

For further study, The relationship between drivers and walkers on 15 streets at the old moat of NCM should be studied, because we believe that, especially, if drivers interact with the streetscape in positively driving emotion, it will reduce driving speed and road accidents.

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The process of teaching and learning to create students' identity

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Abstract

The purpose of the study was to empirically validate the teaching and learning process to create students' identity. Twenty-six Agricultural Education students and a lecturer in the Economics of Vegetables subjects completed three activities by applying five steps in enhancing the identity of Phonpakdee and Aquino: 1) exploring the identity of the student; 2) formulating objectives for developing the student; 3) setting a mission; 4) providing activities; and 5) evaluating the students' identity. The results showed that the number of students who had low perseverance decreased in all three domains. The number of students with low honesty in terms of affective and psychomotor decreased while cognitive domain remained the same. The number of students with low intuitiveness in the psychomotor was reduced but the cognitive and affective still did not change.

Keywords: Teaching and learning process, identity, agricultural education student, learning activities

1. Introduction

The identity of this group is a manifestation of socialization [1]. In particular, teachers' educational institutions must be aware of the need to cultivate students to become good models of society. The agricultural education students of the King Mongkut's Institute of Technology Ladkrabang (KMITL) are in the stage of late adolescence and are entering adulthood. If they do not know themselves and get confused about moral development, they might affect the behavior of their future learners.

Honesty, intuitiveness, and perseverance are well-known as the identities of the KMITL. The identity is of great importance in the production of agricultural teachers of the Department of Agricultural Education (AgEd). Honesty is a necessity in the development of food security. Intuitiveness is a very important part of learning in the 21st century. Agricultural teachers must be knowledgeable as facilitators for students to create innovative designs for agricultural development. In addition, farming is a challenging task, and agricultural teachers must be physically strong and get motivated to fight. Therefore, agricultural teachers must be perseverant [2].

In the concrete side views of the AgEd lecturers [3], honesty means not copying works of others, not cheating on exams, not stealing performances of others, as well as being punctual and responsible for an assignment. Intuitiveness means studying information from various resources, inquiring teachers or others, and observing and taking notes. Perseverance means tolerance to do good work until success. In addition, the way to improve the students' identity is to integrate the KMITL identity into the teaching and learning processes. Then the identity of the students will be enhanced and become their enduring behavior.

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Learning is a process of permanent behavioral change that creates new understandings, knowledge, behaviors, and attitudes [4]. Bloom [5] has divided the types of learning into three areas cognitive, affective, and psychomotor for student to make permanent changes. There, learners must understand honesty, curiosity, and work, as well as have a good attitude towards all three identities, which will lead to their expression in doing activities with honesty, curiosity, and attempt.

This research will be of great benefit in developing students' identity through teaching and learning process. It will make aware of students' weak points which will lead to the correction of the learners' understanding, attitudes, and actions because these learners must be role models of good agricultural teachers. This identity development process can also provide a guideline for other teachers to make permanent changes in student behavior.

2. Objective

To validate the teaching and learning process in creating the students' identity.

3. Literature Review

3.1 Identity development

Most of the students development will come from Chickering and Reisser' study [6] which discussed seven areas of student development: developing competence, managing emotion, developing autonomy, freeing interpersonal relationships, establishing identity, developing purpose, and developing integrity. Popattanacha and Phetriang [7] brought the concept of student identity derived from Chickering and Reisser, in conjunction with Kemmis and McTaggart's [8] action research cycle. It
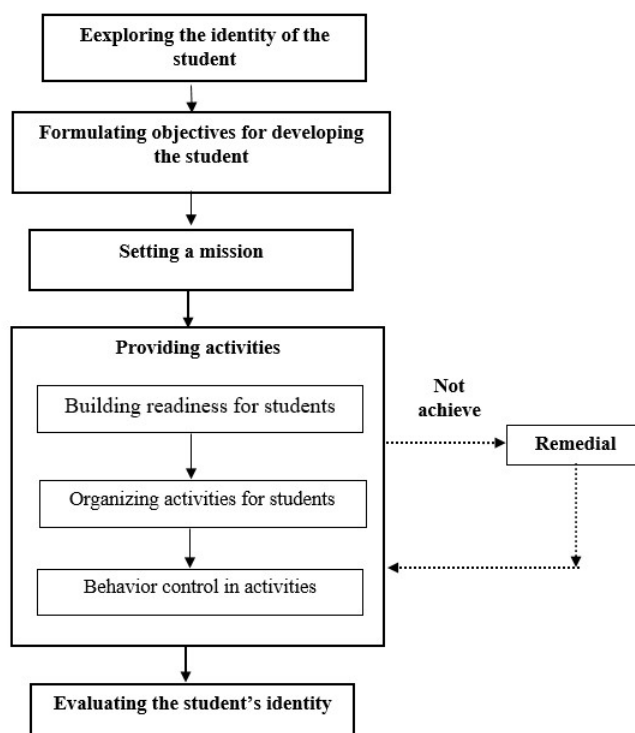
Figure 1: Design of innovation activities [14].

consists of four main stages: planning, implementation, observation, and reflection. They created activities for identity development and found that there was a significant increase in the behavior score of service mind, discipline, and eagerness to learn among nursing students after they participated in the activities. Accordingly, Intachod [9] studied the identity development of Kasetsart University students using university activities, enhancing performance activities, and social activities. The results showed that the development of identity was very high.

3.2 The teaching-learning process for creating the identity

The theory of behavioral learning discusses the human response to behavioral stimuli, which is the cause of learning. They have been applied to modify human behavior in a better way through teaching-learning. The instructor will provide learners with a stimulating environment to respond and learn. The behaviors resulting from learning have been satisfactory, and the behavior will continue. If any behavior does not work as desired, it tends to decrease or stop [10]. The application of subject teaching, cognitive and affective strategy, and the discussion of the understanding between the instructor and the learner can change the behavior of the learners positively [11] because each learner is different in thinking, instructors must be open-minded, listen to, and respect students' ideas. Teachers will then be able to give advice and find solutions to solving undesirable behaviors together with students.

Identity happens in a person. It changes according to the driving force, ability, beliefs, and adaptation of the person [12].

Good identities should consist of three elements: ethical knowledge, ethical feeling, and ethical actions [13]. Phonpakdee and Aquino [14] stated that there are five steps in enhancing identity from the design of innovation activities for Industrial Education students. These are 1) exploring the identity of the student by the identity test; 2) formulating objectives for developing the students; 3) setting a mission by the instructors; 4) providing activities; and 5) evaluating the student's identity by comparing the results of self-assessments from the identity tests in the first hour and after completion of assignments. The details of the steps are shown in Figure 1.

In formulating objectives for developing students, the aim of creating an identity of honesty is that students do not cheat on exams, do not copy works of others, do not let others do assignments from teacher, do not lie, be punctual, do not steal, and responsibility for assigned task. In addition, students can characterize an honest person. They can also express their opinions on the impact of dishonesty. As for intuitiveness, students research information from various sources such as the internet, books, and textbooks, as well as questioning teachers, observations, and recordings. In addition, students can describe the characteristics of curious people. They can also comment on the impact of ignorance. As for perseverance, the students have the effort, patience, and work to succeed. They are also able to characterize people who are curious and comment on the impact of unemployment.

Activity providing has been divided into three phases: building readiness for students, organizing activities for students, and controlling behavior in activities. In preparation, the teacher

informs students about the tasks that students have to perform in conjunction with the three identities. In organizing activities for students, the teacher emphasizes behaviors that students should express according to the KMITL identity. After that, the teacher will monitor the behavior in the activities. If students do not participate in activities or participate in activities and still cannot achieve the objectives set by the teacher. The teacher will arrange remedial activities or extracurricular activities as a special case for students.

4. Methodology

The population was 62 students in the department of Agricultural Education, KMITL. The purposive sample was 26 third-year students who had been taken Economics of Vegetable Course for 4 months. The teaching-learning process to create the students' identity began in the second semester. The main tool used in the research was an identity test. The test was reviewed by three experts and was trialed with non-sample students. The reliability was analyzed for 0.714, indicating that the quality of the test was usable. This test consists of 36 questions with a yes-no-answer format. The honesty test consisted of 21 items consisting of 7 items of understanding, 7 items of attitude, and 7 items of action. There were 9 items of intuitiveness, which were divided into 3 items of understanding, 3 items of attitude, and 3 items of action. The 6 items on perseverance categorized into 2 understandings, 2 attitudes, and 2 actions. The interpretation derived from summarizing the answers of all students in each aspect of each range. However, there were still other tools that were used in this research based on five steps in enhancing identity from the design of innovative activities as shown in Table 1.

5. Results and Discussion

5.1 Exploring the identity of the student

The students were tested on their identity level. From Table 2, it was found that out of 26 students, 5 had a lack of understanding of honesty, 6 had an appropriate act about honesty, and 8 had a lack of honesty attitude. For the intuitiveness of the 26 students, 2 had a lack of understanding of intuitiveness, 5 had a lack of attitude, and 6 had an inappropriate act. In term of perseverance, 2 students lacked understanding about perseverance, 4 students lacked attitudes, and 4 students had inappropriate actions in perseverance. It can be seen that students have low honesty in the affective domain with the highest frequency. Meanwhile, the number of students having low intuitiveness and perseverance in the cognitive domain was the least. They have different identities because they have their point of view on ethics from the experiences of different environments. According to Freud's theory [15], this environment affects three human expressions: id, ego, and superego. Id is raw power, emotions, desires, and instincts that seek satisfaction. Ego is reasoning, reality is what controls Id. Superego comes from society's upbringing, norms, and social values. In addition, in Piaget's theory of moral development, children between the ages of five and ten years think that morality cannot be changed and is determined by authority. When they start at about the age

of ten or eleven, they think that morality depends on adolescent intentions and circumstances [16].

5.2 Formulating objectives and determining the identities toward learning

The results of the identity profile of the students and course description were analyzed to formulate the cognitive, affective, and psychomotor objectives. The lessons were planned and 3 activities were provided to the students: 1) sunflower sprout production, 2) quiz, and 3) field trip. The reason for having quiz activities is that most students have low levels of honesty. Students' honesty in the quiz was observed and the students learned about their practice during the exam. Field trip activity was used to provide the opportunity for students to learn from observation, inquiry, and record. This activity will support the intuitiveness of the student. Sunflower sprout production is a creative activity to reinforce the students' identity since this activity employed the concept of learning by doing. The students will learn honesty, intuitiveness, and perseverance through these activities.

5.3 Providing activities

The teacher informed the students about the student's identity during the first hour of the subject. The teacher and the students discussed and summarized a mutual agreement on the purposes and activities of the subject.

5.3.1 Activity 1: Sunflower sprout production

The teacher emphasized the behaviors of honesty, intuitiveness, and perseverance before assigning students to learn about sunflower sprout production by themselves for a wee. They studied and tried to produce and sell sunflower sprouts. For each sunflower sprout production step, they took photographs and shared in the online social media group of Economics of Vegetable subject. The teacher monitored their performance every day by observing, recording, and discussing with the student. After completing the sunflower sprout production activities, the students summarized their performances and submitted the study report to the lecturer.

The results of the student's identity in this activity found that all students submitted their assignments within the set times. They neither copied their friend's work, allowed others to work for them, nor stole the work of others for submission. Furthermore, they searched for the information on sunflower production from books and the internet, and consulted the teacher when they had some problems with production and sales. They also learned by doing, took a note, recorded what they did, reported regularly, and submitted their work on time. This showed that they worked hard to accomplish their assignment. It can be concluded that this activity has created their honesty, intuitiveness, and perseverance from explicit learning to demonstrate significant knowledge acquisition. This research is consistent with the Functionalism of Dewey [17], who considered that human learning comes from the work of the mind and the environment. The continuity of human behavior and the adaptation of humans to the environment from their different learning experiences in each person will create desirable attributes.

Table 1. Target group, Instruments, and Data Analysis of Stages in the research.

Stage	Target Group	Instruments	Data Analysis
1. Exploring the identity of students	- 26 Agricultural students in the Economics of Vegetable subject	- Identity test	- Frequency, percentage
2. Formulating objectives	- A lecturer in the Economics of Vegetable subject	- Course description	- Content analysis
3. Setting a mission	- A lecturer in the Economics of Vegetable subject	- Lesson plan	- Content analysis
4. Providing activities	- 26 Agricultural Education students in the Economics of Vegetable subject - A lecturer in the Economics of Vegetable subject	- Lesson plan - Materials - Video behavior record - Students' performance - Quiz - Content analysis	
5. Evaluating the student's identity	- 26 Agricultural Education students in the Economics of Vegetable subject	- Identity test	- Frequency, percentage

5.4 Activity 2: Quiz

The teacher emphasized the behaviors of honesty, intuitiveness, and perseverance to students before doing the quiz. The teacher distributed the quiz paper, and allowed the students to answer for 15 min no exam proctor in the room but there was a closed-circuit camera. The students' behaviors were observed and recorded through closed-circuit television. In the room, 6 students spoke with their friends. After the quiz, the lecturer went back to the room and collected the quiz paper. The 6 students were called to inquire about the conversation behavior during the quiz. The teacher asked them the reason for their behavior. They said that they asked about the contents of the quiz, but they did not copy the answers. Then the teacher checked the answers of six students, and they were found different. Even if this act did not affect the answer, it was a sign of corruption, which they thought was not a fraud. These correspond to Mazar *et al.* [18] who described people who think they are honest and will find reasons to support their thoughts even though they have committed dishonest things. Over time, these will become the norms of society. Finally, the teacher warned them about the regulations and discipline of KMITL during the quiz. A month later, the teacher gave a 15 min quiz again without the procto. This time, there were no students who talked or copied the answer. Moreover, they submitted their quiz paper on time.

The results of students' identity in this activity showed that some students assumed to copy the answer of their friends. After discussing with the teacher, they listened and accepted the comments. When the teacher gave quiz again, they did not speak to others and copied the answer. Even if the students do not express their honesty, their behavior is changing in a better way because of the warning about the mutual agreement and the discussion about understanding integrity. This is consistent with the social contract orientation [19], which described that children between 14 and 20 years old will pay attention to the contractual agreements they provide to others.

5.4.1 Activity 3: Field trip

The teacher emphasized the behaviors of honesty, intuitiveness, and perseverance before assigning students a survey on the vegetable market and submitting their study report within 1 week. The teacher took the students to explore the wholesale market of vegetables in the country for 1 day. The teacher observed and recorded the survey behavior of the students. One week after the field trip, all students submitted their reports on time. The teacher checked their report and inquired about the price of vegetables, as well as how to interview the seller.

The results of students' identity in this activity showed that all students submitted their reports on time. They neither copied their friends' work, allowed others to work for them, nor stole the work of friends for submission. They intended to ask about the price of vegetables in the market, took note of the answers, and prepared the report very well. The evaluation revealed that the students are honest, intuitive, and perseverant. This is because the field trip activity provided direct experiences of reality and allowed the students to change their learning atmosphere. The students are enthusiastic and interested in learning, practicing knowledge acquisition, and developing morals [20].

5.5 Evaluating the students' identity

After completing the teaching-learning process, the students evaluated their identity from the test. Table 3 shows that the number of students with low perseverance decreased in all three domains. From the admission, students passed an interview to understand the agricultural education that will motivate and encourage to work in both agriculture and teaching profession.

However, the numbers of students with low honesty in the cognitive domain and low intuitiveness in the cognitive and affective domains were not changed. The students think if they are too honest, they would be exploited by others since Thai society is technologically changed and highly competitive. What led to the reduction of Thai honesty was selfishness, greed, passion, lack of good models, and lack of indoctrination [21]. Therefore, the most basic virtue that young people should cultivate is honesty [22]. The teacher should explain to learners the dangers of dishonesty affecting themselves and society, distinguishing personal and collective interests. At the same time, the teacher should be also a good role model and create a correct understanding for the students.

The number of students with low intuitiveness in the cognitive and affective domains did not change. They will only follow the instructions of the teacher to pass the course. The content of the course may not be in the student's interest. One factor of learning is the intention and interest to learn [23]. Then the teacher should motivate and stimulate the interest of the students more.

6. Conclusion

From using the teaching and learning process to develop students' identities, it was found that most of students had a better identity. However, there are still some identities that remain the same especially cognitive honesty and intuitiveness,

Table 2. The number of students having a low identity before beginning the teaching-learning process.

| Domain | Number of students having a low identity | | | | | |
| | Honesty | | Intuitiveness | | Perseverance | |
	Frequency (N=26)	Percentage (%)	Frequency (N=26)	Percentage (%)	Frequency (N=26)	Percentage (%)
Cognitive	5	19.23	2	7.69	2	7.69
Affective	8	30.77	5	19.23	4	15.38
Psychomotor	6	23.08	6	23.08	4	15.38

Table 3. Number of students having a low identity after finishing the teaching-learning process.

| Domain | Number of students having a low identity | | | | | |
| | Honesty | | Intuitiveness | | Perseverance | |
	Frequency (N=26)	Percentage (%)	Frequency (N=26)	Percentage (%)	Frequency (N=26)	Percentage (%)
Cognitive	5	19.23	2	7.69	1	3.85
Affective	4	15.38	5	19.23	3	11.54
Psychomotor	4	15.38	4	15.38	2	7.69

and affective intuitiveness. Teachers must continue to build an understanding of honesty and curiosity among their learners. They also need to build a good attitude in accepting the pursuit of knowledge for themselves to use in the future.

Overall, the teaching and learning process can create student identity and can apply and amplify the change in behavior of learners in other extra-curricular activities, including the identity of personnel in the department, along with learners. Nevertheless, providing activities for enhancing only one identity will lack continuity in the development of identity in other areas of social necessity. An effective learning management process for creating identities should start with the self-understanding of students. The teacher allows students to participate in instructional design and practice by themselves. The teacher is the one who helps to counsel and support them by applying the psychology of late adolescence. They will be proud and have a good attitude, knowledge, and skill. Their identities such as honesty, intuitiveness, and perseverance have been enhanced. They can step into mature adults who are responsible for themselves, their families, and society in the future.

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Local government involvement in post-pandemic development initiatives for the Lao Khrang Ethnic Group of Nakhon Pathom Province

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Abstract

This mixed-methods study examines the role of social enterprises among the Lao Khrang ethnic group in Nakhon Pathom Province. There is particular emphasis placed on the relationship between government agencies and local community leaders. Results were gathered from document analysis and field investigation in five districts of Nakhon Pathom Province, Thailand. Surveys, interviews, and focus-group discussions were the primary research methods. Results reveal that there is a strong community spirit among the Lao Khrang people of Nakhon Pathom. They are involved in the upkeep of traditional culture and participate in the local tourism sector. There has been past government involvement in the maintenance of culture for the benefit of tourism, although this has been put on hold during the current pandemic. This paper argues for a stronger relationship between local government organizations and community leaders to promote sustainability in post-pandemic society.

Keywords: Community participation, ethnic groups, Lao Khrang, local governance, minority representation

1. Introduction

Prior to the global Covid-19 pandemic, the World Travel and Tourism Council (WTTC) forecast 6.5% annual economic growth for the Thai tourism industry, which was projected to account for 30% of the total economy of Thailand over the next decade [1]. The government had thus begun campaigns to promote the Thai tourism industry in developed countries in an attempt to further boost national income. Thailand was branded as a quality leisure destination and there was a systematic operation to develop tourism within the private and public sectors. This had led to expansion of local community economies in an attempt to promote local Thai culture, which was succeeding in creating jobs, generating income, and improving the quality of village life. Tourism had become a driver of community development.

Nakhon Pathom was one of the many provinces emphasizing the importance of tourism development at the local level and it was incorporated into the 4-year provincial development strategy (2015-2018). Located in Central Thailand, in close proximity to the national capital, Bangkok, the vision was to raise Nakhon Pathom Province as a safe location meeting international standards. Historical tourism and cultural tourism were the primary focal areas and were promoted in accordance with tourism standards. The ultimate objective was to develop competitiveness at the national level by developing natural resources, restoring the environmental quality of tourist attractions, raising the standard of utilities, developing sou-

venirs, raising community product standards, and developing management systems, tourism personnel, marketing and public relations.

However, this progress was stalled by the onset of the Coronavirus pandemic. Although the Thai response to the pandemic, which hit the Southeast Asian nations in early 2020, was widely commended for limiting the spread of the disease and preventing loss of life, considerable economic sacrifices were made [2]. International borders were closed and a countrywide lockdown was put in place. For an economy that boasted 60,521,000,000 USD worth of international tourist receipts in 2019 (a 13.7% share of the Asian market), these virus containment measures were a huge blow [3]. Suddenly, a 10% chunk of gross domestic product was directly in jeopardy, with a higher percentage of indirect tourism-related professions also under threat [4]. In June 2020, it was found that at least seventy percent of small manufacturing companies were only earning (at most) half of their pre-pandemic income [5]. This is representative of the catastrophic consequences of COVID-19, which has hit the tourism sector the hardest. All this came at a time when Thai economists were buoyant about the perspectives of a growing economy that was projected to expand further in 2020 due to "(i) a gradual global economic recovery following easing trade tensions and lower risks of a no-deal Brexit; (ii) a favorable expansion of private consumption and investment of both private and public; (iii) key government stimulus measures; and (iv) a low growth base in the last quarter of 2019" [6].

Yet, rather than wallow in the unfulfilled predictions and missed opportunities, it is imperative that developers and

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economists focus on the future and retain the sense of optimism from the pre-COVID years. To enable all sectors to take part in the post-pandemic recovery and solve pre-pandemic problems in the climate of a 'new normal', there must be a reduction of self-interest, a drive towards communal benefit and a focus on sustainable living [7]. Social businesses are a potential solution that can help to reduce these problems. The establishment of community enterprises or cooperatives will be a vital step towards economic recovery because these organizations all aim to work in response to the problems that arise in their own local context, as well as achieve common economic and social goals. Given the value and heightened importance of future innovations in the tourism industry, this investigation was designed to examine the potential role of tourism-driven social enterprises among the Lao Khrang ethnic group in Nakhon Pathom Province.

2. Literature Review

Traditionally, the tourism industry has been resilient and rebounded well from international or regional crises. Some examples included the Bali bombings, the 2004 tsunami and the 2003 SARS outbreak [8]. This recovery has usually been driven by government intervention that targets incentivized investment [9]. Airline rescue packages have already been authorized by the Australian, Russian, and United States governments [10]. Forecasts predict that the EU will allocate a fifth of its emergency funds to boost post-pandemic tourism, which would make the sector the biggest beneficiary of its recovery strategy [7]. However, unlike former times of upheaval, the current pandemic has been a sudden and long-lasting trauma with multiple levels of overlapping impact [11]. Quick fixes are unlikely to prove sufficient in rectifying the catastrophic impact of the pandemic. Moreover, they are likely to return to a status quo of uneven wealth distribution and climate destruction. There will be a tendency to assist the largest firms to ensure the sector gets up and running again quickly but there is an argument that this pandemic has provided governments with a unique opportunity to fix issues in tourism from the ground up [7].

One of the national government's key strategies for the development of local tourism in Thailand has been to provide assistance to community-based enterprises (CBEs) and transform traditional artisans into larger enterprises [12]. This is part of a drive to promote local culture as a key attraction within the country. The Thai One Tambon One Product (OTOP) policy for generating stronger local identities and providing community narratives to bolster both tourism and the economy was based on a similar Japanese model developed in the 1980s, One Village One Product. OTOP is an entrepreneurship stimulus program established in 2001 to aid the development of community businesses through the promotion of one distinctive, locally crafted product from each Thai district. The idea was based on the premise that strong community enterprise can strengthen the national economy and enhance local economic performance [13]. The program has had mixed results.

Although there have been numerous examples of successfully implemented OTOP businesses, inconsistencies continue to occur when businesses are not adequately supported or do not fully embrace the principles of the program [14]. Surveying OTOP-focused community enterprises in Thai border towns, Pholphirul, Charoenrat, Kwanyou, Rukumnuaykit and Srijamdeeit [15] found that there was inadequate emphasis on both upstream and downstream business activities. There was a lack of research and development during the production process, and also insufficient marketing and branding practices among small community businesses. It was concluded that targeted government support in these areas would significantly enhance profits generated by community enterprises. Similar research has identified a lack of continuous improvement and government involvement in public goods and services, recommending increased social capital and deeper local participation to 'improve public sector accountability and performance' [16]. Other studies have identified a dearth in digital marketing expertise [17], budget management [18], weak business culture [19] and poor leadership [20], as well as a multitude of external factors that now include the COVID-19 pandemic.

Community-based tourism is a particularly effective promotion strategy in developing countries, whose governments seek to exploit the growing international tourist desire for the exotic and otherly [21]. Using their rich cultural and social capital, tourism strategies attempt to use local communities as tools to aid wider economic growth. The most successful of these initiatives empower communities to control tourism management and development within their locality and reap the benefits that tourism activities can generate [22]. It has been argued that such a method mostly helps remote communities because the economic benefits give them a reason to manage local resources and ensure community participation [23]. In this way, community-based tourism can be a means of reducing rural poverty, however, an effective long-term vision and continuous leadership and monitoring are required to achieve this goal [21].

By involving local people in the tourism sector, they become invested in the conservation of both natural and cultural resources. For this reason, community-based tourism is a viable method for combating poverty and developing sustainable tourism practices in a post-COVID world [24]. The economy, the environment, and quality of life can all benefit [25]. Yet the involvement of local people in tourism development presents multiple challenges that are rarely overcome easily [26]. Effective and sustainable resource management, communication to all stakeholders, and equal distribution of benefits must be considered priorities in any tourism development initiatives based on community participation. Financial risks are a particularly significant factor in the success or failure of community businesses [27]. The emphasis is therefore on local governments to provide financial support, which communities will lose control of external businesses [26].

For decades, community participation, community-based tourism, and social enterprises have been the mechanism by which the Thai government has created opportunities for sustainable development. There have been concerted efforts to establish community enterprises to address financial problems throughout the country, many of which have encountered some success [28]. Yet the failures are equally numerous and often due to the same problems: low-level community participation, external business involvement, and lack of standardization [21].

Ultimately, 'when residents have greater sustainable tourism development attitudes, or when they understand that community tourism development requires long-term planning, environmental sustainability, the development of community-centered economic benefits and tourist satisfaction, they are more willing to prevent environmental issues developing or resolve environmental problems in their communities, thus displaying active and responsible behaviors' [29].

Two different perspectives exist concerning the consequences of tourism for ethnic groups [30, 31, 32]. The first perspective advocates for the benefits of tourism for ethnic groups, especially the revival of traditions and customs, in addition to economic and political benefits for rural communities [33, 34, 35]. On the other hand, some scholars argue a second viewpoint, which suggests that there is a nominal economic benefit of tourism for minority groups, even if tourism does strengthen traditional identity [36, 37]. However, research consensus concludes that meaningful community participation in ethnic tourism leads to empowerment and local benefit [26, 38]. Studies have indicated that ethnic minority groups tolerate ethnic tourism in spite of limited economic benefits due to its transformative effect on culture and ethnic identity [39]. Nonetheless, there are many arguments that criticize the artificial creation and manipulation of traditional culture in the name of tourism [40, 52] (Grünewald 2002; Yang and Wall 2009). Given these debates, the researchers were keen to investigate the readiness of Lao Khrang communities in Nakhon Pathom Province to be self-manage effective social enterprises in tourism sector.

3. Research Methodology

This qualitative investigation gathered results from document analysis and field investigation. The research population was composed of 30 individuals in local government positions with roles and duties as advocates or promoters of tourism in Nakhon Pathom, 30 people working in private sector businesses with an interest in the tourism industry of Nakhon Pathom Province, 5 Lao Khrang community leaders in Nakhon Pathom Province, 5 academic experts in the implementation of social enterprises and domestic Thai tourists traveling in Nakhon Pathom Province. All informants, except tourists, were purposively selected. In 2019, 3,718,847 tourists traveled to Nakhon Pathom Province. Using Taro Yamane's formula with a tolerance set at 0.05, the tourist sample size was fixed at 400 people [41]. The tourist research sample was selected using a random non-probability sampling method to identify a group of Thai tourists traveling in Nakhon Pathom Province aged 18 years and over and not domiciled in Nakhon Pathom Province. This study was conducted within the context of ethnic Lao Khrang communities in five districts of Nakhon Pathom Province, namely Mueang District, Kamphaeng Saen District, Nakhon Chai Si District, Bang Len District, and Don Tum District. This research was carried out from 1 March 2020 to 28 February 2021.

For the investigation, the research team used a mixed-methods approach combining both quantitative and qualitative research techniques. Surveys were conducted with the 400 tourists to better gauge their opinion of tourist attractions and activities in Nakhon Pathom Province. In-depth semi-structured interviews were then conducted with people involved with tourism in Nakhon Pathom Province and local community leaders. The second set of interviews was conducted with experts in social enterprises. These were followed by focus-group discussions to consolidate understanding of social enterprises and community participation among the Lao Khrang ethnic group in Nakhon Pathom Province. All data was validated by the investigator and methodological triangulation methods. The data was analyzed by analytic induction and typological analysis with the results presented below as a descriptive analysis. A field investigation was conducted in three stages: Firstly, the researchers conducted participant and non-participant observation to identify the culture of Lao Khrang people. In-depth interviews were also conducted with community leaders and village elders during this research phase. Then, the researchers conducted informal interviews with randomly sampled villagers to gather their opinions on the impact of tourism on Lao Khrang culture. Finally, research respondents were invited to participate in a focus group discussion alongside representatives of the local government to identify a future direction for tourism and cultural conservation in the Lao Khrang communities of Nakhon Pathom. All data were categorized according to the research aims following a process of methodological and source triangulation to validate the data. Data were then analyzed using a typological analysis method and analytic induction. The results are presented below in the form of a descriptive analysis.

4. Results

4.1 Distinctive culture of the Lao Khrang community in Nakhon Pathom Province

Interview results revealed that it is assumed among local oral histories that the people of Lao Khrang heritage living in Nakhon Pathom Province are descended from those forcibly relocated during historical conflicts between Laos and Thailand. When Thai forces defeated Laotian armies, they sent Lao people to work in Central Thailand, especially in Nakhon Pathom, Ratchaburi, and Suphan Buri. These areas were conducive to the continuation of Laotian agriculture. The Lao Khrang were settled near water sources and assumed new lives in ethnic village clusters. As far as possible, the people retained an animist spiritual culture, marrying it with the common Buddhist practices found in Thailand. Merit-making in the area thus developed in a unique way, resulting in a distinctive, hybrid religious culture with numerous festivals and ceremonies that developed an exotic appeal to visiting tourists. Through relocation, urban migration, and inter-marriage, the Lao Khrang ethnic group is now scattered throughout Nakhon Pathom Province, and many traditional cultural practices have been maintained throughout the area. Involvement in the local tourism industry has also helped to restore the local identity of Lao Khrang people, most visibly through woven handicrafts and cuisine.

Observations and interviews confirmed that within Nakhon Pathom, there is a variety of cultural and historic tourist attractions. Of particular interest to the domestic visitors surveyed in this investigation are the lifestyle and distinctive culture of the various local ethnic groups. People of Lao descendant,

including Thai Song Dam, Yuan, and the Lao Khrang minority groups, are especially linked with the region. These groups are Laotian ethnic groups and have unique cultural identities, which manifest in dress, traditions, and performing arts. Local governments have sought to help these ethnic groups attract and facilitate more tourism by encouraging community participation in tourism initiatives. This has led to the development of manufacturing systems and services that connect environmentally conscious consumers and sustainable processes. Past developments have included improvements to product quality and safety, marketing, and integration of modern technological innovations. Particular emphasis has been placed on training members of minority groups to provide them with the expertise to manage the market by themselves and raise the level of the local economy. A positive side effect of these initiatives has been the preservation of culture and traditional knowledge. Products under the 'One Tambon One Product' (OTOP) initiative have been seen as the primary outlet for traditional culture and a suitable access point in the tourist market for unique indigenous groups. This serves as a mutual benefit for the province because the cultural heritage of the Lao Khrang adds to the provincial narrative and attracts tourists to the region.

However, further investigation has found that local Lao Khrang community members have not received real benefits from the system. There has been a lack of participatory involvement in operations and, whilst government work focuses on product development and regulatory changes, it still does not meet the needs of consumers. Research respondents indicated that there have been numerous examples of initial enthusiasm and motivation that have not been continued. This lack of sustained support over long periods has caused community businesses to stagnate. Furthermore, there is a need to develop the tourism market in the community and promote community products within and outside Nakhon Pathom Province. Whilst this was achieved with a notable upturn in trade during times of initial institutional support, the marketing was not maintained. Furthermore, locals did not fully acquire the expertise required to manage their own marketing campaigns. Tourist numbers have thus dwindled. This situation has added to the impact of today's social problems, which are diverse and complex and have been exacerbated by the current COVID-19 pandemic.

4.2 SWOT analysis of community participation in local tourism initiatives

A SWOT analysis was carried out in the province to determine the strengths, weaknesses, opportunities, and threats surrounding the development of sustainable tourism in the Lao Khrang communities of Nakhon Pathom. The most visible strengths of community participation in local tourism are all related to the traditional Lao Khrang lifestyle. Lao Khrang people have a unique identity, especially the spoken language, dress, traditions, and way of life. Lao Khrang weaving is particularly renowned for its beauty and style. The inheritance of Lao Khrang weaving is strong, with communities paying close attention to the transmission of local traditions and culture by running workshops and demonstrations for younger community members and tourists alike. There is still a high degree of importance placed on the nature of the community and the

harmonious coexistence of different groups in society. The community is diverse and welcomes other ethnic Thai, Lao, and Yuan. The lifestyle is simple with a foundation on agriculture and community-run farms promoting organic cultivation of vegetables. Locals also maintain the largest prawn fishery in Nakhon Pathom Province. These community-managed businesses and the rich cultural heritage combine to provide a source of community products that can continuously create careers for local people, ranging from farming to the production of clay dolls. There is a balanced mixture of newer tourist attractions, including a crocodile farm that produces products made from crocodile skin and date orchard, and more well-established attractions, including local temples and weaving centers. In each of these locations, there is a strong community presence.

The investigation divided tourism initiatives into seven elements: attractions, accessibility, accommodation, facilities, activities, culture, and participation. The Lao Khrang ethnic group has strong cultural traditions, a unique language, distinctive fashions, an agricultural way of life, and both natural and cultural variety. Moreover, the sense of community is strong and accessibility in the area is good. All communities can be reached along various routes by car. Motorcycles can reach the area quickly and some areas are serviced by public transport, including trains. There are generally many accommodation providers offering different types of hotels: large, medium, small, and resorts. However, within Lao Khrang ethnic communities, there is a lack of cultural homestay accommodation. There are basic utilities and services in the communities. Restaurants are widespread as community product outlets, photo points, and vacation spots for tourists visiting the community. Yet, a lack of travel service providers in the area means that tourists must study the area by themselves and navigate independently - a further example of the disconnect between the Lao Khrang community and government infrastructure. There are a number of different activities that tourists can undertake. They can participate in Lao Khrang festivals, including the Songkran flag parade and the household merit ceremony. Lao Khrang fabrics are exhibited in weaving centers and visitors can watch weaving demonstrations, learn how to weave from expert villagers, and learn to dress in Lao Khrang style. Tourists may also visit ancient houses to admire local architecture, cook local Lao Khrang food, visit community farms, view the clay-doll production process, see how to catch prawns, and watch traditional cultural performances. All of these are run and managed by local Lao Khrang people who cooperate in community tourism initiatives. There are exhibits of dance, play, and unique dresses to welcome tourists traveling in the area. Locals have also collaborated with the Nakhon Pathom Provincial government to spread awareness of local arts and culture and continue ancestral traditions at festivals and exhibitions. The Lao Khrang people take part in organizing events and attend annual events.

The four primary weaknesses of ethnic, community-based tourism in the Lao Khrang villages of Nakhon Pathom Province are a lack of connections between main attractions, a lack of tourism routes in the community, a lack of external interest in tourist attractions, and a lack of community narrative develop-

ment connecting the people with the tourist attractions. As there are very few Lao Khrang people working in government roles in the region, there is little awareness of community-specific needs. Similarly, there is minimal communication between the government and the community with regard to infrastructure development, business strategies, and training. These links need significant improvements in order to further maximize the vast potential of the Lao Khrang culture. Whilst it was found that local tourism policies provide support to community tourism, the interaction is, at times superficial. There is little tangible government investment in the community and there is a similarly low level of Lao Khrang interest in the government. Each party is concerned with its own sphere of influence and benefits. There must be a greater appreciation of the mutually beneficial relationship for further success to be had. Interviewees suggested that this could be achieved by Lao Khrang presence in local government positions or establishment of a local tourism board with equal representation from government officials and Lao Khrang civilians. An additional observation made by villagers and business leaders alike was the need for targeted training in branding and marketing to enable the community enterprises to respond better to market trends and generate a greater reputation outside the province. There is a growing trend of tourism in the Greater Bangkok area, of which Nakhon Pathom is a part and the villagers felt they were not in a position to exploit this fully. In addition to this, the main Lao Khrang sites are relatively near the busiest metropolitan area of the province and provide a convenient opportunity for tourists to experience the traditional lifestyle. At this time though, the biggest restrictions for the development of sustainable community tourism initiatives are the COVID-19 pandemic, the consequently depressed economy, and a lack of continuity in tourism support. It was conceded by all parties that nothing is likely to change until the pandemic subsides and efforts and funding can be redistributed back into tourism development. Once this is possible, areas of the tourism industry identified as having the biggest potential for development were cultural tourist attractions that allow tourists to participate in activities, learn traditional community lifestyles, and buy products created in the community.

5. Discussion

External involvement by governments and private investors has been criticized for its impact on the financial sustainability of community-based tourism [42, 43, 44]. However, it is an essential component of success [45]. In Thailand, '71% of communities deemed by the Office of Tourism Development (OTD) as possessing a high level of CBT readiness received assistance from external agencies, compared to 57% of communities with a medium and low readiness' [46, 47]. Nonetheless, it is imperative for the success of grass-roots tourism investment in Nakhon Pathom Province that local authorities get to know the Lao Khrang ethnic culture and lifestyle more thoroughly and recognize the legitimate importance of the community. Lao Khrang communities practice a rich culture that must be promoted, conserved, and celebrated. However, there is a danger that current community development initiatives are managed for

their potential benefit to the government rather than a mutual benefit. In fact, Theerapappisit [48] argues that government benefit should not be a primary objective, and instead the two main aims of community-based ethnic tourism must be to improve the local quality of life and increase economic benefits to the local community. The limited research on ethnic minority representation at the local government level suggests that the best way to achieve this might be, as indicated by the interview respondents, to include Lao Khrang representation in local government positions [49]. At the very least, government bodies charged with supporting local tourism must be set up to include representatives from the local community. This will ensure the investment priorities are in the right order [50].

Whilst growing in popularity, ethnic tourism does not have the best global reputation. If it is not managed properly, there is a very real danger that it will consume 'the cultural commodity on which it is based' and damage the host culture [51]. The authenticity of local participation must be retained and it is important that individuals are invested in genuine cultural representation, rather than driven by profits. Over-commercialized cultural products have been found dissatisfying visiting tourists and devaluing traditional culture. Consequently, diverse and high-quality ethnic products should be developed to suit both domestic and international markets. Especially, minority-made products and community-based businesses should be facilitated in order to give tourists an authentic experience and improve the economic gains for local communities [52]. When the tourism economy in Thailand restarts in the post-COVID world, any injections of support and finance must be targeted to protect and preserve the rich Lao Khrang culture, rather than exploit it. This will not be achieved without local civilian and government cooperation, yet the importance of sustainable tourism practices that conserve culture, protect the environment, and generate income will not be realized without significant steps to raise awareness [53]. In Thailand, there is a gulf between institutional understanding of sustainability and community understanding of sustainability. There is an especially alarming lack of understanding of sustainability among destination stakeholders in the country [54, 55, 56].

While external support may be obtained by ethnic communities, it will only partly ensure the success of community-based tourism initiatives. There must also be skilled, collaborative leadership and a balance between external involvement and community participation. This can be achieved in Nakhon Pathom if policy-makers and community leaders are prepared to work together and learn from successful community-based initiatives elsewhere. These are best exemplified by studies of the Mae Kampong community in Northern Thailand:

> 'Though many CBT projects around the world do little to challenge the status quo, and instead simply enrich the economic and political power of existing elites, Mae Kampong illustrates that widespread profit sharing and participation are indeed possible even in situations where success depends principally on the actions taken by individual leaders, as well as on the support of external agents such as government officials, NGOs, academics, and private tour operators ... In this way, tourism in Mae Kampong is both community-based, in that the community itself initiated

tourism and retained control over its nature and direction, and community-oriented, in that village elites and external actors took steps to generate benefits for the community as a whole.' [46]

Tourism will be different in the post-pandemic society. Firstly, the recovery will be gradual as domestic restrictions are lifted, followed by tourism 'bridges' or 'bubbles', providing access to nearby countries. Full international tourism will be the last step [57]. It is vital that developers use this hiatus to instill a more sustainable policy that can benefit and be led by local community members. This will require closer collaboration between the local government and Lao Khrang people, it will require investment, it will require education, but most of all it will require empathy. Government figures must understand the needs of the community and introduce mechanisms to benefit the community. Similarly, local people must understand the perspective of government agents and collaborate to ensure there is mutual benefit from tourism in the post-pandemic society.

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Bachelor of Technical Teacher Education versus Bachelor of Technical-Vocational Teacher Education: A comparative analysis of technical teacher education curricula

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Abstract

Technical teachers are the main contributors to the development of effective technicians and TVET practitioners. The effective implementation of the curriculum depends on the capabilities of technical teachers. Thus, this study sought to compare and analyze the Bachelor of Technical Teacher Education and Bachelor of Technical-Vocational Teacher Education curricula in a state university in Southern Luzon. It identified the similarities and differences in the curricula regarding its general educational objectives, program specifications and goals, and program outcomes and competency standards. This descriptive-comparative study utilized qualitative procedures to compare the curricula under investigation. Document analyses and guided interviews were used as methods of gathering data. Baseline data from the CHED Memorandum Issuances were mainly utilized in the analysis. Findings revealed that the BTVTEd curriculum is better in general educational objectives. Program specifications and goals are common in both curricula regarding graduate attributes and the adequacy of the program to produce quality graduates. BTVTEd curriculum is better considering the addition of TLE and TM courses. However, BTTE is better considering its provision for multiple entries and exits in the program. There are differences between the TLE and ICT competencies in terms of program outcomes and competencies. BTVTEd is better in this consideration, but in terms of balance in theory and practice, BTTE is better. The research recommends that the general educational objectives of both curricula must be adhered to at all times to result in an aligned teaching-learning process approach. Curricularists should review the program specifications and goals and incorporate revisions. The competencies and program outcomes should be revisited with consultation with the people of the industry to set standards aligned to the needs of the industry properly.

Keywords: BTTE curriculum, BTVTEd curriculum, comparative analysis, education, technical teacher

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1. Introduction

Technical teachers are essential agents of change in society. Their roles underpin developments necessary for forming technical workers and the country's labor force. From the fundamental fields of technology to its complex forms, technical teachers are behind the success of every technician that contributes to nation-building.

The Commission on Higher Education (CHED) is the governing body that facilitates program offerings in the Philippines. CHED Memorandum Order (CMO) No. 56 series of 2007 pertains to the Policies, Standards, and Guidelines for the Ladderized Bachelor of Technical Teacher Education (BTTE). It is intended to rationalize undergraduate teacher education to keep up with global competitiveness demands [1]. In 2018, tertiary education curricula were adjusted and modified for alignment due to the advent of the Enhanced Basic Education Curriculum, popularly known as the K to 12 Program under RA 10533 [2]. The BTTE program was shifted to BTVTEd or the Bachelor of Technical-Vocational Teacher Education under CMO No. 79 series of 2017 [3]. The shift in the name has a significant change in the curriculum and its whole approach. There are subjects taken out of the original curriculum, and some subjects are added. The revised version is not as well ladderized, unlike the old one.

The Enhanced Basic Education Act of 2013, or the K to 12 Act [2], introduces Grades 11 and 12 to high school education in public and private schools. The program's objective is to establish a functional basic education system capable of producing productive and responsible citizens with the necessary competencies and skills for lifelong learning and employment. One of the curriculum's primary objectives is to alter public perceptions of high school education as merely a preparation for college; instead, it should prepare students to pursue gainful careers, employment, and self-employment in an increasingly globalized and rapidly changing environment. This results in graduates having the skills and competencies necessary to be productive members of society or pursue higher education.

The senior high school of the K to 12 Curriculum provides options to students on what track they may be interested in or where their skills may be aligned. A student may take among academic, sports, arts and design, and technical-vocational-livelihood (TVL) tracks. In the TVL track [4], it is the Technical Education and Skills Development Authority (TESDA) that crafted the curriculum for teaching technical vocational education and training (TVET) courses to students. Students are prepared for tertiary education, middle-skill development, employment, and entrepreneurship through the new educational

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model. There are twenty-three (23) tech-voc courses that have been developed. The advent of this new field in basic education demands competent and skillful teachers and trainers that technical teacher education institutions should answer.

Before offering the K to 12 Curriculum in basic education, the BTTE program is the existing college curriculum for technical teacher education in the country. It is aligned with the former Basic Education Curriculum (BEC). The Commission on Higher Education [1] detailed the policies, standards, and guidelines for the ladderized Bachelor of Technical Teacher Education (BTTE). The memorandum includes the program's mission statement, specifications, and other pertinent features, including subjects or courses for a student to take. It helps teacher education institutions be guided in the implementation process of the curriculum. Though it states the non-negotiable standards, it still offers academic freedom to enhance the program based on the contextualization of the institution. One of the features of this program is the ladderized approach. The memorandum covers two models, one for high school graduates, one for two-year trade technical curriculum graduates, and a three-year diploma in technology program.

CMO No. 79 [3] covers the principles, standards, and guidelines (PSG) for the Bachelor of Technical-Vocational Teacher Education. Based on the Guidelines for the Implementation of CMO No. 46 series of 2012, this PSG implements the shift to learning competency-based standards/outcomes-based education in response to the 21st Century Philippine Teacher Education framework. Furthermore, this PSG is anchored on the salient features of the K to 12 Enhanced Basic Education Curriculum (RA 10533), the Philippine Qualifications Framework (EO 83, series of 2012), the National Competency-Based Teacher Standards (NCBTS) now the Philippine Professional Standards for Teachers (DO 42 series of 2017) and other relevant documents. It specifies the core competencies expected of Bachelor of Technical-Vocational Teacher Education (BTVTEd) graduates regardless of the type of Higher Education Institutions (HEIs) they graduate from. However, in recognition of the spirit of outcomes-based education and the typology of HEIs, this PSG allows ample room for them to innovate in the curriculum in response to assessments of the most effective methods for achieving learning outcomes in their particular contexts and missions.

Furthermore, a state university in the Philippines is piloting its Technical Teacher Education program. The said program addresses the present needs of the Senior High School - Technical Vocational and Livelihood (TVL) Track of the K to 12 curricula for technical teachers. Since the BTVTEd is a new curriculum, the university is continuously reviewing its substance for some modification points in the future. On this premise, this research was conducted to investigate several aspects of the old and new curricula for technical teacher education. The investigation attempted to discover venues of strengths and improvements by comparing and analyzing the curricula. Specifically, it sought the similarities and differences of the curricula in the following considerations: general educational objectives, program specifications and goals, and program outcomes and competency standards. Moreover, since the results of the study are essential baseline data for curriculum development, ways and means were also recommended to improve the currently existing curriculum.

2. Research Problems

This study aims to compare and analyze the Bachelor of Technical Teacher Education and Bachelor of Technical-Vocational Teacher Education curricula in a state university. Specifically, the central research question is:

• What are the similarities and differences of the BTTE and BTVTEd in terms of:

    a. General Educational Objectives?

    b. Program Specifications and Goals?

    c. Program Outcomes and Competency Standards?

3. Methodology

This research employed the descriptive-comparative research method. The method involved collecting data to answer questions concerning the current status of the subject under study. The research method also suited the purpose of the present study, which sought to make apparent the similarities and differences in the curricula of Bachelor of Technical Teacher Education and Bachelor of Technical-Vocational Teacher Education. The study involved selected individuals and experts in technical teacher education chosen purposively. These involved three (3) professors of the technical teacher education courses and two (2) supervisors in both curricula.

The researcher used various materials to examine the similarities and differences of the curricula under study. To get impressions of how the BTTE and BTVTEd operate without necessarily interrupting the program, the researcher employed the qualitative interview technique to help review and analyze the CHED Memoranda of both curricula. According to Villena *et al.* [5], it can be done through the actual review and analysis of existing and available documents such as memoranda, circulars, orders, minutes, procedures, and the like. This provides the researcher with comprehensive and even historical information about the implementation of the programs.

An interview guide was crafted and validated by research experts in TVTEd and curriculum and instruction. The interviews had a semi-structured format. In this format, the interviewer asked predetermined questions but also attempted to give the interviewees more freedom to discuss topics of importance based on their experiences in the curriculum. Participants have scheduled in-person interviews as well as focus group discussions. The interviews were analyzed at a convenient time for each individual and each group. Consequently, the researcher employed probing questions to elicit more comprehensive responses from the participants. For data accuracy, transcripts were sent back to participants. Responses were coded for qualitative analysis.

The data collected from libraries, correspondence, and interviews were examined and analyzed by the researcher using the following subheadings in both curricula:

• General Educational Objectives;

• Program Specifications and Goals; and

• Program Outcomes and Competency Standards

Table 1. Summary of results.

Similarities	Differences
General Educational Objectives	
• gearing toward a quality technical teacher education	• alignment to basic education curricula
• incorporating exposure to the industry	• target graduates
• dual structure (professional education and industry-based courses)	• alignment to standards
• statements on educational objectives	
Program Specifications and Goals	
•program descriptions	• target technical certifications
•capacity to equip graduates with knowledge in their fields of specialization	• Technology and Livelihood Education (TLE) courses
•provisions for industry exposure, field studies, and pre-service teaching experience	• ladderized features and exit points
Program Outcomes and Competencies	
• graduate standards (both for the teaching profession and for the industry)	• TLE components
	• ICT integration
	• number of program outcomes
	• course congestion
	• balance in theory and practice courses

The data were then interpreted. The use of interviews was the primary source of analysis in this study. The analysis compares and contrasts the two curricula involved in the study, the BTTE and BTVTEd curricula. Commonalities were obtained upon interpreting the data, and so towards the end, it was recommended that the technical teacher education curriculum be enriched.

4. Results

The following results have been arranged according to the research problems based on the data analysis. Table 1 summarizes the similarities and differences among the key variables in the research problem.

4.1 General educational objectives

4.1.1 Similarities

One of the significant commonalities of the BTTE and BTVTED curricula is their educational objectives. They are both gearing toward a quality technical teacher education that will address the need of the country for trainers in technical and vocational educational institutions. They also both incorporate exposure to the industry before graduation. Both curricula are dual in structure with professional education and industry-based courses. As stated in both CMOs, both curricula are expected to produce effective synthesizers of organized knowledge capable of analytical and critical thinking, efficient promoters and facilitators of learning capable of enabling learners to maximize their potential for self-education, committed humanists whose clear understanding and appreciation of human ideals and values inspire learners to reach greater heights of human aspirations. Model teachers are imbued with the spirit of education.

4.1.2 Differences

BTVTEd curriculum is an updated program aligned to the K to 12 Curriculum. Its focus adds Grades 9-10 and Senior High School teachers as target products. It is also aligned with the Philippine Professional Standards for Teachers, an updated version of the NCBTS. In contrast with the BTTE, it is aligned with the old NCBTS. Its graduates' focus is on preparing teachers for TVET and higher education institutions. It is also evident in the responses that there is an additional sixth role in the BTVTEd curriculum, which focuses on implementing the

TVTE approaches and practices in the context of the K to 12 Senior High School TVL Track.

4.2 Program specifications and goals

4.2.1 Similarities

It is evident from the responses that the program descriptions of both curricula are quite the same. Their foci are both towards the development of skills in specific fields. Towards the end of the program, students are also expected to learn to facilitate the teaching-learning process aligned to particular standards like the NCBTS for BTTE and PPST for BTVTEd. One of the significant commonalities of the two curricula in terms of program specifications and goals is their capacity to equip graduates with knowledge in their fields of specialization. Both curricula provide industry exposure, field studies, and pre-service teaching experience. They are also adequate in producing graduates with the required entry-level knowledge and skills.

4.2.2 Differences

BTTE is gearing towards National Certification (NC) while BTVTEd targets Trainer's Methodology (TM). This is a big challenge for the BTVTEd and is an advantage. Since TM is an essential requirement for a person to be an assessor in a particular field, the program is an advantage. BTVTEd is as well more detailed and comprehensive, according to the responses. It clearly stated specialization, general education, and professional education components. On the BTVTEd, there are details on allied fields and specific careers for graduates. Though both curricula are adequate in producing graduates with the required entry-level knowledge and skills, BTTE has a disadvantage since it does not cover different areas in Technology and Livelihood Education (TLE). It is the advantage of the BTTE to be specialized but a disadvantage since the licensure examination for teachers covers all areas of TLE.

In addition, BTTE is a ladderized program. Two models, Model A and Model B have given students the options. Responses say that the ladderized approach is more advantageous. Model A is available to high school graduates who meet the college's admission requirements. In contrast, Model B is open to graduates of the Two-Year Trade Technical Curriculum or the Three-Year Diploma of Technology Program with at least one year of industry experience. This has given access to technical

workers to become prospective teachers in their respective areas of specialization. This is a major difference in both curricula since the feature is absent in the BTVTEd curriculum.

4.3 Program outcomes and competency standards

4.3.1 Similarities

There are commonalities in the competencies and program outcomes of the BTTE and BTVTEd curricula. Both tackled the expected graduate to be adaptive both in the teaching profession and in the industry of their field of specialization.

4.3.2 Differences

There are differences in the specifications of the competencies and program outcomes. One of which is the lacking TLE components in the BTTE program. Responses also detailed the lack of ICT integration in BTTE. BTTE has additional program outcomes that are not presented in the BTVTEd. This is item 6.8 of the BTTE CMO that says, 'can demonstrate and practice the professional and ethical requirements of the teaching professions.' In BTTE, as one respondent commented, the time frame is not congested. BTTE also has a better balance in terms of theory and practice. The On-the-Job Training period is enough for the students to learn more in their fieldwork. BTVTEd, on the contrary, provides a broader chance for students to grasp experiential learning.

5. Discussion

BTVTEd is an updated version of BTTE. However, dilemmas are arising in the change of curriculum that gave the reason to pursue this study. The study compared and contrasted the two curricula focusing on the program's educational objectives, program specifications and goals, and program outcomes and competency standards. Abaddeni et al. [8] emphasized the importance of a degree's program educational objectives (PEOs). It derives from the fact that it symbolizes students' accomplishments several years after graduation. The Program Educational Objectives then serve as the ultimate assessment of a degree's relevance and success.

Additionally, program educational objectives are linked to student outcomes and the curriculum. Students are prepared to achieve PEOs through curriculum and student outcomes. As a result, if students do not meet the program's PEOs after graduation, there are likely issues with the curriculum and student outcomes of the degree program. Curriculum designers must carefully consider the program's educational objectives and ensure that the curriculum and its outcomes adequately prepare students to achieve them. Since PEOs are geared towards their attainment, it is truly a task for curriculum experts to continue modifying them to keep pace with society's changing demands.

There are also commonalities in the foundations of both curricula. This includes philosophical, historical, psychological, sociological, and technological bases common in technical teacher education. Both were founded in the same background, and these technical teacher programs should also be governed by the Technical Education and Skills Development Authority (TESDA). It is mentioned that the strength of the BTTE program is its technological foundation. BTTE is said to be more

specialized, having adequately distinguished subjects and concentrating on its specific field alone. However, this is also part of its weakness since the Licensure Examination for Teacher (LET) measures all areas of the TLE, generalist in nature.

Bilbao et al. [9] stressed in their book, Four Major Foundations of Curriculum and their Importance in Education, that any curriculum should be deeply rooted in philosophy, history, psychology, and sociology. Educators, curriculum developers, and teachers must have espoused a philosophy or set of philosophies deemed necessary to plan, implement, and evaluate a school curriculum. They have adopted a philosophy that will assist them in defining the school's purpose, the critical subjects to be taught, the learning students must possess and how they can acquire it, the instructional materials, methods, and strategies to be used, and how students will be evaluated. Similarly, philosophy contributes to problem-solving by assisting administrators, curriculum planners, and teachers in making sound judgments. An individual's philosophy is shaped by life experiences, social and economic background, shared beliefs, and education. When John Dewey stated that education is a way of life, his philosophy became a reality. Dewey's philosophy has served as the bedrock of the educational system in many countries, most notably the Philippines.

The history of a country can influence its educational system and curriculum. This can be traced back to Franklin Bobbit's 1918 book, "The Curriculum." Numerous changes occurred between Bobbit and Tyler in the curriculum's purposes, principles, and content.

Psychology influences the curriculum. Psychology elucidates the teaching and learning processes. In addition, it seeks answers regarding how a curriculum should be organized to maximize students' learning and the amount of information they can absorb while learning the various curriculum contents.

Because the school exists within a societal context, society and curriculum have a reciprocal and encompassing relationship. While schools are formal educational institutions, other units of society, such as families, friends, and communities, educate and influence how people think. Due to the dynamic nature of society, numerous developments are difficult to cope with and adjust to. However, schools are designed to address and comprehend changes in one's country and the world. As a result, schools must remain relevant by expanding their innovative and interdisciplinary curricula-a curriculum capable of addressing the diversity of global learners, the explosion of knowledge enabled by the internet, and the United Nations' educational reforms and policies. However, a country's curriculum must reflect and preserve its culture and aspirations for national identity. Regardless of how far individuals go, it is the country's responsibility to ensure that schools educate the citizenry. It is then very relevant to consider the mentioned concepts in the technical teacher education curriculum.

Most of the responses say that BTVTEd is better in general educational objectives. They premise their answers to the fact that BTVTEd is aligned with the K to 12 programs of Basic Education. They have reasoned that it has addressed the gaps in the TLE by inserting subjects like Agri-Fishery Arts, Industrial Arts, ICT, and Home Economics. However, the argument is balanced by the statement that it is still an impending problem in

the BTVTEd program because the skills needed to be developed were addressed in Senior High School. After all, some subject areas both in the general and professional education courses were deleted. Those deleted courses are present in the old BTTE curriculum. The shift to competency-based/outcomes-based education of the BTVTEd is also highlighted. BTVTEd is also praised for the addition of courses on ethics and entrepreneurship.

According to Abbott [10], as cited by Rodriguez [11], school administrators, educational experts' reform organizations, and government agencies can align professional development activities such as training, sessions, workshops, conferences, and resources with the goals of specific policies, improvement plans, or academic mastery. This is evident in the BTVTEd curriculum, which includes TLE areas, as mentioned above. This will mobilize teachers to move closer to the alignment of competencies that they need to acquire in the program and the subjects they will be teaching in the future.

Odufowokan [12] used a descriptive survey research design to examine the relationship between industry planning and students' academic performance in southwest Nigerian schools. The study discovered a strong correlation between industry planning and students' academic performance and was significantly related to instructional space planning. Therefore, since BTTE and BTVTEd are programs based on the industry's needs, they will significantly help develop program descriptions and specifications to involve the industry in the planning stage. This collaboration will strengthen the program to meet the needs of the industry.

In the study of Atkinson [13], he reviewed twenty UK institutions, eighty undergraduate modules, and some four hundred thirty-five individual competencies and program outcomes. It reveals the lack of definition of competencies and program outcomes in developing skills attractive to employers. The article argues that employability skills should be more explicitly articulated in the curricular outcomes. Moreover, it implies that institutional development of employability skills requires sustained attention to ensuring transparency in module design to facilitate student choice and quantifiable skill acquisition. This is also in connection with Odufowokan's [12] study that the industry should actively engage in curricular programs that are either technical or are bound to be employed in the industry.

In addition, several strengths and weaknesses are identified in both curricula. BTTE has the ladderized feature as one of its significant advantages. This also allows students to exit (per year) the program with certification. BTVTEd, on the contrary, enhanced the BTTE program with its additional features. These include the clear statement on the specified body of knowledge and skills expected from a graduate, inclusion of the TLE areas, and the provision of experiential learning that targets the trainer's methodology certification.

Balingbing [6] studied the academic profile of BTTE students as the basis for an intervention program. According to his article, students of BTTE who take the TESDA assessment can express excellent and valuable ideas, manage their time effectively, and respond to practical questions. But they occasionally request to repeat or rephrase those questions. They also attempt to understand and cope with questions using the Filipino language. They are willing to learn and complete tasks but not under time constraints and pressure. They can also explain the details of what they have done. However, they prefer the Filipino language to English when explaining tasks. These results obtained are views of the evaluation of the BTTE curriculum.

On the contrary, since the BTTE curriculum lacks TLE areas, it is one of its main disadvantages. This includes special research projects that are offered only in a single semester, not giving ample time for student-researchers to finish their thesis. In the BTVTEd curriculum, the special research project is offered in two semesters. But it is offered in the semester of the second year of students in the program. This posed lacking necessary preparation on the part of the students. The curriculum is said to be congested as well. Since the curriculum offered courses on Trainer's Methodology, there are no sufficient materials or references.

In terms of weaknesses of the BTTE curriculum, as evaluated by Balingbing [6], BTTE students have poor English grammar and communication skills, are easily distracted by gadgets/technology, have poor listening habits, and are unable to control their negative behavior during the assessment. They are also unfamiliar with tools and equipment, have poor time management, have difficulty understanding instructions (logical or critical thinking), have behavior problems, and have poor comprehension.

However, there are also identified areas of improvement as this study's main outcome. The central theme of the responses focuses on the sufficient provisions of laboratory materials, tools, and equipment. Participants look forward to the government providing the necessary funding so that the graduates can be well-equipped. It is also a vision to look forward to a more substantial and comprehensive curriculum for technical teacher education. Respondents also hope that proponents of technical teacher education programs will eventually push for a separate licensure examination. It will never be under the TLE program, so more specialization subjects can be added to its curriculum, thus strengthening its technical and professional side.

According to a growing body of research [7], school facilities can significantly impact teacher and student outcomes. School facilities affect teacher recruitment, retention, commitment, and effort. School facilities affect students' health, behavior, engagement, learning, and achievement growth. Thus, researchers generally conclude that serving many children with complex needs is difficult without adequate facilities and resources. Nearly three-fourths of all existing schools in the United States were built before 1970 in 1996. Around one-third of these schools required extensive repair or replacement, while almost two-thirds had at least one substandard building feature, such as substandard plumbing, roofing, or electrical systems. Additionally, 58% of respondents reported having at least one unsatisfactory environmental condition, such as insufficient ventilation, acoustics, or physical security.

Researchers discovered that most schools lack 21st-century infrastructure, laboratories, and instructional space besides general maintenance and construction issues. More than half lack the adaptable instructional space necessary for effective teaching. Thus, the facility's quality strongly correlates with

teacher retention and student learning. Students' and teachers' physical and emotional health are contingent on the quality of their physical environment, which makes establishing safe, healthy buildings critical. This is the same dilemma that state universities in the Philippines are experiencing. Facility and equipment are an integral part of the effective implementation of the curriculum.

6. Implications for curriculum and instruction

Curriculum and instruction are two ever-changing concepts in the field of education. They are the meat of the educational process. Actual educational change occurs due to changes in the content teachers teach, students learn, and the instructional methods teachers use. Curriculum and instruction are shaped by expectations for the educational outcomes that students should demonstrate by the time they graduate high school. These realities are implemented simply because the written curriculum guides them. Though other facets of the curriculum take place in the teaching and learning process, the Memoranda from the Commission on Higher Education in this study is still the guiding framework of the Bachelor of Technical Teacher Education and the Bachelor Technical-Vocational Teacher Education. The comparative study between the two curricula is a substantial start in revisiting the standards set by the Commission. It has revealed valid data that show the strengths and weaknesses of both curricula. Results that were driven are inputs for improving the present and existing program, the BTVTEd. It may adopt the strong points of the BTTE program and eliminate the weak points of the BTVTEd. Still, it will be beneficial if the competencies and program outcomes are revisited with consultation with the people of the industry to set standards aligned to the needs of the industry properly.

On the instruction part, analyses of the written curriculum have substantial input to implementing the taught curriculum well. Since instruction is directly affected by the written curriculum, revisiting its content will also impact the teaching and learning process. Curriculum change is the primary concern of research to better develop graduates and individuals in the field.

7. Conclusions

Studying and comparing the technical teacher education curricula have brought about the following conclusions:

• The pertinent review of the general educational objectives of the BTTE and BTVTEd curricula permitted a broad view of their common aims and foundations. Basically, it can be said that similarities outweigh the differences. However, the BTVTEd curriculum is better regarding general educational objectives in this particular area of consideration.

• Program specifications and goals are common in both curricula regarding graduate attributes and the adequacy of the program to produce quality graduates. BTVTEd curriculum is better considering the addition of TLE and TM courses. However, BTTE is better considering its provision for multiple entries and exits in the program (Model A and B).

• The competencies and program outcomes of both curricula are similar, in general. However, there are existing differences

in the TLE and ICT competencies. BTVTEd is better in this consideration, but in terms of balance in theory and practice, BTTE is better.

8. Recommendations

It is evident in the data gathered that the curricula of technical teacher education in a state university in the Philippines have commonalities and differences. From this diversity, there are emerging strengths and weaknesses in both curricula. In view of the conclusions, the following recommendations are worth mentioning:

• The general educational objectives of BTTE and BTVTEd curricula must have been adhered to at all times to result in aligned approaches to the teaching-learning process.

• Curricularists and educational experts should thoroughly review the program specifications and goals of BTTE and BTVTEd, and then a revision of the process can be incorporated.

• The competencies and program outcomes should be revisited with consultation with the people of the industry to set standards aligned to the needs of the industry properly.

• Government should increase the budgetary allocation to technical teacher education institutions to provide tools, facilities, and equipment for better delivery of competencies to students.

• A study of the same nature may be pursued, focusing on the other areas of the CHED Memorandum Orders.

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