

**THE COOPERATIVE EDUCATION EFFECTIVENESS :  
A CASE STUDY OF HIGHER EDUCATION  
IN THAILAND**

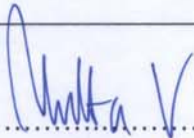
**Wilailak Khaosaard**

**A Dissertation Submitted in Partial  
Fulfillment of the Requirements for the Degree of  
Doctor of Public Administration  
School of Public Administration  
National Institute of Development Administration  
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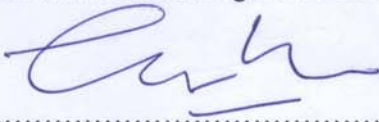
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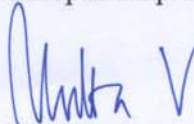
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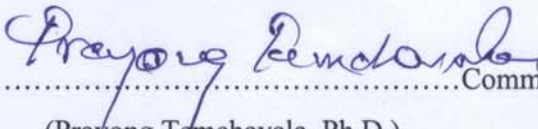
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## ABSTRACT

<b>Title of Dissertation</b>	The Cooperative Education Effectiveness : A Case Study of Higher Education in Thailand
<b>Author</b>	Miss Wilailak Khaosaard
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The objectives of the research were to 1) explore the key characteristics of co-operative education conducted in higher education institutions in Thailand, 2) investigate the procedure of co-operative education employed in higher education institutions in Thailand, 3) examine the evaluation of the effectiveness of co-operative education undertaken in higher education institutions in Thailand, and 4) analyze the influential factors affecting the effectiveness of co-operative education of higher education institutions in Thailand. It was qualitative research. Data were collected through documentary research, in-depth interview, and non-participant observation. The total of 40 samples was divided into two groups. The first group of the samples comprised university administrators, co-operative education teachers as supervisors, and students. All were from three universities including Suranaree University of Technology, Walailak Univeristy, and Rajamangala University of Technology Thanyaburi. The second group of the samples consisted of administrators from business organizations, and staff acting as supervisors. All of them were from three companies including Western Digital (Thailand) Co. Ltd., Betagro Public Co., Ltd., and Microchip Technology (Thailand) Co. Ltd, (as they were partners joining in the co-operative education with the 3 universities listed above).

For the results of the study, those 3 universities had different perceptions on the concept of co-operative education overall. However, some of its key characteristics were in common, which included the emphasis on professional development of science and technology fields, and the aim to provide students with

effective professional preparation and development, where the students could develop themselves according to their own strength and weakness through professional experiences at workforces. The focus was targeted on students.

The common procedure of co-operative education of the 3 universities was divided into 3 consecutive phases including 1) Pre-Co-operative Education, 2) While-Co-operative Education, 3) Post- Co-operative Education.

The evaluation of the effectiveness of the co-operative education of those 3 universities was conducted in 3 different domains. The first domain was the evaluation of the students' quality, which could be observed from the students' performance, and skills while they were on professional training at the workforces. The second domain was the evaluation of the university quality, which could be measured from the quality of the teachers, the co-operative education curriculum whether the quality was maintained, and it remained updated, the appropriateness of the procedure and time allocation for pre-training service, the management on co-operative education operation, the co-operative education coordination between the teachers and staff for supervision, knowledge sharing between the university and the business organizations, preparation to promote students' work readiness and working skills. The third domain was the evaluation of the quality of business organizations, which could be measured from their provision of training for internship students, their procedure of co-operative education operation, the sizes of their business, internship duration at the workforces, their budget allocation for the co-operative education operation.

Regarding the influential factors analysis, the research discovered that the factors affecting the effectiveness of co-operative education consisted of financial factor, institutional factor, leadership factor, and innovative management factor, whereas the political factor had no effect towards the effectiveness of the co-operative education.

## **ACKNOWLEDGEMENTS**

This dissertation as entitled, “The Cooperative Education Effectiveness : A Case Study of Higher Education in Thailand” could not have been completed without guidance, advise, support, and encouragement from many people. My first and greatest debt is to my major advisor, Asst. Prof. Nattha Vinijnaiyapak. She heartily devoted supervising, guiding and recommending valuable sources of information for me to take up this project. Particularly, her great patience, and generosity are most appreciated for me. It was a privilege to work under her supervision.

I own a debt and would like to express my gratitude to the entire dissertation committee, for devoting their time to critically read my work and their insightful advice. Especially, Asst. Prof. Prayong Temchavala, who gave me useful suggestions necessary in conducting my project and he was a model of good discipline in dealing with academic works and dissertations. I’m grateful for the help of the chairman of my dissertation committee, Asst. Prof. Thanapan Laiprakobsup, from Faculty of Political Science, Chulalongkorn University, who also devoted his time to validate and ensure the completion of my dissertation.

Special thanks also go to Mr. Warut Ingkathawornwong, Miss Wassana Pongsapan and all of My DPA batch 6 friends, for their constant encouragement and assistance and stayed with me through all the joy and frustrations.

Last but not least, my heartfelt appreciation is to my beloved parents who were my very first teachers and from whom my inspiration to study was began. They deserve all my gratitude for their constant encouragement and support throughout my whole life. I do owe more than thanks to my husband, Mr. Pisut Wisetmuen, for his unconditional support and love towards the end of my study.

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# **CHAPTER 1**

## **INTRODUCTION**

### **1.1 Statements of the Problem and Background of the Study**

At the present time, Thailand is stepping into Thailand 4.0, a new model aimed at driving Thailand to achieve national prosperity, stability, and sustainability. The core concept is the development of Thai people to become “Perfectly Adjusted Human for the 21<sup>st</sup> century,” together with the transformation to become “Thai People 4.0 in the First World Classification,” which contains the following characteristics: 1) from being unskilled to highly skilled; 2) from being self-minded to being public minded; 3) from holding a Thai-Thai personality to a Global-Thai personality, which can support more solid steps on the global stage; 4) from being Analog Thai to Digital Thai (Office of the Secretary of the House of Representatives, 2016: 17). In order to meet the first characteristic as to develop Thai people from being unskilled to highly skilled, good education policy is obvious as the carrier. Therefore, education appears to be the key to the success of moving the nation forward and plays a significant role as the heart of national human development. In particular, “human” is considered a valuable social resource to create a balanced economy and society, which directly implies the importance in encouraging individuals to effectively bring out their internal potential for social benefits.

Apparently, education is a process of developing human living quality and condition. Not only does it bring happiness to living but also develops the country following global dynamic changes. According to the Constitution of the Kingdom of Thailand 2007, the essence of education has been defined in Section 49 with the description that every person shall enjoy equal rights to receive at least twelve years of comprehensive and quality education as provided by the state free of charge. Indigent, disabled or handicapped, or destitute persons shall enjoy equal rights under paragraph one and shall be supported by the state to receive education on an equal

basis with other persons. Education and training provided by professional or private organizations, alternative education of the public, and self-learning and lifelong learning shall receive appropriate protection and promotion from the state. In addition, section 50 states that a person shall enjoy academic freedom. Education and training, learning and teaching, research and the dissemination of research according to academic principles shall be protected and provided that it is not contrary to one's civic duties or good morals (Office of the Council of State, 2007: 13). Additionally, in section 81, it is mentioned that the state shall provide and promote education to achieve knowledge alongside morality, and improve education in harmony with economic and social change, as well as provide law related to national education, as stated in National Education Act B.E. 2542. In Section 81 law is the higher law that connects with the law written in constitutional law and it draws a guideline of national education reform (Office of the Council of State, 2007: 21), consistent with the Eleventh National Economic and Social Development Plan (2012-2016), in which the concept was continued from the Eighth to the Tenth National Economic and Social Development Plans, focusing on "the Philosophy of Sufficiency Economy." The concept of this philosophy places humans at the center of development and it is the key for balancing development in all dimensions. For the application of the philosophy under the basis of sustainability and happiness of life, still, it is necessary to pay deliberate attention to both the external and internal changes of the country, as well as the effects from all different dimensions, so as to create a long-term development plan under Thailand vision 2027. From the context of the potential changes in the future and in different sectors in Thailand, the plan is feasible for cultivating friendship under the following characteristics: a sufficient way of living, awareness of one's own culture, democratic system support, good governance conduct, good fundamental public management, good security of life, good environment, a high degree of hospitality, eco-friendly production, and self-reliance in terms of food and energy consumption. All of those characteristics are combined to enhance a solid step on the stage of regional and world competition (Office of the National Economic and Social Development Board, 2017) together with the following goals: 1) to increase the peacefulness and happiness of life in Thai society, to reduce inequality in the society, to reduce the proportion of the people under the poor line,

and making the corruption perception index not less than a score of 50; 2) to encourage the Thai people to continue learning throughout their lives, to become healthier, and to be more moral, resulting in a stronger society; 3) to maintain economic growth at an appropriate rate according to the potential of the country, to increase production at over 3 percent a year, to increase economic competitive capability, to maintain the GDP of the products of small and medium business enterprises not lower than 40 percent; and 4) to adhere to standards of environmental quality, to increase the effectiveness of the reduction of greenhouse gases, and to expand forest areas in order to maintain ecological balance (Office of the National Economic and Social Development Board, 2017). Consistent with the National Education Plan (B.E. 2545-2559) announced by the cabinet, which was a long-term plan under the National Education Act, the plan is used as a guideline to design education plans at different levels, ranging from the ministry level to the regional level and the institutional level, based on the Philosophy of Sufficiency Economy of the King, including moderation, a balanced way of living, prudence, reasonableness, and all-round knowledge for the ultimate goals of sustainability and happiness of life. “Human” is considered the center of development (Office of the Education Council, 2002).

Considering educational policy, educational institutes are key units responsible for bringing such policy into practice until success. Without actual practice, no matter how excellent the policy, if it cannot convey the end goals, the business is considered to have failed. In contrast, if the institutes run the policy based on a good model, guideline, and process of good practice as well as the relevant factors, they tend to be more successful in meeting the goals (Voradej Chandarasorn, 2009; Sombat Thamrongthanyawong, 2011).

Practically speaking, from the past until the present, even though policy and the law have been enforced, there are still many obstacles in running a co-operative education program, resulting in the failure to accomplish goals. This failure can be seen from the empirical evidence regarding competitive capability ranks. In terms of education from 2012 to 2015, it was found that Thailand was ranked in the 31<sup>st</sup> place in the world, out of 144 countries, and 3<sup>rd</sup> place in ASEAN behind Singapore, which was in 2<sup>nd</sup> place; Malaysia was in the 20<sup>th</sup> place. When considering the education

index in particular, the overall quality of fundamental education in Thailand was ranked in the 7<sup>th</sup> place in ASEAN (the 6<sup>th</sup> from the previous year), and the overall quality of the higher education was ranked in 8<sup>th</sup> place, even though its mathematics index and science index seemed to be a bit higher—in 5<sup>th</sup> place. When taking the analysis of the GDP rate into account, Thailand as the 3<sup>rd</sup> wealthiest country in ASEAN (GDP per capita), is still behind other poorer countries in terms of education. (Office of the Education Council, 2016: 69-72). The reasons above were the explicit grounds for inferring that Thailand is confronting a dilemma in terms of the quality of higher education. As a consequence, Thailand is struggling with human resource development, the quality development of graduates, and the cultivation of satisfactory characteristics of graduates that are aligned with the demands of employers. According to the criticism raised by employers, higher education in Thailand is still unable to produce qualified graduates. To put it another way, the sources of the problems are unskilled laborers, no connection or relationship between business employers and the university, and no collaboration for sharing resources. This implies that the skills required of graduates are their knowledge, ability and professional skills, systematic planning skills, perspective-taking skills, decision-making and problem-solving skills, interpersonal skills, creative thinking skills, discipline skills, morals, ethics, communication skills, presentation skills, leadership skills, etc. Those skills can ultimately be cultivated from actual professional experience in the workforce.

Regarding the development of graduates, the emphasis is usually on integrated study (Work-integrated Learning: WIL). The main purpose of this learning approach is to develop graduates that meet the demands of the labor market and to provide a system for professional development. Since the focus is on professional training to produce skilled labor, the outputs as qualified graduates can be the mechanics to mobilize national economic growth, and to escalate the national development to a larger scale, respectively. WIL consists of 9 attributes as follows: 1) pre-course experience, 2) sandwich courses, 3) cooperative education, 4) cognitive apprenticeship or job shadowing, 5) joint industry-university courses, 6) new trainee ship or apprenticeships, 7) placement or practicums, 8) fieldwork, and 9) post-course internships (Sumeth Yaemnun, 2004: 23). It is a kind of experience-based learning

that offers students the opportunity to apply their knowledge and specific professional skills at work. It can also help students realize how different work life is from their real life experience before they finish school. Further, both employers and the university can gain benefits from the collaboration in return in terms of the development of work effectiveness, the development of curricula and research, the development of knowledge construct, etc. Therefore, WIL is a guideline to enable students to connect their theoretical knowledge with their practical knowledge, as well as to ensure that they can be well adjusted and ready to work once they graduate.

Cooperative education is a form of WIL, where the instruction is conducted based on the cooperation between the institutes and business employers. The focus of the programs is on professional training of the workforce (Work Based Learning), where the students can integrate their knowledge from the classroom with their actual experience at the business sites. Professor Dr. Wichit Srisa-An coined the term “Co-operative Education” in Thai from the English translation. It refers to “education constructed under a collaborative partnership between the university and employer for educational development.” Suranaree University of Technology was the first university to establish co-operative education in Thailand. The co-operative education system gives students the opportunity to have full-time professional training in the workforce, and they can be assigned to practice working in the area directly related to their study program. Usually, the students will be given a task as an *ad hoc* project so that they can finish within 4 months. The employer will assign a mentor or a job supervisor to help in supervising, training and evaluating the students’ performance. As a result, the students can improve their work skills a great deal in a particular kind of job in response to the employers’ direct demand. Nowadays, a number of education institutes around the world incorporate co-operative education programs in their curricula. The Office of Higher Education Commission has been aware of the paradigm and the importance of developing co-operative education; therefore, a certain policy has been imposed by the office to promote the consistency and long-term running of the program, with the terminal aim to make graduates ready and with satisfactory qualifications to work in accordance with the employers’ demands (Wichit Srisa-An and Alongkot Yawai, 2009: 4-6). The establishment of co-operative education has been the collaboration among the members of the Office of Higher

Education Commission, the Thai Association for Co-operative Education, the Network of Development of Higher Education, Higher Educational Institutes, students, business employers, and other relevant parties that deal with co-operative education under the following goals:

1) To develop graduates to acquire satisfactory characteristics and abilities that directly meet the demands of employers

2) To promote collaboration between higher education institutes and the employers from business organizations in order to consistently evaluate and refine instructional curricula in accordance with the labor market, as well as improve the competitiveness and capability to meet the challenges of international competition

3) To enhance and support co-operative education networks to play a role as a mechanic in mobilizing co-operative education policy, as well as networks in sharing educational knowledge and resources (Office of Higher Education Commission, 2013: 11)

According to government policies issued to support and promote national co-operative education, business enterprises and high education institutions, both public and private, are aware of the advantages of co-operative education in terms of its benefits to themselves and the students. Mostly, the co-operative education programs in higher education are incorporated into the curricula that aim at producing graduates for serving the business and industrial sectors, such as engineering, technology, business management, and so on.

Thus, it is interesting to investigate the effectiveness of the co-operative education established in Thailand's higher education, including details of its aspects, including characteristics, processes and procedures, instructional design, and all of the relevant factors that can contribute to the effectiveness of the national education development of Thailand. In so doing, the study of the casual factors that have an impact on the efficiency of the co-operative education implementation in Thailand higher education is rather substantial. Although a model of co-operative education has been designed by the Office of the Higher Education Commission, the single policy and goal setting on a large scale cannot reflect all of the dimensions of the demands and restrictions of diverse cases or situations that really exist in the country. This study attempts to investigate them in greater detail in terms of the actual needs of

particular groups and then to propose the causal factors influencing the effectiveness of co-operative education. The proposed factors may shed light on practical guidelines for management panels in order to maximize their capability regarding co-operative education administration that best fits the current Thailand circumstances. In summary, it is necessary for universities that take account to follow the government policy on the establishment of co-operative education programs in order to construct a solid basis for students, to have practical guidelines and effective models to bring policy into practice, and to accomplish its end goals that contribute the best benefits to students in return. Since the world paradigm has become highly competitive, only good management of budget, time, and students' potential can promote the vigorous growth of Thailand.

## **1.2 Research Questions**

This study has sought to understand the policy implementation of the higher education regarding the effectiveness of co-operative education in Thailand.

The study sought to answer the following questions:

- 1) What are the differences and similarities of the co-operative education operations conducted among higher education institutions that have joined co-operative programs across Thailand?
- 2) What are the differences and similarities in terms of the procedures in conducting co-operative education among higher education institutions that have joined the co-operative programs across Thailand?
- 3) What are the differences and similarities in terms of the effectiveness of the co-operative education conducted among different higher education institutions that have joined the co-operative programs across Thailand?
- 4) What are the different and similar influential factors affecting the effectiveness of co-operative education implementation when it is conducted in different contexts across the higher education institutions that have joined the co-operative programs in Thailand?

### **1.3 Objectives of the Study**

- 1) What are the important characteristics of the co-operative education established in Thai higher education?
- 2) What are the processes of the co-operative education conducted in Thai higher education?
- 3) How can co-operative education effectiveness in Thai higher education be measured?
- 4) What are the key potential factors that influence the effectiveness of co-operative education in Thai higher education?

### **1.4 Definition of Terms**

Cooperative Education : Cooperative education is generally defined as a collaborative partnership between the university and employers in which students work full or part time in an area related to their major while they are attending college. Co-operative education programs are designed to provide practical applications of the theory learned in the classroom by combining academic education with hands-on work experience (Weston, 1986).

Higher Education : Higher education refers to study beyond the level of secondary education under the higher education commission in Thailand. Institutions of higher education include colleges and universities. They also include community colleges and institutes of technology.

Effectiveness : Effectiveness generally refers to the emphasis on doing the right thing (Drucker, 1954; Zheng, Yang and McLean, 2010). Doing the right thing in terms of co-operative education implies adopting innovative strategies (Kerzner, 2004; Olsson, 2006) that support the degree to which objectives are achieved and the extent to which targeted problems are solved.

## **1.5 Scope and Limitations of the Study**

This study is titled Cooperative Education Effectiveness: a Case Study of Higher Education in Thailand (with Particular Attention to the Faculty of Engineering of Thai Public Universities).

The area of the study is focused on Thai public universities that have engineering programs because those schools have already participated in co-operative education programs in engineering for over 10 years. The implications of the study might be generalizable to the particular sample group of the study of Thai public universities, with the specification of their geographic locations, and might not be generalizable to other Thai public universities or to other geographic regions.

Additionally, there was a restriction in the researcher's ability to control the participants' willingness to take part in the interviews and to answer all of the interview questions. Finally, due to the subjectivity of the data collected from the participants' and the complex ways in which they can be viewed, the interpretations might have been made on the basis of the researcher's presumptions.

## **1.6 Expected Benefits of the Study**

The study of the effects of co-operative education in Thai higher education institutions will provide the following benefits,

1) Academic benefits: the research is expected to extract essential information regarding co-operative education to develop a framework for co-operative education management, as well as to maximize its effectiveness.

2) Benefits in terms of policy: the research is expected to provide in-depth information for public authorities and policymakers regarding co-operative education, as a guideline for the improvement of co-operative education in Thailand.

3) Benefits in terms of co-operative education operation: the research is expected to provide useful information for school management and instructors that are in charge of co-operative education, as it will enable them to see co-operative education conducted in different contexts, where they can select the information to

create their own plans or rules that fit their practices, under the context of higher education in Thailand.

## **1.7 Organization of the Study**

This study is divided into six chapters. Chapter one provides the background of the study, a statement of the problems, the significance of the study, the research questions, the definitions of terms, the limitations, and the organization of the study. Chapter two includes a review of the concepts related to co-operative education in Thailand, the history of co-operative education, the purposes of co-operative education, the benefits of co-operative education, cooperation in co-operative education, and international experience. Chapter three contains a review of the relevant literature regarding the topic. Chapter four discusses the research method used in this study. The discussion reviews the research design and appropriateness of the design, the geographic location and setting, a case study overview and the sampling process, the data collection strategy, data analysis, data validation, and ethical considerations. Chapter five presents the findings of the research, and chapter six is comprised of the conclusion and suggestions for future research.

## **CHAPTER 2**

### **THE CONCEPT OF COOPERATIVE EDUCATION**

The literature was reviewed in this section to draw out the concept of co-operative education. The sources of literature came from a variety of co-operative education studies. Some of the literature was published in academic journals, monographs, and edited volumes of academic papers. A lot of them also can be found in government reports and publications intended for an audience of practitioners and policymakers. From the recap of the bundles of those cumulative data regarding the underlining concept, the ideas were discussed with no particular focus and were rather mixed. However, when the data were carefully examined for more details, their patterns were discovered, which included co-operative education in Thailand, the purposes of co-operative education in Thailand, the benefits of co-operative education in Thailand, the success of co-operative education in Thailand, international experiences with co-operative education, co-operative education in The United States, co-operative education in Canada, co-operative education in Australia, and so on. The information were discussed as follows:

#### **2.1 Cooperative Education in Thailand**

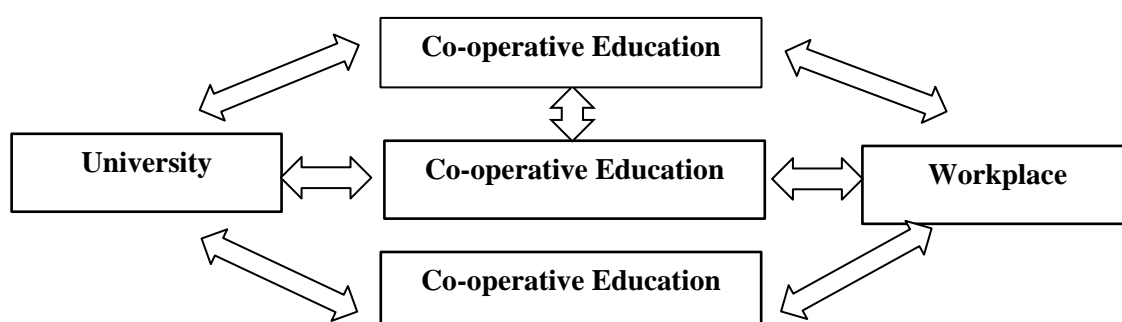
##### **2.1.1 The Cooperation of Cooperative Education in Thailand**

At the beginning, the co-operative education system in Thailand employed in a bilateral approach between the university and the workplace. Nowadays, cooperation has been developed using a multilateral approach among universities, workplaces, government sectors such as the OHEC, and the private sectors such as professional or academic associations. These two approaches of cooperation are illustrated in Figure 2.1 and 2.2 as follows:



**Figure 2.1** Cooperation in Cooperative Education: A Bilateral Approach

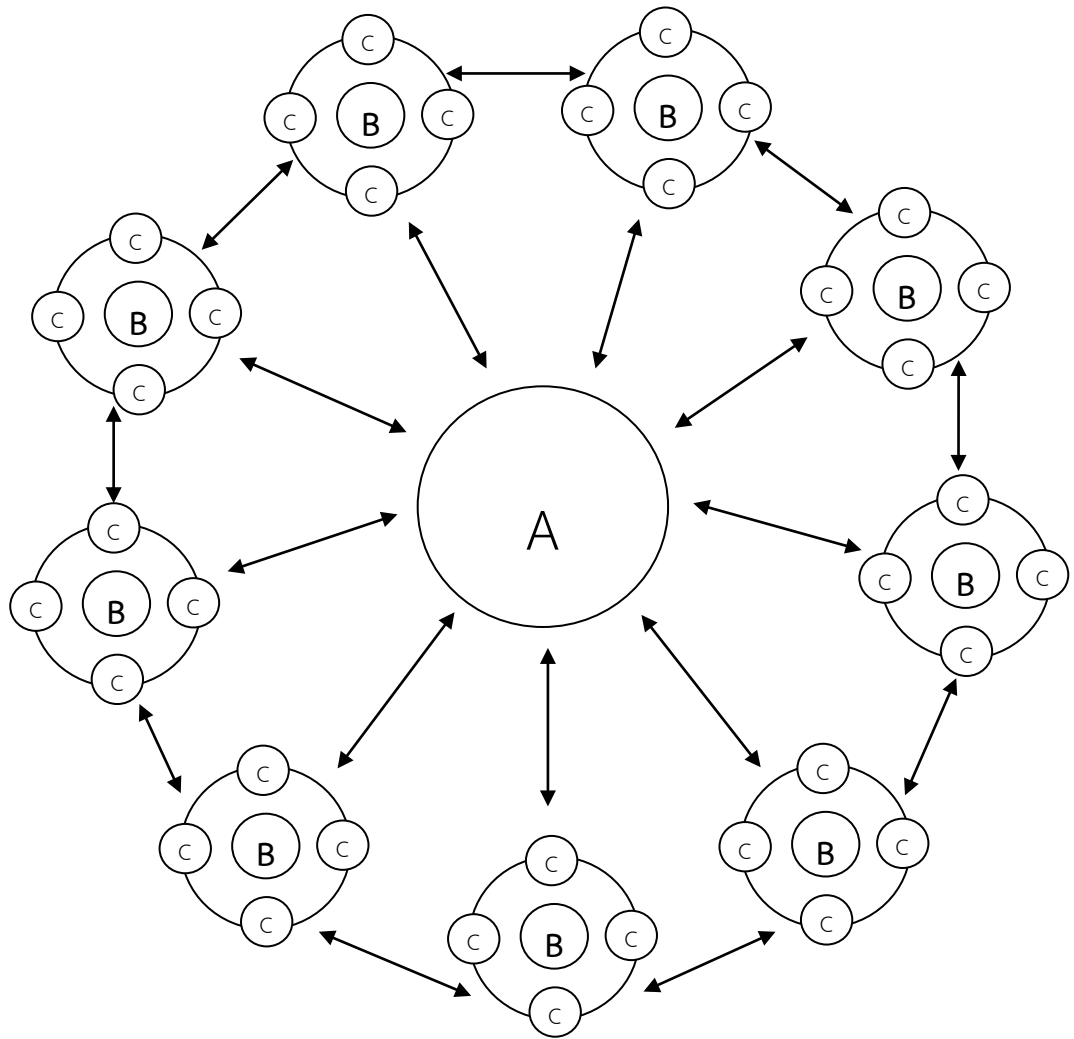
**Source:** Thai Association for Cooperative Education (2009 quoted in Narumol Ruksasuk, n.d.: 2).



**Figure 2.2** Cooperation in Cooperative Education: A Multilateral Approach

**Source:** Thai Association for Cooperative Education (2009 quoted in Narumol Ruksasuk, n.d.: 2).

In 2005, the Office of Higher Education Commission, the Ministry of Education, announced the establishment of three educational networks as administrative structures in managing and developing higher education and as a tool for promoting cooperation and enhancing collaboration among higher education institutes so as to achieve their missions, which were the ability to support the nation's policies and participation in solving the nation's problems. These networks were a Central Administrative network (Network A), a Regional Higher Education network (Network B), and a Specific Mission Network (Network C). The structure of network A, B, and C is shown in Figure 2.3.



**Figure 2.3** Structure of Network A, B, and C

**Source:** Thai Association for Cooperative Education (2009 quoted in Narumol Ruksasuk, n.d.: 3).

**Table 2.1** Nine Regional Co-Operative Education Networks

Cooperative Education Network of Higher Education	The Number of Higher Education Institutes					
	Public	Rajabhat	Rajamangala	Private	Community Colleges	Total
Higher Northern	6	3	1	6	3	17
Lower Northern	1	5	-	4	3	13
Higher Northeastern	3	6	-	4	2	15
Lower Northeastern	2	6	1	6	2	17
Higher Central	10	7	2	26	1	46
Lower Central	6	6	3	16	1	33
Eastern	1	2	1	2	2	8
Higher Southern	1	3	-	3	2	9
Lower Southern	3	2	1	3	5	14
<b>Total</b>	<b>31</b>	<b>40</b>	<b>9</b>	<b>71</b>	<b>21</b>	<b>172</b>

**Source:** Office of Higher Education Commission, 2011.

The activities for each co-operative education network included promoting understanding about co-operative education to the public and stakeholders, for instance, students, lecturers, and institutions' personnel as well as in the workplace. Moreover, in terms of research on co-operative education, the development of a database and the staff's research skill development were strongly encouraged. From the establishment of nine co-operative education networks, 5 main barriers were repeatedly found as described in following information.

1) Administrators, faculties, students and workplaces lacked knowledge and understanding of the education system of co-operative education, reflecting the lack of effective cooperation and standard policy.

2) Most members of the participating institutions and parties did not have direct authority or responsibility to override consensus on the changes or conflicts that might occur within a network, and there were no full-time representatives to monitor the network operation assigned.

3) Co-operative education policy of the institutions, defined by both government agencies and private sectors, was still not clear or consistent.

4) There was no policy written for consistent financial support from the government.

5) Employment organizations and universities still had no database for sharing information, and the supervisors from faculties lacked professional experience and content knowledge of the subject areas (Office of Higher Education Commission, 2011).

Currently, according to the results of the survey from 133 educational institutes in 2006 by the Commission of Higher Education regarding the number of educational institutes that adopted co-operative education in their curricula, it was found that 88 institutes (66.17%) had already participated in co-operative education, 45 institutes (33.83%) were pending, and 5,810 workplaces and 13,630 students had already participated in co-operative education. The number of participating educational institutes and workplaces was expected to be higher, for the target of approximately 60 participating educational institutes and 2,000 participating workplaces more in the year 2004.

### **2.1.2 Purposes of Cooperative Education in Thailand**

The OHEC has proposed the co-operative education objectives as follows:

1) To develop graduates' characteristics and potential that match the employers' demands

2) To promote collaboration between the employment sectors and the universities in order to develop curricula that match the employment markets and to maximize the competitive capability of the nation as whole for world competition

3) To promote and support the co-operative education network as a mechanism to mobilize co-operative education policy, as well as to stimulate resources and knowledge sharing (Office of Higher Education Commission, 2013: 11)

### **2.1.3 Benefits of Cooperative Education in Thailand**

Private organizations such as the Federation of Thai Industries, the Thai Chamber of Commerce and Board of Trade of Thailand, the Thai Academic Council, the Thai Association for Cooperative Education (TACE), an international academic organization, and the World Association for Cooperative Education (WACE) have paid very much attention to co-operative education programs and have been involved in them. Consequently, various different participating agencies from all sectors have begun to work together in the form of multilateral participation.

From an educational strategic perspective, co-operative education provides benefits to all three participating constituencies: employers, students, and educational institutions (Blair and Millea, 2004; Hadara and Skanes, 2007; Kerka, 1989; Van Gyn, Cutt, Loken and Ricks, 1997). Therefore, the co-operative education benefits can be summarized as follows:

#### 1) Benefits for academic institutes:

- (1) Academic collaboration and good relationships with workplaces are established.
- (2) Feedback can be used in revising the curriculum as well as teaching and learning.
- (3) The academic institutes are recognized by the labor market.

#### 2) Benefits for workforces:

- (1) Academic collaboration and good relationships with the institutions are established.
- (2) Good images of the workplaces in supporting education and assisting with the development of the graduates of the nation are created.
- (3) Interns have used their academic knowledge for working dedicated to the workplaces throughout the year.
- (4) With intern substitution, the workload of the permanent staff is reduced and they have more time to perform other tasks.
- (5) It is an opportunity for the employers to pre-screen interns for full-time vacancies with no probation required.

### 3) Benefits for Students:

(1) The students gain professional experience in the fields of their studies, in addition to knowledge from classroom learning.

(2) The students' satisfied characteristics to the workplaces were promoted, such as self-development, interpersonal skills, responsibility, and self-confidence.

(3) The students become better learners and earn good grades after the co-operative education practicum, due to a better and deeper understanding of the content knowledge as a result of the authentic experience in the workplace.

(4) The students acquire communication skills.

(5) The students earn extra income.

(6) The students select future appropriate jobs for themselves, and make the right decisions about their jobs based on self-awareness of their own strengths.

(7) The students are formed to be qualified graduates with higher potential, and they also have a better chance of being offered a job before graduation (Thai Association of Cooperative Education, 2009a).

Thus, the ideal co-operative education graduates were generalized as those that had the potential for career advancement, theoretical knowledge in their professional field, and the capability to learn new skills and procedures (Marchmet, 1998). Chapman (2009) reported an outcome of co-operative education—that it could ultimately benefit the students, employers, and educational institutes. This was a significant increase in the employability rate of the students. Relatively 95% of students that have passed cooperation education were reported to have been accepted in jobs related to the positions assigned during their internship before graduation.

#### **2.1.4 Success of Co-operative Education In Thailand**

Suranaree University of Technology in Thailand was the first university that developed a co-operative education system in 1993 with the cooperation of private industrial sectors and public sectors. The curriculum was designed for a trimester system, and allow the students to serve the internship twice, in the third and the fourth years. The internship semester was alternated with a regular school semester in a

structured manner. The university had started sending the first batch of the student trainees for co-operative education in 1995 and this has continued until now. The co-operative education system is still operating in all bachelor programs at Suranaree University of Technology; however, the frequency of the professional experience has been reduced to only once, except for the Department of Management Technology, which still has the number of professional experience at two times (Alongkot Yawai, 2006: 3).

Co-operative education as a semester system has also succeeded in some other universities such as King Mongkut's University of Technology Thonburi. The university management committee agreed on the policy in 2002 that any written curriculum that embedded co-operative education would be refined in a university leading plan. First, the curriculum would be circulated throughout the management team, and later the team would consider the possibility and potentiality of the curriculum to implement the co-operative education program. This began with the science faculty, where more systematic and empirical operation of co-operative education could be found than in the engineering faculty, for example, which had only 2 departments. However, the Department of Control & Instrumental Engineering was a pilot group or a prototype of co-operative education implementation for the development of students. Abiding by the university policy, all revised curricula needed to adhere to the option of co-operative education, with no rejection. There were two alternative options for students whether they would join the co-operative education program or do individual study projects. Yet, the co-operative education program was not compulsory for all students.

The engineering faculty began employing a co-operative education model that was very similar to the model designed by the Co-operative Education Association of Thailand. To begin with, the curriculum was revised based on the concept of reducing class time. As clearly seen, the students would go for co-operative education in the first and the last semester in the fourth year. There were 30 additional hours (not yet entitled a full course credit or name) assigned for the preparation for co-operative education in the first and second semester in the third year. The teachers acting as advisors usually selected the workplaces that were considerably large or as public companies, the places where the students would at least gain knowledge of the

working system of the organization. The companies located in Bangkok and vicinity were the choices for them because the locations were not far and the transportation was convenient for students to go to work on Saturday. However, those companies with hazards or with safety risks, such as chemical plants, were excluded from their list.

Meanwhile, the university signed a memorandum of understanding (MOU) with Mr. Herve Le Gavrian, Managing Director Asia Oceania, from Siam Michelin Company, for the joint of co-operative education for engineering projects, with the aim to enable students to gain on-site experience from the work stations. The project was regarded as the first example of cooperation between the university and Siam Michelin Company, which would benefit the university mission by meeting the “Mor Cho Thor Quality Standard.” The concept was to form good qualified graduates with high professional skills and ability. The interns were on co-operative education for 10 months and they could graduate at same time with other classmates from the same batch (Narin Sridokmai, 2012: 98-100).

For King Mongkut's Institute of Technology Ladkrabang, the co-operative education program was designed as an elective course. The students that participated in the co-operative education program were those in the fourth year. Normally, fourth-year students are required to pursue university project courses, but so far the co-operative education course was its substitution. The 6 credits were given for the co-operative education course, which was the same number of credits given for the old university project course; however, the students still needed to enroll in one to two more courses to obtain their degree.

In 2012, the university and its faculty created a plan for co-operative education and committee panels were assigned for this particular project. Each department would be appointed a representative for co-operative education operation. Regular meetings would be held once a month during the first year in order to gather guiding information for setting up basic co-operative education regulations and rules. For the students that were ineligible because of a low grade point average, they needed to submit an appeal to the advisors for an abatement request. There were additional activities in the pre-training of co-operative education, as organized in co-operative

education week to prepare the students to get to know more about co-operative education before starting the co-operative education program.

Regarding the establishment of the rules and regulations, they initially were defined in a proposal, then circulated as the committee agenda to finalize a consensus. Finally, they would be officially announced at each faculty. For example, the GPA (grade point average) of the eligible intern applicants had to be over 2.50. The grading system of the co-operative education course would be A, B, C, and D. The criteria form would be designed for the employers to evaluate the students according to the details and specific aspects written in it. Samples of the students' performance evaluation forms and criteria were collected from various universities in order to develop a single practical form for the university. All of the useful information would be included in the manuals, and later updated on a website, available for the students to download those documents and also for the employers to key the score into the online system.

In terms of contacting business organization partners, the teachers acting as advisors, who were supervisors of the students, would contact them, and then passed on the further process of document preparation and submission to the university co-operative education office to continue the deal. Once the business organizations returned the official acceptances, the university co-operative education office would circulate the information to the relevant departments regarding the types of work, the availability, and the capacity of the contacted organizations. For the students that expected to join the co-operative education program, they were required to apply for it in advance, as it was a prerequisite for them to attend 30 hour pre-training service for co-operative education for their work readiness.

In 2016, the university in cooperation with "Team Group of Companies" Company Limited made an agreement with a memorandum of understanding to produce young generations and researchers, as well as to promote the Dreams to Come True Project, in terms of human resource development. In the first phase, the admission of the students to co-operative education project would be focused on those in the area of logistics of water distribution, architecture, and town and city planning. The company took national mega projects which could be an excellent source of knowledge collection shared for learning through work experience, especially

knowledge on dominant forms of transport and rail transport such as the Bangkok-Chiang Mai Hi-speed train project, the Red Line Train Project, the Pink Line Monorail Project, and so on (Narin Sridokmai, 2012: 98-100).

## **2.2 Implementation of Cooperative Education in the World**

### **2.2.1 Cooperative Education in the United States**

At the beginning of the 20<sup>th</sup> century, at Lehigh University, Herman Schneider (1872-1939), who was an engineer, architect, and educator, mentioned that the traditional classroom was insufficient for technical students any longer (Smollins, 1999). Smollins also explained in more detail that Herman Schneider launched the first cooperative program in 1906, drawing upon earlier work experience models such as apprenticeships, mentorships, etc., to develop his co-operative education model. The program was originally applied to his engineering students at the University of Cincinnati (UC), with the aim of bridging the gap between theory and practice, and on-campus and off-campus learning. It was well timed with U.S. industrial expansion (Zegwaard and Coll, 2011). Earlier to the launch, in 1905, he got permission from the UC Board of Trustees to “try this cooperative idea of education for one year only, for the failure of which they would not be held responsible.” When co-operative education was launched in 1906, it became an immediate success. The University of Cincinnati returned to the matter in its September 2005 board meeting, declaring the 100 year trial period of one hundred years of co-operative education officially ended, for the success of which the board resumed full responsibility (Knowles, 1972).

#### **2.2.1.1 Co-Operative Education Models**

From its beginnings in Cincinnati in 1906, co-operative education evolved into programs offered at the secondary and post-secondary levels in two predominant models (Grubb and Villeneuve, 1995). In one model, students alternated a semester of academic coursework with an equal amount of time in paid employment, repeating this cycle several times until graduation. The parallel model split a day between school and work, typically structured to accommodate the student's class schedule. To conclude, like school-to-work (STW), the co-operative education model included school-based and work-based learning and, in the best

programs, “connecting activities” such as seminars and teacher acting as coordinator work site visits were added in. These activities helped students explicitly connect working and learning.

Co-operative education's proponents identified the benefits for students (including motivation, career clarity, enhanced employability, vocational maturity) and employers (labor force flexibility, recruitment/retention of trained workers, input into curricula) as well as educational institutions and society (ibid.). Beyond informal and anecdotal evidence, a familiar refrain in the literature was the lack of well-done research that empirically demonstrated these benefits (Barton, 1996; Wilson, Stull and Vinsonhaler, 1996). Barton (1996) identified some of the research problems for secondary co-operative education as follows: federal data collection on high school co-operative education enrollments and completions ceased in the 1980s; some studies used data in which co-operative education was not isolated from other work experience programs. Ricks et al. (1993) described other problems: researchers lacked a clear or consistent definition of co-operative education; they could not accurately identify variables and led the findings unable to be discussed; theories were not well developed and related; grounding theory, research, and practices could not be integrated; and co-operative education research did not adhere to established standards.

Another set of problems involved perceptions of the co-operative education program and its marginalization. Because of its “vocational” association, co-operative education was not regarded as academically legitimate; rather, it was viewed as taking time away from the classroom (Crow, 1997). Therefore, experiential activities should be necessarily rewarded in post-secondary promotion and tenure systems (except in certain extenuating situations), and co-operative education faculty should be isolated from other faculty (Crow, 1997; Schaafsma, 1996). Despite the current emphasis on contextual learning, work was not recognized as a vehicle for learning (Ricks et al., 1993). Schaafsma (1996) and Van Gyn (1996) agreed that professional training in the workforce should emphasize students’ placement rather than learning. Wilson, Stull and Vinsonhaler (1996) also criticized that the focus of the co-operative education was rather on administration, logistics, placements, and procedures.

Some institutes were fully dedicated to the co-operative education concept (such as Georgia Institute of Technology, Rochester Institute of Technology (RIT), Kettering University, LaGuardia Community College and Purdue University). For others, the co-operative education program might be viewed as an add-on and therefore was vulnerable in cost cutting (Wilson, Stull and Vinsonhaler, 1996). Even where co-operative education was strong, budget allocations were also limited, as the case of Cincinnati Technical College when it became a comprehensive community college (Grubb and Villeneuve, 1995) or LaGuardia during a budget crisis (Grubb and Badway, 1998). For students, cost and time for the degree completion might be deterrents to co-operative education participation (Grubb and Villeneuve, 1995).

### **2.2.2 Cooperative Education in Canada**

In Canada, the University of Waterloo was the first university to establish a co-operative education system (Wilson, 1971: 3-8). It was one of the medium public universities, positioned as a research-based university. It started the co-operative education program in 1957, and it gained renown for co-operative education with the highest number of students joining the co-operative education program. Its co-operative education program was quite outstanding, especially in the departments such as engineering, mathematics, science, and computers. As a result, the university stepped up into the top 3 university rankings in the South American region. Regarding how the university managed the co-operative education program, it was rather flexible. There, the regular academic program had been set up to be longer than the co-operative education program, and both programs could either be alternated (alternating pattern) or paralleled (parallel pattern). The co-operative education curriculum usually took longer than the regular curriculum. However, some departments might assign the co-operative education learning for only 4-5 semesters in total, because of the economic regression for over 10 years, resulting in the decrease in the demand for student trainees. No coursework was provided during the co-operative education semesters (Office of Higher Education Commission (2008: 4-5). Currently, co-operative education in Canada is very successful.

The University of Waterloo is considered one of the world's well-known universities in operating co-operative education. The university organizes a

cooperative center for co-operative education called Co-operative Education & Career Services: CECS. Its administrative structure included the Director of the Center, Heads of the Departments, Deputy Directors, Managers, on-site coordinators (off-campus working), and office staff, making the total of 117 members (half of them are on-site coordinators working across the areas in the country). There are 12,000 participating students per year. Preparation of the students before joining professional training is organized by co-operative education and professional training staff. They provide consultancy related to work or one's profession, personality development, seminar organization for professional development, and workshops on writing application letters, job interviews, and so on. Regarding the allocation of jobs for co-operative education and supervision assignments, on-site co-operative education coordinators are in charge of those that would go to the work stations located in their areas, under the supervision of the co-operative education advisors from each department. Assignments are typically individual project works with clear pre-determined aims for convenient follow-ups. Meetings are organized often so as to ensure that the student assignments can be accomplished. The results of the performance evaluation are broken down into 2 sessions, including a mid-term examination (scores are reviewed by the cooperation of both teacher and students in order to improve the students' performance), and a final examination at the end of the work.

Students' learning activities and tasks are based on mutual agreement of the advisors and the employers in the form of problem solving projects or assignments in industrial sectors, and the students would have the opportunity to see the business organizations as a whole. Students needed to write a journal every day. The evaluation of the students' performance depended on the criteria set by the co-operative education coordinators and consulting staff. Additionally, the students are required to submit a full report of the professional training and present the results within the pre-defined timeline, including during work and at the end of work (University of Waterloo, 2005).

### **2.2.3 Cooperative Education in Australia**

Australia is a country that established an co-operative education program for students to gain effective professional experience by joining hands with business enterprises, and the program was later called “Sandwich Education.” It first started in 1962-1963 at Footscray Institute of Technology, now called the Swinburne Institute of Technology. There were two types of programs which included “Thin-Sandwiches” and “Thick Sandwiches.” The system was carried out through the alternation between on-campus and off-campus learning. There were 7 on-campus academic semesters and 2 off-campus semesters in the “Thin-Sandwich” type, whereas there were 7 on-campus academic semesters and 6 off-campus semesters in the “Thick Sandwich” type. Both types of curricula were offered for college-based students, university-based students, and industry-based students, and employees in the industrial sector pursuing a degree (Wichit Srisa-An and Alongkot Yawai, 2009: 3-4). In 2011, Swinburne University of Technology developed a work-integrated learning model known as the “Swinburne Professional Learning Model,” where the form of the model incorporates various work-based activities such as Industry-Based Learning (IBL), and the Integration of Authentic Working Experience at Diploma called TAFE (Technical and Further Education), focusing on real life experience at work stations (On the job training) to produce qualified workers for the employment market. With over 50 years of experience in co-operative education management, Swinburne University of Technology is regarded as the first university in Australia embedding co-operative education in its system and continuously improving co-operative education all the time. The university has created an agency called the Industry Liaison Office responsible for co-operative education. The organizational structure of the co-operative education staff includes the director of the Industry Liaison Office, co-operative education managers from each department, project managers, the Administrative Manager, IT Manager, and the Assistant Managers of each departments. There are 13 management and operational staff members, and 483 participating students per year. Preparation of the students before internship is done through the training programs, held by each department, normally on writing application letters and job interviews. Training on other topics related to work are organized separately by Central Professional Service and is offered to all students of

the university. Regarding the allocation of jobs for co-operative education and supervision assignments, the co-operative education manager of each department together with the teachers acting as advisors are in charge. The teachers acting as advisors are assigned to supervise the students that work at the work stations located their scope areas. Students' learning activities and tasks are based on mutual agreement of the advisors and employers in the form of problem solving projects or assignments in the industrial sector, and the students have the opportunity to see the business organization as a whole. Students need to write a journal every day. Evaluation of the students' performance depends on the criteria set by the co-operative education coordinators and consulting staff. Additionally, the students are required to submit a full report of the professional training and to present the results within the pre-defined timeline, including during work and at the end of work (Office of Higher Education Commission (2008: 7-8).

**Table 2.2** Comparison of the Concepts of Co-operative Education in Countries around the World

Country	Theoretical Concept/ Philosophy	Target Goals of Development	Organizational Structure/ Management System	Key Success Factors
<b>Thailand</b>	The education system is integrated with work or co-operative education learning, in which the learners can gain direct professional experience, apply the knowledge from the classroom learning to work, acquire working skills and other specific skills for particular professions, and realize what work life would be like before graduation.	Educational institutes can create a connection of the educational world with business enterprises; the nation would have high potential human resources provided with competitive capability in the world competition.	1. Educational Institutes 2. Employers/ Entrepreneurs 3. Professional institutions	1. Educational institutes and business enterprises took co-operative education as a reciprocal responsibility in terms of co-operative education partnership, alliance, cooperative, mission, policy and plan that had been clearly made together. 2. Co-operative education was regarded as a part of educational system. It was one of the key components of the curricula, run in following co-operative education standard and educational institution standards. 3. Assignment of the agencies or staff responsible for the management on co-operative education on behalf of both academic institutes and private sectors. 4. The organization and staff were cultivated on their readiness to operate co-operative education before the launch of the program. 5. Follow-up program for co-operative education was established in parallel with the implementation, as to take the result for continuous improvement of the co-operative education management system.

**Table 2.2** (Continued)

<b>Country</b>	<b>Theoretical Concept/ Philosophy</b>	<b>Target Goals of Development</b>	<b>Organizational Structure/Management System</b>	<b>Key Success Factors</b>
<b>America</b>	Development of the national standards of professions and professional skills to reach the international standards to promote national standard labors, a key strategy to success in educational development	Instructional management integrates learning and working to stimulate or trigger industries to improve their human resources in attaining competitive capability.	1. Educational Institutes 2. Employers/ Entrepreneurs 3. Professional institutions	Strategic key success factors in operating co-operative education and professional training management in America, were developed from education reform policy to lead the national move. Vocational institutes was regarded as a high potential organization to push the step forward and to guide the nation the way as they could solve the community problems on employment. The institutes became isolated legitimate organizations to possess full right and freedom to manage themselves, in providing educational service and academic knowledge to different target groups of occupations. They were worth being professional training and development centers.

**Table 2.2** (Continued)

Country	Theoretical Concept/ Philosophy	Target Goals of Development	Organizational Structure/Management System	Key Success Factors
<b>Canada</b>	Co-operative education is an important part allowing the students to efficiently apply the knowledge to work; there tended to be a great opportunity for the students to get jobs related to the work that they did during the practicum as soon as they graduated.	Co-operative education is implemented and promoted in the country; the country is leading in terms of incorporating co-operative education in its educational system, resulting in the highest number of participating students in the world.	1. Educational Institutes 2. Employers/ Entrepreneurs 3. Professional institutions	1. Co-operative education had been practiced in educational institutes for long time already with clear and concise policy defined to follow. Like that of University of Waterloo, for instance, co-operative education had been operated since 1957, and the policy was constantly refined, as clearly seen in the subsequent increasing number of co-operative education student participants. 2. Educational institutes and business enterprises established a reciprocal responsibility in terms of co-operative education partnership, alliance, cooperative, mission, policy and plan that had been clearly made together. 3. There were on-site coordinators or representatives in each field of study, under supervision of the assigned co-operative education advisors in each particular areas, to provide and allocate jobs for the established co-operative education programs. This conduct was distinguished from those being done in other countries, resulting in insightful professional knowledge and ability to deal with confronting problems in time.

**Table 2.2** (Continued)

<b>Country</b>	<b>Theoretical Concept/ Philosophy</b>	<b>Target Goals of Development</b>	<b>Organizational Structure/ Management System</b>	<b>Key Success Factors</b>
<b>Australia</b>	The education system is integrated with on-site professional training (on the job training), in order to produce human resources for the employment market.	“Sandwich Education” consists of two curricula types: “Thin-Sandwiches” and “Thick Sandwiches;” the co-operative education alternates with the regular education.	1. Educational Institutes 2. Employers/ Entrepreneurs 3. Professional institutions	1. Educational institutes and private enterprises cooperated in running co-operative education, in Sandwich Education form. 2. Constant improvement and development of co-operative education were found in the universities across the country, especially in Swinburne University of Technology, the first university in Australia implementing co-operative education for over 50 years. 3. An organization and staff members were appointed to centralized responsibility and take control on the Co-operative education management on behalf of both academic institutes and private sectors.

## **CHAPTER 3**

### **LITERATURE REVIEW**

The literature related to co-operative education effectiveness or its operation is rather extensive and unsystematic. Contributors to the relevant literature have come from a variety of fields or areas of study, including public administration, public policy, education, generic management, and economics studies. Some of the literature is published in academic journals, monographs, and edited volumes, but a lot of it also can be found in government reports and publications, intended for practitioners and policymakers. Trying to put the collection of information into a systematic order was seemingly a huge task. However, a deliberate literature review was conducted, especially on at least two distinct theoretical perspectives or approaches to co-operative education, both of which reflect co-operative education effectiveness and the factors affecting policy implementation in light of a deeper understanding of co-operative education effectiveness and its relevant extents.

#### **3.1 Effectiveness**

The world is constantly in need of change. As such, recent research on effectiveness has focused strongly on the abilities of individuals, groups, and the entire organization to align promptly and then realign continually with changes in approaches necessitated by unstable environments (Jaques, 2010; Yilmaz and Ergun, 2008) from global challenges, economic turmoil, and competitive business opportunities. However, what is needed to manage these changes to ensure the consistency and sustainability of project delivery among project professionals is what Morrison and Brown (2004) termed effectiveness.

The significance of increased effectiveness in managing projects cannot be underestimated. Kerzner (2004), Mescon et al. (1985), and Morrison and Brown (2004), have consistently asserted that for an organization to survive, to succeed in the

long term, and to accomplish its objectives, it has to be effective in its approaches and techniques. Kerzner has argued that the effectiveness of project management demands thoughtful decision making, goal setting via prioritization, and effective communication with the stakeholders involved in implementing projects. According to Kerzner, this effectiveness would result in (a) defining expectations clearly, (b) facilitating interfacing with support departments, and (c) providing the opportunity for personal and professional growth within the project team. On the other hand, Wysocki (2007) claimed that a lack of effective practices would lead to (a) unacceptable products or services, (b) customer complaints, (c) high warranty costs, (d) decreased market share, (e) backlog, (f) redoing of completed work, (g) rejected output, and (h) late output of product or service delivery.

Goal clarity and rational decision making have been identified as key determinants of effectiveness (Campbell, 1977; Locke and Latham, 2002; Zwikaël and Unger-Aviram, 2010). Locke and Latham added that setting goals stirred up action and energized the team. They claimed that when the goals were clearly clarified from the onset, the project team members tended to focus their attention and effort directly on relevant activities, rather than extraneous activities that would not lead to success. Curtis (2000) asserted that goal setting is an effective way of directing interest, mobilizing effort, and enhancing the project team's determination to achieve the client outcome goals.

## **3.2 Implementation**

### **3.2.1 Definition of the Phrase “Turning Policy into Practice”**

From different perspectives of both national and world scholars, the phrase “turning policy into practice” has been defined as follows:

Pressman and Wildavsky (1984) gave the meaning of “Turning Policy into Practice” as written in Webster, and Roger dictionary in terms of the operation perfectly achieving or accomplishing its missions or aims. That was what the government was attempting to do. In fact, this meaning was attached to the nature of the word “policy.” Therefore, the first duty for government organizations was to turn policy into practice and to attain the target aims and all of their aspects. In other

words, the term was regarded as an interactive process between the targets and practices at the point where they meet. The underlining characteristics of turning policy into practice according to Pressman and Wildavsky can be observed as follows:

The first characteristic: the process of turning policy into practice involved the interrelation between all relevant factors.

The second characteristic: the core process involved the interrelation between the determination of target aims of the policy and the actions taken to achieve them.

The third characteristic: the evaluation of the achievement was defined in the form of a score framework with a precise and fair criterion that was clear for practitioners.

The fourth characteristic: intangible to tangible conversion of the aims that related to the human resources that worked together in a large group including both members within the organizations or between organizations.

Voradej Chandarasorn (2009: 25) shared his comment that the term “Turning Policy into Practice” was something related to education, as he said that “it was the extent to which the organizations owning the policy can guide and stimulate human management resources, as well as all relevant mechanics to work in achieving the goals.” In other words, in order to turn policy into practice, attention should be focused on “the ability to push all important mechanics to function for pursuing the goals.”

### **3.2.2 Conceptual Framework of “Turning Policy into Practice”**

3.2.2.1 The framework that viewed policy as an instrument: Hood (1984) perceived the concept of turning policy into practice as a tool of policy. Based on the degree of enforcement of the policy, from inducing to enforcing practitioners to forming their behaviors, it is an influential factor in making decisions to choose a policy. Alternatively, from the view of Linder and Peters (1989) regarding the concept, they think that the focus should rather be placed on the practitioners, as the ones that actually use the policy tool. The key information taken into consideration concerned those that had authority to choose the policy, the description of the policy, and the result of policy enforcement. The concept can be formed by using the patterns

of interrelations between the organization and the system. Since the interpretation of the concept is quite subjective, as it is based on the perceptions of practitioners towards the effectiveness of applied policy, and the defined criteria used to evaluate the appropriateness of such policy, the conceptual framework of “Turning Policy into Practice,” seemed much wider and not limited to the focus on the designers that provided the choices for decision makers.

The impediment to the success of turning policy to action or practice relates to the characteristics of the policy tool whether it is congruent with the political factors or not, and to what extent. If the policy tool is incongruent, the failure in turning the policy into practice is undeniable. Jobert (1989) pointed out that the policy tool should be aligned with those of the public authorities and formulated under the consideration of public institutions’ conditions, because they have direct effects on the characteristics of a policy tool; in other words, it is framed by environments. The concept of a policy tool could increase the potentiality of the policy. The formulation of the policy choices is undertaken by the accumulation of information about the desired characteristics of the policy. The proposals of alternatives are provided for the decision-makers. The theory of the policy tool stems from the framework or the model of the empirical interrelationships of all influential factors. Choices of policy for decision-making would be arranged in order based on the level of satisfaction of the practitioners and its degree of congruence with the political factors.

3.2.2.2 The framework focused on the interrelations among transaction costs, public choices, and implementation: Hargrove (1975) commented that there is a missing part of policy connection in analyzing the policy. The analysis has nothing to do with the separation between policy formation and how to turn it into practice, but instead, it is rather involved with the basic interconnection of the factors, which include the dimension on congruence of the policy with government contexts. Generally, the recently-defined policies have reflected inconsistency of transaction costs and the market’s demands, and the lack of proposed democracy policy options. Additionally, policy intervention theory should be able to analyze the conditions of the policy consistency with the market demand, not to only explain that the public sector was the original cause of the failure of the marketing. Moe (1991) asserted that

a good theory should systematically demonstrate the change in the trade-offs system and nonmarket alternatives.

3.2.2.3 The framework related to new institutionalism and policy implementation: Bryson and Ring (1990) explained that the framework attempted to draw on the empirical analysis that described the relation between the public sector and private sector. They stated that the public sector had the ability to set its own conditions, looking beyond rebuttable presumptions. The concept was that the new government brought some Incremental Welfare Economics to solve social problems instead. However, there is still no empirical evidence to prove that Incremental Welfare Economics is superior to the Market-Based Solution concept which could stimulate a free market. Rushefsky (1984) argued that without rebuttable presumptions, the private market would be superior. Nevertheless, the Policy Intervention also cannot make the presumption valid that the government substitution of the private market would lead practitioners to turn the policy into practice better and fairer than the Market-Based Solution or the Semi-Market Based Solution.

### **3.2.3 Educational Approaches to Turning Policy into Practice**

The approaches can be listed out as follows:

3.2.3.1 Structural approach: Sombat Thamrongthanyawong (2011: 419) posited that the new structural analysis of organizations lent the benefits of turning the policy into practice because the design of organizational policy formulation would be synchronized as a by-product. Recently, the educational approach to policy focused on the appropriateness of synchronizing different structures under different missions and environments. The concept is embedded in the terms “planning of change” and “planning for change,” which means planning for organizational changes through the process of clearly controlling the direction, time, management, and characteristics of work, as well as the interrelation among influential factors, whereas planning for change involves the external environment or the procedural changes that are difficult for one to take control or predict. Barrett and Fudge (1981) added that the process of policy development should be iterative. Turning policy into practice requires an applied process. The relation between policy

and practice of the policy is consistent and dynamic in a continuous loop (policy–action–policy).

Burns and Stalker (1961) stated that the organizational structure that was suitable for planning for change might be characterized as that of a government organization. According to the characteristics defined by Max Weber, structure is usually set up in a hierarchy. For planning for change, in contrast, different structures are more appropriate for being adjusted since their organic features make them highly flexible.

Hogwood and Gunn (1984: 209-210) concluded that determining the organizational structures for planning for change are not simple in a government system, since the government structure has many limitations considered from its general characteristics. Therefore, what to do is to blend the characteristics of both vertical structure and horizontal structure for more effective coordination within the organization

3.2.3.2 Procedural and Managerial Approaches: Hogwood and Gunn (1984: 210) shared their comment that designing an appropriate structure for turning policy into practice is less important than developing processes and procedures, as well as a managerial system that is applicable to the techniques used. The concepts of Planning of change and Planning for change could be a guideline in analyzing procedure and managerial systems. For planning of change, turning policy into practice can be considered as a technical problem. The management and regulations for operations usually involve work scheduling, planning, and controlling. Therefore, after identifying the problem and choosing the most effective policy, the steps in turning policy into practice can be described as follows:

Step 1: to design the plan in line with the expected outputs or done by clearly setting goals, working standards, and a timeline.

Step 2: to take the plan for action is done by appropriately designing the operational structure, selecting staff, sourcing and allocating budgets and resources, and formulating operational regulations.

Step 3: to define operational scheduling, operational monitoring, and controlling devices is done to ensure that the process is kept on target. Lang (1977) asserted that the management technique that has been widely used

is Network Planning and Control-NPC. It is a guideline for planning in terms of how to define and control the policy for practitioners to follow and take action, to ensure the defined missions covering the plan, and to determine the interrelations among the missions and expected outcomes. Sapolsky (1972) added that Program Evaluation and Review Technique–PERT can also be used as a tool to turn the policy into practice. The plan might not have very much effect on controlling to achieve the target time but it can be quite active in cultivating the confidence of decision-makers regarding the effectiveness of the plan management, resulting in less interference from politicians and less time for consideration of the approval of the plan.

From the perspective of Albanese (1975: 203), if network planning is effective, it will be beneficial as a tool to lead staff to perform expected behaviors, whereas network planning control heavily depends on the conditions of the network in terms of the communication of organizational messages, acceptance, probability, credibility, which would be controlled under the appropriate degrees of flexibility and rigidity.

3.2.3.3 Behavioral Approach: Eddy (1970) commented that there have been several attempts to apply behavioral analysis, but the most commonly-found is that of Organizational Development – OD. It is a kind of management consultancy in relation to the staff's roles and influential factors surrounding the organizational culture, including the behaviors of the staff and their attitudes towards the organization. It emphasizes more problem-solving procedures to find out solutions, rather than suggestions for the solutions. Hogwood and Gunn (1984: 214-215) raised an issue about the effectiveness of the managerial technique called management by objective – MBO, in which the management is transferred from the private sector to the government sector. The doubt concerned whether MBO was really practical. When there are a lot of objectives for government officers to take action, most of them lack authority to have direct control of the necessary resources that could support them to turn the policy into action. Therefore, consideration of the application of MBO should be based on the 3 following factors:

Factor 1: the hierarchy of goals or objectives of the managers, so as to ensure that the each manager, is assigned to the right objective and could lead

to the consistency of the whole structure and support all of the organizational objectives.

Factor 2: MBO has to be interactive based on consultancy.

Factor 3: MBO has to be embedded within the evaluation system of the operational performance of the staff to check whether the targets are accomplished or not, and to identify what operational strategies should be improved.

In summary, to some extent, the behavioral approach can give direct and indirect benefits in turning policy into practice.

3.2.3.4 Political Approach: Hogwood and Gunn (1984: 215-218) mentioned that, apart from the structural and procedural approach, and the behavioral approach, the political approach is one of important fundamental approaches in analyzing turning policy into practice. The meaning of politics is not limited to the politics among political parties, but it also includes the forms of power and influence between organizations and within the organization. In this sense, the analysis of politics is not complicated. Even though turning policy into practice can be conducted through planning, formulation of regulations, management, the application of behavioral techniques, the lack of political concerns could lead to the failure of turning policy into practice. Additionally, the interrelations among policy determination and relevant factors are actually dependent. Therefore, analysts usually consider both together. Similarly, politicians need to pay attention to turning policy into practice. The review implement of the policy helped making adjustment on of the rules or regulations where necessary.

3.2.3.5 Top-Down Approach: Younis and Davidson (1990: 5-8) called this approach the Prescriptions for Success, whereas Barrett and Fudge (1981: 12) called it the Policy-Central Approach. This means the image of the policy product foreseen by the policymaker. The image reflects what the policymaker wanted or thought was about to happen in his or her mind. In other words, it is a top-down process, where the policy is defined from the top view of what it was presumed to be and is broken down to practices at operational levels for making it possible. Sabatier (1986) shared a comment about the top-down approach—that its effectiveness in turning policy into practice depends on the clarity of the organizational goals. Moreover, this approach is consistent with the model of perfect administration, as

Hood (1984) explained that it was the conditions encompassed with the ability on the provision of external resources, and political acceptance, integrated with well management, to perfectly make turning policy into practice happened. Gunn (1980: 5) added that the perfect administration in line with the ideology can be called “perfect competition” or “rational decision making,” which has never existed in the real world, but it could scaffold practitioners to have a systematic concept of the rationales used in analyzing the causes of failure and that concept could be used to increase the efficacy of the process in turning policy into practice. The above details imply that the Top-Down approach is rather idealistic and is impractical for setting all of the relevant factors in the assigned conditions.

3.2.3.6 Bottom-Up Approach: Younis and Davidson (1990: 8-10) called this approach A Radical Change because it opened up the opportunity for lower-level staff to make decision on policy. The concept is the total converse of the Top-Down Approach. It was a huge change compared with the traditional approach. The outputs or consequence of the policy were believed to occur from the use of lower-level staff. Logically, the determination of policy cannot be responded to without negotiation between the policymakers and practitioners.

Inconclusively, Ham and Hill (1984) presented their view towards a shortfall of top-down as a risk when political power can internally influence the process of achieving the policy goals, not just about the matter of budget allocation. As a consequence, the application of the top-down approach appeared to avoid the management of budget, especially in terms of appropriate budget distribution. Likewise, Hjern and Porter (1981) gave an additional comment on the benefits of the Bottom-Up Approach, that it was more applicable in a democratic system in terms of increasing the roles of practitioners. Consistent with the concept of Kaufman (1976), analysts were familiar with the procedure of making appeals of government officers, in expecting to join their parts or authority in formulating the policy. Later, in response to that phenomenon, Lipsky (1971) proposed an important approach called street-level bureaucrats, and that supported the value of the bottom – up approach.

Elmore (1978: 605) concluded the advantages of the Bottom-Up Approach was that it provided more prompt solutions to the encountered problems because the lower staff was closely related to the problem sources. Attention to the

approach was placed on the operational staff decisions as they were enforced by the policy to solve public problems. Basically, they used their utmost skills and field experience in considering a solution to the problem. Thus, the policymakers should take the role of supporter or facilitator or provider of resources instead of a controller. They could use budget strategies to support those practitioners.

### **3.2.4 Influential Factors in the Success of “Turning Policy into Practice”**

Breuer and deLeon (1983: 265-274) stated that the influential factors regarding the success of “Turning the Policy into Practice” included the source of the policy, the clarity of the policy, the support of the policy, management complexity, the motivations of practitioners, resource allocation, and the adequacy of the support in pushing policy into action.

3.2.4.1 Source of the policy: the process of policy development usually begins with the policy formulation stage and continues throughout the implementation stage. As a result, various different forms of policies are launched for public practice and targeted to goals. Some common components of the policy could be reflected as follows.

Component 1: Attribute of policy: Policy can be publicized in the form government announcements or cabinet resolutions. Before that, the development stage of the policy begins with policy formation, policy alternative development, and policy decision-making. After all, the policy was considered as an output of politics with legality. The organization owning the policy has accountability for turning it into practice. Good policy should contain legitimacy, righteousness, social values, and be well-accepted by the general public.

Component 2: key contents of the policy: the key contents of the policy should cover all potential problems for which solutions are accepted. They are usually comprised of goals, measures of the implementation, and the accountable agency. Those contents would lend to more possibility in turning the policy into practice.

Component 3: collaboration between the legislative division and the administrative division: any policies issued by the administrative division are required to be legislated. Therefore, approvals from the legislative division are

requisites. This implies that the policies mechanically have a direct influence from both divisions.

Component 4: roles and responsibility of the public organizations: the roles and responsibility of the government organizations not only turn policy into practice in order to solve public problems, but also initiate policies, creating alternatives and making proposals to political authorities. Implementation of the policies would be more likely to be successful if the government leaders were truly attentive to public problems, and if the policy designers initiated high impact alternatives proposed for those that make decisions.

Component 5: the judgments and decisions of Supreme Court are final: the government organization accountable for the public policy has to follow the judgments and decisions of the Supreme Court for any cases under that policy.

Pressman and Widavsky (1984) stated that the main reason that analysts have paid more attention to the source of the policy as a high-impact factor of the success in turning the policy into practice is that lawful policy is normally constituted by two influential parties, the administrative division that issues it and the legislative division that approves it. They have the power to negotiate with each other. The administrative division might use its influence with the government organization or take direct accountability of the policy. Lazin (1973: 263-273) gave feedback regarding the analysts—saying that considerable concern should be taken on some vulnerable points of the source of the policy. For example, there are still some hidden conflicts against turning policy into practice. Some serious conflicts can be developed to be opponents or obstacles in implementing the policy. The analysts should put effort into minimizing or avoiding those conflicts; otherwise, negative effects would come in return in terms of loss of time, manpower, opportunity to solve public problems, etc.

3.2.4.2 Clarity of the Policy: it is the basis of setting goals and objectives. The clearer the policy is, the more practical and more likely it is that the policy will be successful. Berman (1978) called this “programmed implementation.” Stevens and Steven (1970: 348-425) maintained that lack of clarity could possibly happen in formulating policy, even with some of those defined by high-ranking government officers. The unclear policy can be caused by confusion in the policy that

the designers have regarding laws and regulations. The imprecise concept vastly affects the directions or goal setting of the policy. Another claim concerns the lack of precise procedures defined to promote turning policy into practice.

3.2.4.3 Support for the policy: Commoner (1979: 71-92) and Derthick (1972) shared their ideas about the supporters of a policy that can be considered based on a political view. Relevant parties include government parties, such as politicians, government organizations in charge, and budget allocation authorities, etc., and non-government parties, such as members in the election areas related to the problems, influential groups, stakeholders that receive effects from the problems, the general public, etc. The policy alternatives should be chosen based on the consideration of the appropriateness of budget allocation, resources, sources of the resources, and expenses used for policy implementation, for instance. Allison (1971: 128) added that understanding the policy implantation procedure, as well as systematic preparation by using strategies, predictions of overall factors, both negative and positive ones, are important. If political value is deemphasized, there is less possibility to make it a success. Still, politics are not always the indicator of success

3.2.4.4 Complexity of the Administration: Pressman and Aaron (1984) posited that if the policy developer is distant from the practitioners and stakeholders, both in a horizontal line such as the government representative team from different places to form a policy, or in a vertical line such as the team that works on controlling, monitoring, or coordinating, the policy will be complicated. To put it simply, the more stakeholders that are engaged in formulating the policy, the more complex the policy will be. As a result, the policy is likely to shift away from what was earlier anticipated, and finally become an impediment. Banfield (1971: 34-45) raised an interesting query about the extent to which the interaction between powerful authorities could assure the project's accomplishment. Basically, administrators will not get involved very much in performing the tasks of the project. The concept then is rather focused on the evaluation of the project, goal setting, motivation enhancement, and incentive support of the policy practitioners. Therefore, an effective policy should avoid complexity of the organizational structure or a lengthy structure of the organization.

3.2.4.5 Incentives for Implementers: Halperin and Kanter (1973: 11) insisted that the development of incentives by the management given to the practitioners has a huge effect on work determination and motivation. It can be seen that there is a lack of information received on market signals in the government system, resulting in difficulty in identifying the right kinds of the incentives, rewards, or punishment for practitioners. Bardach (1980) asserted that incentives are very important for the success of policy implementation. The organization should provide organizational incentives to reinforce the staff in pushing the project to the goals. However, a limitation in incentives provision could occur when unsystematic allocation of the budget is made, resulting in failure of the policy implementation. Moreover, in the study of McLaughlin (1975), the results revealed negative incentives, which could be misleading in terms of goals, whereas positive incentives could motivate the practitioners to push their effort towards the goals. To conclude, incentives are a crucial factor affecting the success of the implementation of policy.

3.2.4.6 Resource allocation: Sombat Thamrongthanyawong (2011: 444) believe that resources are one of the crucial factors in success. Even if the plans or projects have all of the important factors except for resources, those plans or projects cannot be accomplished and are thought to have failed from the start. Brever and deLeon (1983: 273-274) reaffirmed the fact that resources for the implementation of policy included capital, time, manpower, as well as technology and the necessary tools. The commonly-found problems were a shortage of resources as every society has limited resources. Hence, effective use of resources should be based on prioritizing plans, as well as using resource management strategies. The limitation caused by limited resources has a great effect on the success of policy implementation. Therefore, appropriate allocation of budget, time, and resource distribution would help in eliminating the shortfall.

Further, Berman (1978) carried out a study on the influential factors for the success of turning policy into practice, and the results showed that success can be evaluated according to the extent of goal achievement, the continuity of the theory, and the enthusiasm and experience of the target the population. Berman also emphasized that turning policy into practice depends on active participation of the relevant members.

### **3.2.5 Process of Turning Policy into Practice:**

The process can be divided into 2 levels as follows:

3.2.5.1 Macro Level: Chumpon Nimpanit (2011: 244) divided the process of turning the policy into practice at the macro level into 2 levels:

Level 1: This involves the transformation of the policy into a plan, a program, a project, or an activity. Voradej Chandarasorn (2009: 35) asserted that the process typically begins with defining the policy in the form of a cabinet resolution or a consensus of government authorities. An organization would be assigned to take accountability for the policy. Crucial success factors include the clarity of the goals of the policy, the relationship between the goals, and the understanding of the policy goals of accountable organizations or stakeholders, as well as the participation of political authorities and the sincerity of the members in turning the policy into practice. Once the organizations clearly know their missions, they will take responsibility for the success of the implementation of the plan and the project.

Level 2: it is the operation process or mission acknowledgement of the federal government or organizations in taking action to employ the policy. When the policy is broken into a plan, it is difficult for regional and local parties to conform if it failed to gain the acceptance of stakeholders. This inconformity would lead to protest, especially by the general public. The federal then needs to seek ways of drawing acceptance from the locality. It might be a benefit dispute between the public and private sectors and the people. Voradej Chandarasorn (2009: 36) added that insufficient resources could lead to a delay in the project. In many cases, if there is inconsistency between the policy and the demand of the localities, the policy would be taken by them as an unavoidable task. Therefore, the result would shift away from the goals set.

3.2.5.2 Micro Level: Berman (1978) made a comment about the operation process in turning policy into practice at the micro level—that it could be broken down into 3 steps as mobilization step, the implementation step, and the institutionalization or continuation step.

Step 1: Mobilization: Van Horn (1976) believes that this step could be operated by the local parties through two types of activities: 1) considering

the acceptance of the policy and 2) finding support for the policy. Apparently, the key success factors in turning policy into practice need the support of the people and groups of stakeholders in local areas. In general, the support would come in the form a plan or a project. Sometimes, it could be a sort of academic support, technique or participatory management by the people, community leaders, and local organizations.

Step 2: Implementation: it is the second step after the acceptance step. The step is the process of putting policy to action. The success of the implementation step depends on ways to make adjustments to the plan or project in order to create an alignment with the demand of the locality. Likewise, the local organizations needs to find ways to adjust their behaviors to be consistent with the plan or project assigned.

Step 3: Institutionalization or Continuation: Voradej Chandara sorn (2009: 41) concluded that administrators at the local level re required to act in pursuing and raising the awareness of the practitioners regarding the importance of policy. In terms of practitioners, they need to set their mind to be ready and willing to follow and to accept the policy as a daily routine. In Thailand, if the policy is consistent and well-accepted, the local stakeholders will perceive it as agreeing with their demands. Then, the process of the Institutionalization or Continuation become possible. In contrast, if there is a political change such as government reform, or policy adjustment, some of the cases will not be able to receive consistent support, and this step would never take place.

### **3.3 Educational Effectiveness**

Mark (1999) stated that the effectiveness of education is a consequence of the learning model designed and the learning theory applied. Boyatzis and Kolb (1995) asserted that, according to learning theory, learning skills can be divided into 4 domains:

- 1) Interpersonal Skills
- 2) Information-Gathering Skills
- 3) Analytical Skills
- 4) Behavioral Skills

Tissana Khamanee (2008: 475) mentioned that learning theory refers to statements that describe, explain, and predict the learning phenomenon, which could be later proved and tested by using the scientific process, and eventually will be widely accepted as a reliable concept that can be applied as a guideline or as rules in designing small units of an instruction or used in real classroom instruction. The theory usually contains many sub-principles as suggested by scholars in the following examples:

Bloom (1995) categorized learning taxonomy into 6 levels:

- 1) Knowledge level: the lowest level or memorizing
- 2) Comprehend level: understanding
- 3) Application level: using
- 4) Analysis level: problem solving, rechecking
- 5) Synthesis level: combining all components and constructing new knowledge that look different from the original sources
- 6) Evaluation level: judging which parts are correct or incorrect, based on the explicit rationales and rules that could be proved

Gagne (2005) proposed the concept of learning theory as in the 8 following steps:

- 1) Motivation Phase: learners' expectation is a motivation in learning
- 2) Apprehending Phase: learners usually learn by picking up particular information that is related to what they expected
- 3) Acquisition Phase: learners organize or internalize what they have learned into short term and long-term memory
- 4) Ability to Memorize Phase: learners are able to memorize what they have learned
- 5) Ability to Recall Phase: learners are able to recall the previously-met information
- 6) Generalization Phase: learners are able to construct the learned knowledge
- 7) Performance Phase: learners are able to perform tasks using the learned knowledge

8) Feedback Phase: learners receive comments and feedback from teachers as a reflection of their learning output, and in doing this, the learners will know their weakness sooner and improve themselves more effectively

In addition, Gagne (2009) proposed the key components of learning as follows:

- 1) The learner is the person that has a sensory system and psychological receptors to receive information.
- 2) The stimulus is a set of situations or conditions in which learners are stimulated to learn something.
- 3) Response is the behaviors performed resulting from the learning.

Gagne's learning theory was formulated as the Information Processing Theory. He explained how learning occurs in terms of information processing in the human brain from surrounding external stimuli until the information is finally internalized by the learner, from the storage of short-term memory to long-term memory, as well as how the learner recalls or retrieves the information that has been stored to perform a task or a behavior. His concept of learning can be broken down into 9 learning steps and arranged in order as follows:

Step 1: The attention of learners is drawn to a lesson where cartoons or graphic illustrations can be applied as stimuli. Curiosity is one of the effective variables to motivate learners to learn. Provocative questions can also be a tool to call the learners' attention.

Step 2: The teacher informs the learners of the objectives of the lesson so that the learners will be encouraged and know what the lesson is about.

Step 3: The teacher stimulates the learners' schemata and tries to make links with new incoming content by using leading questions to brainstorm learners prior knowledge about the topics. The new information could eventually be stored in long-term memory when the information in both memories are interconnected.

Step 4: The teacher gives a lecture or presents the learning content with an explanation through learning materials such as graphic illustrations or videos.

Step 5: The teacher provides examples including case studies and case comparisons as a means of learning to ensure that the learners have a clear understanding of the contents.

Step 6: The learners practice what they have learned to improve their skills and ability in performing the expected behaviors. Correction or more explanation could be added as necessary.

Step 7: Additional activities are assigned to enforce the learning achievement such as extra exercises for the learners, provided with teachers' feedback and comments.

Step 8: Evaluation is undertaken by using testing tools to measure the learners' achievement.

Step 9: The learners can apply the knowledge gained from the lesson in performing the tasks. The exercises should also be designed to give the learners the opportunity to transfer their knowledge.

According to Gagne's Information Processing Theory, knowledge can be internalized when the learners have motivation and expect to learn. They will pick up the information that is relevant to what they had anticipated. Once the brain receives that information, it is first temporarily stored in short-term memory and then moves to long-term memory which is considered as the permanent storage of information in the human brain. After that, the information can be recalled when the learners want to apply the knowledge to performing a task.

### **3.3.1 Problem-Based Learning**

Learning by using the basis of problem solving has been defined by psychologists, researchers, and specialists as follows:

Boud and Feletti (1997) described that it is the learning designed on a problem basis, added into the structure of the curriculum, where the students have the opportunity to learn and practice while they are confronting a problem.

Manita and Pat (2016) defined Problem Based Learning (PBL) as learning that begins with a problem, and its 5 key characteristics have been elaborated by various groups of experts, as: 1) a situation that is complex and students can experience the real world; 2) students work collaboratively as groups; 3) students gain new knowledge from authentic experience; 4) the roles of teachers are as facilitators; and 5) the problem could lead to the ability to develop knowledge maintenance. Later, the characteristics of PBL were expanded into 8 aspects:

- 1) Acknowledgement of the learners' background from their experience
- 2) Reinforcement for learners to take their own learning as self-responsibility
- 3) Knowledge integration or cross-disciplinary learning
- 4) Combination of theories and practices
- 5) Attention on the knowledge acquisition process rather than products or learning outputs
- 6) A shift of the teacher's role from instructor to facilitator
- 7) A change of assessment by the teacher as an assessor to be a learner that conducts his/her own self-assessment or among themselves by peer-assessment
- 8) Emphasis on expertise in communication and interpersonal relations to promote understanding and knowledge acquisition

All of the above characteristics reveal that the PBL has a focus on learners, the learning process, and learning content. Knowledge is acquired through the learners' sharing their experiences and their interaction. Learners use their entire knowledge or experience to analyze and deal with problems. A number of experts have defined PBL as a learning model focused on the development of learners in a specific area they are keen on, through situations where the learners encounter assigned cases, and problems or problems in a real life context (Savin-Baden, 2000). Bridges (2007) added that the objectives of PBL are to discover and attempt to find the knowledge elicited from cumulative knowledge portions relevant to the topic that they already have, through the assigned tasks, by using the working steps in figuring out what the variables are, how to deal with them, and why or other contexts constituted the task. Therefore, PBL probably means learning or an instructional model that bonds learning and instruction together; for instance, learners need to formulate guided questions and then find out the solutions by themselves in order to construct knowledge and understanding about the topic through real-life experiences (Savin-Baden, 2000). It is believed that PBL allows learners to be able to increase their expertise in the area that they are interested in, as well as to gain ability to solve confronted problems and to raise their essential skills such as self-awareness, creative thinking, critical thinking, systematic data organizing, etc.

The PBL of Medical School of Harvard University has been integrated in its system. The PBL there is a mixed style between traditional learning and PBL in the sense that there is still a lecture combined with clinical learning but lecture time is reduced and focuses only on key information. It includes 6 learning steps (David and Hardens, 1999; Feletti and Caver, 1989).

Step 1: the learners are given assigned tasks without earlier notification or reviews about the tasks

Step 2: the learners identify the problems from the given tasks

Step 3: the learners identify what additional knowledge is required from the goals or objectives of learning to achieve the tasks

Step 4: the group members are individually assigned to find out more knowledge required for which each takes responsibility

Step 5: the group members call a meeting to discuss their prior knowledge, the new knowledge gathered from the group, and to review the newly-constructed knowledge as to whether it has achieved the learning goals. If there is still some missing knowledge, the members will help to find it out once again.

Step 6: the group members help each other in synthesizing the data and principles from the information gathered from each member, and then form a conclusion regarding how the group can solve the problem

Although PBL was first implemented in medical schools, it has become recently more prevalent with other groups of practitioners. The distinctive strength of PBL can be found in the following characteristics (Wanlee Sattayasai, 2004; Wattana Rattanaprom, 2005).

1) It is a preparation of learners before confronting problems simulated by real-life situations. If the learners foresee the links of what they have learned with real life situations, the knowledge will be meaningful to them and they will have more curiosity to learn and memorize it.

2) Content knowledge is usually interconnected with other areas of studies. As a result, some irrelevant or outdated fundamental courses can be removed from the curriculum.

3) Knowledge constructed from PBL is normally collected from the required contents from many fields of studies. PBL can help reduce unnecessary content courses in the curriculum.

4) PBL enhances the learning and professional skills necessary for job operation after attainment of a bachelor's degree, especially the professional skills in specific fields or vocational fields.

5) The focus of PBL is on the learner-centered concept. The learners that used to be passive would become more active in the sense that they have roles to participate, monitor, and take responsibility for their own learning. In this way the knowledge gained from PBL is more comprehensible and durable in the learners' memory. As the learner's role comes into in the form of designing and finding solutions to problems, the teacher's roles are reduced and appear to be just a facilitator instead in order to create a stimulating learning environment.

6) PBL is a kind of interdisciplinary learning, as it allows for the opportunity for students to learn by solving a problem. While they are in the process of solving the problem, they need to know many different knowledge contents across a variety of areas of studies to be able to handle the problem.

7) PBL stimulus is the problem in an assigned task simulating a real-life situation. The learners need to truly understand and know what content is necessary for them. The knowledge is gained in small group discussion activities. Learners feel more satisfied and have more motivation to learn.

8) PBL stimulates in-depth learning rather than traditional rote learning because learners need to really understand the learning content so that they can apply it in solving problems.

9) PBL is creative learning because the learners need to use their prior knowledge and add new knowledge on top of that, and then construct new knowledge.

10) PBL promotes cooperative learning. The learners have the opportunity to learn through solving a problem, and encouraging a teamwork environment where the learners can work, learn, and solve the problem together. PBL, therefore, is a solution for mixed-ability classes where the learners can share different points of view and learn how to help each other.

According to the above discussion related to the PBL concept, the core concepts seem similar and can be projected in the following steps:

1) Understanding the problem step: the learners are divided into groups of 4-5 and problem-based tasks are given to each group with an explanation of the question.

2) Identifying problems from the question step: the group members try to identify what the problem is according to the given situation.

3) Analyzing problem and hypothesis setting step: the group members help each other in order to analyze the problem and formulate a hypothesis for the study in order to solve the problem. The hypothesis can be more than one and should be arranged in sequence from more important to less important.

4) Goal Setting Step: the group sets the goals according to the hypothesis formulated in item 3, and then works together to achieve them.

5) Information Searching Step: the group members will be individually assigned to gather relevant information until it is sufficient to use in achieving the goals.

6) Discussing step: after the group members compile the information, they have a group discussion in order to review whether the information is sufficient or is directly related to what they can use to solve the problem. If there is still some information missing, they will help each other in obtaining more information until it seems ample.

7) Synthesizing and concluding step: the compiled information will be synthesized and then concluded in terms of how the group would apply the information to solve the problem and to meet the goals.

### **3.4 Cooperative Education Effectiveness**

Co-operative education is one of the most successful work-based learning programs. It aims to equip students with the organizational skills needed in the labor market. Much of the literature published in the cooperative education field can be divided into four thematic areas: 1) the student's benefits, 2) the employer's benefits, 3) training and experiential learning models, and 4) employer perspectives, with

anticipation of successful interaction of these four areas to improve the quality of cooperative education programs (Braunstein, 2000).

In 2004, the OHEC set up higher educational standards to adopt co-operative education and to measure the success of its effectiveness. Three main OHEC indicators were also developed, as applied in the present study, to measure the co-operative education effectiveness in the case of higher education in Thailand. They are as follows.

- 1) Quality of students
- 2) Quality of higher education
- 3) Quality of workplace

Cooperative education effectiveness was defined as the degree to which goals are achieved and the extent to which targeted problems are solved. The present study emphasizes co-operative education effectiveness in Thai higher education, integrating classroom theories with practical, planned, and supervised work experience in the public and private sectors. It allows students to acquire essential practical skills by being exposed to the reality of the working world, thus enhancing self-confidence and career direction.

#### **3.4.1 Cooperative Education Effectiveness: Quality of Students**

Chapin, Roudebush and Krone (1997) conducted a survey concerning the use of co-operative education on the part of 88 members of the schools in the Associated Schools of Construction. The response rate was 61% with 54 of the 88 questionnaires returned. The definition of co-operative education also included internships and work study programs. A major finding of the study was that 91% of the schools had some kind of co-operative education and the majority of the schools (58%) required the experience in their curricula (Chapin et al., 1997). For the schools where the co-operative education program was voluntary, an average of 32% of the students chose to participate. While the benefits of co-operative education were descriptive, opinion-based, and self-reported by the faculty, co-operative education administrators, and department heads, some of the written comments came from the questionnaire and gave a clue as to what construction educators believed about the students' co-operative education experience as follows:

- 1) Students gained more motivation.
- 2) Most of the programs improved classroom performance as a result of the experience.
- 3) The quality of the performance in the capstone courses required at the end of the senior year had been changed.
- 4) The programs provided direction for students and helped to motivate them when returning to the classroom.
- 5) In having experiences provided with responsibility, students became mature in their discipline.
- 6) The programs brought in relevant experiential simulations to the students' classes.
- 7) Students familiarized themselves with real-life situations. Academic tests reflected such situations. All curriculum tests reflected practical applications.
- 8) Employers offered higher salaries to graduates with experience.
- 9) Graduates with co-operative education experience obtained higher entry-level salaries and were promoted much faster (Chapin et al., 1997).

Burton (2000) conducted a study involving engineering students from the fall semesters of 1993 and 1994 at Clemson University. In an effort to create equal groups between co-operative education students ( $N = 190$ ) and non co-operative education students ( $N = 193$ ), Burton measured baseline academic achievement using freshman GPAs and student grades in a required freshman engineering class. The outcome measurement was cumulative GPA and student grades in engineering major-specific classes, including the sophomore, junior, and senior years. After using analysis of covariance (ANCOVA) to create adjusted means, Burton's results showed that the cooperative students had a statistically-higher mean cumulative GPA than the non-co-operative education students at the .05 level (Burton, 2000). Burton also reported that after using ANCOVA to account for the initial differences in the groups' freshman GPAs, there were no significant differences between the co-operative education students and non-co-operative education students when comparing the engineering major-specific classes in the sophomore, junior, and senior years (Burton, 2000). It is interesting that co-operative education participation had a significant effect on the more general cumulative GPA, but did not have a significant effect on the grades in

engineering classes that would seem to benefit from related co-operative education work experience.

In summary regarding co-operative education effectiveness: the quality of students was seen as an important indicator in the study. With respect to the investigation of indicators, the measurement of co-operative education effectiveness in Thai higher education suggested particular exploration of three types of measurement of the quality of students: 1) their experience, 2) their GPA, and 3) their skills.

Many scholars have tried to measure the quality of students and the collection as represented in Table 3.1. This paper attempts to group the types of indicators with the types of measurement regarding the quality of students in order to achieve the OHEC purposes for co-operative education as follows:

- 1) To develop and form graduates that have desirable characteristics, skills, and abilities in responding to employers' requirements
- 2) To encourage institutions and employers to engage in cooperative work in order to develop curricula in responding to labor market demands, as well as to increase internationally competitive capability at the greatest level
- 3) To promote and support co-operative education networks as a mechanism for reciprocally mobilizing co-operative education, resources, and the body of knowledge (Office of Higher Education Commission, 2009a)

**Table 3.1** Measurements of Quality of Students

<b>Types of Measurement of the Quality of Students</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>Experience</b>	<b>Department of Education English Programs (2007)</b>	<ul style="list-style-type: none"> <li>- Opportunity for students to share experience in co-operative education with staff, faculty and students in formal presentations, through informal group debriefing, one-on-one with coordinators, on line postings, web logs, evaluations (both positive and constructive), etc.</li> <li>- Students' application of' portfolios related to co-operative education (including reports) for future work terms and for students' future career development</li> </ul>
	<b>Chin, Steiner Bell, Munby, and Hutchinson (2004)</b>	<ul style="list-style-type: none"> <li>- The number of interviews obtained might be an indicator of the success of work experience, and might be included in writing resumes and cover letters</li> </ul>
<b>GPA.</b>	<b>Burtons (2000)</b>	<ul style="list-style-type: none"> <li>- Prospective co-operative education student screening criteria before joining the training program in the workplace</li> <li>- Co-operative education student evaluation of progressive development conducted jointly by the co-operative education coordinator and the on-the-job supervisors during the practicum</li> </ul>
<b>Students' Skills</b>	<b>The University of Waterloo (2005)</b>	<ul style="list-style-type: none"> <li>- Co-operative education student evaluation after completion of the practicum</li> </ul>

**Table 3.1** (Continued)

<b>Types of Measurement of the Quality of Students</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>Students' Skills</b>	<b>The University of Waterloo (2005)</b>	<ul style="list-style-type: none"> <li>- Co-operative education site visits, back to school debriefings, protocol setting to reflect the focus on learning aspects that covered the monitoring of learning objectives, reflecting on exercises, establishing work projects based upon learning objectives, etc.</li> <li>- Students' setting up their co-operative education learning objectives prior to the work term.</li> <li>- Students' co-operative education work or tasks for the term completion requirements include evidence of learning outcomes.</li> </ul>
	<b>Chin, Steiner Bell, Munby, and Hutchinson. (2004)</b>	<ul style="list-style-type: none"> <li>- The number of jobs filled as a proportion of the number of jobs posted in the term demonstrates how closely aligned the job postings are with the students' skill sets.</li> </ul>
	<b>Illinois State Board of Education (2009)</b>	<ul style="list-style-type: none"> <li>- Ability of the co-operative education students to solve unanticipated problems that arise on the job</li> </ul>

### **3.4.2 Cooperative Education Effectiveness: Quality of Higher Education**

Wilson (1988) highlighted the importance of good teachers, a well-planned and executed curriculum, careful sequencing and timing of the student experience, well-organized work experiences, employer and educator communication, knowledgeable liaisons, and the strength of student preparation. An important point made by authorities in the field is that while employers are interested in the preparation of students for productive roles in the workplace, with an emphasis on

commitment, flexibility, adaptation, team work, and problem solving, most co-operative education studies have examined specific trade skill competencies and organizational efficacy as measurement tools for the program success.

There are, however, some major challenges that need to be overcome before these practices become more widely adopted. Despite the estimates that many Australian universities offer co-operative education and other work-integrated learning programs and that there is pressure to extend work place experience to all university programs (Reeders, 2000), there appears to be a lack of funding to support these programs adequately.

Academic staff members involved in co-operative education have reported that they felt that their workload was high and was undervalued, and that their programs were not adequately funded (Atchison et al., 1999). This means that co-operative education managers might not have the time to check all work placements thoroughly enough to ensure that the appropriate learning opportunities are being provided for students. There might also not be time to inform workplace supervisors of their responsibilities and the learning objectives of the program. This, added to labour market pressures that could make finding work placements difficult, means that some placements do not support students' learning as well as they should.

Insufficient resourcing of co-operative education might also mean that there is inadequate preparation for academic mentors whose role is to support student learning in the workplace (Atchison et al., 1999). These mentors often have to supervise large numbers of students without the appropriate time allocation. Furthermore, academics have reported that they feel that their work in mentoring co-operative education students is not recognized nor is it rewarded through the process of academic promotions (Weisz, 1995). This means that the commitment by academics to co-operative education often takes relatively low priority in their work planning (Weisz, 1995) and that the learning in co-operative education and other work-integrated learning programs is often left to chance (Reeders et al., 1999).

It has, however, been determined that many students do adopt a deep approach to learning during co-operative education (Weisz et al., 2001) despite the lack of academic support. While many academics hold the belief that students in the workplace pick up skills and knowledge just by being in the workplace and that

learning occurs through osmosis (Martin, 1997), Martin explained that students learn from their employer or supervisor, who might also support them in reinterpreting and transforming the theory in light of their practical experiences.

In summary, co-operative education effectiveness in terms of the quality of higher education is an important indicator in the present study. With respect to the investigation of indicators that measured co-operative education effectiveness in Thai higher education, the results suggested an exploration of seven types of measurement of the quality of higher education: 1) good teachers, 2) a well-planned and executed curriculum, 3) careful sequencing and timing of the student experience, 4) well-organized work experiences, 5) employer and educator communication, 6) knowledgeable liaisons, and 7) the strength of student preparation.

Many scholars have tried to measure the quality of higher education and the collection as represented in Table 3.2. The present paper has attempted to group the types of indicators with the types of measurements of the quality of higher education in order to achieve OHEC purposes of co-operative education as follows:

- 1) To develop and form graduates to have desirable characteristics, skills and ability in responding to the employers' requirements
- 2) To encourage institutions and employers to engage in co-operative working to develop curricula in responding to labor market demands, as well as to increase their internationally-competitive capability at the greatest level
- 3) To promote and support co-operative education networks as a mechanism for reciprocally mobilizing co-operative education resources and bodies of knowledge (Office of Higher Education Commission, 2009a)

**Table 3.2** Measurements of the Quality of Higher Education

<b>Types of Measurement of The Quality of Higher Education</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>Good Teachers</b>	<b>the University of Waterloo (2005)</b>	<ul style="list-style-type: none"> <li>- The teachers possessed appropriate certificates or academic degrees of attainment.</li> <li>- The teachers prepared and followed an annual professional development plan that was aligned with their individual performance-based teacher evaluation.</li> <li>- The teachers participated in technical and professional activities or trainings in content areas of knowledge and in instructional management.</li> </ul>
	<b>Canadian Association for Co-operative Education (CAFCE) (2006)</b>	<ul style="list-style-type: none"> <li>- The teachers possessed appropriate certificates or academic degrees of attainment.</li> <li>- The teachers prepared and followed an annual professional development plan that was aligned with their individual performance-based teacher evaluation.</li> <li>- The teachers participated in technical and professional activities or trainings in content areas of knowledge and in instructional management.</li> </ul>
	<b>Department of Elementary and Secondary Education (2015)</b>	<ul style="list-style-type: none"> <li>- The teachers maintained partnerships, participation, and leadership for professional organizations.</li> <li>- Daily lesson plans and teaching calendars were derived from the curriculum guide and used to direct the instructional process.</li> <li>- A variety of instructional methods and strategies was used to accommodate all learning styles.</li> </ul>

**Table 3.2** (Continued)

<b>Types of Measurement of The Quality of Higher Education</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>Good Teachers</b> (Continued)	<b>Department of Elementary and Secondary Education (2015)</b>	<ul style="list-style-type: none"> <li>- The teachers' effective research-based classroom management techniques were provided and facilitated instruction.</li> <li>- Co-operative education goals, measureable learner objectives, assessment methods, and performance expectations were shared with students prior to instruction.</li> </ul>
	<b>Seneca College (2013)</b>	<ul style="list-style-type: none"> <li>- School and industry resources were utilized to effectively achieve curricular and co-operative education goals.</li> <li>- Appropriate technology, equipment and instructional materials were employed to support the curriculum and instructional process.</li> <li>- Work-based learning supported co-operative education objectives, where appropriate.</li> </ul> <p>Co-operative education was guided by policies for supervised employment and for approved higher education co-operative education.</p>
<b>A Well-Planned and Executed Curriculum</b>	<b>Department of Elementary and Secondary Education (2015)</b>	<ul style="list-style-type: none"> <li>- The written curriculum guide included the required co-operative education components (Instruction Engineering Process Standard, Career and Technical Student Organization (CTSO), and leadership content was aligned with appropriate state and national academic and technical standards.</li> <li>- The curriculum was reviewed annually and revised as necessary to reflect changes occurring in industry, students' needs, and instructional technology.</li> </ul>

**Table 3.2** (Continued)

<b>Types of Measurement of The Quality of Higher Education</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>A Well-Planned and Executed Curriculum</b>	<b>Department of Elementary and Secondary Education (2015)</b>	- Written agreements (dual enrollment, articulation, co-operative education, etc.) were developed, implemented, and updated regularly.
<b>Careful Sequencing and Timing of the Student's Experience</b>	<b>Illinois State Board of Education (2009)</b>	<ul style="list-style-type: none"> <li>- The number of workshops provided by the institution and by faculty</li> <li>- The content of the workshops was specific and relevant in supporting students with a job search process and success in the workplace</li> <li>- The number and percentage of students that obtained work placements and were seriously seeking a co-operative education work term</li> <li>- The number and the percentage of co-operative education students that successfully completed (passed) their co-operative education work term</li> <li>- The number and required percentage of co-operative education modules delivered within an "academic" course, or for which the students received credits</li> </ul>
	<b>The University of Waterloo (2005)</b>	<ul style="list-style-type: none"> <li>- The integration of co-operative education experiences when they were back in the classroom</li> <li>- A high level of faculty involvement in above monitoring and assessment</li> <li>- Academic credit given to the students for the completion of all requirements for the work term</li> </ul>

**Table 3.2** (Continued)

<b>Types of Measurement of The Quality of Higher Education</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>Careful Sequencing and Timing of the Student's Experience</b>	<b>The University of Waterloo (2005)</b>	- Co-operative education policies and practices that focused on learning
<b>Well-organized work experience</b>	<b>Seneca College (2013)</b>	- The program included a written statement of educational mission, goals, and objectives that were developed with the input from the program advisory committee consisting of parents, students, administration, the community, and business/industry.  - There was a written plan to annually evaluate the continuous improvement of the effectiveness of the program.  - An annual program budget was collaboratively developed by the teachers and administrators to provide adequate funding for professional development, career and technical student organization activities, equipment, maintenance, supplies, and materials.
	<b>Narin Sridokmai (2012)</b>	- The certificated teachers participated in ongoing, high-quality, program specific professional development activities.  - The measurement of the satisfaction of students, employers, faculty, and staff through surveys, as a regular component of the co-operative education, enabled responsiveness to internal and external changes and assisted with the trend analysis over time.

**Table 3.2** (Continued)

<b>Types of Measurement of The Quality of Higher Education</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>Employer and Educator Communication</b>	<b>Canadian Association for Co- operative Education (CAFCE) (2006)</b>	<ul style="list-style-type: none"> <li>- The maintenance of regular contacts between the co-operative education coordinator and the workplace supervisors</li> <li>- The practice of on-site visits that established the work conditions of the students and fostered deeper communication between the institution and the workplace</li> </ul>
<b>Knowledgeable Liaisons</b>	<b>Illinois State Board of Education (2009)</b>	<ul style="list-style-type: none"> <li>- The proportion of work terms that were self-developed as opposed to posted and obtained through competition was dependent on each institution's strategies.</li> <li>- The recognition of co-operative education work terms for academic credit by the institution</li> </ul>
<b>The Strength of The Student's Preparation</b>	<b>National Forum on Education Statistics (2005)</b>	<ul style="list-style-type: none"> <li>- Classroom and lab areas met existing federal, state, and local health and safety codes/standards.</li> <li>- Classroom and lab areas were appropriate for the program and conducive to student learning.</li> <li>- Equipment was in good condition and proper working function.</li> <li>- Equipment was representative of that used in industry and aligned with the curriculum.</li> <li>- An inventory of the equipment was on file and updated annually.</li> </ul>

**Table 3.2** (Continued)

<b>Types of Measurement Of The Quality Of Higher Education</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>The Strength of the Student's Preparation</b> (Continued)	<b>Narin Sridokmai (2012)</b>	<ul style="list-style-type: none"> <li>- The agricultural education teachers were provided time during the school day to supervise student experiential learning (SAE) instruction.</li> <li>- The program had in place a grading procedure that incorporated all components of the instructional program (i.e. classroom/lab, experiential learning (SAE), and leadership and personal development (FFA).</li> </ul>
	<b>National Forum on Education Statistics (2005)</b>	<ul style="list-style-type: none"> <li>- Based on career pathways/clusters, interests, and agricultural education curriculum standards, all students had experiential learning (SAE) programs that were planned, developed, and managed by the students with instruction and supported by the agriculture teachers, parents/guardians, and/or employer.</li> <li>- The agricultural education teachers were employed for 12 months to provide continuous instruction and supervision of student experiential learning (SAE) programs.</li> <li>- Each agricultural education student maintained up-to-date and accurate experiential learning (SAE) records.</li> <li>- The program served the entire community by providing agricultural educational opportunities for adults.</li> <li>- The program promoted agricultural literacy within the school and community.</li> </ul>

### **3.4.3 Cooperative Education Effectiveness: Quality of workplaces**

The workplace played an important and critical role in work-based learning. The main reason was that they were the ones that owned the jobs and that knew the skills most needed in the labor market. Therefore, their contribution and involvement in program planning and development would help secure job opportunities for graduates. Another reason their role was critical was their contribution to training in general and youth training in particular. Based on a 1995 survey, the US government found that in firms with more than 50 workers, 95.8% of the people surveyed had received some form of informal training while on the job with that employer. Some 69.8% had received some type of formal training in the previous 12 months. The most frequent type of training included occupational skills training, safety training, or communications, and the younger workers were much more likely to receive training than the older ones (Hawley, 2001). The findings of that study provided indicators that the private sectors and employers in general paid more attention to training. Therefore, their training experience would have a positive impact on the students assigned to those training programs.

In a 1993 telephone survey, Wheeler (1993) studied workplaces' perspectives regarding eight organizational skills. They concerned the theoretical knowledge of the professional field and the potential for career and advancement. These skills were:

- 1) Communication skills
- 2) The capability to learn new skills and procedures
- 3) The capability to make decisions and solve problems
- 4) The ability to apply knowledge in the workplace
- 5) The theoretical knowledge in the professional field
- 6) The capability to work with minimum supervision
- 7) The capability for cooperative education and team work
- 8) The potential for career and advancement

Al-Megren (1996) studied the perceptions of the private sector towards the quality of the vocational education system in Saudi Arabia. He found that the organization's size and organization's years of experience dealing with vocational students created great differences in their responses. For example, smaller and newer firms had a positive perception of the level of experience of vocational educational

students, whereas bigger organizations had negative perceptions. Additionally, firms with very low capital tended to hesitate to cooperate with vocational education programs. The majority of the study respondents emphasized the importance of technical and soft skills in their future employees, and the report of the absence of these skills written to the General Organization for Technical Education and Vocational Training (GOTEVT) graduates. Despite the negative perception of students' attributes and the vocational education system, employers were willing to hire vocational education graduates and to cooperate with the GOTEVT in student preparation for the labor market (Al-Megren, 1996). However, Al-Megren's study was conducted before the implementation of co-operative education in the GOTEVT.

In summary, co-operative education effectiveness: the quality of the workplace is an important indicator in the present study. With respect to the investigation of indicators, the measurement of co-operative education effectiveness in Thai higher education suggested particular exploration of four types of measurement of the quality of the workplace: 1) training, 2) professional skills and abilities, 3) business size and years of experience dealing with co-operative education, and 4. the business's capital.

Many scholars have tried to measure workplace quality by using a collection of measurements with some key indicators as illustrated in Table 3.3. The respective measurements on workplace quality were selected from those achieved by the OHEC regarding co-operative education in serving the following purposes:

- 1) To develop and form graduates to have desirable characteristics, skills and abilities in responding to the employers' requirements
- 2) To encourage institutions and employers to engage in cooperative work to develop the curriculum in responding to labor market demands, as well as to increase their internationally-competitive capability at the greatest level
- 3) To promote and support co-operative education networks as a mechanism in reciprocally mobilizing co-operative education, resources, and the body of knowledge (Office of Higher Education Commission, 2009a)

**Table 3.3** Measurements of the Quality of the Workplace

<b>Types of Measurement of The Quality of The Workplace</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>Training</b>	<b>Canadian Association for Co-operative Education (CAFCE) (2006)</b>	<ul style="list-style-type: none"> <li>- The university jointly developed the co-operative education training plan with the workplace.</li> <li>- The workplace developed the training plan for co-operative education students.</li> <li>- Additional training (on new technologies, tools, process co-operative education, etc.) for employees and trainees in the workplace</li> </ul>
<b>The Workplace Skills</b>	<b>National Forum on Education Statistics (2005)</b>	<ul style="list-style-type: none"> <li>- Employees and resources were available to assist in training co-operative education students for implementation.</li> <li>- The employer formally assigned a mentor to the co-operative education student.</li> <li>- Supervisors assisted in work report evaluation.</li> <li>- The workplace management geared up training co-operative education students.</li> <li>- The employees in the workplace focused on product quality requirements or training co-operative education students.</li> </ul>
<b>The Workplace Size and The Workplace Years of Experience Dealing With Co-Operative Education</b>	<b>Illinois State Board of Education (2009)</b>	<ul style="list-style-type: none"> <li>- Support structures were in place to assist students with self-development in the job.</li> <li>- Supervisors were a part of the hiring process.</li> <li>- Supervisors met coordinators at the work site to visit and provide detailed feedback to the students under their supervision.</li> <li>- Students noted ways in which supervisors were assisting in learning.</li> <li>- Supervisors' assessment carried significant "weight" regarding the overall grade assigned.</li> </ul>

**Table 3.3** (Continued)

<b>Types of measurement of the quality of the workplace</b>	<b>Authors (Year)</b>	<b>Indicators</b>
<b>The Workplace Size and Workplace Years of Experience Dealing With Co-Operative Education</b> (Continued)	<b>Sumeth Yaemnun (2004)</b>	- Employer and student participation was maintained and their needs were met (i.e. year-round availability of students for employers, timely degree completion for students).
<b>Capital</b>	<b>Narin Sridokmai (2012)</b>	- The workplace planned to employ other co-operative education students in the next fiscal year. - Employers continued to hire full-time co-operative education students and there was a consistently high placement rate.

### 3.5 Factors Influencing Implementation

The factors influencing implementation included political, economic, institutional, and leadership factors. However, some of these factors were still not unique and could not be assigned to specific categories.

#### 3.5.1 Political Factors

According to Brodtkin (1990) and Ferman (1990), policies are implemented in different political cultures and are surrounded by various kinds of existing political conflicts. For instance, Hill (1997) distinguished between the acute concerns for hierarchical policy control as a result of the highly-fragmented and competitive nature of federalism in the United States, and the more gentle and consensual deliberation about national and local collaboration as typically seen in the more cooperative political systems in the Scandinavian countries. Thus, the contexts of project

implementation differed from one country to another country and from one political system to another.

Quantitative empirical studies have shown that bureaucracies respond to major political realignment in congressional committees (Weingast and Moran, 1983), to periodic realignments that corresponded to different presidential regimes (Moe, 1991), and to more incremental changes in many federal institutions. Further, a few state-level studies have concluded that state bureaucracies are more responsive to political influences than federal bureaucracy, especially from interest groups.

Brehm and Gates (1997) stated that asymmetry in information between street-level workers and their supervisors puts important parts of front-line work beyond the control of political executives. They suggested that political officials exercised only “differentiated and limited political control” over street-level bureaucracies.

However, studies of policy implementation by administrative agencies perceived elected officials as relatively distant, minor participants in the everyday battles within the bureaucracy determining policy impacts: “The specialized technical, legal, and administrative knowledge, the authority to make specific decisions, the control over important streams of information, the reputation for revenge and reliability, the lack of electoral incentives, and the staying power of bureaucratic participants gave administrative agencies considerable resources to thwart specific demands from elected officials” (Allison, 1971).

Again, studies on bureaucratic output in other contexts, especially regarding urban service delivery, have found that the distribution of output is determined not by political influence but by the routines the agency had established to perform its assigned tasks (Levy, Meltsner and Wildavsky, 1974).

#### Political Factors in Cooperative Education

In actuality, co-operative education has been well-defined since the model was first implemented at the University of Cincinnati in 1906. However, with the influx of federal dollars during the 1960s and 1970s, some institutions have interpreted the definition of co-operative education rather broadly, and the term soon included programs that might not truly be deserving of the name (Accreditation Council for Cooperative Education, n.d.c; Walter, 1994). Further, when federal funding was rescinded several decades later, institutions that had not secured institutional

commitment were left with a shortfall of resources to run their programs and consequently eliminated important elements of the co-operative education model.

Even with common goals, co-operative education across the nation was fairly diverse, with individual academic programs typically determining the requirements necessary for students to participate (Collins, 1971). Ryan (1999) pointed out that this could be an issue for researchers or evaluators that are attempting to control variables or compare similar programs. Some faculties and administrators believe that only students with a high grade point average should participate in experiential learning opportunities, whereas others have argued that that philosophy bordered on discrimination and could result in a larger divide between the socioeconomic classes (Cantor, 1997). Some institutions require students to earn academic credit during the experience, whereas others do not (Dodge and McKeough, 2003). Certain academic majors are more likely to offer experiential learning programs than others, and of those that do, some are mandatory and some are optional (Akeyo, 1993). Clearly, it is difficult to generalize experiential learning research to more than a small population, usually contained within the same institution (Dodge and McKeough, 2003).

With the variation in co-operative education across different colleges and universities, a set of standards of the attributes of co-operative education were developed in 1993 to unify the discipline (American Society for Engineering Education, 1998). These attributes were accepted by the Cooperative Education and Internship Association and were later used to form an accreditation process for the discipline. Though requirements still varied for student participation among accredited programs, the standards formed a framework under which co-operative education professionals operated.

### **3.5.2 Economic Factors**

Some studies have identified resource constraints as a major influence on the extent and direction of discretion exercised by front-line staff. It can be observed that street-level bureaucrats have coped with “chronically limited resources and unlimited client demands” through the rationing of services, service discrimination to more cooperative groups, and rationalization of program objectives” (Lipsky, 1980). For instance, Brodtkin (1997: 24) noted the following: “Caseworkers, like other lower-

level bureaucrats do not just do what they want or just what they are told to want. They do what they can.”

Researchers believe that attempts to cope with limited resources might result in the inconsistent and particularistic treatment of clients with similar needs or in the routine treatment of clients with different needs (Weatherley and Lipsky, 1977).

Again, resources have been identified as an important factor in the studies of the regulatory efforts of government inspectors (Winter, 2000) and in studies that used administrative data to differentiate front-line activities, for instance, to assign child support benefits, to grant disability benefits, and to exempt single parents from requirements to cooperate with child support enforcement (Keiser, 2010; Schram and Soss, 1998).

#### Economics in Cooperative Education

Some economic researchers perceive the great impact made on co-operative education's variability as it happens because of the change in environmental conditions such as those in economics (Sovilla, 1988; Varty, 1988). Federal support for co-operative education began with the efforts of the National Commission for Cooperative Education in 1973 (Wilson, 1988) to develop co-operative education. Because of continued federal and state support, co-operative education varied in response to the policies set up by those funding the programs. Federal support improved the program, which led to increased enrollment (Hoberman, 1994). Sovilla (1988) has maintained that because the federal government supported co-operative education with funding (fuel for diversity), public attention was drawn to the program and institutions and could expand their programs. Later, federal government funding for co-operative education ended as Higher Education Act Title VIII, which served to fund job training, including co-operative education, no longer existed Co-op. Then, a shift in funding for co-operative education—from federal and state government support to college support—might have caused the programs to vary even more greatly.

Other economic changes have caused co-operative education to vary, especially in the numbers of participating students. During the early years of co-operative education, few students had options that allowed them to pay for a college education, and co-operative education became a reasonable and attractive option for

financing a college education (Sovilla, 1988). However, at the present time, students have several options for financing college, including state, federal, and institutional aid packages. Consequently, some students choose to bypass co-operative education.

Job market conditions have also changed over the past century, such that the number of working persons in the household is less than two or sometimes even none. These family members have turned to work at full-time jobs, which leads one to imagine that a considerable number of potential co-operative education jobs have been taken by the increase in the full-time labor force (Sovilla, 1988).

Another recent labor market development that has impacted co-operative education and its variability is part-time employment. Over 3.7 million people work part time regularly (Sovilla, 1988). A number of factors influence the variability in co-operative education. To explain the program further, co-operative education has to be examined from other perspectives.

When examining co-operative education and accountability in the North Carolina Community College System, knowing all stakeholders and understanding who is accountable to whom, is important. In North Carolina, the State Board of Community Colleges is the funding agency for the North Carolina Community College System (NCCCS), which is headed by a system president. The State Board and the NCCCS are responsible for (a) distributing funds equitably and maintaining fiscal accountability, (b) establishing and maintaining state priorities, and (c) approving educational programs and assuring both accountability and quality (U.S. Department of Education, 1991). Out of the 58 publicly funded two-year community colleges in the North Carolina Community College System, 22 colleges have co-operative education and 36 do not. Colleges with co-operative education have to document accountability to continue receiving funds. Students, employers, and community colleges in the three-way partnership are all important in documenting accountability. Accrediting agencies in the process of evaluating and improving co-operative education can also use the present study, which documents accountability and serves to promote co-operative education.

In order to maintain approved standing with accrediting bodies, all stakeholders-government funding agencies, faculty, students, and, ultimately the

public, post-secondary institutions sponsoring co-operative education haeto remain accountable (Harrow, 1978; Owens and Owens, 1981-1982).

### **3.5.3 Institutional Factors**

Institutions are required to engage in policy implementation in order to transform policy intents into action. Institutional settings for implementation might differ in several ways but one major distinction that can be cited is that implementation can be carried out by one organization (Torenvlied, 1996) or possibly coordination of multiple organizations or parts of organizations (Hjern and Porter, 1981). However, implementation becomes more complicated if two or more institutional settings are involved in the process.

Intergovernmental relations, as exhibited in “vertical” intergovernmental programs (e.g. those involving national and sub-national authorities) or “horizontal” intergovernmental programs, can be critical to policy implementation. Many countries currently use complicated cross-sectoral implementation arrangements including one or more public agencies linked to for-profit companies and/or nonprofit organizations (O’Toole, 2007: 35). Increased inter-organizational connections have led to some scholars’ emphasis on “collaborative” and collaboration (Bardach, 1998), in addition to the critical role of inter-organizational relations for influencing program results. Others emphasis has been on “networks” and network management (Hufen and Ringeling, 1990).

According to O’Toole (2007), cooperation and perhaps coordination are induced among interdependent actors when faced with impediments in order to generate successful policy implementation. On the other hand, Gage and Mandell (1990) noted that when working across organizational borders, public administrators have to find or stimulate common interests, and develop and maintain sensible exchanges in order to trigger policy implementation.

While Pressman and Wildavsky (1984: 25) asserted that “the complexity of joint action” is a major constraint to successful implementation, other researchers such as Bowen (1982) have disagreed with that claim, pointing out flaws in the analysis. For instance, the probabilities of agreements among organizations can be influenced by events in reality. Most of the time, “bandwagon effects” are developed

and basic understandings agreed upon at the start of the implementation process that could increase the likelihood of further agreement.

#### Institutions in Cooperative Education

The consensus among co-operative education researchers and practitioners is that the success of any co-operative education rests in large part on the involvement, acceptance, and support of the faculty (Wilson, 1987; Heinemann and DeFalco, 1990). In his biography of Dean Herman Schneider as the acknowledged architect of the first co-operative education at the University of Cincinnati in 1906, noted the importance that Dean Schneider placed on the support of the faculty in his program implementation efforts. Despite several efforts to encourage research activity which further informed the nature of faculty involvement in co-operative education (Ad Hoc Committee on Cooperative Education, 1998; Ricks et al., 1993.), the response among researchers was minimal and sporadic.

The emphasis on encouraging faculty support for co-operative education is clearly reflected in the literature. Knowles (1971) explained that even the most hostile of faculty may, over time, changed their minds concerning co-operative education as they recognize the maturity of co-operative education students when they work and the value of the student work experience as a supplement to their classroom teaching. Knowles argued that co-operative education advocates have to earn the respect of the faculty. He explained that support for faculty ideals and sensitivity to their issues and concerns have to be coupled with an aggressive research effort to document the interrelationship of cooperative and traditional education in order to achieve this aim. McNutt (1980, 1989) argued further that since the faculty has traditionally defined curriculum content and outcomes, co-operative education administrators have to first articulate to the faculty the value of co-operative education as a means to both identify and evaluate desirable student outcomes, and collaborate with them to adopt a co-operative education learning strategy. Van der Vorm, Jones and Ferren (1979) advocated the use of workshops to bring faculty together with co-operative education employers, students, and administrative staff to increase awareness of co-operative education issues and to enhance faculty participation.

Stull and DeAyora (1984) posited that the identification and articulation of the benefits accruing to faculty participation could enhance faculty support of co-

operative education. They surveyed more than 250 co-operative education directors and faculty members at the two- and four-year college level. Those surveyed were randomly selected after an initial list of 458 two-year and 546 four-year institutions was reviewed to determine both the existence of a co-operative education and the involvement of faculty in the program. Stull and DeAyora's survey included a list of 20 individual faculty benefit statements identified through a review of the literature, interviews with co-operative education practitioners, and a review by an expert panel of judges. Stull and DeAyora concluded that the benefits were ranked highest by both two- and four-year faculty concerning the facilitation and enhancement of classroom learning. They also concluded that those of least benefit to the faculty concerning promotion, salary, tenure, and professional development.

Swann (1993) built upon the work of Stull and DeAyora (1984) by utilizing their list of faculty benefit statements as part of a structured interview process. Employing a qualitative methodology, Figueroa conducted in-depth interviews with four faculty members involved in co-operative education at four different higher education institutions in Massachusetts. The faculty represented both two-year and four-year public and private institutions. Figueroa concluded that the faculties were generally positive about co-operative education within the parameters of the benefit statements utilized in the study. Additionally, they assigned the greatest value to four themes that she constructed based on the original benefit statements in the Stull and DeAyora study including "academic related" (e.g. the ability to develop more meaningful relations with students), "classroom learning enhanced" (e.g. the classroom learning environment enhanced by the presence of co-operative education students), "relationship with students" (e.g. co-operative education provided opportunities for feedback concerning the relevance of academic courses), and "self enhancement" (e.g. potential employer contact and visitations resulting from the presence of a co-operative education allowed for faculty renewal and the avoidance of burnout).

Harris (1984) attempted to determine the faculty expectations of co-operative education students by comparing the views of faculty and employers concerning the employment qualities of those students. Co-operative education directors at institutions in a twelve-state region (Alaska, California, Colorado, Idaho, Montana,

Nebraska, Nevada, New Mexico, Oregon, Utah, Washington and Wyoming) were contacted and asked to provide the names of five faculty members and five employers that were considered to be supportive of co-operative education. A survey instrument consisting of 60 student employment characteristics was sent to 187 faculty and 190 employers with an overall response rate of 70%. Data analysis focused on the first 30 items of the instrument, which placed on students' non-technical employment qualities (e.g. demonstrating motivation, showing enthusiasm, coping with change). Harris discovered statistically-significant differences between faculty and employer expectations—that employers were more likely than faculty to place a much higher value on student motivation, enthusiasm, and initiative as well as job performance qualities such as interacting with customers in constructive ways. Harris also concluded that the faculty in the social sciences, business, and humanities varied in how they perceived the importance of student employment qualities.

#### **3.5.4 Leadership Factors**

Leadership has been defined in many ways, from many points of view, and in varying contexts. Leadership can be framed by traits, styles, and situations and characterized as management, dominance, influence, dominance with influence, participative, and meaning-making (Drath and Palus, 1994). Leadership has been described as transformational, transactional (Burns, 1978), and visionary management (Bennis and Nanus, 1985). Over time, scholarly investigation of leadership theories and frameworks have shifted from what a leader is and does, to what leadership is for (Furman, 2003 quoted in Fusarelli and Fusarelli, 2005: 198 ). The question of what leadership is for has intriguing implications for the cooperative executive directors that work and lead within varied organizational entities and across multiple organizational and cultural boundaries.

Educational practices and research have addressed the perceptions of effective leadership which have been generated in numerous theories and constructs of effective school leadership, congruent with the challenges faced by special education executive directors. Investigation into these leadership constructs provided the present researcher with increased insight into philosophical and pragmatic aspects of the study.

The leadership challenges faced by the special education cooperative requirements of its executive director to recognize the organization's complexities and to willingly embrace uncertainty and experimentation. In evolving organizations like the cooperative, “leaders externalized their own assumptions and embedded them gradually and consistently in the mission, goals, structures, and working procedures” of the cooperative and its member districts (Schein, 2004). In addition, the executive director has to have the ability to evolve the organization's vision and purpose as external factors change and are intensified. The director has to understand the cooperative's organizational culture and embrace varied leadership frameworks to stimulate and support the cooperative's viability and growth within continually-changing circumstances and forces. Special education is inherently grounded in a servant approach to leadership, administration, and delivery of services. Due to the individualized focus of special education and its commitment to students with disabilities, the special educator and administrator naturally act as servants to both their students and parents, committing to Greenleaf (2002) thesis that “caring for persons, the more able and the less able serving each other, was the rock upon which a good society is built.” Servant leadership is at the core of the cooperative's executive director's purpose and mission. However, other leadership constructs serve as the foundation for the executive director's collaborative leadership within the cooperative and with the cooperative's numerous educational and governing partners.

The Illinois special education cooperative has evolved over the past 40 years, mirroring and responding to the evolution of its member districts' special education orientations and service delivery models. The cooperative executive director has to meet these challenges with an adaptive leadership lens and approach. Heifetz (1994) defined adaptive work as work that “consists of the learning required to address conflicts in the values people held, or to diminish the gap between the values people stood for and the reality they faced.” The cooperative executive director leads adaptively by orchestrating conflict, fostering a participative mode of leadership, and taking advantage of unexpected opportunities.

In working with numerous school districts and multiple governing partners, the special education cooperative is continually faced shifting realities, conflicts (in values and philosophies), and both firmly-drawn and subtle organizational

boundaries. The executive director has to “communicate with subtlety, taking into account the particularities of the constituents, their networks of support, and the harshness of the news” (Heifetz, 1994). While leading across boundaries, the executive director permeates and reforms relationships and boundaries, and necessarily challenges the cooperative’s constituents to face new perspectives and adaptively develop a new reality.

Expanding upon Heifetz's theory of adaptive leadership, Heifetz and Linsky (2002: 48) characterized leadership as “an improvisational art.” By its very nature, the special education cooperative frequently encounters adaptive pressures as its member districts change the dynamics of their relationship with the cooperative: that is, they change what Heifetz and Linsky has called “new market conditions.” Anticipating and responding to these new market challenges, the cooperative executive director faces adaptive pressures in sustaining the viability of the cooperative and leading the cooperative’s constituents (staff and partners) in internalizing the change. Flexibility and improvisation are necessary to successfully meet these leadership challenges.

The special education cooperative director can also be characterized as demonstrating a transformational leadership orientation and approach. Burns (1978: 30) defined leadership as follows:

A reciprocal process of mobilizing by persons with certain motives and values, various economic, political and other resources, in a context of competition and conflict, in order to realize goals independently or mutually held by both leaders and followers.

#### Leadership in Cooperative Education

In 1906, Dean Herman Schneider pioneered a revolutionary concept, within the College of Engineering at the University of Cincinnati, that he called cooperative education (Schneider, 1912: 124). Starting with 27 engineering students and 13 local employers, Dean Schneider created a program that alternated full-time academic study with full-time work experience. Schneider envisioned an educational system that combined work experience with classroom contents to improve the knowledge and skills of engineering students. The National Commission for Cooperative Education defined co-operative education as “a structured educational strategy integrating classroom studies with learning through productive work experiences in a

field related to a student's academic or career goals” (University of Cincinnati, 2013). Approximately 200,000 students annually participated in cooperative education programs at nearly 900 colleges and universities in the United States. As a testament to Dean Schneider’s 1906 concept, the American Society for Engineering Education chose cooperative education as one of the ten most outstanding engineering education and engineering technology achievements of the past century (Bumet and Greisch, 1994).

### **3.5.5 Management Innovation Factor**

#### **3.5.5.1 Theoretical Concepts of Innovation**

According to the review of related literature, scholars have defined innovation in various ways.

Hughes (1992: 23) gave the definition of “innovation” as an action in using a newly-developed means of a practice after it has been experimented through the following steps:

- 1) Invention
- 2) Development
- 3) Implementation that is distinctive from the traditional practice of the past

Rogers (1983: 56) defined “innovation” as a thought, action or object formed into a new creation perceived by individuals or social entities. The concept was underlined in the statement below: “Innovation is a new idea, practice or object, that is perceived as new by the individual or other unit of adoption.”

Rogers (1983) pointed out that the consideration on which thing was an innovation or not, lied heavily on the views of individuals or groups as they perceive it. Hence, a perceived innovation of one society might not be able to refer to that of other societies, depending on their perception of it. Alternatively, newness can probably be scoped out, based on the time of existence. If innovation is not always a new invention, it can be interchangeable with the reconstruction of traditional thoughts or practices that have been ignored for a period of time, as its benefit lead to the solution of the existing problem in a new circumstance. It can be concluded that

something can be considered as an innovation when it meets the 3 following characteristics:

- 1) A new activity that nobody else has done before
- 2) The restoration of the activity, being applicable in the past and later left for some reason and for some time, in order to try to make a new use of it in a new setting
- 3) The continuous development of an existing thing

Another meaning of “innovation” refers to a new concept, technique, or thing that can contribute some benefits. Innovation appears to be a new knowledge construction for a particular group of potential people to accept it. Kritsaman (1993: 104) proposed a guideline to define innovation as follows: 1) a new thing that never has happened before, 2) a thing that is brought in to use from existing resources that has never been used before, 3) a thing that was used in the past for some time because it was not practical in that particular context, and then it is restored for a new use under a change of conditions and settings, 4) a thing that was well applied in other social or national contexts and later was adopted in a context, 5) a thing that was continuously developed from an existing thing, made for a new difference from the original model so as to suit new social changes or contexts.

#### 3.5.5.2 Types of Innovation

Scholars have divided innovation into many types according to its purposes.

There are 2 broad types of innovation (Office of National Innovation Agency, 2004: 5).

- 1) Product innovation includes the innovation of tangible and intangible products.
- 2) Process innovation refers to changes in the production process of products or services that are different from the past.

In some studies, innovation was divided based on the purposes of its uses (Office of National Innovation Agency, 2004: 5).

- 1) Product innovation: the product was created for commercial purposes; it could be continuously developed from an old product or created as a novel product in the market; the development of the innovation was conducted

through the process of exploration, consistent development, in order to design to meet its maximum value offered to end users or customers; the key component of innovation was the development of its attributes and features; in designing the product, its uses or benefits should be primarily taken into account; product innovation was categorized into 2 types: tangible product or general goods, and intangible products or services.

2) Process innovation: a change or different method or technique in producing the products or services is implemented compared to that used in the past by the creative development of a new process for improving its effectiveness using technology, as well as relevant knowledge and a new production process; that new concept was applied in order to produce the product more effectively at a maximum capacity.

3) Management innovation: administrative knowledge was required for the management to improve the previous structural system of the organization; the administration style was focused on the staff's participation and collaboration, resulting in a compilation of their initiations and creative thoughts, in response to the customers' demands, as well as an increase in the financial means to earn more income and profits that are indeed returned to the company, such as the management of the organization in terms of permanent jobs or the management line considered as a project, etc.

4) Service innovation: the proposal of a newly-developed service or an improved service from the previous version that was established, such as the improvement of the operational functions of technology or applications for more flexible dimensions of uses, etc.

5) Business innovation: a change of business operation conducts was developed to make the business more valuable.

6) Marketing innovation: new marketing was developed in terms of product designing, packaging or pricing.

7) Organization innovation: a change in the business structure, business operation, prototype, perhaps including a process, marketing, and business model being implemented. The underlying business innovation is emphasized in

maximizing organizational management capability, which requires knowledge and skills in management to improve the internal management of the organization.

Panu Limmanon (2003: 14) has divided organizational innovation into 3 types:

1) Product innovation: development of product innovation requires consistent exploration and creation in order to present the product's value to customers. The essential element of the innovation is to develop its attributes and features. The product designs are developed on the basis of the customers' benefits. The customers can even take part in the development through all the steps including the design, development, and evaluation or testing of the end product. Such a process should be operated by taking account of value chain management that could offer commercial benefits to all entities.

2) Process innovation: process innovation lies heavily in the knowledge of technology which includes the knowledge of its components and connections of those components, as well as the relevant process, techniques and application of the new concepts, methods, and process to promote higher productive and operational capability as whole.

3) Management innovation: the development of management innovation requires the knowledge of management to improve the previous structure of the organization. The model of the management is formulated in terms of participatory managing conducted among staff members. New ideas and creative thoughts are pulled out for generating a creative unit in response to the customers' demands. It is also a way to generate income and profits for the company. For example, the organizational management that is designed by using two divided groups of staff members working simultaneously as 1) the management team of the key permanent staff on duty, and 2) the management team of the project work staff assigned for a particular job. The model, called a matrix, was commonly found in 1970, and the defined index that was used to evaluate the operational performance of the organization, etc.

### 3.5.5.3 Applications of Innovation in Other Disciplines

1) There is still misunderstanding of the terms “innovation” and “technology” that they share a common meaning. In fact, technology means a new science or method that can bring the concept into practice and it is quite practical and broadly used. When researchers carry out studies through exploring and experimenting to develop a product, those studies still can have limitations as they have been tried out only under specific conditions, usually in laboratories or variable-controlled areas. As a consequence, the results of the studies are still uncertain in terms of being able to arrive at conclusions for appropriate use in authentic conditions, unless they pass tests under authentic conditions. It is conclusive that several trials under authentic conditions are required to ensure its practicality. All of those validating steps are included in developing technology. To put it another way, technology can be defined as the result of research that has been tried out and refined several times until its validity and practicality are sufficiently ensured for a launch in an authentic condition. It can be alternately validated by its use widely by the general public. Meanwhile, “innovation” has been defined as a new invention, method, or process not limited to the same experimental conditions, but can be applicable in other conditions unlimitedly. To conclude, innovation integrated with technology becomes an effective tool, for instance, bio-technology innovation and audio-visual technology innovation.

2) Innovation and management are integrated, in terms of the use of technological innovations, to assist management, particular on decision making of the administrators that was undertaken as fast as to catch up the world’s changing move. Innovation used in management normally copes with a database management system in the organization, such as a customer database, a human resource database, a finance database, an accounting database, and an inventory database, for example. Those databases need an effective storage and operational system with high data security. Further, innovation also includes external information technology such as operational policies, laws, and royal acts in connection with organizations. Training is provided to maintain and design search engine systems for administrators, and the systems can retrieve required information as promptly as needed. The application of the integrated innovation has some content overlaps, so the development of various

aspects should be carried out together. Clusters of databases should be created for effective information sharing.

Moreover, Sane Chuito (2003: 35) added in the article entitled “Innovation Management: New Science of Management” that innovation is a new paradigm of management in which people perceive that new innovation trends come into play and have huge impacts and influences on organizational management. The trends can be grouped into 3 different types.

#### 1) Strategic Management Trend

The importance of the trend is placed on distinctive strategic thinking and development of diverse or innovative strategies. Whoever is acting as an administrator has to always be able to create new innovation and new immergences.

#### 2) Human Resource Management Trend

Here the focus is on human resource management and development in terms of intelligence and creativity development, especially in stimulating human resources to continuously create new innovations for the organization so as to escalate the competitive capability level of the business in the market in the future.

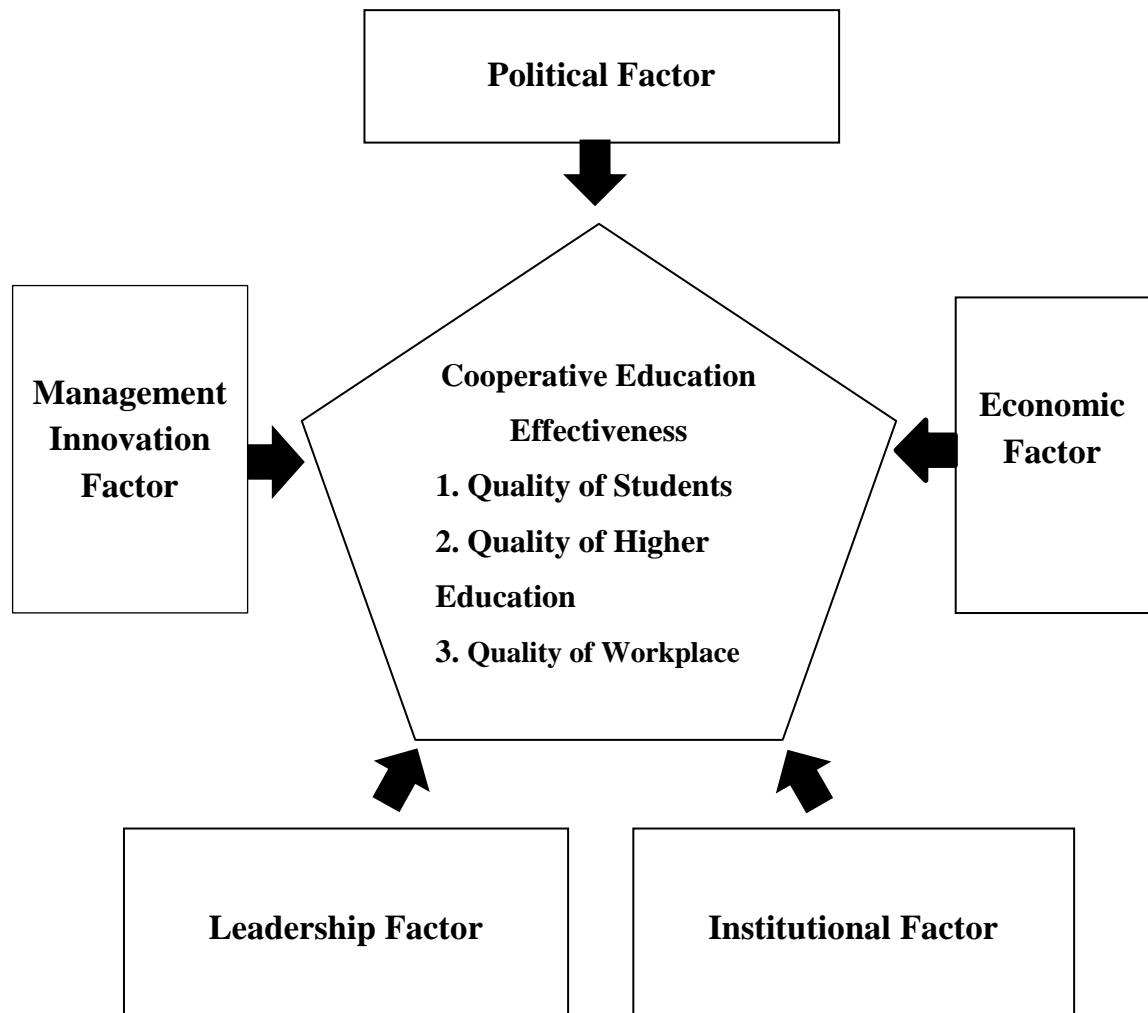
#### 3) Organization Management Trend

The focus is on the development of new organizations such as the learning Organization, Intelligence Organization, Wisdom Organization, and Innovation Organization, and so on.

According to the 3 trends mentioned, innovation is an interesting new paradigm of management, which could trigger the best practice of administration and management in the future.

All in all, according the reviewed literature related to Management Innovation, the factors encompass management innovation which could make a difference in forming other designs of pedagogy aside from co-operative education, and the changing quality of co-operative education in the future towards both directions of either the creation of a new invention or the improvement of the existing resources for creating a difference, aiming to balance the innovation with rapid organizational changes.

### 3.6 Conceptual Framework of the Study



**Figure 3.1** Conceptual Framework of the Study

### 3.7 Operational Definitions of Terms

#### 1) Cooperative Education Effectiveness

Cooperative education effectiveness refers to the degree to which goals are achieved and the extent to which targeted problems are solved. The present study emphasized co-operative education effectiveness in Thai higher education, incorporating classroom theories with practical, planned, and supervised work experiences in the public and private sectors. It allows students to acquire essential

practical skills by being exposed to the reality of the working world, thus enhancing their self-confidence and career direction.

Cooperative education effectiveness in the present study was based on the following 3 components:

(1) Quality of students: there are 3 data types measuring the quality of students: 1. their experience, 2. their GPA., and 3. their skills.

(2) Quality of Higher Education: the 7 following characteristics articulate the quality of higher education: 1) good teachers, 2) a well-planned and executed curriculum, 3) careful sequencing and timing of the student's experience, 4) well-organized work experiences, 5) employer and educator communication, 6) knowledgeable liaisons, and 7) the strength of student preparation.

(3) Quality of workplace: the 4 following traits measured the quality of the workplace: 1) its provision of student training, 2) its skills in developing professional experience, 3) its business size and years of experience indealing with co-operative education, and 4) its capital

## 2) Political Factor

The political factor refers to the authority held by a group within a society that allows for the administration of public resources and implementation of policies for co-operative education. Power might be acquired as a means of governmental direction or in opposition to a government group.

## 3) Economic Factor

The economic factor refers to the financial and human resources available to co-operative education for its implementation in Thai higher education.

## 4) Institutional Factor

The institutional factor is a part of the academic mission, goals, and objectives of the organization, and is an integral part of the co-operative education process. Interinstitutional relationships (the coordination and cooperation among students, the university, and the workplace) refers to their mutual involvement in policy formulation and the establishment of co-operative education in Thai higher education.

## 5) Leadership Factor

Leadership refers to the art of motivating a group of students, universities and workplaces to operate co-operative education towards achieving a common goal.

#### 6) Management Innovation Factor

Management innovation can be defined as the occurrence of differences in terms of co-operative education, quality, and co-operative education attributes over the time of the management activities in an organization, where change is a novel or an unprecedented departure from the past.

## **CHAPTER 4**

### **METHODOLOGY**

This project was a qualitative study aimed at exploring and describing the factors influencing the effectiveness of co-operative education implementation. The study was divided into two separate phases, multiple, holistic case studies and the development of policy or program recommendations.

Individual interviews were employed with 40 participants (administrators, program teachers, students, entrepreneurs, and mentors) whose work was related with co-operative education. The discussion in this chapter pertains to the research method carried out in the present study. The discussion review includes the research design and the appropriateness of the design, the geographic locations and settings, a case study overview and the sample selection process, the data collection, the data analysis, the data validation, and ethical considerations.

#### **4.1 Research Design and Appropriateness of the Design**

A qualitative descriptive design was used to describe the effectiveness in implementing co-operative education. Three Thai public universities (1. Suranaree University of Technology, 2. Walailak University, and 3. Rajamangala University of Technology Thanyaburi) out of 28 Thai public universities participating in co-operative education programs were chosen for the case study. The qualitative descriptive methodology describes the effectiveness of co-operative education implementation through the data-collection procedures, data analysis, and a data report (Yin, 2014: 37). A qualitative descriptive design was chosen rather than a quantitative design because the data collection type, from limited participants of three public university, which was considered to be too few to sufficiently generate data for statistical data analysis. Administrators, program teachers, students, entrepreneurs and mentors were asked to respond to open-ended interview questions related to their

specific methods in implementing cooperative education to determine what seemed to be the strengths or the effectiveness of co-operative education. According to Sandelowski (2000: 336), qualitative descriptive research allows the researcher to remain close to the research. In other words, it is not necessary to conceptualize or provide a highly-abstract rendering of the data.

A qualitative design also allows the researcher to gain a wealth of detailed data when a small number of participants are involved in a study (Coll and Chapman, 2000: 2). The research investigated the patterns emerging among the data gained from the participants' verbal information.

#### Objectives of the Study According to the Following Questions

- 1) What are the important characteristics of co-operative education in Thai higher education?
- 2) What are the processes of co-operative education in Thai higher education?
- 3) How is co-operative education effectiveness in Thai higher education measured?
- 4) What are the key factors regarding co-operative education effectiveness in Thai higher education?

## **4.2 Geographic Locations and Settings**

The present study investigated what seemed to be the effectiveness of implementing co-operative education in Thai higher education institutions that had received a budget from the Office of Higher Education Commission (OHEC). The Ministry of Education announced the establishment of three educational networks as administrative structures in managing and developing Higher Education, and as tools in promoting cooperation and enhancing collaboration among Institutions of Higher Education, in order to achieve their missions, including to be able to support the nation's policy and to participate in solving the nation's problems. Those networks consisted of the Central Administrative network (Network A), the Regional Higher Education network (Network B), and the Specific Mission Network (Network C). The structure of network A, B, and C is shown in figure 2.3 and table 2.1.

### 4.3 Case Study Overview and Sample Selection Process

Three Thai public universities (1. Suranaree University of Technology, 2. Walailak University, and 3. Rajamangala University of Technology Thanyaburi) out of 28 Thai public universities in the co-operative education program were chosen for the case study. One of the three cases was a pilot sample that was used to validate and refine the research instruments. The researcher chose cases from a pool of nine networks. Previous literature has documented the importance of supporting any universities employing co-operative education systems by allocating a government budget to them. The present dissertation project was interested in identifying the factors relevant to co-operative education effectiveness while implementing co-operative education .

The researcher specifically targeted the three Thai public universities. They were chosen from leading co-operative education institutions in regional networks based on the expertise of each co-operative education implementation within the network. The three Thai public universities were selected under the criteria that they had participated in co-operative education in engineering for over 10 years.

Another reason for choosing those 3 universities as the samples was that they were pioneers in incorporating co-operative education programs in education. The researcher paid particular attention to the co-operative education implementation of the engineering faculty since the world pioneer in this area, Herman Schneider, from the University of Cincinnati, in Ohio in the U.S., had also started his study with a faculty of engineering under a project called the “Cincinnati Plan.” He proposed it as a way to teach professional concepts and skills to the students, where in-class teaching was unable to lead them to achieve their goals. Co-operative education, instead, was a way to allow the students to have an opportunity to practice in their fields for better understanding and greater competence. The engineering students in his project were divided into 2 groups. Each week, one group would study at the campus, and the other group would practice working at local factories as one of their employees. As a result, the alternation between work and study brought in to the students the higher motivation of in-class learning, greater insight regarding the knowledge gained, more confidence in choosing their future careers, and more skill in working. Later, in 1909,

with the co-operative education concept, Northeastern University in Massachusetts made a try with the students from the Faculty of Engineering as well. In 1965, the United States of America launched higher education laws to offer funds for the institutions that established co-operative education projects. That triggered the worldwide expansion of co-operative education, especially in Canada (Wilson, 1971: 3-8). The first university that established such a program was the University of Waterloo. It was a medium-sized public, research university. The program there has been run since 1957 and it has gained world reputation for its quality of co-operative education and with the highest number of co-operative education students. The co-operative education areas that the University of Waterloo specialized in included Mathematics, Engineering, Science, and Computers, ranked as the top 3 best universities in the North American region (Office of Higher Education Commission, 2008: 4-9). In a similar fashion, Australia set up professional experience for students by collaboration with entrepreneurs. The program was later called “Sandwich Education,” which was first began in 1962-1963 at the Footscray Institute of Technology and the Swinburne Institute of Technology (present name is Swinburne University). The curriculum was designed according to two types: the “Thin-Sandwich” program and “Thick Sandwich” program. They were an alternation between in-class studying and professional experience in the workplace. “Thin-Sandwiches” had 7 semesters for in-class studying and 2 semesters for professional experience in the workplace. On the other hand, “Thick Sandwiches” had 7 semesters for in-class studying and 6 semesters for professional experience. Both programs were assigned to College-Based Student and University-Based Student, and Industry-Based Student (Office of Higher Education Commission, 2008: 7). According to the aforementioned, it is obvious that the implementation of co-operative education in renowned institutions usually began in the engineering field.

Therefore, the present study had the aim to investigate the effectiveness of co-operative education established in higher education institutions in Thailand. The focus would be on public universities containing engineering programs. The investigation was conducted to see whether the effectiveness of co-operative education in Thailand would be the same as took place in the universities abroad. Berman (1978) examined the influential factors in turning policy into practice and the result of his study showed

that the indicators of success could be found in the percentage of the project achievement, the degree of theoretical consistency, enthusiasm, and experience of the target group. From his findings, he also added that the participation of relevant parties was very important to the success in turning policy into practice. From what Berman had studied, it sparked an idea for the present study to begin research with engineering students, since it could probably replicate the success of co-operative education implementation done by those universities in America, Canada, and Australia as mentioned earlier. They all began with the engineering faculty and alternated study semesters with working semesters in order to encourage students to gain higher motivation for in-class learning, knowledge insight, skills, and confidence to choose their future career and competence in working. That was empirical evidence of the effectiveness of co-operative education and represented solid ground as to why co-operative education has been implemented for long time in many countries around the world.

**Table 4.1** Nine Regional Cooperative Education Networks in Engineering

<b>Co-operative Education Network of Higher Region</b>	<b>Thai Public Universities</b>	<b>Total</b>
The Higher Northern Region	1. Chiang Mai University 2. Maejo University 3. University of Phayao 4. Mae Fah Luang University 5. Rajamangala University of Technology Lanna	5
The Lower Northern Region	1. Naresuan University 2. Pibulsongkram Rajabhat University	2
The Higher Northeastern Region	1. Khon Kaen University 2. Mahasarakham University 3. Rajamangala University of Technology Isan (Khonkaen)	3

**Table 4.1** (Continued)

<b>Co-operative Education Network of Higher Region</b>	<b>Thai Public Universities</b>	<b>Total</b>
The Lower Northeastern Region	1. Suranaree University of Technology 2. Rajamangala University of Technology Isan (Nakhon Ratchasima)	2
The Higher Central Region	1. King Mongkut's University of Technology North Bangkok 2. King Mongkut's Institute of Technology Ladkrabang 3. Thammasat University 4. Rajamangala University of Technology Thanyaburi 5. Rajamangala University of Technology Suvarnabhumi 6. Chulalongkorn University	6
The Lower Central Region	1. King Mongkut's University of Technology Thonburi 2. Kasetsart University 3. Rajamangala University of Technology Krungthep 4. Rajamangala University of Technology Phra Nakhon 5. Rajamangala University of Technology Rattanakosin	5
The East	1. Burapha University 2. Rajamangala University of Technology Tawan-ok	2
The Higher Southern Region	1. Walailak University	1

**Table 4.1** (Continued)

<b>Co-operative Education Network of Higher Region</b>	<b>Thai Public Universities</b>	<b>Total</b>
The Lower Southern Region	1. Rajamangala University of technology Srivijaya 2. Prince of Songkla University (Hat Yai)	2
<b>Total</b>		<b>28</b>

**Source:** Office of Higher Education Commission, 2011.

The researcher made initial telephone contacts with each university participating in co-operative education, through co-operative education coordinators, and with the assistance from each regional network leader. During the initial contacts, each co-operative education coordinator was asked for his/her willingness and consent to participate in the study. Each coordinator was given a chance to ask the researcher principal questions about the research study during the initial phone call. Fortunately, all higher education enthusiastically agreed to participate. The regional network leader played a crucial role in gathering information from the participating parties.

Additional key informants, such as program teachers and administrators, were identified by the co-operative education coordinator for joining the interviews. For those participants, initial contact was facilitated by the co-operative education coordinator via electronic mail. After that, the researcher made follow-up contacts via electronic mail with each individual participant. In the electronic letter, the researcher provided a personal introduction, a brief description of the study, a description of the nature of the data being collected, the intended use of the data, the anticipated amount of time of their involvement, the nature of their involvement, and contact information for both the researcher and the academic advisor. The dissertation proposal abstract was sent out as an attachment with that electronic letter. The program teachers and administrators as the key informants represented three Thai public universities and nine networks.

Prior to the start of each participant's interview, the researcher provided another overview of the study and multiple opportunities for questions. After the study overview, the researcher gave the participants a clear description of the human research subject/confidentiality/privacy protections for authorization. The researcher also asked for their consent to record the interview and to make an audio-recording at any time during the interview. Each participant was verbally asked again for his/her consent to join the study. The written script was read to each participant prior to the interview.

#### **4.4 Data Collection**

Creswell (1998) explained that the best process for a phenomenological study (so as to get stories of the existing experiences) was to conduct in-depth interviews. The interviews are not for explaining the causes of events, but instead attempt to describe how they had firsthand experience with the involved events. Patton (2002: 546) added that it is important for the researcher to establish rapport with the participants because it helps in the process of obtaining information about personal experiences. This takes place through the relationship between the researcher and the participants; the degree of honesty and accuracy of the information depends on the distance of their relationship (Ritchie and Lewis, 2003: 271).

A semi-structured interview was employed to gather the data. Esterberg (2002: 87) explained that the goal of a semi-structured interview is to “explore a topic more openly and to allow interviewees to express their opinions and ideas in their own words.” In semi-structured interviews, “the interviewers [are] also free to probe the research participants for more information on particular points, as to explore the topics more discursively than in structured approaches, and even to explore topics that might be arisen while conducting the interview” (Gibson and Brown, 2009: 88). Esterberg (2002: 85) stated the following about the interviewing process: “two individuals come together to try to create meaning about a particular topic” and can “draw on established social conventions.” It is important for the researcher to ask questions in order to learn from the participants, and to see the world through the eyes of the participants so as to get adequate data for the phenomenological study. More

specifically, as Gibson and Brown (2009: 86) discussed, the goal of interviewing is to “create analytically focused discourse that provide[s] insights into specified research questions” which enable the researcher to collect specific details of each graduate’s experience and to combine all stories to answer the research questions.

Those data sources included semi-structured key informant interviews with multiple participants in each case, representing multiple groups of actors (e.g., administrators, program teachers, students, entrepreneurs, and mentors), and document reviews.

Upon meeting the participants for the first interview, each was asked to provide demographic information so that the researcher could gather initial information from the participant. The informed consent was also discussed and signed at the beginning of the first interview. The interview guides were developed to help the researcher gain insight into the past co-operative education experience of each participant and to understand their perceptions of cooperative education effectiveness. The questions in the interview guides were developed using the implementation of the co-operative education program. Those guides were finally presented.

Respondent-specific interview tools were developed beforehand in order to help guide the semi-structured interviews for each actor group, to ensure consistency of the data being collected across the cases. The administrators’ interviews were not less than 180 minutes in length. Other participant interviews (program teachers, students, entrepreneurs, and mentors) were not less than 120 minutes in length. All of the respondents agreed to allow the interview to be audio-recorded.

**Table 4.2** Selection of the Cases of Thai Public Universities

	<b>Suranaree University of Technology</b>	<b>Walailak University</b>	<b>Rajamangala University of Technology Thanyaburi</b>	<b>Total</b>
<b>Administrator</b>	1	1	1	<b>3</b>
<b>Program</b>	60	5	57	<b>122</b>
<b>Teachers</b>				
<b>Students</b>	402	14	630	<b>1,046</b>
<b>Entrepreneurs</b>	80	14	95	<b>189</b>
<b>Mentors</b>	80	14	95	<b>189</b>
<b>Total</b>	<b>623</b>	<b>48</b>	<b>878</b>	<b>1,549</b>

**Table 4.3** Selection of the Individual Cases for the Interviews with the Thai Public Universities

	Target No. Per Site	Suranaree University of Technology	Walailak University	Rajamangala University of Technology Thanyaburi	Total
<b>Administrators</b>	1	Professor Dr. Wichit Srisa- arn	Assist. Prof. Dr. Padungsak Suksa-Ard	Aj. Nuchtiphong Ou-thong	<b>3</b>
<b>Program Teachers</b>	2 or more	1. Asst. Prof. Dr. Boonchai Wichitsathian 2. Assoc. Prof.Flt. Lt. Dr.Kontorn Chamniprasart 3. Dr.Krawee Treeamnuk 4. Dr.Ekarong Sukjit	1. Dr. Anurak Thungtong 2. Assist. Prof. Dr. Kamchai Nuithitikul 3. Dr. Thunyawat Limpiti 4. Aj. Satjapan Leelatanon	1. Aj. Ouychai Bumrunghukiet 2. Dr.Chatchai Veranitisagul 3. Asst.Prof. Thanapong Noppawong na ayuthaya 4. Dr. Prusayon Nintanavongsa 5. Dr. Kittiwann Nimkerdphol	<b>13</b>

**Table 4.3** (Continued)

	<b>Target No. Per Site</b>	<b>Suranaree University of Technology</b>	<b>Walailak University</b>	<b>Rajamangala University of Technology Thanyaburi</b>	<b>Total</b>
<b>Students</b>	2 or more	1. Mr. Phanupong pheakaew 2. Mr. Phanudech Saraphad 3. Mr. Nuttaphol Saelim 4. Mr. Kittipong Sotjun 5. Ms. Phatraporn Saengwichian	1. Mr. Thawat Phucharoenphokha 2. Mr. Pongphat Boonma 3. Mr. Sakdida Haelabang 4. Mr. Tharit Srangtongdee 5. Mr. Chawalit Rakkong	1. Mr. Navamin Sodsaard 2. Mr. Suphachai Chamluang 3. Mr. Nuttanikorn Chaimongkolsatit 4. Mr. Visarut Chatchavankavinkul 5. Ms. Bavornlak Sairattanaindra	<b>15</b>
<b>Entrepreneurs</b>	1	Mr. Theerasak Sa- nguanmanasak	Mr. Rungroj Tantivejarpikul	Ms. Wanphen Lertarpirak	<b>3</b>
<b>Mentors</b>	2 or more	1. Mr.Santi Pumkrajang 2. Ms. Kittisuda Kittisakkul	1. Mr. Supharoj Kanjapananjaphol 2. Mr. Wisanu Chuglin	1. Ms.Ploypailin Charoen 2. Mr. Arthipong Chintai	<b>6</b>
<b>Total</b>		<b>13</b>	<b>13</b>	<b>14</b>	<b>40</b>

The researcher conducted all of the interviews to ensure consistency. The participants were asked to respond to closed and open-ended questions about their perceptions related to co-operative education, activities, historical events, organizational infrastructure, and organizational changes. The researcher recorded all of the key informants' interviews using a digital recorder, and subsequently transcribed all of them.

The documents collected during the systematic document review included organizational charts, grant applications, co-operative education plans, progress or data surveillance reports, co-operative education meeting minutes, co-operative education reports, and so on.

## **4.5 Data Analysis**

A content analysis methodology was used for the data analysis in the present study. Content analysis has been described as a technique used for examining text information collected by researchers (Hsieh and Shannon, 2007: 115). Neuman (2003: 44) noted the following: "Data analysis means a search for patterns in data, recurrent behaviors, objects, or a body of knowledge." Hsieh and Shannon (2005: 1277) pointed out that many researchers use content analysis as a qualitative research technique because it is a flexible method for analyzing text data such as interview responses.

### **4.5.1 Data Analysis Process**

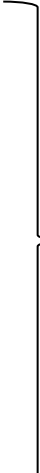
Mile and Huberman (1994) pointed out that the data analysis process comprises 3 key components: 1) data organization, 2) data display and results presentation, and 3) discussion and conclusion.

#### **4.5.1.1 Data Organization**

1) First, the interview records were transcribed. This was carefully carried out as soon as the interviews ended. The transcription was conducted in a deliberate manner, that is, not only was the gist summarized, but also every single detail was transcribed word for word, and then appropriate language use was adjusted.

2) Secondly, the information was organized into appropriate coding schemes. As the research attempted to go over the information several times to extract essential information for analysis, categorized segments of information from the interview by data coding were used to help focus on certain kinds of information, especially that which could contribute to the answers to the research questions. A single code for data segmenting was used with different expressions that shared common meanings for convenient data retrieval. The important activities in designing the codes included observation, critical thinking, basic data interpretation, data accumulation of certain kinds of information useful for the analysis, coding assignments for each message, and the same coding used with the messages that contained common meanings. An example is illustrated in table 4.4.

**Table 4.4** Data Organization (Coding Assignment)

Phrases	Relations	Keywords
1. GPA 2. Work Experience 3. Work Skills - Preparation Skill - Responsibility - Discipline - Social Adjustment - Problem Solving - Language Skill		As a partial unit of   Students' Quality

3) Thirdly, coding techniques (assigning key codes) were used: the researcher defined the themes for the coding to reflect all of the data representations. There might have been several themes based upon the scope of the research study. The codes assigned for each theme were called as “key codes,” which reflected the core concepts and the main topics for the data analysis.

4) Finally, coding techniques (assigning sub-codes) were used: the researcher attempted to match the read messages to the codes earlier assigned for particular meanings. All of the messages were substituted by the assigned codes. In the case of different messages containing similar meanings, they were assigned under the same codes. Those codes were called sub-codes. One key code actually could be broken down into multiple sub-codes, depending on the scope of that topic or concept. Similarly, when the sub-codes were combined, they could constitute the whole meaning of the key code. Suggestions for coding assignments were the following: 1) the researcher could use the guided questions of the interview as a tool to define certain key codes, 2) while the sub-codes were being assigned, the researcher should be aware of the benefit of applying the word or phrase utterances of the informants and should avoid using words that could create a gap from the informants' original ideas. Thus, the researcher should maintain the context and environment encompassing the data as much as possible. The example in table 4.5 illustrates the assigning of the codes and sub-codes.

**Table 4.5** Data Organization (Assigning Codes, Sub-Codes)

Phrases	Keywords	Keywords
Students' Quality	1. GPA	- The GPA is an important factor for students to join co-operative education programs in the workplace.
	2. Work Experience	- Solving project problems
	*****	
	3. Work Skills	- Registering for the course in pre-training service of co-operative education, Finishing work assignments on time
	- Preparation Skill	
	- Responsibility	
	- Discipline	
	- Social Adjustment	- Having self-discipline both in studying and working
	- Problem Solving	

**Table 4.5** (Continued)

<b>Phrases</b>	<b>Keywords</b>	<b>Keywords</b>
- Language Skill		- Having self-adjustment with colleagues and regarding the workplace - Getting work problems solved - Communicating in English with colleagues and customers

#### 4.5.1.2 Data Display and Results Presentation

1) The researcher brought the particular segments all of which were earlier assigned for codes, to combine them as groups according to their concept meanings, resulting in forming a new logical concept of knowledge.

2) The researcher engaged in critical thinking on the sub-codes in order to elicit the real meaning of each message that the informants tried to communicate, as well as to investigate the relationship between other segments. Segments that entailed common themes usually can offer a more detailed picture of certain topics.

3) When the topics were connected based on the related theoretical concepts, the completeness of the picture from the combined jigsaws could reflect the answers to the research questions.

4) The present research had sufficient information to answer the research questions as can be seen in the example in table 4.6: data display and results presentation.

**Table 4.6** Data Display and Presentation

Keywords	Descriptive Notes
Project	SAIC Motor CP Company Limited was located in Chonburi Province. My mentor assigned me a project to expand the automation capability of the machined door. I worked together with the door machine production line
Problem Solving of the Project	on the design. My project was 50% completed and its price would be quoted based on the market pricing. On the other hand, if it was produced by the company itself, the price quotation of the door machine would be one
Experience	time cheaper than that of the market price. Basically, my daily routines related to production line and production process of wheel nuts and bolts, which were actually direct to my interest of work, as I was really keen to know about any kinds of automatic systems.

#### 4.5.1.3 Discussion and Conclusion

The researcher created a discussion and conclusion on several points according to the results of the study, such as the points related to the students' quality and work experience. The co-operative education students were mostly found to have gained a lot of experience from the co-operative education program. The workplaces usually provided the students with professional-related project assignments so that they could have the opportunity to learn through problem-based solving, resulting in an advantage to both entrepreneurs in saving their cost in managing the project themselves, and the students in having a high possibility to get an immediate job offering from the co-operative education employer after their graduation.

#### 4.6 Data Validation

In qualitative research, data validation pertains to the reliability and validity of the research results. In the present study, there were three methods used to increase the trustworthiness of the research findings. Peer-debriefing was one method used. Peer-debriefing is “a process of exposing oneself to a disinterested peer in a manner paralleling an analytical session and for the purpose of exploring aspects of the inquiry that might otherwise remained only implicit within the inquirer's mind” (Guba and Lincoln, 1985: 308). The analytical sessions were conducted between the researcher and the debriefing peer in helping each other to identify emerging themes and other issues being developed during the data collection process. In the present project, the debriefing peer was the Director of the Co-op and Work-Based Learning Office. The director understood co-operative education and the program; therefore, she was able to reflect the findings so as to see if there were any loopholes or biases from the researcher’s perspectives.

An audit trail is also a method that increased the validity and reliability of the study. An audit trail documents the research steps taken from the start of a research project to the development and report of the findings. Those data were recorded and maintained in order to make the investigation complete. For the present research, the interviews in digitally-recorded audios were stored in the researcher’s personal recorder, as well as copied in soft files in a computer. Other relevant documents such as notes from the interviews, copies of the transcriptions, and the completed forms for each participant were kept as well. This audit trail helped to promote confirmability (Guba and Lincoln, 1985: 84), which has been defined as “the extent to which the findings of the study [are] shaped by the respondents and not by researcher bias, motivation or interest.” This process was important to ensure that the data collected truly highlighted the respondents’ voices and led to a trustworthy conclusion.

Internal member validation was also performed to increase the trustworthiness of the study. In other words, the process allowed the participants to have the opportunity to critically analyze the transcriptions and to comment on them (Guba and Lincoln, 1985: 84). For the certain purpose, the researcher provided a copy of the written summary of the interview to each participant so that each of them could look

over the documentation and offer suggestions for changes in order to ensure credibility and reliability. The participant validation provided extra quality assurance as it provided participants with the opportunity to affirm the documentation before conclusions were developed.

#### Data Triangulation

Validity, in qualitative research, refers to whether the findings of a study are true and certain—“true” in the sense that the research findings accurately reflected the situation and “certain” in the sense that research findings are supported by the empirical evidence. Triangulation is a method used by qualitative researchers to check and establish validity in their studies by analyzing a research question from multiple perspectives (Guion, Diehl and McDonald, 2011: 1).

For the principle of data collection, when we used the multiple sources of evidences, we had to use triangulation. Denzin (1978: 297) identified four basic types of triangulation: 1) data triangulation: involving time, space, and persons, 2) investigator triangulation: involving multiple researchers in an investigation, and 3) theory triangulation: involving using more than one theoretical schemes in the interpretation of the phenomenon, 4) methodological triangulation: involving using more than one method to gather data, such as interviews, observations, questionnaires, and documents.

In the present research, data triangulation was used because the data in the study were obtained from various sources such as documentation reviews, in-depth interviews (a semi-structured interview), observation, etc.

## 4.7 Ethical Considerations

Audiotapes were used to record the interviews. Specific information about the participants would be kept strictly confidential. Pseudonyms were used in the audiotapes as well as in the transcriptions, summaries, and the final draft of the dissertation. The participants were informed earlier that any information obtained in this study that could identify them would remain confidential and would be disclosed only with written permission.

## **CHAPTER 5**

### **DATA ANALYSIS AND RESEARCH RESULTS**

This chapter presents the findings of the study according to the focuses on the three main components of co-operative education: co-operative characteristics, co-operative implementation procedures, and the effectiveness of the co-operative operation of higher education institutions in Thailand, and the influential factors regarding the effectiveness of the implementation of the co-operation in higher education institutions in Thailand. The findings were obtained from the in-depth interview data collected from the universities (1. Suranaree University of Technology, 2. Walailak University, and 3. Rajamangala University of Technology Thanyaburi) and the companies (1. Western Digital Thailand Company, 2. Betagro Public Company Limited, and 3. Microchip Technology Thailand Company). The key informants from the universities comprised administrators, supervisors, and students. The key informants from the companies comprised management members and mentors. All of those samples participated in the same co-operative program network and worked together in running co-operative implementation in Thailand. The data were also obtained from non-participant observation and related literature reviews. The findings for each university and each company will be described separately in detail according to the following topics:

5.1 The co-operative characteristics of higher education institutions in Thailand

5.2 The co-operative implementation procedures of higher education institutions in Thailand

5.3 The effectiveness of the co-operative operation of higher education institutions in Thailand

5.4 The influential factors regarding the effectiveness of co-operative implementation in higher education institutions in Thailand

## **5.1 Key Characteristics of the Co-Operative Education of Higher Education Institutions in Thailand**

According to the findings on the key characteristics of co-operative education from the data collected through in-depth interviews with the participants, including university administrators and supervisors across the 3 universities (Suranaree University of Technology, Walailak University, and Rajamangala University of Technology Thanyaburi), together with the data obtained from non-participant observation and related document study, the key characteristics of the co-operative education of each university can be concluded as discussed below.

### **5.1.1 Suranaree University of Technology**

Suranaree University of Technology was founded in 1990. It began the first enrollment of students and officially started operation in 1993. At that time, the founder group was well aware of the significance of the students' professional development as a focus of the production of qualified graduates, since the survey results regarding graduates' employment in the labor market obviously revealed the following hindrances.

- 1) Graduates were not fully ready to work as they gained only knowledge of content but not practices or applications. The employers usually had to provide approximately 6-9 months additional in-service training for new employees to develop their readiness to work.

- 2) Graduates possessed competence but not endurance in working, especially in remote areas.

- 3) Graduates had very limited ability to communicate in other foreign languages, whereas most of them that graduated from the science field usually were offered jobs and worked in foreign companies.

Prof. Dr. Wijit Srisa-an, as the founder and a former president of Suranaree University of Technology during that time, was well aware of those problems and attempted to seek solutions. In searching for a model university, he visited several universities in America, Canada, and Germany, and finally found that the University of Waterloo exhibited excellent practice in providing professional training programs.

It offered co-operative programs in which the students were required to undertake 4 internships in the workplaces that participated in the co-operative education program. Therefore, he applied this concept to Suranaree University of Technology. Prof. Dr. Wijit Srisa-an was considered the founder of co-operative education in Thailand, first implemented at Suranaree University of Technology in a trimester system, and that was the first time that co-operative education was defined in Thailand.

Cooperative education is a systematic learning approach focused on the learners' authentic professional experience in the workplace. Regular in-class learning is alternated with out-of-class professional training. The work types assigned to students are directly related to their fields of the study. The emphasis is more on professional experience development, in other words work-based learning. At Suranaree University of Technology, the students' tasks for professional experience development normally are assigned as certain projects, especially those that could have benefits for the business organization in terms of business improvement, efficiency development of business systems, and problem solving of the business, for instance. Those projects would be undertaken during a period of 4 months so that the students could gain direct experience from the workplace, as well as the required characteristics in response to the labor market being developed simultaneously.

The university set up the objectives of the co-operative program as follows:

- 1) To enhance greater professional experience development and the self-development of the students by employing a new forms of learning experience in which that experience would be accomplished differently from that of traditional professional training
- 2) To allow the public and private sectors to have the opportunity to take part in developing the graduates' quality
- 3) To consistently update the curriculum according to the moves of the world paradigm
- 4) To promote and establish a relationship between universities and entrepreneurs through students that have been sent for professional development in the workplace

The philosophy of Suranaree University of Technology regarding education management is to develop graduates in science and technology through the

curriculum aligned with the community so as to provide students with more knowledge and social experience and to produce graduates with required characteristics including 1) to develop in being Thai, 2) to escalate the ability, and 3) to promote moral and ethical conduct.

Suranaree University of Technology also emphasizes producing technology developers for national development. The characteristics of the developers, as defined, consist of 1) Humanware, 2) Orgaware, 3) Inforware, and 4) Technoware (Suranaree University of Technology, 2016).

### **5.1.2 Walailak University**

Walailak University, under the Act of Walailak University launched in 1992, was established as “a university under the supervision or the jurisdiction of government from institutional decentralization reform.” Prof. Dr. Wijit Srisa-an, a former Acting President of the university during 1993-1998, initiated an effective guideline on educational management and proposed a good model for educational management, as a university to work autonomously and free from government control. The university would have its own management system. Enrollment was set with a trimester system and one academic year would be divided into 3 semesters and under the co-operative education program. In this regard, he defined “cooperative education” as “the education system in which the regular in-class studying was alternated with out of class professional experience in the workplace, under the co-operation with entrepreneurs and relevant entities. It was considered as Work Integrated Learning. The management was based on Thailand Co-op education standards.” The main mission of the co-operative program was to promote the engagement between educational institutions and entrepreneurs. It was first established at Walailak University in 1998.

The objectives of the co-operative program were as follows:

- 1) To develop a new learning approach consistent with social and national mainstreams
- 2) To escalate the knowledge, skills, and ability of student trainees through authentic professional experience in the workplace

3) To prepare students for work, and to make them self-aware of their own weaknesses and strengths in order to maintain themselves for success

4) To promote co-operation in terms of human resources between the universities and entrepreneurs both from public or private sectors, as well as the institutions across Thailand and abroad

5) To develop co-operation in terms of research conduct, knowledge and innovation sharing among the institutions and entrepreneurs both from public and private sectors

The main mission of the university is to explore, search for, and maintain knowledge, and to transfer this knowledge so that creativity, development, and academic excellence would be created simultaneously, resulting in the increase of knowledgeable and high-moral human resources, as well as the persistent facilitation of the society and world development. The emphasis of graduate production was placed on:

1) Being in-trend as a citizen of the world and holding a democratic ideology perspective, knowledge of the world, and a broad vision

2) Containing academicism and advance professionalism in a certain field of study and the ability to effectively apply the knowledge to work

3) Becoming and “Interlectual” that has high consciousness, morals, and professional ethics (Walailak University, 2016).

### **5.1.3 Rajamangala University of Technology Thanyaburi**

On the 27<sup>th</sup> of February, 1973, the Act of the “Technological and Vocational College” was launched and became effective since that time. The purposes of the Act were to produce vocational teachers at the bachelor degree level in terms of professional development, including the diploma level or any other degrees lower than a bachelor degree, for conducting research in professional development areas, as well as for providing academic service to the public. King Bhumibol Adulyadej renamed the college the “Rajamangala University of Technology” on the 25<sup>th</sup> of September, 1988.

According to the educational reform of Thailand in 1999, the focus was to decentralize the management authority of the central government as well as to directly give it to the institutions so that the management of the institutions could be more independent and flexible under the supervision of the Office of Higher Education, the Ministry of Education. The old Act of the Rajamangala Institution of Technology had been edited and substituted with a new Act. After all of its branches were grouped together, there was a total of 9 institutions of Rajamangala Institution of Technology in Thailand, emphasizing professional development in Science and Technology for education at all levels, including advance diplomas, and bachelor, master, and doctoral degrees, so as to serve the demand of those graduates that wanted to further their education and to broaden the opportunity to continue their professional study at the bachelor degree level for those graduates that had finished their degrees at vocational community institutions and at basic education institutions.

From the Act of Rajamangala Institution of Technology given by King Bhumibol Adulyadej in 2005, endorsed on the 8<sup>th</sup> of January, 2005, officially announced on 18<sup>th</sup> of January, 2005, and effective on the 19<sup>th</sup> of January, 2005, the institution was renamed again as Rajamangala University of Technology Thanyaburi.

The operation of co-operative education of the university, working together with the Office Higher Education, began in 2002 in the form of a pilot project. Before that time, the university had regular professional training courses conducted in the curriculum, but when co-operative education became more prominent and in trend, the university was interested in joining the program and made a try. The operation of the co-operative education of the university went very well and consistently under the supervision of the Office of Higher Education and the support of the Thailand Co-op Education Association. Its success can be clearly seen in how the co-operative procedure was defined and how students could be transformed to be “hands-on practitioners of science and technology” based on the mission of the university and co-operation from entrepreneurs. The operation of the co-operative education program of the university was performed effectively with the objectives to promote graduates to gain more authentic professional experience in the workplace before graduation, where they could learn how to adjust themselves to workplaces and social contexts. Additionally, it was a chance for them to get a permanent job. Even more, the

program offered the opportunity for students to develop themselves for more responsibility, honesty, academic knowledge, and morals and professional ethics. The development was consistent with the university's main goal, which was the determination to constantly promote the professional development in science and technology of the students (Rajamangala University of Technology Thanyaburi, 2016).

From the aforementioned, the characteristics of co-operative education in Thailand from the perspectives of those 3 universities, Suranaree University of Technology, Walailak University, and Rajamangala University of Technology Thanyaburi, have been distinguished in the table 5.1.

**Table 5.1** Characteristics of Co-operative Education in Thailand

<b>Universities</b>	<b>Characteristics of Co-operative Education</b>	<b>Objectives</b>
<b>Suranaree University of Technology</b>	<p>The nature of the co-operative education encompasses the enhancement and development of quality technological specialists for helping with the development of the country; the characteristics of expected technological specialists were defined as follows:</p> <ol style="list-style-type: none"> <li>1. Humanware</li> <li>2. Orgaware</li> <li>3. Infoware</li> <li>4. Tehnoware</li> </ol>	<ol style="list-style-type: none"> <li>1. To increase students' professional experience and the self-development of the students in a more meaningful way than as in regular professional training courses</li> <li>2. To broaden the opportunity for private and public sectors to join in developing the quality of graduates</li> <li>3. To keep updating the curriculum</li> <li>4. To promote and establish the relationship between the university and entrepreneurs through students that are taking the professional development program in the workplace</li> </ol>

**Table 5.1** (Continued)

<b>Universities</b>	<b>Characteristics of Co-operative Education</b>	<b>Objectives</b>
<b>Walailak University</b>	<p>The focus of co-operative is placed on the production of good and talented graduates with the following characteristics:</p> <ol style="list-style-type: none"> <li>1. Being an up-to-date citizen of the world, who possesses a democratic ideology, knowledge of the world, and a broad vision</li> <li>2. Being academic and professional in terms of having in-depth knowledge, ability, skills of his/her disciplines as well as having the ability to efficiently apply knowledge to practice</li> <li>3. Being an “ intellectual” who possesses moral consciousness and professional ethics</li> </ol>	<ol style="list-style-type: none"> <li>1. To keep updating the learning model and the curriculum of the university to be consistent with existing social and national demands</li> <li>2. To enhance the work ability, skills and knowledge of the students through authentic professional experience in the workplace</li> <li>3. To prepare the students to gain professional readiness in terms of cultivating their self-awareness in order to find the right way for themselves to maximize their own ability</li> <li>4. To promote co-operation in terms of human resources with entrepreneurs from both private and public sectors in Thailand and abroad</li> <li>5. To develop explicit co-operation in terms of research conduct and knowledge and innovation sharing between the university and entrepreneurs from both private and public sectors</li> </ol>

**Table 5.1** (Continued)

<b>Universities</b>	<b>Characteristics of Co-operative Education</b>	<b>Objectives</b>
<b>Rajamangala University of Technology Thanyaburi</b>	Being a “hands on” practitioner in the fields of science and technology	To promote graduates to gain more authentic professional experience in the workplace before their graduation so as to build up their readiness and adjustment towards the future work environment along with increasing the opportunity to for them to get job offers. The development included their work responsibility, honesty, professional knowledge, and ethics.

## **5.2 The Procedures of Co-Operative Education Implementation in Thailand**

The findings regarding the procedures of co-operative implementation in Thailand from the three representative samples—Suranaree University of Technology, Walailak University, and Rajamangala University of Technology Thanyaburi—through data that were collected from interviews with the key informants, non-participatory observation, and a review of related documents, showed that each university had its own unique characteristics of co-operative education as can be seen in the following summary.

### 5.2.1 Suranaree University of Technology

The university first established co-operative education in 1993. At the beginning, the program was set up as a co-operative project in 1994, and later became a co-operative education and professional development center in 2008. The whole process of the co-operative operation was run by the center as a one-stop service. The procedures of co-operative project can be divided into 3 stages: 1) pre-stage co-operative education, 2) While-stage co-operative education, and 3) post-stage co-operative education as described in the following details.

#### 5.2.1.1 Pre-Stage of Co-operative education

Step 1: students that were eligible to participate in the project had to hold these criteria: 1) passing pre-co-operative training; 2) having a minimum GPA of 2.00, calculated from the study beginning to the end of the last semester before leaving for the internship; and 3) passing additional criteria defined by the studying program, e.g., qualifying examinations for certain courses. For example, the students from computer engineering (based on Edited Curriculum B.E. 2554) were required to pass 3 core courses: 523 211: Database Systems, 523 352: Computer and Communication, and 523 354: Operation Systems. Similarly, the students from mechanical engineering (based on Edited Curriculum B.E. 2556 or those group of students whose ID started with 54 and above in the first two digits) were required to pass 3 in 5 core courses which included 525 308: Heat Transfer, 525 304: Machine Design I, 525 305: Mechanics of Machinery, 525 311: Automatic Control System, 525 315: Refrigeration and Air Conditioning before enrolling in pre-co-operative training, and so on.

Step 2: In applying to join the co-operative project, the students were required to conform to the following processes.

- 1) The pre-co-operative training course had to be enrolled in during the semester that immediately followed the co-operative semester except in emergency cases. Those special cases needed to be proposed as a request form to the dean for approval, along with the direct submission of the application to the companies such as Western Digital (Thailand) Company, and all of that had to be done earlier than the opening of the regular application period. For the company process, there was an admission process policy; first, the department in charge of the

student trainees had to create a work project proposal submitted online to the company recruitment department, and then the recruitment department would proceed with receiving the students for the internship. The learning was conducted in the form of problem-based learning, which refers to learning by using problems as a base with which to start. The students usually learn through the assigned work project. If the number of qualified students' applicants after reviewing the qualification is not sufficient or available, the company sends the information of their requirement request to the university, and vice versa. However, the company does not have criteria regarding the students' minimum GPA.

2) The request of the delay to start the co-operative internship needs to be submitted to the dean earlier than the date of the announcement of eligible students.

3) The announcement of eligible students must be considered final, and no withdrawal or postponement would be accepted, except emergency cases concerning health problems.

#### 5.2.1.2 During the Co-operative Education

Step 1: Registration at the university for entry: a set of documents used for co-operative education is available at the Co-op Education and Professional Development Center according to the regular schedule, which is attached with 1. The co-op scope and description of the job; 2. a map of the co-op company; 3. an evaluation form for the supervisor; and 4. other documents provided from the company (if any).

Step 2: Initial Contact with the company for entry: the students would have to make an initial contact with the coordinator who was assigned by the company, and to make inquiries regarding the following information: 1. the knowledge and skills required for the job; 2. directions to the company; 3. recommendations about transportation and accommodations; 4. the time, place, and contact for first registration for entry; 5. A Standard Form of Wearing, 6. extra documents for registration such as copies of the person's house registration, identification card, bank account, photos, etc.

Step 3: Registration at the company for entry: according to the appointment made with the company, the students should wear formal clothes and

show up at the registration site at least half an hour early and then submit additional documents requested by the company to the mentors.

Step 4: Supervision during the co-operative education: the university co-operative coordination would contact the supervisors from all departments to set a schedule for supervising students. The schedule basically would be held during weeks 5- 12 of the co-operative internship so that the supervisors could give suggestions and advice to the advisees on the students' work and self-adjustment to their work environment. All students needed to be supervised at least once during their co-operative internship. The supervision would last approximately 20 minutes. The teacher supervisor would either talk individually with the student first and then with the job supervisor, or have a discussion with all of them.

#### 5.2.1.3 Post-Stage of Co-Operative Education

Step 1: An interview and students' report submission: after finishing the internship, the students returned to meet the supervisor from their department for an interview to discuss their problems and suggestions for further development and then submitted their paper reports to the advisors. The revision of the report had to be made and submitted again within the assigned due.

Step 2: Discussion in a seminar: in order to develop the students' presentation and information transfer skills, a seminar would be held as a stage for them to exchange their knowledge and experience of co-operative education with their friends under the supervision of the school supervisors. The supervisors would take this chance to evaluate the students' presentation of co-operative education according to the following criteria: 1) a score of 30 for presentation; 2) a score of 20 for content; 3) a score of 20 for material preparation; 4) a score of 20 for personality; 5) a score of 5 for the ability to answer the questions; and 6) a score of 5 for time management. That made for a total of 100, which would be later divided by 5 as a 20 net score for the whole project presentation out of the overall project score for co-operative education.

Step 3: evaluation of the students' co-operative performance: the grading system for the co-operative education would be S (Satisfactory = pass) and U (Unsatisfactory = fail). The components of the evaluation or grading included 1)

attendance in all activities provided by the university, which consisted of the orientation, the training, the seminar, and pre-service co-operative activities; 2) the requirement of grade S for the performance and co-operative report evaluated by the staff mentor; 3) the requirement of grade S for the performance and report evaluated by the university supervisor; 4) participation in the post-co-operative education activities such as meetings, interviews, seminars, the return of the questionnaire, and so on (Suranaree University of Technology. The Center for Co-operative Education and Career Development, 2016).

### **5.2.2 Walailak University**

In 1998, the university started the enrollment of its first batch of students. At that time, the co-op and professional development center had not been set up. Co-operative education initially became a co-operative project under the supervision of the academic service center. For quite some time, when the co-operative establishment appeared to be on the right track, the university foresaw its importance and then developed a co-operative and professional development center in 2010. For serving co-operative education, the center was a one-stop service for all kinds of co-operative business. The university's co-operative implementation was divided into 3 phases: 1) the pre-stage of co-operative education; 2) during the co-operative education; and 3) the post-stage of co-operative education. Details are discussed in the following.

#### **5.2.2.1 Pre-Stage of Co-Operative Education**

Step 1: 1 year preparation before co-operative education: the co-operative students had to submit their application before October of each year. After that, they needed to enroll in the course called Pre-Cooperative Education as a prerequisite of the cooperative education course that would be conducted in 2 consecutive semester lengths. The course content of the pre co-operative was focused on professional planning, the development of job application skills, job interview skills, and all essential knowledge for working. The students that enrolled in the course were required to pass the course by getting an S grade as to be eligible to apply for co-operative education.

Step 2: The semester, which was normally 2 semesters long, they were required to prepare themselves one semester in advance according to the following process:

- 1) The students confirmed that they were going to participate in co-operative education in week 2 of the semester.

- 2) The students checked the name list of eligible students together with their entrepreneurs, and submitted applications and a selection list of the workplaces between the third and fourth semesters. The students had to select three workplace options arranged in order. Meanwhile, the entrepreneurs such as Betagro Public Company Limited also worked on planning the co-operative education by making an explicit co-operative plan, assigning mentors from each department, and each mentor needed to develop and propose a work project that had to be partial or related to their current scope of work or responsibility. The students would learn by using problem-based learning, which refers to learning that involves problem solving as a trigger. For co-operative education, the students would learn how to solve the problem from the project assigned and then present the project results to other students in each university.

- 3) The students had a job interview according to the regulations of each department.

- 4) The interview results were announced and then the students had to have a consent form signed by their parents to allow them to participate in co-operative education.

- 5) The students submitted the consent form of their parents to the university in week 8 of the semester.

- 6) The students were required to attend the co-operative pre-training service and activities assigned by Co-op Education and Professional Development center, for building their readiness before going for co-operative education.

- 7) The students had to attend activities for preparing students for the workplace called “Song Pradu Su Sathan Prakornkarn” and to receive the following set of documents: 1) the results of the contact with the entrepreneurs; 2) a map and accommodation information of the entrepreneurs; 3) a co-operative work

plan; 4) details of the position and job description and staff mentor's name; 5) a work report form and template; and 6) a data record form for a daily journal on co-operative education.

8) The students received the introduction letter from the university and the evaluation form for the staff mentor as the documents to present to the workplace.

#### 5.2.2.2 The Stage During Co-Operative Education

Step 1: Registration for the entry to the workplace: the students were required to register for entry to the workplace according to the schedule set. If an unexpected or emergency incident occurred and the students could not make it on time, the students needed to contact the workplace as soon as possible.

Step 2: Returning the documents to the university: the students were required to return the set of documents including the map, the co-operative work plan, the details of the position, the job description, staff mentor names, and the work report form and template to the Co-op Education and Professional Development Center within week 3. The center would send those documents to the supervisor for his/her information in order to verify and provide suggestions for supervision later.

Step 3: Submission of the report and presentation of the work project: the students were required to submit a report of the project to the mentor at least two weeks before the end of the co-operative education in the workplace and then adjusted the report according to the mentors' comments and feedback. Once the students finished their internship, before they left, they had to present their project to the entrepreneur.

#### 5.2.2.3 Post-Stage of Co-Operative Education

Step 1: Submission of the report and presentation of the work project: the students were required to submit the report of the project to the supervisor within the timeline. Additionally, it was compulsory for them to present their projects and to participate in the post co-operative activities according to the schedule and the plan set by their departments. Finally, they had to submit a copy of the completed report to the entrepreneur and the department.

Step 2: Submission of the evaluation and questionnaire: the students had to submit the evaluation done by the entrepreneurs and the student questionnaire, with

a CD of soft files of the report and presentation to the Co-op Education and Professional Development within the timeline (Walailak University. The Center for Co-operative Education and Career Development, 2016).

### **5.2.3 Rajamangala University of Technology Thanyaburi**

In 2002, Rajamangala University of Technology Thanyaburi started a pilot project on co-operative education, working together with the Office of Higher Education. At that time, the university just sent the students for a regular internship and co-operative education was perceived as something very new for all. However, the university foresaw the benefit of the co-operative education and it began to join the co-operative education pilot project. To begin the pilot project with the engineering faculty, the faculty organized a co-operative education office to manage the operation. Later in 2008 the university decided to fully establish 100% co-operative education. Since the amount of co-operative education affairs was increasing as a consequence of the full establishment, the university organized a university co-operative education office and first appointed the director of the office in 2009 in order to serve all co-operative related business. A functional structure of the co-operative office was officially announced in 2010, whose scope included the management of a co-operative education affairs database, an IT system for co-operative education, and an act as a one-stop service for co-operative affairs. One benefit of the office was that it could reduce the process of the work of co-operative operations. For another benefit, it could reduce the number of staff dealing with those tasks as well as the workload. At the present time, the Co-op Education office is still not ready to offer fully service to all faculties. For example, the engineering faculty still has its own co-operative education affiliation unit, working instead with the university co-operative education office during the interim. To illustrate, the procedure used for the co-operative operation of the university can be described in the following 3 phases: 1) pre-stage co-operative education; 2) the stage during co-operative education; and 3) the post-stage co-operative education. In each stage, the details can be seen below.

### 5.2.3.1 Pre-Stage of Co-Operative Education

Step 1: Qualifications of Eligible Co-operative students: the co-operative students are required to enroll in the courses and to obtain the credits more than half of the total credits of the curriculum. The minimum GPA is 2.00 or above in the bachelor's degree. The qualification would be reviewed and approved again, based of the university criteria, by the department/program/major where the supervision was the director of the co-operative students.

Step 2: Registration for the co-operative education course: the co-operative students had to register (pre-register) to enroll the co-operative education course in advance before the semester ended.

Step 3: Provision of Pre-training and a co-operative seminar before internship: the faculty or the university would consistently provide the pre-training service and a co-operative seminar to cultivate the students' work readiness in advance before they go on the co-operative education semester. The training topics would be based on knowledge of co-operative procedure, skills for writing application letters, skills for job interviews, knowledge of the use of professional law for working, 5s guideline, English for communication, and so on. Those activities could be conducted in the form of a training or a course in the curriculum.

Step 4: Selection of jobs and the co-operative students by the entrepreneurs and notification of the results: usually the co-operative education unit or center would send the compiled applications of the students to the entrepreneurs. The entrepreneurs would make a selection by considering only the application form or both the application form and an interview. For the co-operative process of the entrepreneurs, for example, the case of Microchip Technology (Thailand) Company, the co-operative education process started with first the head of each department submitting a student trainee requisition form and job assignment justification to the human resource management department. Each department must have its each own plan for conducting co-operative education and assigning staff in the department for mentoring the co-operative students. The appointed mentors are supposed to initiate the co-operative project for the co-operative students and basically the project was created from the scope of the mentors' existing work. Learning as co-operative education would be Problem-Based Learning, which refers to learning that occurs

when students begin to solve the problems of the assigned project. Once the HR receives the documents from each department, it will proceed with contacting and coordinating as well as sending the co-operative students' acceptance letter to the university.

As soon as the students submit the application forms, the students need to follow up the interview-call announcement or updates. After that, the entrepreneurs send the results of the selection to the university co-operative education office and the enlisted co-operative students are ranked in order. The university co-operative office would later announce the result to students. After the announcement of the selection, the prospective co-operative students must strictly follow the co-operative schedule and plan to start their work with the entrepreneurs with no conditions. Withdrawal would not be accepted in any cases except emergency incidents with appropriate grounds, and on a case-by-case basis. The approval of a special case would be based on the consideration of the co-operative committee panel.

Step 5: Verification of the jobs qualified for co-operative students: the co-operative education office of each faculty would take the jobs offered by the entrepreneurs to the supervisors related to the field for their verification. The jobs that qualify must contain the following criteria: 1) the job was direct to the field of the study, 2) the job is challenging but not beyond the students' ability, 3) the job is possible to be completed within 16 weeks during the internship period, and 4) the company provides appropriate benefits for the students in supporting the completed project.

#### 5.2.2.3 The Stage during Co-Operative Education

Step 1: Co-op education in the workplace: the co-operative students must arrive in the workplace on the exact date written in the schedule. The co-operative office of each faculty would coordinate the transfer of co-operative students with the entrepreneurs in advance. The co-operative students need to show up for registration of their entry at the HR department of the co-operative workplace on the first day of the work.

Step 2: The activities during co-operative education in the workplace: according to the policy, for convenience in contacting and coordinating with the workplace and the co-operative students, the students are required to submit a set of

documents to the co-operative education office or to their teacher supervisors within the timeline. Those documents include: 1) the place of work to be submitted within the first week of work, together with the attachment of a map, the name of the mentor, the scope of the assigned work, and the telephone contacts for the workplace, the co-operative students, and the mentor; 2) the working plan to be submitted to the co-operative education office during the second week of the work; 3) the project topic and a brief report of the project written according to the university template to be submitted to the teacher supervisor during week 3 so that the supervisor can review it and provide feedback; 4) a progress report to be submitted in week 10 to the supervisor; 5) a final report to be submitted to the staff mentor at least two weeks before the end of the internship, and a revision from the staff mentor's comments must be done before the end as well, and the completed report after the revision is to be submitted to the supervisor shortly after the co-operative students return to school from the internship.

Step 3: Co-operative supervision: the supervision would be carried out by the supervisor at least once in 8 weeks during the internship period. The process of supervision can be listed out as follows. First is pre-co-operative education: the co-operative coordinating committee of each department would assign the supervisors for the co-operative students and create a schedule plan for supervision and then pass the information to the co-operative education faculty or university representatives that will work on coordinating with relevant external parties. The number of the supervisor's visits will be based on the guideline announced by the faculty or the university. Second, the teacher supervisor visits the co-operative students according to the schedule set earlier, and the main tasks in supervising are to determine the quality of the co-operative students' work and the topic of the assigned project, and after that the supervisor needs to send a report of the supervision to the co-operative education office in the faculty or at the university.

#### 5.2.3.3 Post-Stage Co-Operative Education

Step 1: Submission of the project report and organization of an interview: the co-operative students must submit the form of the project report together with the full report to the co-operative supervisor. After that, they have an interview with the co-operative education committee from the department or the

program. The interview takes place right after the co-operative students finish their internship and return to the university. The main points of the interview cover the investigation of problems, additional comments, suggestions, and concepts necessary for further self-development of the co-operative students. The full report would be submitted to the supervisor and revised according to his/her comments within the timeline.

Step 2: Organization of a seminar: a co-operative education seminar will be held so that the co-operative students are able to exchange their experiences, and present and transfer the knowledge gained from the co-operative education in the workplace under the supervision of the supervisors from their departments (Rajamangala University of Technology Thanyaburi. COOP RMUTT, 2016).

From all the aforementioned that depicted the co-operative education procedure of the 3 universities including Suranaree University of Technology, Walailak University, and Rajamangala University of Technology Thanyaburi, the similarities and difference could be found in the table 5.2 below.

**Table 5.2** The Procedure of Co-operative Education Implementation in Thailand

Universities	Process of Co-Operative Education Implementation		
	Pre-Stage	While-Stage	Post-Stage
Suranaree University of Technology	<p><b>Step 1: eligible co-operative education students must hold the following qualifications:</b> 1) passing the co-operative education pre training course, 2) Having GPA 2.00 above, cumulative to the last semester before applying for internship, and 3) passing the other criteria set by each program or department</p> <p><b>Step 2: submission of the application or requisition form:</b> 1) the co-operative education students would have to submit the application or requisition form within week 2 of the open semester, 2) the co-operative education students would have to register the co-operative education pre training course next to the co-operative education semester, and 3) the official announcement of co-operative education students would be considered final, the co-operative education students must strictly follow</p>	<p><b>Step 1: documentation on work entry registration:</b> 1) co-operative education job offering form, 2) the map of the workplace, 3) evaluation form (Supervisor's envelop)</p> <p><b>Step 2: arrangement of the contact to the entrepreneurs for the registration of the work entry:</b> the contact would be made through the co-operative education coordinator. The co-operative education students could ask questions about knowledge and skills required for work, and the time and the place for registering on the work entry.</p> <p><b>Step 3: registration of the work entry:</b> the co-operative education students must strictly follow the instruction of the entrepreneurs and also submit the additional documents requested (if any) and evaluation form (Supervisor's envelop) to the staff mentor</p>	<p><b>Step 1: organizing interview and submitting report:</b> the co-operative education students must have an interview with the supervisor in order to discuss about the problems, receiving suggestions, concepts that helped the students to develop themselves. Also, they needed to revise and submit the final project report to the supervisor within the timeline.</p> <p><b>Step 2: attending a seminar:</b> the seminar would be a stage for co-operative education students to exchange their experience and develop their presentation and information transfer skills. The instructors would evaluated them from the seminar based on 1) 30 score for presentation, 2) 20 score for content, 3) 20 score for material preparation, 4) 20 score for personality,</p>

**Table 5.2** (Continued)

Universities	Process of Co-Operative Education Implementation		
	Pre-Stage	While-Stage	Post-Stage
	the co-operative education plan, without any exceptions, postponement, or withdrawal, unless the emergency cases.	when arrived. <b>Step 4: supervision:</b> the teachers from the department and the co-operative education officers would work together to design a co-operative education plan. The supervision would be carried out during week 5 - week 12. The supervisors would give suggestions and comments to the co-operative education students both on working and self-adjustment to the working environment. All co-operative education students would be supervised at least one time during work.	5) 5 score for answering questions, 6) 5 score for time management. The total was 100 score, divided by 5, equaled 20 score for the overall project evaluation. <b>Step 3: evaluation of co-operative education performance:</b> grading system used by the instructors for the co-operative education evaluation consisted of S (Satisfactory = pass) and U (Unsatisfactory = fail).
<b>Walailak University</b>	<b>Step 1: 1 year before co-operative education:</b> the co-operative education students must submit the application form for participating in the co-operative education. After that, they needed to enroll in the pre- co-operative education course within 2 semesters earlier to the co-operative	<b>Step 1: registration for the work entry:</b> the co-operative education students must strictly arrive at the workplace on the exact date indicated in the plan. <b>Step 2: returning documents to the university:</b> the co-operative education	<b>Step 1: submission of the project report and presentation:</b> the co-operative education students must submit the project report to the supervisor within the timeline. Also, they had to attend the post co-operative education activities according the criteria set from each

education, and they had to pass the course with student information regarding department. After that, they would have to

**Table 5.2** (Continued)

Universities	Process of Co-operative Education Implementation		
	Pre-Stage	While-Stage	Post-Stage
	<p>S grade as to become an eligible candidate.</p> <p><b>Step 2: preparation before co-operative education:</b> preparation before co-operative education could be done within 2 semesters in advance. The students needed to check their qualifications first and then to submit their confirmation form within one semester before the co-operative education semester. The 3 selected choices of the workplaces could be made and ranked in order in the requisition form. The students must also attend an interview and a co-operative education pre-training called “Song Pradu Su Sathan Prakornkarn” beforehand and receive necessary documents for co-operative education including job position and description, the name of mentor, the introduction letter, and the evaluation form to the workplace.</p>	<p>their accommodation, the map of the workplace, the project plan, the job position and description, the name of the staff mentor, and the brief of assigned project to the co-operative education officers within three weeks after leaving, and then all the information would be gathered and passed to the supervisor for their further verification, and the provision of the supervision for the students during the co-operative education.</p> <p><b>Step 3: submission of the project report and presentation:</b> the students needed to submit the project report to the staff mentor within 2 weeks before the end of the internship. They also had to revise the report according to comments received from the staff mentor, and finally present the project to the workplace before returning to the</p>	<p>finally submit one copy of the final report to the workplace and the university academic service office.</p> <p><b>Step 2: submission of the evaluation form and the students’ questionnaire:</b> the co-operative education students must submit the evaluation done by the entrepreneur, a CD of soft files of the report and the presentation to the university co-operative education center within the timeline.</p>

Table 5.2 (Continued)

Universities	Process of Co-operative Education Implementation		
	Pre-Stage	While-Stage	Post-Stage
<b>Rajamanga la University of Technology Thanyaburi</b>	<p><b>Step 1: Co-operative education students' qualification:</b> the co-operative education students must obtain the minimum credit equaled half of the total credit. The minimum GPA was 2 above of Bachelor's degree. Also, they needed to pass the verification of other qualifications as set by each department.</p> <p><b>Step 2: registration of co-operative education course:</b> the students were required to register the course earlier (Pre-register)</p> <p><b>Step 3: Co-operative education pre-training before co-operative education:</b> the training was organized by the faculty/ university. The topics of the training included skills in writing a job application letter, knowledge of how to apply professional law for working, 5s guideline for working. It could be in form of a training session or a course in the curriculum.</p>	<p><b>Step 1: professional experience at the workplaces:</b> the co-operative education students needed to show their presence at the workplaces on the exact date set in the plan. Beforehand, the university would made an initial contact about the students' arrivals with the entrepreneurs.</p> <p><b>Step 2: activities during internship:</b> the students would send the necessary documents to the university co-operative education center or to the supervisors within the following timeline: 1) the information of the workplace, the staff mentors' names, the scope or work, the telephone contacts within the first week of co-operative education, 2) the project plan of the co-operative education within the second week, 3) the brief of</p>	<p><b>Step 1: submission of the project report and participation in an interview:</b> the students must send the confirmation form of the submission of the project report together with the copy of the report to the co-operative education supervisors. After that, the co-operative education students must have an interview with the co-operative education committee from their department in order to discuss about the problem during internship, suggestions that could be made, and the initiative concepts that could lead the students to their ability for self-development. It was the same time to submit the report to the supervisors and got the feedbacks to revise report and resubmitted it within the timeline.</p> <p><b>Step 2: attendance of post co-operative education seminar:</b> the co-operative</p>

**Table 5.2** (Continued)

Universities	Process of Co-operative Education Implementation		
	Pre-Stage	While-Stage	Post-Stage
<b>Rajamanga la University of Technology Thanyaburi</b>	<p><b>selection of the co-operative education students by the entrepreneurs, and notification of the result of the student selection:</b> the faculty co-operative education office would send the students' application forms to the entrepreneurs for a selection. Consideration of the selection would be based on a single application form or included with an additional interview. After the selection was finalized, the entrepreneurs would notify the university the results with the selection rank, in order that the university would later make an announcement to the students.</p> <p><b>Step 5: verification of the jobs assigned for co-operative education students:</b> the co-operative education supervisors from each department would be in charge to verify the job quality under the following criteria: 1) being</p>	<p>project ..... university template</p> <p>education students would have an opportunity</p> <p>within the third week, 4) the progress report within week 10 submitted to the supervisors, and 5) the completed project report to the staff mentor within 2 weeks before the end of the co-operative education. The final report after revision would be submitted to the supervisor as soon as returning to the university.</p> <p><b>Step 3: Co-operative education supervision:</b> the university assigned the supervisors to visit the co-operative education students at least once in 8 weeks. The process of supervision was in the following steps: 1) the co-operative education committee of each department would appoint the supervisors and create a supervision plan for the team. Then, the department would pass the information to the</p>	<p>to exchange their experience and opinion about co-operative education at the post co-operative education seminar as well as to present and transfer their knowledge gained from co-operative education. The seminar was conducted under the supervision of the supervisors.</p>

direct to the students' fields of study, 2) being faculty cooperative education

**Table 5.2** (Continued)

Universities	Process of Co-operative Education Implementation		
	Pre-Stage	While-Stage	Post-Stage
<b>Rajamangala University of Technology Thanyaburi</b>	challenging enough for the co-operative education students to develop themselves at an optimal level but not beyond their ability, 3) being possible to be completed within 16 weeks of co-operative education duration, and 4) having adequate benefits that were appropriate for the project accomplishment.	office, 2.) the co-operative education staff from each faculty would contact the entrepreneurs for making an appointment for the supervisor's visits and prepare basic information necessary for the supervision, 3) the supervisors would study the information of the co-operative education students, and the jobs, 4) the supervisor went for a visit on the date that was earlier planned, based on the issues including job quality assessment, and the topics appeared in the project reports. Finally, the supervisor must submit the report of the supervision to the faculty or university co-operative education office after their visits.	

### **5.3 Co-operative Education in Thailand**

The results of the effectiveness of co-operative education in Thailand focus on the three following themes: 1) the co-operative students' quality investigated from the interview data from the co-operative supervisors, the co-operative students, and the staff mentors; 2) the quality of the university determined by the interviews with the university administrators and the co-operative supervisors; and 3) the quality of the entrepreneurs evaluated by the interviews with the management of the entrepreneurs and the co-operative staff mentors. The results from each university are described in the details as follows.

#### **5.3.1 The Co-Operative Students' Quality**

##### **5.3.1.1 Suranaree University of Technology**

According to the data collected from the interviews with the co-operative supervisors, the co-operative students, and the co-operative staff mentors, the results revealed that the quality of the co-operative students could be evaluated according to three indicators: 1) the work experience of the co-operative students, gained from the co-operative education in the workplace; 2) the co-operative students' GPA; and 3) the work skills gained from co-operative education in the workplace. All of the indicators are elaborated below.

1) Work experience of the co-operative students gained from their co-operative education in the workplace: the results showed that the co-operative students obtained a lot of experience from their co-operative education in the workplace. The entrepreneurs usually assigned projects as tasks for the co-operative students to achieve. In dealing with the project, the co-operative students learned how to solve the project problems, resulting in benefits to the entrepreneurs in terms of the cost reduction of production, and also the benefit that might be returned to the co-operative students as there might be a high tendency or an opportunity for them to get jobs offered by the entrepreneurs once they graduate. This result was reflected in the data collected from the interview with Panupong Paokaew (2016), a co-operative student from Institute of Engineering at Suranaree University of Technology, as stated below:

SAIC Motor Company Limited was located in Chonburi. The staff mentor assigned me a project to enhance the capability of the machine door by increase its automated function. So, I had to work with the staff from machine door production line. Currently, the project was about 50% completed and the quotation for its price was defined according to the market pricing. However, its price that I quoted to the company was one time cheaper than the market price. My daily routine was normally assigned day by day, which was mostly involved the study of the factory production line, and the support in controlling the production process of wheel nuts, bolts, and studs. The task was exactly what I was interested in because it related to the automatic systems of machines.

2) The co-operative students' GPA: the GPA set by the university as a criterion for the co-operative student's qualification must be above 2.00. For the entrepreneurs, the GPA had no role in recruiting the co-operative students and no relation with the quality of the co-operative students. Instead, the co-operative work performance in the workplace was more likely to indicate their actual quality. This finding is reflected in an the interview with Santi Pumkrachang (2016), the manager of the R&D department of Western Digital Thailand Company Limited, as follows:

Western Digital Thailand Company Limited had tested the co-operative students by using informal interviews. Their GPA for me was not a matter. Most of co-operative students who came to work here had varied grades from low to high level. I had looked more on their description of their prior knowledge cumulative from the first year of the study and what they were keen to do, and the rank of their interested jobs, and so on.

3) The work skills gained from co-operative education in the workplace:

(1) Skills gained from pre-co-operative education: Suranaree University of Technology sets the requirement that the co-operative students must register to enroll in the pre co-operative education course. The course provides students with basic knowledge that is important for co-operative education and for work such as labor laws, writing a job application letter, use of Microsoft Office, etc. The lecturers in the course consist of guests from external institutions and internal instructor members from the Faculty of Engineering.

(2) Language Skill: According to an interview with Panudeth Sarapat (2016), a co-operative student from Institute of Engineering at Suranaree University of Technology, the following was found:

Due to 30% of the staff at work was Japanese, when I had to communicate with them, I used English as a medium. Also, when I presented my work, I had to use English. I spent about 1 month to practice and get acquainted to English. Sometimes, I got difficulty in listening to Japanese's' English accent. So, I used writing on paper to communicate with them instead, because it seemed clearer to get understanding each other. Another way for me was to ask for my staff mentor to help me communicate.

(3) Responsibility Skill: in an interview with Kittipong Sordchan (2016), a co-operative student from Institute of Engineering at Suranaree University of Technology, he mentioned the following:

Stepwise Company Limited which got a project at the Sanambinnam to construct mechanical system, air-conditioner system, fire hydrant system, and hygiene system for the Manor Condominium at Sanambinnam. The civil staff of the company worked on the site and I was assigned to take the control of the sub- contractors in

maintaining the construction work as agreed in the plan, and as required by the customer. For water supply system, fire hydrant system, and air-conditioner system, I had to be a point of contact in managing the messengers for sending and receiveing all construction documents back and forth to the specialized consultants at the company office, coordinating with relevant technical agencies, and providing consultancy on examining the construction work. Sometimes, if the problem seemed too complicated, I had to bring a specific team to fix it right away at the site works.

(4) Self-Discipline Skill: in an interview with Kanathorn Chamnisart (2016), Dean of Institute of Engineering at Suranaree University of Technology, he shared the following comment:

The university offered academic service in trimester system. A semester break was set for three weeks long as a way to practice the students' endurance to the work and study. The students would not have enough free time to wander around and waste time with no use. It was a way to make the students realize the fact of how working life was. Work, in real life, dealt a lot with the dedication, and effort to achieve the goals.

(5) Self-Adjustment Skill: As asserted in Kittipong Sordchan's interview (2016), A co-operative student from Institute of Engineering at Suranaree University of Technology, the following was found:

Working at Stepwise Company Limited, my team consisted of 8-9 members. We were quickly get together so well. One of them was a woman, the rest of them was men. There were 3 of them were my former senior at the university. Adjustment to working environment

with the company staff was easy for me because of that but with the staff from sub-contractors, it took more time.

(6) Problem-Solving Skill: Again from Kittipong Sordchan's interview (2016), A co-operative student from Institute of Engineering at Suranaree University of Technology, the following was additionally revealed:

One of the problem for me was the lack of trust that the colleagues could give to me. I solved this problem by consulting with those of my seniors friends graduated from the same school and tried to communicate with technicians more and more. Some of new construction workers were Burmese and some were Thai. When it came to the communication with Burmese, of course, I got a problem about the language for communication. I solve this problem by asking each individual Thai staff to work one on one with each of them to ensure that the communication was not misled.

#### 5.3.1.2 Walailak University

For Walailak University, regarding the co-operative students' quality from the data collected from the interviews with the co-operative supervisors, the co-operative students, the co-operative staff mentors, the results indicated that there were three indicators of the quality: 1) the work experience of the co-operative students gained from their co-operative education in the workplace; 2) the co-operative students' GPA; and 3) the work skills gained from co-operative education in the workplace.

1) Work experience of the co-operative students gained from their co-operative education in the workplace:

According to the study, the co-operative students gained a lot of experience from their work. At work, the entrepreneurs assigned the work projects for the co-operative students, who got a chance to learn by using problem-solving skills to deal with the projects. As mentioned earlier, the advantages can be seen in terms of the production cost reduction for companies and more opportunity to get a job and

greater work ability for the co-operative students. This is reflected in an interview with Tawat Puchareonpoka (2016), a co-operative student from School of Engineering and Resources at Walailak University.

I was on co-operative education work at Asdecon Corporation Company Limited. The site that I was assigned to work was at the main road construction in Banglane District, in Nakorn Pathom. I was appointed as an Engineer assistant, in charge of examining the construction work of the road. The company got the concession and the work order from the Department of Highways. First, I had to examine the drawing of the construction blueprint of the contractors. If the blueprint was not fine, the contractor needed to revise it until it was good. After the final blueprint was completed and the construction was about to start, I had to examine the construction site instead.

## 2) The co-operative students' GPA:

The eligible co-operative students were required to have a GPA above 2.00. If the students' GPA was less than that, however, but not lower than 1.90, the individual case requested would be based on the consideration of the supervisors. For the entrepreneurs, the students' GPA had no relation with the co-operative students' recruitment and also it did not reflect the quality of the co-operative students from the view of the entrepreneurs. Instead, the quality of the co-operative students was considered based on their work efficiency and effectiveness, as mentioned by Pongpat Bunma (2016), a co-operative student from School of Engineering and Resources at Walailak University in the following:

When I was first arrived at the workplace, I had an interview with Mr. Sarawut. He asked me about my GPA and I told him that mine was 2.10. He encouraged me that GPA was actually not a big deal, as long as I could work. I was finally appointed as a field engineer

and he taught me how to work and helped cross-examining my works. I gained more trust from him by time as I could see that my work was examined often at the beginning but later he came to check only once in a couple weeks.

3) The work skills gained from co-operative education in the workplace

(1) Skills gained from pre-co-operative education: Walailak University also sets a requirement that the co-operative students must register to enroll in the pre co-operative education course. The course must be enrolled in two semesters in advance of the co-operative education. The course focuses on the students' planning for their future careers, writing a job application letter, and necessary knowledge for working. The co-operative students must also pass the course with an S grade to be eligible to apply for co-operative education and to enroll in the course.

(2) Responsibility Skill

In an interview with Sakda Laebang, (2016), a co-operative student from School of Engineering and Resources at Walailak University, he shared the following experience:

I worked for the quality assurance department and I was responsible for the process of mixing rubber, using rubber blocks (compressed from crumps) melted with some cheap chemicals. Since the price of rubber was quite high; therefore, the mixture of the rubber compound should be controlled. Normally, each department would send the raw materials for melting and forming the rubber the department here. The formula and the combination of the compounds mixture were actually developed from Japan. The quality test would be undertaken by experiments of different combination and test of its use. I was confident that I could do it "sometimes, in working, we must dare to make a decision". At the beginning of my work, the manager of the department and staff mentor came to

supervise me closely but now they trusted me more so I could work more independently. I thought I worked professionally”.

### (3) Self-Discipline Skill:

Based on the data collected from the interview with Pongpat Bunma, (2016), A co-operative student from School of Engineering and Resources at Walailak University, he pointed out the following:

I developed a working model to present to the company staff in order for them to see how much knowledge I did have and I could contribute. The model was a development of a working site. I created it by myself every 2-3 months. The host of the working site would come to check the model with me. I thought it was quite comprehensible and convenient for the site host to communicate with his/her subordinates.

### (4) Self-Adjustment Skill:

The data obtained from an interview with Tawat Puchareonpoka (2016), A co-operative student from School of Engineering and Resources at Walailak University, indicated his perspectives about the co-operative education in the following passage:

At work, there were 8-9 staff working with me. Mr. Witsanu was my staff mentor and he was also the one who assigned me the working tasks. Every time after I had finished my assignment, I would offer my help to others. Everyone here was nice to me. They were friendly and flexible. Probably because we were of similar age, the relationship among us appeared to be close like brothers and sisters. For me, generation was quite important. That was why I didn't have problem in adjusting myself to the work environment here.

(5) Problem-solving skills:

In an interview with Sakda Laebang (2016), A co-operative student from School of Engineering and Resources at Walailak University, he stated the following:

I worked in a mixed department. Most people thought that the machine that seemed to be functional to us every day might not break. In fact, the company emphasized on the importance of safety at work. We set a system to check the machines' operation 24/7. Every time we turned the machine on in each shift (8 hours long for a shift), we would have to check its' running first. For instance, in this morning shift, rubber was stuck in the Conway and the rubber was not moving. Then I turned off the switch and fixed the problem for a while. For the problems that I could not fix, I would call mechanical engineers to help sort it out.

### 5.3.1.3 Rajamangala University of Technology Thanyaburi

According to the data collected from the interviews with the co-operative supervisors, the co-operative students, and the co-operative staff mentors, the results revealed that the quality of the co-operative students could be evaluated according to three indicators: 1) the work experience of the co-operative students gained from their co-operative education in the workplace; 2) the co-operative students' GPA; and 3) the work skills gained from co-operative education in the workplace. All of the indicators are elaborated below.

1) Work experience of the co-operative students gained from their co-operative education in the workplace:

As mentioned before, the empirical evidence showed that co-operative students gained a lot of experience from their co-operative education. When the students were engaged in their co-operative work, the staff mentors usually asked the students about their aptitudes and fit them with the assignments, e.g., drawing the constructing building. Additionally, the staff mentors treated the co-operative students like normal staff members in the organization. The entrepreneurs also assigned them

a project where they had the opportunity to learn from solving a problem. This benefited the entrepreneurs in terms of production cost reduction and, in return, it was a golden opportunity for students to get jobs offered after their graduation, as reflected in an interview with Supachai Chamluang (2016), a student from the Faculty of Engineering at Rajamangala University of Technology Thanyaburi:

I was on co-operative education in Trang province, at Career Thailand Company Limited, in the department of maintenance and service of refrigerators. The project that I was assigned was related to the work on cooling system of the refrigerators and on the repair of refrigerators. Accordingly, the staff mentors proposed the tasks for the co-operative students to analyze the problems of broken refrigerators and to find out sources of the problems and the reasons why the temperature was not reach -20 degree. Then the co-operative student would must submit the report of the repair and analysis to the staff mentors and to the head quarter office of the company in Bangna. Bangkok. The company was satisfied with our performance. Most of the cases that we found caused from the problems with the compressors.

2) The co-operative students' GPA: the results showed that the students' GPA had no relation with the co-operative students' recruitment and also it did not reflect the quality of the co-operative students from the view of the entrepreneurs, as can be found in the voice of Nattanikorn Chaimongkolsathit, (2016), a student from the Faculty of Engineering, Rajamangala University of Technology Thanyaburi:

There were 3 applicants sent to Soft Square Company Limited and the company held interviews for recruitment. Finally only one of us was selected. The interview was taken placed to test 1) the applicants' IQ, 2) English language skill through self-introduction, 3) knowledge about the system of retail trade and IT programs such

as JAVA and C.net. I was selected which, in a way, could imply that the selection didn't rely on the GPAs because those of my friends which were 3.00 and 2.80 obviously higher than mine.

3) The work skills gained from co-operative education in the workplace

(1) Skills gained from pre-co-operative education: Rajamangala University of Technology Thanyaburi organized a co-operative pre-training service for the co-operative students in order to cultivate their readiness to work in the semester right before the co-operative education semester. The topics of the training included the co-operative education procedure, writing a job application letter, preparation for a job interview, and the application of labor laws to careers. The 5s guideline, and English for communication. The training can be established as a training course or as a regular course in the curriculum.

(2) Responsibility Skill:

In an interview with Nawamin Sodsa-ard (2016), a student from the Faculty of Engineering, Rajamangala University of Technology Thanyaburi, he mentioned the following:

What I had gained from the co-operative education was responsibility. Before I submitted the project I had to go over it for several time to ensure the accuracy of the project report. The written report would be initially reviewed by the staff mentor. If there was any revisions required, the staff mentor would inform me to do it but if there was not, it meant pass. I normally took 2-3 days to write the report but if there were complicated topics that I needed to elaborate more, I had to spend about 1 week to finish writing it. My motto was "when it was time to work, just do it, be responsible for it, and act professionally".

### (3) Self-Adjustment Skill:

According to an interview with Wisarut Chatchawank winkul (2016), a student from the Faculty of Engineering at Rajamangala University of Technology Thanyaburi, he revealed the following:

In fact, I was a hot tempered person and kind of aggressive. I would speak out when I felt not happy with something or someone. After co-operative education, it made me realized that “If I was still the same and kept those behaviors with me, all of my expectations would be fail, and even more nobody wanted to get close to me. I must learn how to change myself to be calm, and cool, to control my emotions, and to speak to people with tactful manners.” Most of my colleagues were from the Northeastern region.

### (4) Problem-Solving Skill:

In an interview with Suppachai Chamluang (2016), a student from Faculty of Engineering, Rajamangala University of Technology Thanyaburi, he revealed the following:

At beginning of co-operative work, I felt not so confident in working but I finally learned the work by doing it myself because actually I studied in the field of electric system. I knew that a refrigerator must keep the temperature at -20 degree. I had to fix the broken ones to keep the temperature to that degree. For example, when the refrigerators of the department stores like Big C, Tesco Lotus, and Macro broke. I went there to fix them, maintained them to its normal functions. There were the technicians from the department stores to monitor my work. They needed to be sure that I could fix the problems. Sometimes, I had to work under the time limited and I felt a little pressure.

### 5.3.2 Quality of the University

In regard to the quality of the university in implementing co-operative education, from the data collected from the interviews with the universities administrators and the supervisors, the evaluation of the quality of the university could be conducted on the basis of 7 key indicators, as follows: 1) quality instructors, 2) quality of updated curriculum, 3) appropriate time allocated for professional skills development and instruction, 4) good management of the operation of co-operative education, 5) efficient coordination between the supervisors and the staff mentors, 6) knowledge exchanging across universities and entrepreneurs, and 7) provision of the co-operative students' preparation before co-operative education.

#### 5.3.2.1 Suranaree University of Technology

1) Quality instructors: the university recruited instructors that had the following qualifications: obtained a bachelor, master, or a doctoral degrees in engineering, from the institutions accredited by the Office of Higher Education. The instructors had to devote all of their effort to teaching, conducting research, providing academic services, and they had to accept the co-operative education and be willing to support the co-operative education to meet its success.

2) Quality of updated curriculum: from the results, it was found that the revision of the curriculum was usually conducted under the Thai Qualifications Framework: TQF. The curriculum developed before 2013 contained a total of 200 credits. Currently, some of the departments still use the 2013 curriculum such as mechanical engineering, but have reduced the credits from 199 to 187 instead since the university had a policy to reduce the tuition costs for students and to help lighten the students' burden regarding cost. Moreover, the co-operative students still had a variety choices of elective courses (requiring 16 credits). For example, in the professional industrial field, the elective courses included Air Conditioner Systems and the Design of Buildings as a R&D form. The reason behind that was that "the department didn't want to produce the exact same block of graduates. Therefore the students could select 4 elective courses and the number of core practical courses was still the same.

The curriculum was also adjusted according to the professional license of engineering such as the mechanical Engineering department, under the

jurisdiction of the Office of Higher Education. The curriculum should be parallel with that of the Office of Higher Education. A clearer view of the engineering profession could be seen in 2016.

3) Appropriate procedure and time allocated for professional skills development and instruction

In an interview with Kanathon Chomniprasart (2016), Dean of Institute of Engineering at Suranaree University of Technology, he gave the following comment:

Eighty percent of the students of our university were from Northeastern region including Nakorn Ratchasirma, Surin, Buriram, and Chaiyapum and most of them got an average GPA. The university would ask the departments to stimulate those students to have more enthusiasm, and active in learning, and working. Learning in trimester system was a way to practice patience and endurance, since there were 3 short semester breaks. Each break was 3 weeks long. The students would not have enough free time to wander around and waste time with no use. It was a way to make the students realize the fact of how working life was. Work, in real life, dealt a lot with the dedication, and effort to achieve the goals.

4) Good management of the operation of co-operative education: Suranaree University of Technology was established together with co-operative education. Therefore, co-operative education was in a sense ready-made there; each department had no need to create any new policy for it. There was the university co-operative education center responsible for all co-operative related affairs. The department only embedded co-operative education in the curriculum and took responsibility for supervision. All of the departments had to join the co-operative education program, and the co-operative schedules and plans were be arranged by the university co-operative center.

5) Efficient coordination between the supervisors and the staff mentors: when the supervisors would like to visit the co-operative students, they

would have to contact the staff mentors in advance in order to arrange an appointment. Supervision could be carried out by an interview with the staff mentor about the students' work performance. Sometimes, the supervisor would be invited as a committee to evaluate the students' presentation in the workplace. The supervisors and the staff mentors might work together in academic affiliation such as conducting research together.

6) Knowledge exchanging across universities and entrepreneurs: according to an interview with Kanathorn Chamnisart (2016), Dean of Institute of Engineering at Suranaree University of Technology, he shared his comment as follows:

Knowledge sharing between entrepreneurs and us could be made through research works and co-operative training organizations, in which the co-operative supervisors would play the leading roles in taking the part. There were many kinds of affiliations that we made. Sometimes if the companies wanted to calibrate their tools, they could come to use our service here with very reasonable cost charged. New knowledge could be formulated as a case study called, "Win Win Situation." The instructors could also gain new knowledge from upcoming technologies and they could apply those technologies in their class instruction and in their research works. For example, Hitachi Global Storage Technology (Thailand) Company Limited had a problem about its production line and it wanted us to help in developing new machine to build hard drives of computers. Another example would be Mitr Phol Sugar Corporation Limited, as it requested our engineer instructors to help them in terms of chemical engineering, environmental engineering, and electrical engineering by giving fund for research works, in order to discover innovations that could save its consumption of energy and increase its production capability. 90% of the funds was from this company.

7) Provision of the co-operative students' preparation before co-operative education: the university provided co-operative preparation for co-operative students in the form of a course, and they were required to enroll in it. The purpose of the course was to provide students with the knowledge that they could use in co-operative education and which they could apply to their work, such as labor law, writing a job application letter, using Microsoft Office, etc. The lecturers could be from external or internal institutions.

#### 5.3.2.2 Walailak University

Considering the quality of Walailak University in terms of co-operative education operation, according to the data collected from the interviews with the university administrators and co-operative supervisors, it was found that the quality could be evaluated according to the following 7 indicators: 1) quality instructors, 2) quality of updated curriculum, 3) appropriate time allocated for professional skills development and instruction, 4) good management of the operation of co-operative education, 5) efficient coordination between the supervisors and the staff mentors, 6) knowledge exchanging across universities and entrepreneurs, and 7) preparing the co-operative students before their co-operative education.

1) Quality instructors: similar to that of Suranaree University of Technology, the university recruited instructors that had the following qualifications: obtained a bachelor's, master's, or a doctoral degree in engineering from an institution accredited by the Office of Higher Education. The instructors had to devote all of their effort to teaching, conducting research, providing academic services, and they had to accept the co-operative education and be willing to support co-operative education to meet its success.

2) Quality of updated curriculum: the curriculum of the university was revised in 2016 with the aim of improving the standards of the university co-operative operation. For more flexibility, the co-operative students should be provided with more choices to go for co-operative education in every semester, instead of the fixed semester assigned to them to go into the second semester of year 3. Additionally, some curricula could be combined to strengthen the overall curriculum like that of computer engineering and electrical engineering, for instance. They could be combined to extend their roles.

3) Appropriate time allocated for professional skills development and instruction: according to the study, the university co-operative center provided a pre-training course of 30 hours for the students and 6 more hours of training would be provided by each department for its own co-operative students.

4) Good management of the operation of co-operative education: the university approved by the university council must manage its internal organization to work consistently. The university co-operative education center provides pre-training services for co-operative students. The first hour of the training is for making the students understand co-operative education in terms of what the students would gain from it and the co-operative education procedure (excluding the pre-training service).

University instructors would have regular meetings for tracking the co-operative operation. The meeting committee included external experts, experts from the Office of Higher Education, the co-operative students' employers, representatives of instructors from across 11 departments, and 7 of those departments as the representatives of the policy meeting committee.

The university co-operative center was responsible for circulating information of the policy to all instructors from across 33 curricula. In each curriculum, one of the instructors would be appointed as a co-operative coordinator. It was a 1-year period position. The supervisors from each curriculum would have their own regular meetings among their members.

5) Efficient coordination between the supervisors and the staff mentors:

according to an interview with Tanawat Limpita (2016), an instructor from School of Engineering and Resources at Walailak University, he shared his comment as follows:

I went to supervise co-operative students in Songkla. The co-operative students were from electrical engineering department. The staff mentors were graduated in mechanical engineering and they didn't have the projects to assign for students. I saw this problem so I decided to discuss with the entrepreneurs in considering to move

those students to other department that more appropriate for them. Finally, the entrepreneur helped in transferring those group of students to the right department. It ended up in a good solution.

6) Knowledge exchanging across universities and entrepreneurs: in an interview with Satjaphan Lilatanon (2016), an instructor from School of Engineering and Resources at Walailak University, he mentioned the following:

We gained a lot of knowledge and experience sharing with the entrepreneurs, for example, how to mix precast concrete for foundation piles. We supervised the co-operative students together with the staff in Saraburi and we regularly visited each other (I was introduced to them by a senior instructor). As I said, for big companies, it was not easy to join working with them because they incorporated high technology in working. For example, Aspal Electronics Thailand Company limited, the staff invited us to join a seminar and trainings.

7) Provision of the co-operative students' preparation before co-operative education: the co-operative students were required to attend a co-operative pre-training course for 1 semester (12 weeks) that intensively prepared the students for co-operative education. Instructors cooperated in sharing guidelines for work and the experience of working and teaching with the students. Workshops and knowledge management from the supervisors' team were also organized. Some training was held under the supervision of the Office of Higher Education.

#### 5.3.2.3 Rajamangala University of Technology Thanyaburi

The quality of Rajamangala University of Technology Thanyaburi, in terms of co-operative education operation, according to the data collected from the interviews with university administrators and co-operative supervisors, was evaluated according to the following 7 indicators: 1) quality instructors, 2) quality of updated curriculum, 3) appropriate time allocated for professional skills development and

instruction, 4) good management of the operation of co-operative education, 5) efficient coordination between the supervisors and staff mentors, 6) knowledge exchanging across universities and entrepreneurs, and 7) provision of the co-operative students' preparation before co-operative education as follows.

#### 1) Quality instructors

According to an interview with Auychai Bamrungchukiat and Chatchai Weeranitiskul (2016), an instructors from the Faculty of Engineering, Rajamangala University of Technology Thayaburi, posited the following:

In our department, more than 70% of the instructors graduated in the direct field of the study but for me I would suggest more variety of specialized fields of the instructors because there were many courses required someone who were in direct area to teach.

2) Quality of updated curriculum: when the faculty or the department drafted a new curriculum, they would invite the entrepreneurs to take part in designing it. There would also be a seminar and a meeting organized to exchange information with the entrepreneurs in terms of the entrepreneurs' requirements and expectations. This was a way to develop the graduates and to increase the opportunity for the co-operative students to get a job after their graduation. The current curriculum revision was that of the 2016 version. It focused on the students' "competency." In other words, the focus was on the expected outputs of the students after learning or the jobs that they were expected to be able to do in the future. In addition, the curriculum was designed in line with the policy of the Council of Engineers (Former Engineering Control Division).

3) Appropriate time allocated for professional skills development and instruction: the curriculum was constantly adjusted according to the policy plan with the aim to produce active quality engineers that could be both practitioners and thinkers. The new curriculum included hands-on courses, in which the new students could learn through the use of actual tools and the study of new courses from different engineering areas provided and rotated for them in order to help broaden their learning experience.

4) Good management of the operation of co-operative education: in the short run, the university has a policy to provide hands-on courses for co-operative students with the aim to produce graduates that would become active practitioners, consistent with the concept of co-operative education. It could be said that the university would produce or prepare the students in response to the direct demands of the entrepreneurs. For example, Sony Thailand Company Limited required manpower that was specialized in computer programming such as the C Control Programing language, digital analysis with illustrations, etc. The faculty and the department then provided a temporary laboratory to train co-operative students to serve the particular purpose. The co-operative students in this group were selected according the criteria set by the company and they would go for co-operative education in the first semester of their fourth year. In the long run, the university was developing a new curriculum so that the time of co-operative education would be extended from 4 months to 6 months. The plan was to involve the co-operative students in co-operative education the whole year long. In doing this, the university would divide the co-operative students into 2 groups. For example, the first group of 15 students would engage in co-operative education for the first 6 months, and then the second group of 15 students would participate in co-operative education for the remaining 6 months and vice versa. The registered courses would be swapped between those two groups. To put it simply, the first group had to study a set of courses that had been already been studied by the second group when they returned school.

5) Efficient coordination between the supervisors and the staff mentors: in fact, the university had long been focusing on practicing students as could be seen from their previous internship program, which was not so different from co-operative education, but the operation was not exactly the same. Co-operative education was more complicated in the sense that there was still a misconception about co-operative education among entrepreneurs. Only 10% of the entrepreneurs really understood the concept and knew that a project needed to be assigned to co-operative students. In order ensure the correct understanding of the co-operative education concept, the university and faculty needed to create a memorandum of understanding (MOU) with the entrepreneurs. In each batch of co-operative students, there were approximately 30 and the faculty would appointe the supervisors to follow

up with them. In order to arrange an MOU before co-operative education could be conducted there would be a discussion forum to clarify the mutual requirement, understanding, and agreement between the supervisors, staff mentors, and co-operative students, especially regarding the decisions made for the design of the project assignment for the students, which usually originated from existing problems found in the workplace.

6) Knowledge exchanging across universities and entrepreneurs: according to the MOU signed off between the university and Sony Thailand Company Limited, endorsed by the president of the university, the company would first receive co-operative students from electrical engineering. The company also granted scholarships to electrical engineering students that were studying in the second year and above with a GPA not less than 2.5, under the condition that they would have to work with the company after graduation. The amount of each scholarship was approximately 100,000 THB.

7) Provision of the co-operative students' preparation before co-operative education: the university provided a co-operative pre-training course for co-operative students. The 30-hour training course would be held for third-year students during in the second semester. In the past, the faculty would invite experts from external institutes to be lecturers for the course, but presently the lecturer would be the co-operative instructor coordinator instead. The training topics were varied, such as the use of IT and computer Acts 2007, etc. The students paid good attention to it.

During the co-operative education in the workplace, the supervisors were assigned to visit the co-operative students three times. If the workplaces were located far, the frequency of the visits could be reduced to two times.

After their co-operative education and the students returned to the university, they had to present their project work to a committee in their department.

### 5.3.3 The Quality of Workplaces

#### 5.3.3.1 Suranaree University of Technology

Co-op education operation would be effective or not depending on the quality of the students, the university, and the entrepreneurs. This could be seen from the co-operative student recruitment process. Based on the data collected from Western Digital Thailand Company Limited, from the interviews with the company administrators, and the staff mentors, the indicators of the quality of the workplace included the four following aspects: 1) provision of in-service training for co-operative students, 2) the procedure of the co-operative education operation of the workplace, 3) the business size of the entrepreneurs and the duration provided for co-operative education, and 4) the operational budget of the entrepreneurs for conducting co-operative education. Details are described as follows:

##### 1) Provision of in-service training for co-operative students:

In an interview with Theerasak Sa-nguanmanasak (2016), the manager of Human Resources department, Western Digital Thailand Company Limited, he shared his comment as follows:

In every 2 weeks, the co-operative students must attend the recreation activities with foreign students who also came here for co-operative education. Both Thai and foreign students worked together well. If the company provided the courses like Hard Disk Drive, and Soft Skill Simulation, all students could join.

2) The procedure of co-operative education operation of the workplace: according to the results, it was found that the process began with the staff mentors who first made a proposal of co-operative students requisition to the HR department, together with the justifications including their work problems or the company's problems and the problems that needed to be solved. The requisition proposal could be submitted online through the company website. HR would later proceed with the co-operative recruitment and would sort out the CVs of the student applicants to initially screen qualified candidates for the requested department to select. If the applicants received from the universities did not match the required

qualifications, the HR team would send a new proposal to the universities for announcing an new opening for the project and a new position. The company would not consider the students' GPAs but it had its own procedure for recruiting the students and the students needed to prepare themselves according to the following steps:

(1) Provide a CV with a 5-minute video clip in English (first 1-2 minutes for self-introduction, next 3-5 minutes for their motivation to apply for the job at the company and their professional self-development plan).

(2) Submit the English test result to Google Document link

(3) Accept the online interview. For the interview, there would be applicants as interviewees and 2 interviewers that were company staff members. The questions would be based on the students' knowledge about the job, the department in which the student was required to work, the nature of the job that the students would like to do, and the relation between the job and the students' areas of study which should be somehow connected. The interview was conducted using Skype Conference. The interviewers could see the applicants' personality, eye contact, tone of voice, and attitudes (just like face to face).

(4) Foreign staff would contact the applicants again on the phone for a rough interview. The company started the phone interview like this in 2015.

(5) The company would send the applicants again to the requested department for another interview with the staff mentors (interviews conducted in order to roughly survey the applicants' opinions and the selection would be made of those that were thought to be able to work well with the staff mentors).

One week before finishing their co-operative education, the co-operative students had to present their projects in English to the company. The best presentation would be selected and awarded by the company. Finally the report of the project had to be submitted to the company (through the staff members to screen first because the project might contain confidential information of the company).

There were 3 steps in the evaluation of the co-operative students' performance after being trained at the workplace: 1) the overall performance evaluated by the university, 2) the performance during the co-operative education

based on the project work, evaluated by the company, and 3) the co-operative students' performance evaluated by the WD Co-op Alumni Social system, where the company would advertise vacancies for those that had finished ?????????? the program?. The number of applicants could imply how effectively the company was able to provide co-operative education for the co-operative students; likewise, if the company selected those co-operative students as an employee, it also indicated that the student that had been trained by them was qualified.

3) Size of the company and the duration provided for co-operative education: Western Digital Thailand Company limited was a large company founded in 1970. The headquarters is located in Irvine, California and it is a leading company in data storage solution provision, where the users can create, manage, and store their digital data. In 2002, the company established one of its manufacturing bases at the Navanakorn Industrial Estate. In 2003, it established another manufacturing base in the Bang Pa-in Industrial Estate in Thailand. The factory there is very large and is considered as the largest base of the Western Digital groups to produce data writer and reader.

The beginning of the co-operative education of the company was in the form of research collaboration. When the company had just opened, no applicants applied for the jobs there. The company then sent out administrators to work at Thammasart University and Kasetsart University as guest lecturers to promote the company. The co-operative education was not officially acknowledged there at that time until Dr. Sampan Silapanart, who moved from Seagate Technology Thailand Company, introduced it to the company and recommended that the management team visit Suranaree University of Technology to see how co-operative education could be run effectively, and that was the beginning step of the co-operative implementation of the company in 2008.

4) Operational budget of the entrepreneurs for conducting co-operative education: currently, the company receives the co-operative students from both semester and trimester systems, as well as foreign co-operative students. The period of co-operative education would be not less than 16 weeks. The estimated number of co-operative students there was 70 Thais and 30 foreigners in each

semester. The maximum capacity of the company to receive Thai co-operative students is 30 per month and 120 per year and 24 foreigners per month.

The annual budget that the company provides for the co-operative students' compensation is approximately 10 million THB and the amount cannot be used for a tax reduction because the company is on the Board of Investment or BOI, which is an organization that promotes investment and has a privilege regarding tax payments such as tax exemptions/tax reductions of the company's revenue as a juristic person, tax exemptions/tax reductions of imported machines and raw materials, etc. Therefore, the company wanted to return the benefit to the country as well. The return on investment of the company increased a lot. The company salary rates given ranged from 300 THB per day for graduates with a vocational diploma degree, 350 THB per day for graduates with a high vocational diploma degree, 9,000 THB per month for graduates with a bachelor's degree, 10,500 THB per month for graduates with a master's degrees, and 12,000 THB per month for graduates with a doctoral degree. Other benefits and facilities included 500 employee shuttles on service for free with a final stop at Wonwien Yai, and dishes at the canteen sold at special prices with free rice available.

#### 5.3.3.2 Walailak University

Co-operative education operation will be effective or not depending on the quality of the students, the university, and the entrepreneurs. This can be seen from the co-operative student recruitment process in the present study. Based on the data collected from Betagro Public Company Limited, from the interviews with the company administrators and the staff mentors, the indicators of the quality of the workplace included the four following aspects: 1) provision of in-service training for co-operative students, 2) the procedure of the co-operative education operation of the workplace, 3) the business sizes of the entrepreneurs and the duration provided for co-operative education, and 4) the operational budget of the entrepreneurs for conducting co-operative education. Details can be seen as follows.

1) Provision of in-service training for co-operative students: Betagro Public Company Limited provides in-service training given by the trainers from the headquarters office. Five standard courses have been developed: 1) Project Management; 2) Time Management; 3) Household Accounting (records of revenues

and expenses, sufficiency economy); 4) Basic Presentation and Foundation of Presentations; and 5) Techniques to Present for Getting a Job.

2) The procedure of co-operative education operation in the workplace: the company has a procedure for co-operative training for staff mentors for at least 30 hours as a criterion set by the Department of Skills Development. The company could use the amount of expenses to reduce tax at about 200%. In fact, not only did the company want to reduce the tax but also it really was determined to implement co-operative education. The company continued to develop groups of staff mentors with for example the constructivist approach, which was a procedure to develop human resources through life-long learning. The company focused on the ability of staff mentors to supervise co-operative students, where they could design a learning process for a 4-month long project. When the co-operative students arrived, the staff mentors were supposed to design the learning project for the co-operative students based on 50% for learning to work, 30% for learning for living life, and 20% for self-adjustment to the work environment.

In receiving co-operative students, each department would plan to appoint staff mentors for the students and the staff mentors needed to propose a project for the co-operative students to work on. The assigned project was rooted in the scope of work of the staff mentors. The project would finally be presented to the co-operative students at each university.

The “Relationship with Universities” project was established to promote the relationship between the university and entrepreneurs. The entrepreneur would select the university as its partner for work on co-operative education. The targeted universities selected as the partner by the entrepreneurs had to be those that were in a co-operative education project. The entrepreneurs would make contact with the university from the time that the students began studying in the first year by helping in designing their work plan and determining the nature of their future careers. The company received many co-operative students to work in the engineering department and animal husbandry as sales representatives and academic support staff working on the farms.

When the students were in the second year, the company would take them to visit the company farms and the company factories to allow them to

explore working in the field. The students would learn how to work and what to do as a sales representative, a part of the academic support staff, and as an engineer.

Throughout the four years of co-operative education, the co-operative students must present their projects and be evaluated by a committee. The evaluation results could entail whether those students would be offered jobs or not. Those that are accepted as prospective employees by the company would be granted a budget to develop themselves such as a 5,000 THB budget provided for the development of English skills. The students could bring the receipt to the company and be reimbursed.

The job advertisement would be announced at the university. The company would offer positions for co-operative education without specific required qualifications. Usually the students would do activities or join the co-operative education. The company focused on the students' leadership.

The co-operative education run at the workplace was for a 4-month period or over. The company would not accept co-operative students that would work with them for less than 4 months.

3) Business size of the entrepreneurs and the duration provided for co-operative education: it was found that Betagro Public Company Limited groups was established in 1967, under the name Betagro Company Limited, doing business in producing and selling animal nutrition. Its first headquarter office was located in the Pomprab district in Bangkok and the first manufacturing factory was founded in Prapradang district, Samutprakan.

The company has 30,000 employees, which is considered large. It started the co-operative education program in 2009. It had a plan to expand the number of co-operative students. Its maximum capacity to welcome co-operative students was 400-500 per year. Therefore, the co-operative education for the company was not a policy "on the shelf" but was a process of work. The company also added a plan for receiving co-operative students based on the calculation of its turnover rate, as well as a plan to develop human resources.

At present, the company has a policy to receive co-operative students at approximately 150% a year, or a total of 1,500 co-operative students a year.

4) Operational budget of entrepreneurs for conducting co-operative education: the company provides a budget for co-operative operation which includes the cost of 1) 300 THB for the co-operative students' daily allowance (only paid upon the students' work days); 2) accommodations (free of charge); in case that the company cannot provide accommodations, it pays a housing allowance of 1,500 THB/room/ month; 3) life insurance/group accident insurance; 4) a food allowance for the staff working on the farms; 5) per diem for those that work out of the stations; 6) permission to join company trainings and recreation activities; and 7) 5000 THB per each for self-development expenses.

#### 5.3.3.3 Rajamangala University of Technology Thanyaburi

Co-operative education operation is effective or not depending on the quality of the students, the university, and the entrepreneurs. This could be seen from the co-operative student recruitment process. Based on the data collected from Microchip Technology Thailand Company Limited, from the interviews with the company administrators, and the staff mentors, the indicators of the quality of the workplace included the four following aspects: 1) provision of in-service training for co-operative students; 2) the procedure of the co-operative education operation of the workplace; 3) business sizes of the entrepreneurs and the duration provided for co-operative education; and 4) the operational budget of the entrepreneurs for conducting co-operative education. Details can be seen as follows.

1) Provision of in-service training for co-operative students: the in-service training that the company provided was useful for co-operative students when they first arrived (as orientation), for example, trainings on basic industrial practices, an international standardization system (ISO/TS16949), management systems for industrial safety, health, and the work environment, presentation techniques, increased production activities, etc.

2) The procedure of the co-operative education operation of the workplace: the company process in recruiting the co-operative students can be summarized as follows:

(1) The university sent out a cover letter to the HR department of the company as a request to the company to receive university co-operative students, attached with co-operative students' CVs and GPAs. Once the HR

department received the documents, a notification letter was send out to heads of departments for consideration in recruiting qualified co-operative students whose qualifications directly related to their scope of work.

(2) When the heads of departments wanted to recruit the co-operative students, they would inform the HR department, together with the attachment of a Student Trainee Requisition Form and Job Assignment Justification.

(3) Once the HR department received the requisition information and the enclosed documents from the heads of departments, the HR department would contact the university to inform them and send an acceptance letter to the university.

(4) When the co-operative education schedule started, the HR department would make an appointment with the co-operative students. On Monday, the co-operative students would attend an orientation program first to learn about the company policies and regulations. After that, the co-operative students would be transferred to a certain department the next days (Tuesday, and Wednesday). Training on industrial safety was also provided for the co-operative students.

(5) The HR department would organize a regular monthly meeting with the co-operative students to discuss difficulties and the problems that the students encountered during work. At the end of the month, the students would be given the monthly allowance; the company would pay them the daily minimum wage rate (300 baht per day), calculated from the actual number of the days that the students worked. The payment would be made on the first Friday of the month by cash. If the students finished their co-operative education before the payment due date, the company would transfer the remaining amount to their account instead.

(6) The supervision provided for co-operative students is very important in developing the co-operative students' skills. Therefore, the entrepreneur usually appoints staff mentors responsible for taking care of, supervising, monitoring, and supporting the students with required work tools. They treat the students like normal new engineering staff. The staff mentor team is comprised of those that the company considers qualified based on the knowledge and experience they have.

(7) When the supervisors from the university come to visit, the co-operative students need to present their projects to the supervisors, staff mentors, and other members that could join. The company evaluates the students' performance according to the template designed by the university. The evaluators from the company would be the heads of the co-operative students' departments. The co-operative students must perform their work in accordance with the goals of the projects that they were assigned and must complete the projects before they finish their co-operative education.

(8) The company keeps records of the co-operative students' that have passed their co-operative education in the HR database. Those students are asked to fill out job application forms and to leave them with the company, so that when they graduate and if they still want to work with the company, and if there are vacancies, they would be the priority group for the company. Network expansion is important to the company in terms of the opinion survey that is carried out with the co-operative students that have had experience working with the company in order to provide useful feedback for the company's future improvement.

3) Business sizes of the entrepreneurs and the duration provided for co-operative education: Microchip Technology Thailand Company Limited is a large enterprise having the goal to give opportunity to Thai youths to experience work during an internship, so as to cultivate their readiness to work before they really enter industrial work in the future (early recruitment). The company has provided support for co-operative education projects and scholarships for those students that need it since the company was founded. Later, it began to receive co-operative students in co-operative education projects in 2011. Several agreements on co-operative education have been made between the company and many vocational institutions.

4) Operational budget of the entrepreneurs for conducting co-operative education: actually, the company does not have a fixed figure for the budget for its co-operative education operation. The budget then depends on the number of co-operative students in house that were accepted as a team to do the assigned projects for the company.

From the results discussed above, the similarities and difference on the effectiveness of co-operative education operation of the universities which were the samples of the present study, including Suranaree University of Technology, Walailak University, Rajamangala University of Technology Thanyaburi, had been focused on the consideration of 3 following aspects: 1) the quality of co-operative education students based on the data collected from the interviews with the co-operative education supervisors, the co-operative education students, and the staff mentors, 2) the quality of universities based on the data collected from the interviews with the university administrators, and the supervisors, 3) the quality of entrepreneurs based on the data collected from the interviews with the management of the companies and the co-operative education staff mentors. Summary of the results could be illustrated in table 5.3.

**Table 5.3** The effectiveness of co-operative education implementation in Thailand

Universities	Students' Quality		
	Experience gained from professional training at workplaces	GPA's	Working Skills gained from professional training at workplaces
<b>Suranaree University of Technology</b>	co-operative education students gained a lot of experience from co-operative education at workplaces where the entrepreneurs assigned them project works to practice. Most students could solve their problems while working on the projects. The benefits returned to the entrepreneurs in terms of production cost reduction and to the co-operative education students in terms of they would have better opportunity to get jobs offers as soon as they graduated.	Qualified students to enter to co-operative education program must have the minimum GPAs above 2.00. For entrepreneurs, GPAs did not represent the students' quality and had no effects to the recruitment consideration of the co-operative education students, instead, the students' quality was reflected from their performance at work.	<ol style="list-style-type: none"> <li>1. Co-operative education students gained working skills from the co-operative education preparations. So, they had readiness to work as they could learn quickly from staff mentors.</li> <li>2. Co-operative education students gained language skill. Even though their oral English skill was not good. They still learned how to use gestures and writing to help them to communicate with foreign staff.</li> <li>3. Co-operative education students gained responsibility skill, in terms of the responsibility that they had on the assigned tasks or projects. They had to effectively and carefully put their wholehearted effort to the work in response to the customers' demands.</li> <li>4. Co-operative education students gained Self Discipline skill as the university ran its service on trimester system, the students had 3 breaks in a year, and 3 weeks for each time. The short break helped them to practice their patience and endurance. They would learn how to maximize the use of time.</li> </ol>

**Table 5.3** (Continued)

Universities	Students' Quality		
	Experience gained from professional training at workplaces	GPAs	Experience gained from professional training at workplaces
<b>Suranaree University of Technology</b>			<p>5. Co-operative education students gained Self Adjustment skill. Since many of them were men and the colleagues were also their former seniors at the schools, they could adjust themselves easily to work.</p> <p>6. Co-operative education students gained problem-solving skill. When the co-operative education students' subordinators did not trust them because they were novice. They solved the problem by communicating more and to establish familiarity or closer relationship to the subordinators. Sometimes, they asked the former senior friends for consultancy. The problem of language for communication with Burmese workers was also solved by the technique that the students assigned an individual Thai worker to work as a partner with each of those staff to ensure the work being kept on its track.</p>
<b>Walailak University</b>	Co-operative education students gained a lot of experience from co-operative education at workplaces as the entrepreneurs assign them	Qualified students to enter to co-operative education program must have the minimum GPAs above	1. Co-operative education students gained working skills from the co-operative education preparations. Before they went for co-operative education. The university co-operative education center would offer them trainings necessary for their works such as Microsoft office training, and instructors from their departments also

**Table 5.3** (Continued)

Universities	Students' Quality		
	Experience gained from professional training at workplaces	GPA's	Experience gained from professional training at workplaces
Walailak University	the project tasks in which they could have the opportunity to solve the problems. The benefits returned to the entrepreneurs in terms of production cost reduction and to the co-operative education students in terms of they would have better opportunity to get jobs offers as soon as they graduated.	2.00. However, it could be less but not less than 1.90, based on the consideration of the supervisors. For entrepreneurs, GPA's did not represent the students' quality and had no effects to the recruitment consideration of the co-operative education students, instead, the students' quality was reflected from their performance at work.	<p>provide extra training for them on the quality assurance work.</p> <p>2. Co-operative education students gained responsibility skill. The students must be responsible and devote themselves to the works. They also needed to be sharp in making decision and worked as a professional workers to gain trust from staff mentors.</p> <p>3. Co-operative education students gained Self Discipline. The students got an opportunity to design working models for providing the company with the convenience on the communication made between superior and subordinators. .</p> <p>4. Co-operative education students gained Self Adjustment skill. When the students completed their tasks. They learned to offer help to other colleagues. Also, the age range of the staff was similar, so the students could adjust themselves well at work as a proverb quoted, “ entering a new town, comes together with adjusting to that town”.</p> <p>5. Co-operative education students gained problem-solving skill. The students needed to test the machines every day to ensure the machines' functionality. If they confronted with problems, they needed to solve them right away.</p>

**Table 5.3** (Continued)

Universities	Students' Quality		
	Experience gained from professional training at workplaces	GPA's	Experience gained from professional training at workplaces
<b>Walailak University</b>			If the problems seemed to be over their controls, the students needed to inform the staff mentors immediately.
<b>Rajamangala University of Technology Thayaburi</b>	Co-operative education students gained a lot of experience from co-operative education at workplaces. The staff mentors usually asked the students about their aptitudes as to assign appropriate tasks that matched with their ability such as drawing building construction blueprints, etc. The staff mentors treated the students as normal staff of the company. The entrepreneur gave assignments as the project works for the students.	Qualified students to enter to co-operative education program must have the minimum GPAs above 2.00. However, it could be less but not less than 1.90, based on the consideration of the supervisors. For entrepreneurs, GPAs did not represent the students' quality and had no effects to the recruitment	<p>1. Co-operative education students gained working skills from the co-operative education preparations. The students were trained to "prepare their minds, their bodies" for work. This could reduce the problems that might occurred when they went for co-operative education at the workplaces. They also learned to know how to be humble and how to behave well in the new environment at work, as a proverb quoted, "entering a new town, comes together with adjusting to that town".</p> <p>2. Co-operative education students gained responsibility skill. The students learned how to review the work over and over for several times to ensure the accuracy. If there was an urgent task, they had to handle with it within a limited time given as a proverb quoted "time to work was time for responsibility, and professionalism".</p> <p>3. Co-operative education students gained Self Adjustment skill. They needed to adjust their emotions and tempers at work. They must learn how to</p>

**Table 5.3** (Continued)

Universities	Students' Quality		
	Experience gained from professional training at workplaces	GPAs	Experience gained from professional training at workplaces
<b>Rajamangala University of Technology Thayaburi</b>	Most students learned from problem solving of the project work. The benefits returned to the entrepreneurs in terms of production cost reduction and to the co-operative education students in terms of they would have better opportunity to get jobs offers as soon as they graduated.	consideration of the co-operative education students, instead, the students' quality was reflected from their performance at work. The entrepreneurs would provide extra tests on the co-operative education students IQ (Intelligence Quotient: IQ), English skill, and knowledge of working systems.	communicate in tactful manner to make the mission accomplished. 4. Co-operative education students gained problem-solving skill: sometimes the students had no confidence to work because they needed to learn by themselves by doing such as how to use the tools and machines at work within the time constraint, but they still could handle the problems.

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Suranaree University of Technology</b>	University instructors must accept and agreed to work on co- operative education and supported the university in moving the co-op education program forward to meet its success. Their main	1. Revision and development of curriculum would be conducted under Thai Qualifications Framework : 2. Revision and development of curriculum	1. Approximately 80% of the co- operative education students were from Northeastern Region. Most of them had average level of learning performance and the instructors	1. Co-operative education program was established at the same time with the university. 2. University co- operative education center would be the point of contact for co-operative education	Supervisors would contact with staff mentors to make appointments for visiting students and also to be committees in the panel to evaluate the students'	1. The entrepreneurs required a teamwork for conducting research projects and organizing trainings for co- operative education students. 2. The entrepreneurs	The co-operative education students must register and enroll in the pre- co-operative education course. One credit for this course. The course included various topics such as basic

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Suranaree University of Technology</b>	responsibility was to teach the courses according to the criteria set by the Office of Higher Education, as well as to conduct research and then internationally published those research works.	would also be conducted under professional engineering licensure. 3. Revision and development of curriculum would also be conducted under the regulations of the Office of	needed to encourage them to have more enthusiasm and curiosity to learn and to work. 2. The university used trimester system. A semester break was only 3	related affairs. 3. All curriculum in the university must be embedded with co-operative education program. 4. The university used trimester system	project works. They both could join hands in working on research.	required to calibrate the tools regularly and the university provided them the service with reasonable prices.	knowledge in writing a job application letter, ISO standards for industrial production, etc.

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
Suranaree University of Technology		Higher Education. 4. The curriculum should be added for more courses for practices. 5. The total credits should be reduced from 199 to 187.	weeks long, which was a way to practice students' patience and endurance to work because working in real life required wholehearted devotion of the workers or staff.	for running academic service.		3. Knowledge exchanging enabled instructors to expand their knowledge, and to learn new technology that they could apply for pedagogy and research works.	

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Walailak University</b>	1. The instructors were required to teach the courses according to the criteria set by the Office of Higher Education and to conduct research. 2. Instructors applied new knowledge gained when they had visits the workplaces in	1. Revision of the curriculum in 2016 was adjusted in terms of the project work in fourth year as it should be the same one of the co-operative education project. 2. The change on the co-operative education	1. The co-operative education students enrolled in the pre co-operative education course for 1 credit of 30 hours. 2. The course contents would be about labor law and industrial safety.	1. The co-operative education center provided pre-co-operative education training service for prospective co-operative education students before they went for co-operative education. 2. The course contents would be about labor law and industrial safety.	1. The supervisors would coordinate with the staff mentors in order to make appointments for visiting the co-operative education students and also to be committees in the panel to evaluate the students' project	1. The entrepreneurs required a teamwork for conducting research projects and organizing trainings for co-operative education students. 2. Big enterprises usually invited	1. The co-operative education students were required to enroll in the pre co-operative education course one semester in advance before they leave. 2. The co-operative

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Walailak University</b>	their teaching classes.	semester from usually being conducted in the second semester of the third year to be available upon requests in any semesters. 3. The Computer Engineering curriculum and Electrical Engineering	3. The co- operative education center organized pre- training service for co-operative education students for the period of 24 hours. In addition, the Faculty of Engineering and Resources	2. The staff from Faculty of Engineering and Resources would visit the co- operative education workplaces to survey first before the students would be going. 3. During co- operative	works. They both could join hands in working on research. 2. The supervisors together with the staff mentors must work together in order to solve the confronting problems such as no a project could be	university instructors to join trainings in order to update their knowledge on new coming technology.	education center invited instructors from each department to help prepare and provide knowledge for co-operative education students. 3. Teacher development was conducted by

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Walailak University</b>		curriculum had been combined.	provided another 6 extra hours for their co-operative education students.	education, the supervisors were required to visit students at least one time and about their living, working and making reports. 4. The co- operative education students must present the project in pair.	assigned for the students, then the solution should be made by transferring the students to other departments.		organizing a Work shop and Knowledge Management forum for the supervisors one time by the university and the other time at another place by the Office of Higher Education.

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Rajamangala University of Technology Thayaburi</b>	In Faculty of Engineering and Resources, 70% of the instructors graduated in direct fields. For learning and instruction, “ if the teachers and the curriculum had quality, the students would be	1. The faculty of Engineering invited entrepreneurs to take part in revising the curriculum, as to design the curriculum and produce graduates in accordance with	1. The faculty improve their instructions according to the plan and policy to produce engineering practitioners. 2. The new curriculum would be embedded with	1. The university had a policy to add Hand-on courses in the curriculum for producing graduates as practitioners. The concept was consistent with co-operative education	1. There was only 10% of the entrepreneurs assigning the co- operative education students with projects in which was underling concept of co-operative education. The solution to communicate	The university provided and signed off the document (Memorandum of Understanding : MOU) with Sony Thailand Company Limited. The company set the	1. Co-operative education students were required to enroll in pre- co- operative education course in the second semester of the third year. 2. Co-operative education center would

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Rajamangala University of Technology Thayaburi</b>	formed as a quality practitioners.	their requirements. 2. In 2015 curriculum, the term “competency” was referred to as what abilities the learners could perform after learning.	Hand-on courses, professional skills and the knowledge of the world around us. 3. Classroom setting was fully equipped with enough tools and materials for	concept as to produce the graduates in response to the market demands. 2. The university attempted to extend the period of co-operative education from	was to have clear statements written in form of Memorandum of Understanding: MOU between the entrepreneurs and the university before the	condition written that the co- operative education students who were granted the scholarships from the company must return to work with them after their graduation.	invite instructors from each departments and external lecturers to present them necessary information in order to help them to be ready to work,

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
<b>Rajamangala University of Technology Thayaburi</b>			learning. However, learning achievement would still depend on the determination of each individual.	4 months to 6 months in any semester of the year as a whole year run.	students went for co-operative education. 2. Discussion made between staff mentors and supervisors in advance in order to design projects together for students. The ideas would be		such as basic knowledge of Computer law 2007. 3. The supervisors would visit students at least 3 times during co-operative education period.

**Table 5.3** (Continued)

Universities	Quality of the Universities						
	High Quality Instructors	Curriculum after revision and development	Appropriate procedure and time for professional experience training	Good management on Co-operative Education	Cooperation between supervisors and mentors during the practicum	Information exchanges between the universities and entrepreneurs	Good Preparation of Students' Readiness before entering to the practicum
Rajamangala University of Technology Thayaburi					based on the existing problems found at the workplaces.		4. The co- operative education students would present their projects to the department committee panels after co- operative education completion.

**Table 5.3** (Continued)

Universities	Quality of the Workplaces			
	Provision of In-service training for students trainees	Procedure of co-operative education at the workplaces	Business sizes of the workplaces and duration of the practicum	Budget allocated for Co-operative Education at the workplaces
Suranaree University of Technology	<p>1. In every 2 weeks, the co-operative education students must participate in the company's recreation activities together with local co-operative education staff and other foreign co-operative education students.</p> <p>2. If the entrepreneur organized the trainings on particular topics such as Hard Drive and Soft Skill and Dialogue Simulation training.</p>	<p>1. The staff mentors needed to propose the project and co-operative education requisition to HR department.</p> <p>2. HR department would proceed on the recruitment.</p> <p>3. HR department would scree the CVs of the applicants first. If there were not enough students qualified, the company would make a contact to the university again for a new announcement for applications of the positions.</p> <p>4. 1 Week before the students finished their co-operative education period. The students must present their project to the company in English and handle the questions in English as well.</p>	<p>1. Western Digital Thailand Company Limited was found in 1970. It was the large sized company in which the head quarter was located in Irvine, California, running the business on data storage solutions provider for industries, incorporated with high quality and technology. . In 2002, the company established one of its manufacturing base in Navanakorn Industrial Estate. In 2003, it expanded the establishment of another manufacturing base in Bang Pa-</p>	<p>1. The budget allocation for the allowance of the co-operative education students was approximately 10 million THB. 2. The allowance rate ranged from ranged from 300 THB per day for graduates of vocational diploma degree, 350 THB per day for graduates of high vocational diploma degree, 9,000 THB per month for Bachelor's degrees,</p>

**Table 5.3** (Continued)

Universities	Quality of the Workplaces			
	Provision of In-service training for students trainees	Procedure of co-operative education at the workplaces	Business sizes of the workplaces and duration of the practicum	Budget allocated for Co-operative Education at the workplaces
<b>Suranaree University of Technology</b>		5. There were 3 steps for the evaluation of the co-operative education students' performance after being trained at the workplace including 1) the overall performance evaluated by the university, 2) the performance during co-operative education based on the project work, evaluated by the company, 3) the co-operative education students' performance evaluated by WD co-operative education Alumni Social system, in which the company would advertise vacancies for those who finished co-operative education students to apply. The number of the applicants could imply how effective the company could provide co-operative education for the co-operative education students, likewise, if the company selected those co-operative education students as an employee, it also indicated that the student who had been trained by them was qualified.	in Industrial Estate. The factory here was very large and was considered as the largest base of the Western Digital groups to produce data writer and reader. 2. Co-operative education was first found in form of Research collaboration and the pioneer of the co-operative education was Dr. Sampan Silapanart. Entrepreneurs and public got to know about Co-operative education and it had been rolled out in 2008.	10,500 THB per month for graduates of Master's degrees, and 12,000 THB per month for graduates from Doctoral degrees.

**Table 5.3** (Continued)

Universities	Quality of the Workplaces			
	Provision of In-service training for students trainees	Procedure of co-operative education at the workplaces	Business sizes of the workplaces and duration of the practicum	Budget allocated for Co-operative Education at the workplaces
<b>Walailak University</b>	During the co-operative education, the entrepreneur provided in-service training given by the trainers from the head quarter office. There were 5 standard courses developed as 1) Project Management, 2) Time Management 3) Household Accounting (records of revenues and expense, sufficiency economy), 4) Basic Presentation and Foundation of	1. The company had a policy to train staff mentors for at least 30 hours as a criteria set by Department of Skills Development. 2. The staff mentors must design the project for co-operative education students and present those projects to other co-op students in each university. 3. The project called, “University Partnership” had an aim to pair a university with and an entrepreneur as a partner. The universities must be the members of co-op education program. The entrepreneurs would have a first contact with the university from the first year of students’ study program.	1. Betagro Public Company Limited groups was established in 1967 with registered capital of 10 million THB. It was a large sized business with 30,000 employees. It ran the business in producing and selling animal nutrition. Its first head quarter office was located at Pomprab district in Bangkok and the first manufacturing factory was found in Prapradang district, Samutprakan. 2. The entrepreneur started its	The allocation of the budget by the company for co-operative education allowance was not much comparing to the works that the co-operative education students were assigned for. The benefit given to the co-operative education students included 300 THB for the daily allowance (only paid upon the students’ working days), 2) accommodation (free of charge) in the case that

**Table 5.3** (Continued)

Universities	Quality of the Workplaces			
	Provision of In-service training for students trainees	Procedure of co-operative education at the workplaces	Business sizes of the workplaces and duration of the practicum	Budget allocated for Co-operative Education at the workplaces
<b>Walailak University</b>	Presentation, and 5) Techniques to Present for Getting a Job.	4. The university made an announcement of the required positions with no basic qualification set. Any of the students were able to apply and join in the entrepreneur co-operative education. The entrepreneur rather focused on the students' leadership. 5. The entrepreneur would accept students who came to work at least for 4 months long.	co-operative education program in 2009. It had a plan to expand the number of jobs for co-op students with the capacity of about 400-500 students per year. Therefore. Co-operative education for the entrepreneur was not just on shelf policy but it turned to be a part of working process. The plan of the number in receiving the students was about 150% to increase, which would finally make the total capacity of approximately 1,500 students per year.	the company could not provide an accommodation, it would pay as a housing allowance for 1,500 THB/ a room/ a month., 3) life insurance/group accident insurance, 4) food allowance for the staff working in the farms, 5) per diem for those who work out of the stations, 6) permission to join company trainings and recreation

**Table 5.3** (Continued)

Universities	Quality of the Workplaces			
	Provision of In-service training for students trainees	Procedure of co-operative education at the workplaces	Business sizes of the workplaces and duration of the practicum	Budget allocated for Co-operative Education at the workplaces
<b>Walailak University</b>				activities, and 7) 5000 THB per each for the expense for self-development.
<b>Rajamangala University of Technology Thayaburi</b>	The entrepreneurs provided training program for co-operative education students since they first arrived (Orientation), such as the basic knowledge about industrial behaviors, international organization for standardization ISO/TS16949,	1. The university sent a letter of co-operative education requisition to HR department of the entrepreneurs, attached with the CVs and the academic performance records of the applicants Once the HR department received those documents, the HR staff would send email of notification to the departments of the required positions for their consideration for the recruitment. Selection of the co-operative education students would be based on the directness of their study field towards the positions. 2. When the heads of departments would like	Microchip Technology Thailand Company Limited ran the business relating to the production of electronic parts. It was a large sized company which the number of staff was more than 3,900 people. The company gave full support for co-operative education and granted scholarships for co-operative education students. The company first	The entrepreneurs didn't limit the maximum amount of the budget for co-operative education It would actually depend on the number of the co-operative education students that had been given the projects to do.

**Table 5.3** (Continued)

Universities	Quality of the Workplaces			
	Provision of In-service training for students trainees	Procedure of co-operative education at the workplaces	Business sizes of the workplaces and duration of the practicum	Budget allocated for Co-operative Education at the workplaces
<b>Rajamangala University of Technology Thayaburi</b>	management systems for industrial safety, health, and working environment, presentation techniques, increase production activities, etc.	to recruit co-operative education students, they first had to submit the student trainee requisition form together with Job Assignment Justification to HR department. 3. Once the HR department received the documents of Student Trainee Requisition Form and Job Assignment Justification from the departments, the HR staff would directly contact the university or the students to notify them about the company acceptance, enclosed with an official acceptance form. 4. When the supervisors went to the workplace to visit the co-operative education students, it was the time that the students needed to present their projects to the group of the teacher supervisors, the staff supervisors, and the staff mentors.	established co-operative education program in 2011 and they had made agreements on dual vocational training system with vocational institutions up until the present time.	

**Table 5.3** (Continued)

Universities	Quality of the Workplaces			
	Provision of In-service training for students trainees	Procedure of co-operative education at the workplaces	Business sizes of the workplaces and duration of the practicum	Budget allocated for Co-operative Education at the workplaces
<b>Rajamangala University of Technology Thayaburi</b>		5. The HR staff would keep all the records of the co-operative education students who came to work with them in the HR database for future use on staff recruitment. Those co-operative education students would be contacted first and became a priority for them to get the job offered for the vacancy positions.		

## **5.4 Effectiveness of the Co-Operative Education Operation in Thai Higher Education**

Examining the factors that had an influence on the effectiveness of the co-operative education operation in Thai higher education of the three sample universities—Suranaree University of Technology, Walailak University, and Rajamangala University of Technology Thayaburi—involved the five following factors: 1) political factors, 2) financial factors, 3) institutional factors, 4) leadership factors, and 5) management innovation factors. According to the data collected from the interviews with university administrators, co-operative supervisors, and co-operative students, together with the data collected from 3 representative entrepreneurs (Western Digital Thailand Company Limited, Betagro Public Company Limited, and Microchip Technology Thailand Company Limited) through the perspectives of interviewees that were management members and staff mentors, as well as a review of related documents regarding co-operative education in the universities and the entrepreneurs and researchers' own observation, the findings reflected that those 3 universities had various dimensions and factors influencing the effectiveness of their co-operative education, with different environments and limitations and entrepreneur representatives. Details are discussed as follows:

### **5.4.1 Political Factors**

#### **5.4.1.1 Suranaree University of Technology**

At the beginning, the university implemented co-operative education with the first batch of students whose ID began with 36. They were the first group sent out for co-operative education in the workplace, during the second semester of their third year, in 1995. There were 61 of them as a pilot group. After sending out the co-operative students, the co-operative education widely gained acceptance and that was one of the factors making co-operative education establishment successful. Therefore, the university developed a policy suggesting that all university curricula add co-operative education as an option or as an elective course. However, in 1999, the co-operative education gained more public attention from the effects of the co-

operative students' performance after experiencing co-operative education. It was finally announced as a required course for all curricula.

In 2002, the Office of Higher Education foresaw the importance of co-operative education, and Suranaree University of Technology was then assigned by the office to be a pilot university implementing co-operative education. At that time, most universities were granted a budget for operating co-operative education. The amount was approximately 10,000 baht per head, and there were 10,000 co-operative students in total participating in the program during that time, but Suranaree University of Technology and Walailak University did not receive that budget.

The result revealed no significant relation between political factors and the effectiveness of the co-operative education of Suranaree University of Technology. It could apparently be noticed that changes in the government had no effect on the university operation of co-operative education because the university had run co-operative education since 1995, long before co-operative education became widely accepted and before the time that the Office of Higher Education was aware of its usefulness.

In contrast, the effect of political factors was clearly found in the effectiveness of co-operative education of the entrepreneur. The effectiveness in operating co-operative education of Western Digital Thailand Company Limited varied according to each government's policy. For example, as the government under the National Council for Peace and Order (NCPO) acknowledged the benefit of co-operative education, there was a growing tendency for the co-operative education operation of the university to be improved. The industrial sector would help with learning and instruction by taking part in it. In the past, governments did not pay much attention to co-operative education; therefore, the university struggled to maintain co-operative education on its own.

#### 5.4.1.2 Walailak University

For Walailak University, the political factors in terms of changes in the government also had no influence on the effectiveness of its co-operative education operation because the university had a solid direction in terms of the operation of co-operative education, whereas the Office of Higher Education Commission still remained uncertain about co-operative education policy. In 2002, as the office

provided a government budget to promote co-operative education by granting co-operative students the amount of 10,000 baht per head, Suranaree University of Technology and Walailak University were not included in the schools receiving the support because the institutions had run co-operative education long before the launch of the policy.

The entrepreneur, Betagro Public Company Limited, also received no effect from the changes in government regarding the effectiveness of co-operative education operations because the government still did not take serious action in terms of developing policy to promote co-operative education, but it took the role of just a little gear to move it a bit forwards.

#### 5.4.1.3 Rajamangala University of Technology Thayaburi

In 2002, Rajamangala University of Technology Thayaburi began a pilot co-operative education project, cooperating with the Office of Higher Education Commission. During that time, the university had only an internship program for professional development. Co-operative education was something new to the university but the benefit of co-operative education was somehow foreseen, so it decided to try taking part in the pilot project.

The Office of Higher Education Commission granted a budget to support the co-operative education operation of the university. In the first year, the university sent out 20 co-operative students for co-operative education, beginning with the students from the Faculty of Engineering and Faculty of Business Administration. Then in 2003, the university became engaged in a co-operative education project under cooperation with the Office of Higher Education Commission. The co-operative education policy was taken to the university and the number of courses in the curriculum was adjusted from 6 to 7 in one semester, and it was possible for the summer semester to also be open for co-operative education courses. In the past, co-operative education was carried out only in the fourth year of study for one semester but after adjustment of the number of courses in the curriculum, hundreds of students could join co-operative education in the second batch. The budget of 10,000 THB per head given by the Office of Higher Education Commission to the co-operative students for tuition was a good stimulator for students to join the program. An extra

2,000 THB was also given to them for self-preparation regarding co-operative education.

For Rajamangala University of Technology Thayaburi, the changes in governments had a big impact on the effectiveness of its co-operative education operation. In 2005, when the university adjusted its curriculum and co-operative education was embedded according to co-operative education operation policy and co-operative budget provision policy, it was found out later that the Office of Higher Education Commission had already cancelled the co-operative budget provision policy in 2004. Therefore, without the government budget for support, many programs were withdrawn from the co-operative project but the university still ran the co-operative education on its own expense using the former co-operative budget provision policy as a guideline.

From the perspective of the university's partner, Microchip Technology Thailand Company Limited, the political factors had no significant influence on the co-operative education operation of the company. Since the company's management actually made a strong effort to give the opportunity to students for learning, it did not depend much on the government.

#### **5.4.2 Financial Factors**

##### **5.4.2.1 Suranaree University of Technology**

The university first began co-operative education in 1993 and it established a co-operative education project in 1994. Later, in 2008, the co-operative project was promoted to be a co-operative education center and professional develop. The center served as stop service for all co-operative education-related affairs including preparation of the co-operative students before entering co-operative education.

The effect of financial factors on the effectiveness of the co-operative education operation of the university was clearly seen, as the university received financial support, called Block Grand. The co-operative education and professional development center had to write a plan to propose the annual budget requisition to the university. All the information related to co-operative education was available online on the co-operative education and professional development center's website. The

allowance rate for supervisors was 400 THB per day. For those co-operative students that wanted to have an internship abroad, the university would grant support for students at a maximum fund of 40,000 THB per head, covering their travelling expenses, VISA fees, and life insurance. The university would only select international entrepreneurs by whom the students would be paid monthly so that they could afford their co-operative education abroad. The university set up funding for co-operative students that wanted to do an internship abroad and in 2014 the amount of 25 million THB was allocated.

From the view of Western Digital Thailand Company Limited, the financial factors had a relative effect on the effectiveness of the co-operative operation of the company. The company received the co-operative students from both semester and trimester systems, as well as foreign students, and the co-operative education took place during a 16-week period or approximately 1 semester. There were 70 local students and 30 foreign students on average for each semester. Currently, the company accepts not more than 30 local students per month and not more than 120 local students per year. Regarding foreign students, the acceptable number was also not more than 24 students per month. The allowance rates given to students ranged from 300 THB per day for graduates with a vocational diploma degree, 350 THB per day for graduates with a high vocational diploma, 9,000 THB per month for graduates with a bachelor's degrees, 10,500 THB per month for graduates with a master's degree, and 12,000 THB per month for graduates with a doctoral degrees. The budget of 10 million baht was annually allocated to cover the co-operative expenses.

#### 5.4.2.2 Walailak University

For Walailak University, the financial factors had an effect on the effectiveness of its co-operative education operation. Currently, the university receives a budget from the financial system called Block Grand. The budget is for the operation of co-operative education and includes allowance, investment, and planning of the co-operative education projects. The process of budget allocation began with the co-operative education and the professional development center compiled and submitted information regarding its co-operative education to the government in each quarter. The budget was calculated based on the number of co-operative students

attached with their names and sent to the co-operative education and professional development center to manage it. If the budget was inadequate, the university had to cover that missing amount. Only the budget for supervision could be requested additionally. In this category, it included the budget for the co-operative student's visits and gifts as tokens of appreciation. Therefore, the amount of supervision could be adjusted but could not be substituted by or moved to other categories.

From the perspectives of its partner, Betagro Public Company Limited, the financial factors affected the effectiveness of the co-operative operation in terms of its annual budget allocation for co-operative students. The rate of the allowance given to the co-operatives students was 350 THB per day, and in each year, the company would accept approximately 400-500 co-operative students. Therefore, its co-operative education was not only a policy "on a shelf" as stated above, but co-operative education was a part of the actual co-operative operation process. Planning for co-operative education was usually based on the rate of its work expansion and the employee turnover rate. At the present time, the company has another policy to increase the number of co-operative students by about 150%, which finally will make up the acceptance of a total of 1,500 co-operative students per year.

#### 5.4.2.3 Rajamangala University of Technology Thayaburi

In 2008, the university established the co-operative education office and its director was later appointed in 2009. The announcement of the office's organizational structure was made in 2010. In the past, the co-operative education of the university began with the Faculty of Engineering, which organized its own internal section dealing with co-operative education. After all, the university fully implemented co-operative education in all of its curricula (100%), resulting in the establishment of the Office of Co-operative Education to handle all of the university co-operative education related affairs, as well as to develop a university co-operative education database and IT system so as to reduce the work process of the co-operative education of the faculty and the faculty work load. The university Office of Co-operative Education played a role as a one-stop service center to handle all co-operative affairs. However, there were still some limitations that made the university unable to establish co-operative education in all departments. Therefore, the Faculty

of Engineering still needed to maintain its internal co-operative education unit during the interim, until the university Office of Co-operative Education became more ready.

The financial factors had a direct influence on the effectiveness of the university's co-operative operation because the Office of Co-operative Education was annually allocated a budget (80% of the tuition fee of the co-operative education course), whereas the co-operative education unit managed by the faculty itself received a budget of 40% of the tuition fee of the course. The tuition fee of the regular students of the Faculty of Engineering was 5,900 THB and 7,900 THB for the students in the weekend program.

Similarly, the financial factors generated an impact on the effectiveness of the co-operative education of the university partner, Microchip Technology Thailand Company Limited. Since the company usually allocated the annual budget for co-operative operation based on an actual need, there was no limitation to the figure of the budget provided. Instead, it would be based on the number of co-operative students and the project that the co-operative students had been assigned.

### **5.4.3 Institutional Factors**

#### **5.4.3.1 Suranaree University of Technology**

It was found that institutional factors had an influence on the effectiveness of the university co-operative operation, which included all stakeholders. The factors can be categorized into the following: 1. the university factor, 2. co-operative student factors, and 3. The co-operative entrepreneur factor. Details are discussed below.

#### **1) University Factor**

(1) University Visions, Objectives, Missions and Goals for Co-operative Operation: the results of the study revealed that the university established the co-operative education and professional development center as a one-stop service for all co-operative education-related affairs. It had the following vision: "Development of Best Academic Service, Best Leadership on Co-operative Education Operation to Gain the World Standard Acceptance." The objectives were: 1) to enhance the professional experience and self-development of students in a way that was more effective than regular internship programs; 2) to provide an opportunity for

public and private sectors to take part in developing graduates' characteristics; 3) to keep the curriculum updated in following the world paradigm; and 4) to promote the relationship between the university and entrepreneurs through co-operative students that work with the entrepreneurs in the co-operative education program. The missions were: 1) to sufficiently provide effective co-operative education for students according to their demands and their fields of study; 2) to prepare the prospective co-operative students with the knowledge and skills necessary for working before they go for co-operative education; 3) to offer fast, clear, and concise co-operative education coordination service to serve all relevant parties according to their demands; 4) to consistently develop students to be professional according to the requirements of both local and international labor markets.

(2) Planning for Co-operative Education Operation: in the beginning, university administrators, instructors, and stakeholders in co-operative education gathered to brainstorm regarding the direction and operation of the co-operative education. It was finally found that co-operative education could not be established in all faculties due to some limitations. Then the university contacted small-sized business enterprises and asked them to join the co-operative education program first. The results of the trial work with those small-sized enterprises returned benefits to both the university and the entrepreneurs. Co-operative education was a good chance for students to demonstrate their ability to work with the entrepreneurs, and an opportunity for the students to get jobs through agreements made in advance by the entrepreneurs in saying that the students could return to work with them after their graduation. The entrepreneurs also were satisfied with the students' work performance during their co-operative education period in the workplaces since the students had the ability to work and to adjust themselves to the work environment and self-discipline for working. Additionally, the university received good feedback from the entrepreneurs and used that information for further development of the management of its own instruction. In the end, three parties—the co-operative students, the universities, and the entrepreneurs—met and discussed how to effectively operate co-operative education. From the discussion, it was recommended that the university add co-operative education as a compulsory course in the

curriculum, except for the faculty of medicine and the faculty of nursing because they already had work-based education designed for their curriculum.

In 1994, the university established the “Co-operative Education and Professional Development Project” as an organization or mediator responsible for coordination with entrepreneurs, instructors, and students on co-operative education operations. The university joined the World Association for Cooperative Education (WACE) in 1997 and assigned co-operative education courses as compulsory for all curricula in the bachelor’s degree. The Federation of Thai Industries certified those co-operative students, who passed the co-operative education course and gave a certificate of co-operative education attainment to all of them. In 2008, the university promoted the Co-operative Education and Development Project to be “Co-operative Education and Development Center” and the center developed strategic plans for the university co-operative education operation. There were short-term plans, and medium-term and long-term plans designed consistent with the university’s main plan. The plans were as a one-year plan or a 5-year plan developed by the committee panel chaired by Asst. Prof. Dr. Bunchai Wichitsatien. The faculties had no need to plan or set up their own policy for co-operative education operation because the center was responsible for all of those matters. The evaluation of the performance of the center would be conducted by using a 360 degree questionnaire to survey the feedback from students, instructors, and entrepreneurs on its service and management.

(3) Roles and Responsibilities of University Coordinators and Supervisors Regarding Co-operative Education: effective co-operative education would exist under 3 conditions: 1) the entrepreneurs offered the positions to the university; 2) the coordinators and supervisors introduced those positions to the students; and 3) the students selected appropriate jobs for themselves and went to work at the workplaces for co-operative education. These also included the process of the preparation of co-operative students before they go for co-operative education, by the coordinators and supervisors, the supervision during co-operative education, and the evaluation of the co-operative students.

What the coordinators and supervisors expected from the engineering students after experiencing co-operative education was the professional

characteristics that they acquired such as being skillful, patient, diligent, and curious to learn. Those characteristics were consistent with the university identity as “Focusing on producing graduates with required professional skills in engineering” for supplying to the market demand of industrial production.

## 2) Students:

(1) Co-operative Education Information Given to the Students Before Going for Co-operative Education: the results from the interview with the co-operative students revealed that the entrepreneur would usually make an appointment with the students in advance for setting a schedule to begin co-operative education. Information regarding date, time and place, as well as the company benefits provided for co-operative students, was given to the students so that they could prepare themselves beforehand.

(2) Co-operative Education in the Workplace: the results of the interviews with co-operative students, again, indicated that the entrepreneurs usually provided in advance the projects and appropriate jobs for new co-operative students, as the reflection of Panudeth Sarapad (2016), A co-operative student from Institute of Engineering at Suranaree University of Technology, indicated in the following:

When I first arrived at the workplace, I went to ask for an assignment from my boss who is a Japanese. The assignment that I got was a project to solve the problem as to design the working process when the machine stopped working, in order to fix them back to work within 15 minutes. I had time for about 16 weeks to analyze, summarized and solve the problem that had happened for 2 years already. I spent 2 days to analyze the cause and I could found the solution of the problem within 2 weeks. Also, I spent another 4 weeks for searching supporting information. Finally the whole problem was solved within 2 months. That was finished very much earlier than the plan. After I completed my co-operative education period, the company invited me to work with them after I graduate.

(3) Knowledge of Engineering: another finding from the interviews with the co-operative students was that they gained a much better understanding of the content knowledge than they had learned in school after the co-operative education through their real experience. Panuphong Paokaw (2016), A co-operative student from Institute of Engineering at Suranaree University of Technology, mentioned this in the following comment:

Before I went for co-operative education, I knew about it when I was in the third year. My senior friends talked about it and they made a plan for it. As I have known from them, the main responsibility of a co-operative student is to cope with daily routine, to study production line and production process. For me, I had to work in wheel bolt, nut, and studs production line to help managing and controlling it. It was actually what I wanted to do because I was interested in working systems of automatic machines. If there were some problems that seemed beyond my ability, I would consult my staff mentor who is very kind and willing to teach me. My mentor's work was to control PLC system and automatic system. To concluded, before co-operative education, I learned a lot about the content knowledge on automatic working system and I think it covered all what it is required for work, and after co-operative education, it made me get more insightful about the system and its functions, which was exactly the filed that I am interested in. I think I can choose the job that matched with my interest now and I can be a good engineer.

### 3) Entrepreneurs

(1) Determination of Visions, Objectives, Missions, Goals, and Philosophy of Co-operative Education Operation: Western Digital Thailand Company Limited had a vision, mission, and organizational value based on the concept of P/Passion, which meant wholehearted dedication to work, products, colleagues, and service given to customers; A/Action, which meant the action taken to

achieve the target goals and opportunity seeking for pushing one's effort forwards to the target goals. As a problem solver, the staff dares to confront problems, and to make sharp decisions to deal with the problems and to enjoy themselves in that hard work; P/Productivity, which meant the development of active plans that could enhance the company's productivity and the escalation of the production capacity. The company's expectation was for the excellent practices of the staff and eventually for the staff to achieve that expectation. Next is P/Perseverance, which meant the endurance to mobilize the work with full effort, and to never give up; and I/Integrity, which meant the completeness of the work. The company worked with transparency and honesty and presented information to customers from its real creativity and potentiality. The main mission was to work in order to meet the customers' demands and expectations, and to cultivate organizational value for the staff in becoming leaders and maintaining a good industrial environment. The company's philosophy was "Smart Socializer, Smart worker, Smart Thinker, Smart Life-Long Learner."

Co-operative education was first by Dr. Sampan Silapanart, who moved from SEAGATE Company limited. He proposed a co-operative project to the company and suggested a study visit to Suranaree University of Technology to see how the university ran its program and to get some ideas about it. That was the beginning chapter of co-operative education implemented in 2008.

(2) Co-operative Education Operation Planning: the entrepreneurs usually assigned the HR department to take responsibility for co-operative education. That department would set up an organization within the department to take the role of recruiting co-operative students and making strategic plans for co-operative operation. The co-operative education policy was run quite well with the company, and the company was fortunate to be introduced to co-operative education by Dr. Sampan Silapanart. The staff of the company was aware of the benefits of co-operative education, which could return to all three parties—the university, the co-operative students, and the entrepreneurs.

The short-term plan for co-operative operation was to maintain co-operative education for the long run and at the same time to escalate the co-operative education. The company tried its best to keep its high standard of co-operative operation. Currently, supervisors are required to sit in together to see the co-

operative students present their projects in the workplace. In addition, the company has attempted to organize knowledge management forums to elicit knowledge from the results of the assigned projects.

In 2015, the company began a policy to accept co-operative students from master degree programs such as graduate students from King Mongkut's University of Technology North Bangkok, King Mongkut's University of Technology Thonburi, etc. It was a strategy to push the company forwards to success in terms of the relationship building between the students and the organization because the master degree students would have the opportunity to work on the projects together with the company staff, which was considered a way to establish a sustainable organizational relationship.

The medium-term plan rather focused on return on investment, total employee participation (TEP) Thailand, as well as Return on Investment: ROI.

The long-term plan emphasized the development of international standards of co-operative education operation. The plan was to encourage Thai students to have greater competitive ability in the world competition such as language ability. However, the company did not consider accepting co-operative students according to their grades so they all could apply. The education program offered to those co-operative students would be different from the student trainees in normal internship programs.

(3) Roles and Responsibilities of Staff Mentors for Co-operative Education: entrepreneurs usually provided training for the staff mentors and the other staff members whose work might be related to co-operative education. The results found revealed the preparation of staff mentors and the relevant members for building up their readiness to be able to supervise was focused on the Leadership Coaching Program (developed from Germany). Since a few of staff mentors and the members had graduated with a master's degree or a doctoral degree, the leadership coaching skill could lead them to know how to supervise co-operative students and made them realize that the supervising task was not a burden but support given to a colleague.

The co-operative education problems, which varied, could be managed and solved. For example, students' stubbornness, the case was an Engineering student. He did not talk much to colleagues. Then his staff mentor often had "homeroom periods" with him. The staff mentor tried to help him adjust himself by first figuring out what seemed to be wrong with him. Finally, it was discovered that the reason that the student did not want to communicate or contact other staff in the workplace was because he felt unhappy with his assigned task. Therefore, the staff mentor took a step to communicate with him in a tactful manner by introducing him to the benefits of team working. Some work would not be successful because of one individual but because of the work of all together joining their hands. It did not matter whether the position appointed was higher or lower, but the aim could be achieved by the team. After the student realized this, he had a better understanding of the message and he could adjust himself.

#### 5.4.3.2 Walailak University

It was also found that institutional factors had an influence on the effectiveness of the university co-operative operation. These factors included all stakeholders, which could be categorized into the following factors: 1. the university factor, 2. the co-operative student factor, and 3. the co-operative entrepreneur factor. Details are described below

##### 1) University

(1) Determination of Visions, Objectives, Goals, Missions, and Philosophy of the Co-operative Education Operation: from the results of the study regarding co-operative education policy, Walailak University, which was founded by Prof. Dr. Wichit Srisa-an, who was a practitioner, had the policy to add co-operative education to its curriculum to prove whether co-operative education was effective and could produce graduates in response to the requirements of the labor market. In 1998, the university had the first batch of the students and the first labor market was for graduates to work in government organizations. However, the problem was that the recruitment tradition of the labor market still was study with a personal connection system, especially those that had graduated from the same institutions. It was quite a challenging problem for Walailak University to find a solution because it was newly established at that time. Therefore, it turned out that the only way to solve the

problem was to change the focus from theoretical content knowledge, as other institutes traditionally do to professional experience like co-operative education. The university established the Co-operative Education and Professional Development Center for serving co-operative education-related affairs as a one-stop service center. At the beginning, the center's roles and responsibilities were been defined clearly or not really set up yet, so the university organized a co-operative pilot project during the interim, under the supervision of the academic service department. However, after a time using co-operative education, the university realized its benefits and the university perceived that was on the right track in operating it. Therefore, the university started to fully establish a co-operative education program and the co-operative Education and Professional Deployment Center was working fully on its way. The center was officially established in 2010. However, at the beginning stage of the co-operative operation, compared to the co-operative education of Suranaree University of Technology, the co-operative education operation of Walailak University was still behind and required clearer regulations and procedures.

The Co-operative Education and Professional Development Center took its role in serving co-operative business related to all as a single-stop service center. It had the vision to be “the Best Practice of Co-operative Education in Southern Thailand, and Move forwards to be the Best Practice of the Nation.” The objectives of co-operative education were set up as follows: 1) to develop learning instruction and a curriculum that is up to date in following the world paradigm and in response to the national labor market; 2) to develop knowledge, skills, and the ability of the co-operative students that have had authentic professional experience from co-operative education in the workplace; 3) to prepare students in advance to gain knowledge, skills and self-development for work in advance, as to build their readiness before going for co-operative education; 4) to enhance cooperation in developing human resources between the university and the entrepreneurs in both the public and private sectors. It also included a connection with national institutions and international institutions; 5) to promote collaboration in professional research, knowledge, and innovation exchange between the university and entrepreneurs. The university missions consisted of: 1) the promotion of the systematic integration of work and study in the curriculum under the cooperation of entrepreneurs; 2) the

production of graduates with the characteristics required by the national and regional labor markets.

## (2) Co-operative Education Operation Planning:

In the beginning, university administrators, instructors, and other relevant parties got together to brainstorm on how to effectively conduct co-operative education. All parties exchanged their opinions about the possible processes for the effective co-operative education. The university also organized knowledge management as a stage where the members could consistently share their knowledge and experience. The beginning steps of the co-operative education operation were just like a trial for them. The Co-operative Education and Professional Development Center was organized to take direct responsibility for the co-operative education operation affairs. The main duty of the center was to prepare students before their co-operative education in terms of providing training in general knowledge and the benefits of co-operative education during the first few hours and then provide information about the process of co-operative education—from leaving the workplace until returning to the university. A co-operative education committee of the center was also appointed comprised of experts from external and internal institutions, from the Office of Higher Education Commission, and included employer representatives and instructor representatives from 11 faculties. Additional representatives from 7 faculties were appointed as a co-operative education policy committee. The instructors also had their own regular meetings on co-operative education.

The co-operative education center usually passed policy information to the instructors throughout 33 curricula. Each curriculum had to appoint an instructor as a co-operative education coordinator for a 1-year cycle. It also set up meetings among instructors who acted as supervisors. In conclusion, the university had been conducting co-operative education for over 17 years until the system became standardized. In addition to the main role of the Co-operative Education and Professional Development Center, it had to develop a strategic plan for the university and the results showed that the plan was consistent with the university's main plan. The plan would be regularly reviewed from time to time. Everyone needed to join in moving the policy, short-term plans, and review the annual plan (developed in the beginning of the fiscal year, from the review of the past year). The keys plan

remained the same but the *ad hoc* plans of all 33 curricula would be operated and controlled by the Co-operative Education and Professional Development Center under the one-stop service system, working together with the curriculum in order to develop the plans and direction of co-operative education each year.

(3) Roles and Responsibilities of Staff Mentors in Terms of Co-operative Education: in order to prepare co-operative supervisors to be ready for supervision, the supervisors needed to pass a 3-day pre-training. The training course for the supervisor was organized in the upper southern region and also another course was available at the central organization. The university offered the budget of 10,000 THB for the self-development of each supervisor. To be able to supervise co-operative students, the coordinators and the supervisors had to truly understand co-operative education and it was thought that they might gain a better understanding after supervising students in the workplace. A self-swot analysis is a very important tool for co-operative education, as it can let the co-operative students learn better about themselves in terms of their weaknesses and strengths in order to progress in their careers on the right track and to know how to improve themselves. Nevertheless, the supervisors had to understand the objectives and the achievement goals of the course first before they could provide supervision for the students. The supervision was usually carried out during a 16-week period. The superiors should focus on the students' learning outcomes first for supervision, but the results indicated that the supervisors still lacked attention to the students' learning outcomes. This point should be particularly addressed for supervisors' improvement. Another concern was their work process and their perception of co-operative education work paradigms.

The roles of the co-operative supervisors and the co-operative coordinators, from the Faculty of Engineering and Resources, was, one, to survey general information on the workplaces, their location, and what the workplaces would provide for the students that the co-operative students going to work beforehand. For example, in the case of Tawee Mongkol (2000) Company Limited, the supervisors had to check whether the staff mentor was a foreman or an engineer, and so on. Two was that during the co-operative education, when the supervisors visited the co-operative students, they would talk to staff mentors and also talk to the students about their experience with co-operative education there. Additionally the

students would be asked to describe their assigned project or tasks to the supervisors. The supervisor would spend approximately 2 to 3 hours for the visit. Three, after the students finished their co-operative education, the instructors of each department would call for a meeting in order to evaluate the co-operative student's performance. The scoring weight would be mostly based on the score from the supervisor, evaluated from the students' report which could be broken down into several parts according to the scoring criteria. The substantial characteristics of the co-operative students from the Faculty of Engineering and Resources were to be "Diligent and Work Hard." In other words, the co-operative students would be able to accept all kinds of work. They were not demanding. Nevertheless, the Faculty of Engineering and Resources based its instruction on a learner-centered approach, with a variety of designs of pedagogical activities, such as active learning. The Active learning activities could be found in the supplementary activities of the curriculum, professional experience activities, international academic skills development activities, etc.

## 2) Students

(1) Co-operative Education Information Received from Entrepreneurs by the Students before Going for Co-operative Education: the results from the interviews with entrepreneurs revealed that the entrepreneurs usually made contact with the co-operative students in advance for making an appointment with the co-operative students for registration to start their internship. The date, time, and place were specified and other information about the company benefits provided for co-operative students was also given. That information could help the co-operative students to prepare themselves before they began the co-operative education in the workplace.

(2) Co-operative Education in the Workplace and the Co-operative Students' Assignments: the entrepreneurs prepared the project work or assignments for the students when they arrived and in positions related to their field of study. Evidence of this can be found in an interview with Chawalit Rakkong (2016), a co-operative student from School of Engineering and Resources at Walailak University:

I made a report instead of the project because the assignment that I got was the construction of 100 million THB house. It was a direct field of construction work even it was not a project. For civil engineering and electrical engineering, it was not quite practical to assigned task as a project. I think I would come back to work here after my graduation, as I would like to continue on monitoring the work at the construction site until the construction of the house was completed. I earned approximately 2,100 THB as my monthly salary.

(3) Knowledge of Engineering: if one takes the knowledge of engineering into account, it was found that only learning theoretical knowledge before the co-operative education might not be enough to make the students fully understand, but co-operative education would give them an opportunity to apply that knowledge to practice in their co-operative education in the workplace. Therefore, the students could eventually obtain more insightful knowledge from their firsthand experience. The reflection of this result can be found in an interview with Tarit Sangthongdee (2016), A co-operative student from School of Engineering and Resources at Walailak University:

The company treats us as an employee. It was totally my new experience, and my responsibility to the newly assigned jobs. I met several types of people (careers) because I had to contact with people from many departments such as marketing, accounting, etc. The tools used when I learned at the university were quite old, but here at the company, there were many new tools. At the beginning, I didn't know how to use them and I had to take time study how they work. However, I still had the background about those machines from the university, so I could guess. To sum up, I think "the university had less practical hours and it focused too much on theoretical content."

### 3) Entrepreneurs

(1) Determination of Visions, Objectives, Goals, and Missions and Philosophy of Co-operative Education Operations: according to the case study of Betagro Public Company Limited, its visions were to produce and develop high-quality and high-safety food, from the basis of modern agricultural industry, to promote the quality of life of the world population. The company's objectives in recruiting co-operative students were to one, to develop the skills of the company staff. Since the co-operative students came to do the project work, they could not help improve the company business work as well. Second was to develop staff mentors because they had an opportunity to become promoted as a prospective head or supervisor. In regard to the company missions, they consisted of 1) developing the employees' potential; 2) improving the work process under effective management for providing services that meet the customers' needs and requirements; 3) conducting research and developing the best product and service under the Betagro brand; 4) having a marketing network and production basis in other key places in the world; 5) sharing support and service with customers, business partners, employees, stakeholders, and shareholders in the long run.

The company had implemented co-operative education in the organization for long time already. In the beginning, education institutions made an effort to introduce co-operative education to the company and the company accepted the first groups because of the establishment of good cooperation and benefit sharing. However, the institutions had to be clear about what they wanted to do with the co-operative education and understand the company's context first. Betagro Public Company Limited officially started its co-operative education in 2009.

(2) Co-operative Education Operation Planning: the entrepreneurs normally established an organization to be responsible for the co-operative students. The findings indicated that the company assigned the task to the HR departments in Betagro groups. The company did not have criteria to select universities to join its co-operative education network since the company management wanted to return benefits to society by opening co-operative education service to the public. The management team set up a co-operative project called "University

Alliances or University Relationship.” It first began by accepting co-operative students from the 1<sup>st</sup> to the 4<sup>th</sup> year of study.

Additionally, the company had a strategic plan for receiving co-operative students. According to the plan, the company would expand jobs and accept a larger number of students, up to 400-500 students per year. This policy was not just a policy; the company really pushed it into practice as a part of its work process. For planning the capacity to accept co-operative students, the company considered its employee turnover rate and job expansion rate. Currently, the co-operative education policy has increased the number of receiving co-operative students to 150% each year, making up a total of 1,500 students per year.

(3) Roles and Responsibilities of Staff Mentors for Co-operative Education: the company provides pre-training to staff mentors for at least 30 hours. The training topics include the importance of co-operative education, dual training conduct, educational psychology, interpersonal skills in the work environment, analysis of work for teaching, educational evaluation, etc. The training is a condition outlined by the Department of Skill Development. The company could use the expenses from co-operative education to reduce its tax by 200%. In fact, the aim was not to reduce the company’s taxes but to effectively determine the implementation of co-operative education. The company continuously developed many groups of staff mentors based on the constructivism concept. It was a kind of life-long learning development for employees with an aim to produce good staff mentors. During the 4 months of co-operative education, the staff mentors would have to assign a project to co-operative students, and those projects had to be developed as a part of the staff mentor’s current work. Later, the staff mentors would present the completed project to students from other universities. Throughout the co-operative education, the staff mentors would help monitor and provide suggestions and solve the students’ work problems. For example, there was a case where a female student could not get along with her staff mentor after a one-month internship. Actually the student went there with a colleague but her colleague had no problem with the mentor. A staff mentor from another department then came to be a mediator to talk with her so as to figure out the problem. It was revealed that the staff mentor’s girlfriend felt jealous of her. When the mentor wanted to assign her tasks, his

girlfriend was usually the one that contacted her instead. After the truth was discovered, the staff mentor stated that he would not let his girlfriend get involved with his job ever again. The problem was finally solved.

#### 5.4.3.3 Rajamangala University of Technology Thayaburi

In establishing effective co-operative education for Rajamangala University of Technology Thayaburi, there were three stakeholders that had an influence its operation: 1) the university, 2) students, and 3) entrepreneurs. Details are described as follows.

##### 1) University

(1) Determination of Visions, Objectives, Goals and Missions and Philosophy of Co-operative Education Operations: in 2002, the university established a co-operative education pilot project, joining with the Office of Higher Education Commission. At that time, the university had only a regular internship program, and co-operative education was very new for the university. However, the management foresaw its benefits, so they decided to join this co-operative pilot project. Co-operative education was first begun by the Faculty of Engineering. After a while, the university set up the Co-operative Education Office to be responsible for the expanding co-operative operation business. The office had the visions as “a company to enhance professional skills for graduates, the students to gain expertise from their firsthand experience, the students to take moral high grounds on working.” The university objectives were: 1) to prepare students with career development skills and experience to make them ready to work (employability); 2) to escalate their academic experience, professional experience, and self-development in a new way that was better than a regular internship; 3) to provide an opportunity for entrepreneurs from public and private sectors to take their part in developing the quality of graduates; 4) to develop a trendy standard curriculum that matched the current labor markets; and 5) to establish a relationship between the entrepreneurs and higher-Oeducation institutions through co-operative students and supervisors. The university mission was to promote education from real life experience. In operating co-operative education, all parties tried to create good collaboration in providing co-operative education for the students, together with maintaining and preserving national religions, arts, cultures, and the environment. The goals were to enhance the

quality of graduates through professional development in the workplace, to develop the quality of graduates in accordance with professional standards and the demands of the labor market. The graduates would eventually have “self-awareness, awareness of people, and awareness of jobs.”

(2) Co-operative Education Operation Planning: the university established the Co-operative Education Office in 2008 to deal with all co-operative education affairs. At that time, faculty member Nuttipong Uthong was appointed to act as the Director of the Office in 2009. The main responsibility of the office was to develop annual planning for co-operative education and to expand the cooperation network with entrepreneurs. Since the office had just been set up, the number of staff members was still limited. They had to help each other in order to complete all of the work at hand. Under the director’s concept of work, the work flow began with his main plan, and later the staff would coordinate to move on his plan and he would act as an advisor. The duration or the cycle of the position would be the same as that of the university president. The position came from a selection system. In the beginning of the co-operative education operation, the office brainstormed on the information from university management, instructors, and stakeholders to design a standard procedure. Mostly the move of the co-operative operation of the university was driven by the staff, not by the students; entrepreneurs did not get involved at this stage. The difficulty of the office in communicating among the groups occurred mostly with the group of instructors since the university attempted to persuade them to join the co-operative program. This attempt began with the management period of Assoc. Prof. Dr. Namuuth Sonthanapitak, the former president of the university, during 2005-2013.

The Co-operative Office developed a 4 year management plan for co-operative education but the action plan for the curriculum level was not developed yet. The plan emphasized “Hands-on Practitioners” that had professional skills. After the plan had been developed, the office would pass it to the Division of University Planning. For the evaluation of the co-operative operation, the president would evaluate it as a performance of the Director of the Office, with the help of reviewing the evaluation by vice presidents and president assistants.

(3) Roles and Responsibilities of Staff Mentors in Relation to Co-operative Education: regarding the roles and responsibilities for co-operative education, there would be one representative for the teacher coordination and one office staff member appointed from each faculty. They were responsible for compiling related documents, searching for co-operative entrepreneurs and listing the entrepreneurs for the students' selection. The coordinator had to review and screen the qualifications of the entrepreneurs to make a list of those available for the students. Also, he/she needed to summarize the total number of co-operative students. The supervisors could work together with the entrepreneurs in terms of collaborative projects, which could be in the form of research or project work. Comments and feedback from the entrepreneurs about the curriculum could be taken back for consideration in adjusting the curriculum.

With the aim to produce "Hands-on Practitioners" from the past to the present, the process of production had to be intensified and clearly scoped in accordance with the demands of the nation.

## 2) Students

(1) Co-operative Education Information Received from Entrepreneurs by the Students before Going for Co-operative Education: the entrepreneurs usually made contact with the co-operative students in advance in order to make an appointment with them for the registration to begin their internship. The date, time, and place were specified, and other information about the company benefits provided for the co-operative students was also given. That information could help the co-operative students prepare themselves before they began their co-operative education in the workplace.

(2) Co-operative Education in the Workplaces and Co-operative Students' Assignments: according to the result from the interviews, the entrepreneur provided the students with projects to work for co-operative education and positions that were directly related to their fields of study, as the words of Wisarut Chatchawanwinkul (2016), a student from the Faculty of Engineering, Rajamangala University of Technology Thayaburi, pointed out:

I went to work with Thung Thoa Thai Company Limited, which ran the business related to the production of socks under the following brands Nike, Jordan, Paul Smith, and Converse. It was located in Prapradang Samuprakran. Even though producing socks seemed to have nothing much to do, the yarn colors still were different. If manufacturing was not controlled, the socks could become different colors. Those different color of yarn would be thrown away and the company would lost a lot of money for that cause. The staff mentor then asked me to do the project on developing the system to control yarn supplying. Usually, the workers would come to get yarn at the main warehouse, and currently there was no system could support in tracking on the inventory. My project was initiated to fix the problem. I spent approximately 3 months to complete the task. The company staff were very satisfied with it.

(3) Knowledge of Engineering: comparing the theoretical knowledge learned before the students' co-operative education, which might not be enough to make them fully understand the content, and the practical knowledge after their co-operative education, it was proved that co-operative education could open a wide vision for them in terms of the ability to apply the knowledge from their co-operative education in the workplace. Therefore, the students could eventually get more insightful knowledge from their firsthand experience, as stated by Nawamin Sodsa-ard (2016), a student from the Faculty of Engineering, Rajamangala University of Technology Thayaburi, in his interview:

I think that the Industrial Engineering Curriculum was very good. (Before I came to work, I thought that the courses that I've learned from school didn't help me much to work, but once I arrived to work, my mindset was changed. I could eventually apply all of the knowledge that I learned from school. So, I think it is good, especially the sub-areas like industrial business drawing course, industrial maintenance course, and industrial management, etc. (Now

people normally perceive that Industrial Engineering was the area that students had to learn all but were not good at anything). With my pride, I think my characteristics meet the requirement of graduates now, even though my GPA was not high. When I first arrived to the workplace, the staff also so asked me about my GPA but when I told them, they encouraged me by telling me that they would consider me based on my working performance.

### 3) Entrepreneurs

(1) Determination of Visions, Objectives, Goals and Missions and Philosophy of Co-operative Education Operations: Microchip Technology (Thailand) Company Limited used the ground for sharing the opportunity with Thai youths to have firsthand experience in working during their internship in order to prepare them to confront the real world of industrial work in the near future (early recruitment). The objective of the company was 1) to provide an opportunity for students to effectively learn through real-life professional experience in the workplace; 2) to prepare the students and to fill their experience with professional skills that would be useful for their career in the future; 3) to promote the students' self-development skills in terms of being more rational, more disciplined towards themselves and the public from the skills that they gained in solving problems while dealing with co-operative education projects; 4) to establish good relationships among public and private sectors, institutions, and entrepreneurs in order to develop the quality of graduates; and 5) to provide co-operative education as a way to select skillful employees from the co-operative students early for the organizations (proactive recruitment). It was also a way to early on cultivate a good organizational culture for the co-operative students (start them young).

For the above reasons, the company accepted all co-operative students from the Faculty of Electrical and Telecommunication Engineering, Mechanical Engineering, Mechatronic Engineering, Computer Engineering, etc. The co-operative education would take place during the semester breaks. The company has given full support to the co-operative education project and has granted scholarships to

students since the company was first founded in 2011, and they currently have dual training agreements with many vocational institutions.

(2) Co-operative Education Operation Planning: in order to mobilize the co-operative education project, the company strictly followed the defined objectives for operating co-operative education. The company also assigned the Human Resource Training and Development Department to take direct responsibility for the co-operative operations. The coordinator staff member would contact and coordinate directly with related parties such as instructors, co-operative students, and staff members from across the company that they were willing to support. Those included executive management, managers, and supervisors, as well as all remaining staff members. For strategic planning, the company set up a policy for the work process as follows: 1) to appoint a company committee for the co-operative project; 2) to allocate a budget for co-operative operations; and 3) to appoint mentors for the co-operative students. For the short-term plan, the co-operative education operation would be controlled according to the duration of the co-operative students' recruitment according to the university schedule. For the medium-term plan, the co-operative students would have to finish their projects within the timeline. If they wanted to extend the period, the company would not mind and they could work there until the school opened again. For the long-term plan, the company would join the university in adjusting the curriculum to meet the requirement of the labor market and the company so that the company could accept the co-operative students as full-time employees right after their graduation.

(3) Roles and Responsibilities of Staff Mentors for Co-operative Education: the head of departments and staff mentors would first submit a proposal to request co-operative students in the form of a Student Trainee Requisition Form and Job Assignment Justification to the HR department. Staff mentors would take responsibility for supervising and supporting the co-operative students during the co-operative education program. For example, the HRD department would call co-operative students for a regular monthly meeting to discuss their problems/difficulties in working at the end of each month. The co-operative students would get an allowance from the company. The staff mentors would keep the co-operative students' records and the company would later key in those records again into the company HR

database. Before the co-operative students left the company, they would be asked to fill out the application forms for the company. If the students graduated and were still interested in working with the company, they could return and the company would consider the students as a priority.

#### **5.4.4 Leadership Factors**

##### **5.4.4.1 Suranaree University of Technology**

According to the findings, it was found that the leadership factors of Suranaree University of Technology were related to the university executive management. They were the key persons that had the most powerful influence on the effectiveness of the co-operative education operations. Starting with the development of a policy, it should be clear and comprehensible and the staff had to agree to follow it as well as perceive its benefits. Additionally, the entrepreneurs in the university network had to understand the same concept and move forward together. Students were considered not a fixed variable because they changed every year since there were incoming students and outgoing students all the time. In order to enhance the understanding of co-operative education concept on the part of instructors, communication should be made at the beginning when the instructors are being recruited into the organization. The university needed to explain to them that the university joined the co-operative education project and it was a part of the curriculum. The information would gradually be internalized by them over time. Meanwhile, the university management and instructors had to participate in the co-operative education and learn about it together. There was a staff mentor system to supervise the co-operative students during work. At the beginning of the co-operative education, Asst. Prof. Dr. Tawatchai Teekachunhakasean was the only person that made a study visit to the University of Waterloo and then came back to share his knowledge about the co-operative education operation from there with other university staff members. The entrepreneurs were introduced about co-operative education by the instructors. Since the university received strong support from the president, who had a clear policy in his mind, co-operative operation was pushed forward quickly. In addition, according to the University Act, the committee of the university council included the chairman of the Federation of Thai Industries, and the

chairman of the Thai Chamber of Commerce. They helped a lot in facilitating and extending the co-operative education information. All of the university co-operative education plans were created by Prof. Dr. Wichit Srisa-arn. The operational plan for the co-operative education of Suranaree University of Technology was designed as a bottom-up type. Therefore, it was a challenging task to communicate with management level so that they could understand the benefits and direction of the co-operative operation.

The leadership factors found in Western Digital Thailand Company Limited obviously reflected the effectiveness of co-operative education. Since the company had a solid policy regarding co-operative education operation, it was run quite successfully. The company was fortunate to be introduced to the idea of co-operative education by Dr. Sampan Silapanart. He was the founder of co-operative education of the company and was active in communicating co-operative education information and its benefits to the staff of the company.

#### 5.4.4.2 Walailak University

For Walailak University, the leadership factors had a strong influence on the effectiveness of its co-operative operation because the policy was an indicator as to whether the co-operative education operation would be sustainable. If the policy was continuous, co-operative education operation would be run consistently. Entrepreneurs also needed more communication to be more confident about the benefits and the operational process of co-operative education. The university management had to act as a mediator to send messages to the entrepreneurs for a better understanding and to overcome their ambiguity concerning co-operative education. At the curriculum level, the instructors in each department had to have a clear understanding of co-operative education first, and the willingness to follow its concepts according to the university plans; both factors were equally important. The first factor was the policy, including the plan and operational organization, which had to be defined clearly, and the second factor was the instructors, who had to have a positive attitude towards the co-operative operations. The director of the Co-operative Education Center as an academic administrator should have the ability to push the policy into practice through effective communication between faculties' deans, heads

of departments, and other management members and the grounds of co-operative education benefits had to be justified for a better understanding of the organization.

In terms of the university co-operative education partner, Betagro Public Company Limited, the findings presented the same results as those of other universities, that the leadership factors had an influence on the effectiveness of co-operative education operations. Since the management fully gave support to co-operative education (100%), the operation has run very well. The company management approved the co-operative education policy as one of its business activities. They also provide benefits to the co-operative students.

#### 5.4.4.3 Rajamangala University of Technology Thayaburi

The results of the effect of the leadership factors of Rajamangala University of Technology Thayaburi on the effectiveness of the co-operative education operation revealed that the university leaders were the most important factor in indicating the success of the co-operative education operations. Dr. Sumeth Yamnun, President of the University Council, was the key man to push co-operative education forwards. He added it in the university policy as all members must conform. The operation was a top-down type as the university focused on producing hands-on practitioners. Therefore, the university administrators would have to “pay particular attention and interest to it.” The university management positions were not just appointed positions but the persons had to take action. In doing so, the administrators needed to learn how to communicate well, as good negotiators. It was certain that no a single decision could be made to serve the satisfaction of all people but good administrators must not only give commands; they also need to act as a facilitators in order to see that goals are accomplished, and the top-down approach could be seen as interchangeable with the bottom-up approach.

Regarding the university partner, Microchip Technology Thailand Company Limited, the findings regarding the leadership factors also showed the same information as those of the university. Leadership factors had a strong impact on the effectiveness of co-operative education operation. For the company, management’ decisions were the most important factors in mobilizing the co-operative education operations. They were the team that provided support and led the direction of the project until it met the goals. The support had to be provided thoroughly across all

members levels, including the higher management level, the lower management level, and the normal staff.

### **5.4.5 Management Innovation Factors**

#### **5.4.5.1 Suranaree University of Technology**

The management innovation factors of Suranaree University of Technology had a significant relationship with the effectiveness of the co-operative operations. To elaborate, the university implemented co-operative education as a part of its curriculum in 1993. It was also a member of the World Association for Cooperative Education, WACE. In the beginning of its co-operative education implementation, the university used management innovation for co-operative education. The university received the honor to be the host of the WACE World Conference in 2001, which was considered as the second university in Asia. Moreover, the university was a pioneer that founded the Thai Association for Cooperative Education in 2001. Later in 2012, the university was upgraded to be a member of WACE at the silver level and was promoted to be a WACE International Satellite Office or WACE ISO@SUT, which was responsible for developing cooperative networks of international co-operative education for higher-education institutions and entrepreneurs in the Asia Pacific Region.

The university incorporated management innovation into co-operative education. Therefore the university was aware of the importance of the development of supervisors and other members whose work related to the supervision given to co-operative students in order to help them become professional trainers; they had a lot of knowledge and experience and could effectively run co-operative education. The university expanded its innovation by developing a curriculum in co-operative education in its graduate programs for both master degrees and doctoral degrees in 2013.

The university also set up an international program in co-operative education with the aim to attract international students to study and to upgrade the program to become an international standard benchmark.

The quality of its co-operative education can be assessed by the university's management innovation. As can be seen, the university had a growing

rate of co-operative students that participated in co-operative education abroad in 1995; three co-operative students were sent out for international co-operative education. Later, 17 co-operative students were sent during the first semester of 2015 to practice in in the IT department at Victory University in Australia and in other countries such as China, Africa, and so on. Compared to the total number of students, the number of co-operative students that engaged in international co-operative education was considered to be small.

In terms of Western Digital Thailand Company Limited, it exhibited management innovation in co-operative education. The company usually created or innovated co-operative education; for example, it initiated joint projects research in engineering conducted between the institutions and the company. New research projects were offered to universities to join, for the sake of both, and the company provided full funding for that research. The company also provided a project called “WD Research Collaboration” in which the instructors proposed research topics to students to solve company problems and then the students would conduct the research for at least a 6-month period in the workplace. The students would graduate within 4 years. The company would select topics from the proposed proposals that seemed to be new and creative to them.

The quality of co-operative education can be assessed by the company management innovations that led co-operative education to international levels. As can be seen, the co-operative students at the university could participate in co-operative education more than one time. For example, the second year students went to Canada for their first experience with co-operative education, and the second time during the last semester of the fourth year in the workplace in Thailand.

Moreover, the company established a co-operative network with the universities, the Thai Association for Cooperative Education, the Office of Higher Education Commission, and the World Association for Cooperative Education. It was a leading company in co-operative education operation in Thailand and abroad (100%) and it signed off agreements with many international universities such as Vitoria University, the University of Melbourne, etc. The company incorporated innovation in developing the quality of co-operative education and it also designed a

long-term plan for co-operative education and attempted to raise the level of co-operative education in Thailand.

#### 5.4.5.2 Walailak University

Walailak University also exhibited management innovations and they had a relative effect on the effectiveness of co-operative education operations. Since Walailak University also sent out co-operative students to have professional training in co-operative education both in Thailand and abroad, incorporated with the management innovations of co-operative education, it was able to conduct co-operative education successfully. For example, in 2011, the university received a national award for the best practice of co-operative education institution. Later in 2014, the co-operative students from the university also received a national award for co-operative education innovation (granted to Miss Chamaiporn Kumarachan, a student from the Chemical and Procedural Engineering Program, Faculty of Engineering and Resources, Walailak University). The National Best Co-operative Education Practitioners Award at the University Level was also granted to Asst. Prof Dr. Padung Suksa-ard, the Director of the Co-operative Education and Professional Development Center. At the present time, with an initiation, Walailak University has formed co-operative education based on active learning approach, resulting in a higher number of graduates that have been employed.

The quality of management innovation in co-operative education can be evaluated according to the number of the students that the university sent out to participate in co-operative education abroad. For example, there were 30-40 international students enrolled in co-operative education during the time of this writing. They included both Thai students that went abroad and international students that came to Thailand for co-operative education. Thai co-operative graduates practiced professional training in both public and private organizations abroad. The first batch was sent out in 2002. Similarly, the university has been a host university for international co-operative students and has had agreements on co-operative education networks signed off with several universities in Australia, Malaysia, South Africa, Cambodia, etc.

Its partner, Betagro Public Company Limited, has also applied management innovation in its co-operative education program. The outstanding

innovation was a project called “University Alliances or University Relationship.” The company had always created something new for developing its operation and improving the effectiveness of its co-operative education operations. Another project was called “Betagro Gen Plus,” with the aim to provide a stage for co-operative students to exchange their knowledge and ideas with their colleagues from other universities, as well as to share the knowledge and experience that they gained with the public. The co-operative students would have an opportunity to learn about various work environments to help them discover the future career direction in which they really wanted to go. The quality of the co-operative education of the company can be assessed by the innovations that the company has created, such as Employee Brand. The company also has an effective system for co-operative education and it has widely gained acceptance by the society. Additionally, it has consistent training services for staff mentors for at least 30 hours as the requirement of the Department of Skill Development and it has produced many groups of them. Another innovation was the Constructivism Learning Approach which it applied to the development of employees. The employees would finally become life-long learners from the approach. The focus of the approach was to produce good staff mentors for co-operative students. The co-operative students usually spent at least 4 months in their co-operative education at the company and the staff mentors were expected to assigned projects to the co-operative students. The project would be calculated as 50% of the total score, general learning about the work was calculated as 30% of the total score, and learning about organizational cultures and the work environment was calculated as 20% of the total score.

#### 5.4.5.3 Rajamangala University of Technology Thanyaburi

For Rajamangala University of Technology Thanyaburi, management innovation was seen to have a relative effect on the effectiveness of the co-operative education operation. Since the university designed CDIO (Conceiving-Designing-Implementing-Operating) as its approach to co-operative education, it was a concept of instruction for engineering students developed by the Massachusetts Institute of Technology. It was widely accepted and more than 90 engineering institutions around the world have applied the concept for teaching their students. CDIO actually focuses on learning outcomes that can be subcategorized into 4 main aspects: 1) conceive: be

able to have critical thinking and to figure out problems in engineering; 2) design: be able to design and find solutions for problems in engineering; 3) implement: be able to apply knowledge and to solve problems; and 4) operate: be able to develop and control the system appropriately. The CDIO curriculum focused on producing engineers that had the ability to think, design, operate, and control the system effectively.

The quality of management innovation in the co-operative education of the university can be evaluated from the plans and policy it developed for co-operative education operations. It focused on producing engineers that were “hands-on practitioners.” The graduates were expected to be practitioners, thinkers, and decision-makers. The new curriculum was to develop students to have skill in using working tools and to learn about other areas related to their fields of study.

Its partner, Microchip Technology Thailand Company Limited, also applied management innovation in the co-operative education program. The company joined hands with the university to adjust the curriculum in response to the labor market demands in order to produce graduates with satisfactory characteristics.

The quality of the management innovation in co-operative education of the entrepreneur can be evaluated according to the national award for the good practice of entrepreneurs it received in 2015. In operating co-operative education, staff mentors would have to submit a proposal to request student trainees to the HR department first. The information that they needed to include in the proposal was the estimated cost required for hiring a permanent staff member compared to the probable cost of using co-operative students. Weak points and advantages also had to be included in the proposal and the project designed in the proposal had to be based on problem solving in their current job, a summary of the causes of the problem, and the cost return that the company could get receive from the co-operative student.

**Table 5.4** Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Suranaree University of Technology</b>	The university had operated co-operative education in 1993, earlier than the Office of Higher Education Commission was aware of the benefits of co-operative education. Therefore, political factors had no effect towards the effectiveness of co-operative	The university received the government budget in form of Block Grand system. It organized the Co-operative education and Professional Development Center to provide one stop service for all co-operative education related business parties. So, financial	<b>1. University</b> 1.1 In determining the visions, objectives, missions, and goals included co-operative education students' preparation and development, the provision of an opportunity for public and private sectors to take part in operating co-operative education, resulting in the development of curriculum and professions that matched with the labor markets in Thailand and abroad. The university identity was "to produce skillful engineers". 1.2 Planning for co-operative education operation in 1997 was defined that co-operative education must be included in all curriculum as a compulsory	The university ran co-operative education program since the university was found in 1993. Co-operative education was included in the university management plan. Therefore the co-operative education started from Bottom up approach, in which referred to activities that began from lower level staff such as the instructors and co-operative education staff to the upper level. In terms of the policy, the leaders must be the key man who clearly	The university had created an instructional innovation by developing a new curriculum on co-operative education operation in Master's degree and Doctoral degree programs in 2013. The main aim of the curriculum was for the students to further their knowledge and skills on co-operative education operation in the more insightful manner, and on specific fields of study. The university quality of co-operative education

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Suranaree University of Technology</b>	education operation. Likewise, for its co-operative education partner, Western Digital (Thailand) Company Limited was also got no impact from the political factors. The political factors had no influence towards the university's effectiveness of co-operative education	system was managed effectively. Disbursement of the budget must be a written project proposed to request for a budget. Therefore, financial factors were important to the effectiveness of the co-operative education operation. For Western	course in Bachelor's degree programs. The Co-operative education and Professional Development Center was responsible to create a strategic plan for co-operative education operation. Instructional design was set up for co-operative education in form of a short-term plan, a medium-term plan, and long-term plan. All the plans must be consistent with the university main plan. They could be a one year plan or a 5 year plan. The affairs related to co-operative education would be managed by the Co-operative education and Professional Development Center. 1.3 Roles and responsibilities of	designed the plan of co-operative education operation. The leaders had to also participate in co-operative education implementation, as to learn and to get better understanding of the potential problems that might occur and were able to assign appropriate tasks for instructors or co-operative education staff, so that they could continue the project. The university co-operative education operation was in form of Top Down process. Therefore, the leadership	operation could be measured by considering its management innovations as seen in the increasing rate of co-operative education students who had been sent out to practice on their co-operative education abroad. In the first semester of 2015, the university sent out 17 co-operative education students to have a practicum abroad at Victoria University in Australia, and to other universities in Australia, China, and South Africa.

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Suranaree University of Technology</b>	operation as well.	Digital Thailand Company Limited, it allocated an annual	<p>coordinators and supervisors: they would give the students suggestions for selection of the positions, provide an orientation for co-operative education students before they went on co-operative education, as well as provide supervision during co-op education and evaluation of their performance after co-operative education.</p> <p><b>2. Students</b></p> <p>2.1 Co-operative education students would receive a contact and the information from the entrepreneur to make an appointment for a register to start their work. The date, time, and location as well as the benefits that they students would get from the company, would be</p>	<p>factors had an effect towards the co-operative education operation. For Western Digital Thailand Company Limited, the leadership factors also had an impact with its effectiveness of co-operative education operation since the company developed a solid plan for co-operative education operation in form of Top Down process, in which it opened the opportunity for the staff to share their ideas about the company's operation on co-operative education</p>	<p>For Western Digital Thailand Company Limited, it had an instructional design that was also beyond regular co-operative education conducts, as it created joint research projects on Engineering with the instructors from the university as to explore new research paradigm and knowledge in Engineering. The company provided full funding for the research conducts, as well as provided the research site</p>

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
Suranaree University of Technology			<p>informed to the students so that the students could prepare themselves ahead of time.</p> <p>2.2 Co-operative education and Students' Assignments: the entrepreneurs must provide the projects and positions that directly related to the co-operative education students' area of the study.</p> <p>2.3 Knowledge of Engineering: Although students had theoretical knowledge on engineering contents at the university before co-operative education, the co-operative education students still didn't fully understand unless they experienced it. After co-operative education, they gained insightful knowledge</p>	<p>education. It disseminated information of co-operative education throughout the whole organization and promote the staff's awareness of the benefits of co-operative education operation.</p> <p>Leadership factors had influence towards the effectiveness of co-operative education operation.</p>	<p>at the workplace.</p> <p>The entrepreneur set up a project called "WD Research Collaboration". It was the project proposed from the entrepreneurs, to encourage the co-operative education students to conduct the research as their final projects, in order to complete their degrees. The co-operative education students would get the research topics from the entrepreneurs and came to conduct the research at the workplace.</p>

**Table 5.4** (Continued)

Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education					
Universities	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
Suranaree University of Technology			<p>of what they had learned from the university since they could apply it when they worked at the workplace.</p> <p><b>3. Entrepreneur</b></p> <p>3.1 In determining the visions, objectives, missions, and goals, Western Digital Thailand Company Limited, focused on its philosophy, “Smart Learners, Smart Thinkers, Smart Life-Long Learners”. The start of co-operative education operation of the company was in form of research cooperation with the university. The co-operative education was officially implemented in 2008.</p>		<p>The management innovation of the entrepreneur could be evaluated from the cooperative network for co-operative education that they had with foreign partners. In some other countries, the operation of co-operative education was different than that in Thailand because the students could go for the practicum more than one time at the workplace and also the foreign entrepreneurs would</p>

**Table 5.4** (Continued)

Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education					
Universities	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
Suranaree University of Technology			<p>3.2 Planning for co-operative education operation: HR department was responsible for recruiting co-operative education students. The strategic plan was developed earlier for the recruitment. This policy led to the successful result of the co-operative education operation.</p> <p>3.3 Roles and responsibilities of staff mentors: the company usually provided trainings for staff mentors beforehand to ensure their quality and ability to supervise the co-operative education students. Their roles were to provide supervision, suggestions, and solution to co-operative education students.</p>		<p>attempt to maintain themselves at world standard level.</p> <p>Knowledge Management: KM was conducted from the results of students' project.</p>

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Walailak University</b>	Walailak University started co-operative education right at the time when the university was established in 1998. Earlier than the Office of Higher Education Commission was aware of the benefits of co-operative education.	The university received the government budget in form of Block Grand system. It organized the Co-operative education and Professional Development Center to provide one stop service for all co-operative education related affairs to related business parties.	<b>1. University</b> 1.1 In determining the visions, objectives, missions, and goals: the university had the aims to develop the instructional design and curriculum, to provide preparation for students, to develop students' knowledge and self-awareness, through real life experience, to produce the graduates with the characteristics that were required by national and regional labor markets, and to promote the research and human resource development collaboration with entrepreneurs both from national and international, public and private sectors.	University began the co-operative education right at the time when the university was established in 1998. The co-operative education was included in the university management plan. The university policy regarding co-operative education instruction, the operational plan, and manpower plan was supposed to be vivid. The university leaders must take part in the process of operation, so that they could learn the difficulties	Walailak University formed an extended instruction of co-operative education by incorporating Active Learning. Co-operative education led to an increase rate of graduates being employed. That could be an indicator to guarantee the quality of the university as the same level as national leading universities. The quality of co-operative education of the university could be

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Walailak University</b>	Therefore whether or not the government changed, there would be no effect with the effectiveness of co-operative education operation.	The center facilitated well management of the university finance. . Disbursement of the budget must be a written project proposed to request for a budget. If the government budget was not sufficient, the university would cover those missing amount.	The university identity was as the statement, “Producing an intellectual, a practitioner, a hard worker, an artist, and moralist.” 1.2 Planning for co-operative education operation: Planning for co-operative education operation started when the university established Co-operative education and Professional Development Center. The center would disseminate the information to throughout the instructors from all 33 curriculum. The center developed the strategic co-operative education plan in consistent with the university plan.	or barriers that might occurred. Also, instructors must truly understand co-operative education and determine to work on it. Therefore, it could be concluded that leadership factors had an impact to the effectiveness of co-operative education operation.	evaluated by its management innovations as the university sent out more co-operative education students to have their practicum abroad, There were 30-40 co-operative education students in the present year. The number included both outgoing co-operative education students abroad, and international incoming co-operative education students.

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Walailak University</b>	For Betagro Public Company Limited, since the government policy in supporting co-operative education was unobvious. Change of government had no influence towards the effectiveness of co-operative education operation.	This indicated that the university gave full support to co-operative education. Therefore, financial factors were important to the effectiveness of co-operative education operation. The university gave full support to co-operative education	The co-operative education operation plan would regularly reviewed. The core operational plan remained the same. There would be annual reviews for the action plans and ad-hoc plans of the 33 curriculum. <b>1.University (Continued)</b> 1.3 Roles and responsibilities of coordinators and supervisors: the coordinators and supervisors were responsible for giving advices and consultancy on the student's position selection. They also provided an orientation for co-operative education students before the students entered co-operative education, and evaluate the co-operative education students'	For Betagro Public Company Limited, the company management created a clear policy for co-operative education operation. Therefore, leadership factors were truly affected the effectiveness of co-operative education operation.	Currently, the university became a Host University for co-operative education of foreign students since it had cooperative agreements that were signed off with foreign universities in Australia, Malaysia, South Africa, and Cambodia. The university also sent out Thai co-operative education students to have co-operative education abroad as well.  Betagro Public Company Limited

**Table 5.4** (Continued)

Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education					
Universities	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Walailak University</b>		operation. Therefore, financial factors were important to the effectiveness of co-operative education operation. Betagro Public Company Limited allocated the annual budget for co-operative education operation. The cost was compared with	performance after they finished co-operative education. <b>2. Students</b> 2.1 Co-operative education students would receive a contact and the information from the entrepreneur to make an appointment for a register to start their work. 2.2 Co-operative education and Students' Assignments: the entrepreneurs prepared the projects and positions that were direct to their fields of study, for co-operative education students. 2.3 Knowledge of Engineering: before co-operative education, the co-operative education students still didn't fully understand the knowledge they learned		extended co-operative education in terms of a set-up of a project called, "University Alliances or University Relationship". The company always improved the operation of co-operative education. Another project of the company was called "Betagro Gen Plus", with the aim to provide a stage for co-operative education students to express and exchange their knowledge and experience from co-

**Table 5.4** (Continued)

Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education					
Universities	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
Walailak University		the benefit returned from the completed project of the co-operative education students. It was well worth.	from the university but after co-operative education, they gained insightfulness of that knowledge since they could apply it when they worked at the workplace.		operative education, between the co-operative education students from different universities. Co-operative education also gave them an opportunity to learn working contexts through firsthand experience of working at the workplace, in order to pave the way for them in selecting a right choice of work for themselves in the future.
		Therefore, financial factors had direct influence towards the effectiveness of co-operative education operation.	<p><b>3. Entrepreneur</b></p> <p>3.1 In determining the visions, objectives, missions, and goals: Betagro Public Company Limited focused all of them under the basis of development of human resources skills. The company accepted co-operative education students to conduct the company projects and to improve the business. Additionally, it provided the training course for staff mentors as to give them the career path for a promotion to become a leaders</p> <p>3.2 Planning for co-operative education operation: HR department would take</p>		<p>The quality of co-operative education operation of the entrepreneurs could be measured from its</p>

**Table 5.4** (Continued)

Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education					
Universities	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
Walailak University			<p>responsible for co-operative education student care. Co-operative education was considered as a company process of working. So, the department designed the recruitment plan in accepting co-operative education students. The company also had a policy to increase the number of co-operative education students 1,500 students per year.</p> <p>3.3 Roles and responsibilities of coordinators and supervisors: the staff mentors took responsibility to propose projects to students, and after that to present their completed projects to students from other universities. The staff mentors' basic roles was also to give suggestions and solutions of the problems for students while they were on co-operative education.</p>		<p>management innovation, which was the creation of Employee brand.</p> <p>The company had an effective operational system for co-operative education.</p> <p>It's was trustworthy from the social perspective. It had a process to offer trainings for staff mentors for at least 30 hours according to the requirement outlined by the Department of Skill Development. The development of staff mentors would be constantly carried out based on Constructivism concept.</p>

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Rajamagala University of Technology Thayaburi</b>	The university started co-operative education in form of a pilot project, working with the Office of Higher Education Commission The motivation for them to conduct the project was the budget that the government provided under	At the beginning, the university implemented co-operative education first in Faculty of Engineering. After a while, the operation appeared to be very successful in there, the university decided to develop a policy to continue the co-operative education to all Faculties (100%).	<b>1. University</b> 1.1 In determining the visions, objectives, missions, and goals: the university gave full support to co-operative education, in which the co-operative education students could have an opportunity to develop their skills through real life experience of working at the workplaces. The benefits of co-operative education also included the establishment of good relationship between the university and entrepreneurs. The university emphasized on “Hand-on” experience, as to produce the graduate who would become a good practitioner. 1.2 Planning for co-operative education: the	The leaders should be the key men to move co-operative education forwards. The co-operative education operation was later defined in the university policy in form of Top-down process. The focus was on “Hand-on practitioner”, who had a good leadership, as well as a facilitator to all in making the mission accomplished. At the present time, Bottom up process was more likely to be used for the management of co-operative education	Rajamagala University of Technology Thayaburi extended co-operative education instruction in form of CDIO : (Conceiving-Designing-Implementing-Operating). It focused on producing engineers who had ability to think, design, construct and control systems. The curriculum should contained the following components: 1. Body of professional knowledge and rationales 2. Professional Skills and

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Rajamagala University of Technology Thayaburi</b>	the supervision of the Office of Higher Education Commission. The amount of budget was given as 10,000 per a co-op student to the university. Even though, the government had stopped funding the project already, the university	Therefore, the university organized a project called, “Co-operative education for service to all”. The budget of the Office of co-operative education was annually allocated from the university budget at approximately 80% of students’ tuition fee of the course. Therefore, financial factors	Office of Co-operative education Operation designed the annual instructional 4 year plan for co-operative education operation. Still, the plan was at the management level, not at curriculum level yet. The plan focused on “Hand-on Practitioner”. The graduates would have skills for working. 1.3 Roles and responsibilities of coordinators and supervisors: at each faculty, there would be 1 coordinator who would act in coordinating and combining the list of entrepreneurs for co-operative education students, she/she had to also screen the workplaces for co-operative education students. Supervisors would help in supervising and evaluating co-operative education students.	education. Therefore, leadership factors had direct influence towards the effectiveness of co-operative education operation. The result was also the same for Microchip Technology Thailand Company Limited, which relied on the leaders who would push it forward to the goals. It was ready to give support and cooperate with all members in the organization to promote co-operative education. Therefore, leadership	desired characteristics The quality of co-operative education operation could be measured by the university management innovation as the university had created the policy to produce engineering graduates who would become practitioners, and the new curriculum would include Hand-on course.

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Rajamagala University of Technology Thayaburi</b>	<p>still ran the project under their own expense.</p> <p>The university foresaw the importance of co-operative education. Therefore, political factors had effect towards the effectiveness of co-operative education operation at the</p>	<p>had affected the effectiveness of co-operative education operation.</p> <p>For Microchip Technology Thailand Company Limited, it did not limit the budget for co-operative education operation. This indicated that the company realized the importance of co-operative education and paid very</p>	<p><b>2. Students</b></p> <p>2.1 Co-operative education students would receive a contact and the information from the entrepreneur to make an appointment for a register to start their work.</p> <p>2.2 During co-operative education, co-operative education students would be assigned by staff mentors the project, tasks, and positions that directly related to their areas of study.</p> <p>2.3 Although students had theoretical knowledge on engineering contents at the university before co-operative education, the co-operative education students still didn't fully understand unless they experienced it. After co-operative education, they gained insightful knowledge of what they had</p>	<p>factors had influence towards the effectiveness of co-operative education operation.</p>	<p>For Microchip Technology (Thailand) Company Limited, it extended the co-operative education in form of the collaboration in designing and adjusting the curriculum that was in consistent with the labor market demands, in order that the graduates would have the possibility to get jobs after graduation.</p>

**Table 5.4** (Continued)

Universities	Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education				
	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Rajamagala University of Technology Thayaburi</b>	beginning but after the Office of Higher Education Commission changed the policy, the university still kept running on the co-operative education on their own. So, the political factors had no relationship with the effectiveness of	much attention on it. Therefore financial factors directly affected the co-operative education operation.	<p>learned from the university since they could apply it when they worked at the workplace.</p> <p><b>3.Entrepreneurs</b></p> <p>3.1 In determining the visions, objectives, missions, and goals of co-operative education, Microchip Technology Thailand Company strongly determined to offer an opportunity to Thai youths to have experience of work during co-operative education, in order for them to be ready to their future career work (Early Recruitment).</p> <p>3.2 A short-term plan was to control on students' applications for co-operative education within the timeline set by the university; A medium-term plan was to control on the completion of the co-operative education students from</p>		<p>The quality of co-operative education operation of the entrepreneurs could be evaluated by the management innovations that the entrepreneurs already had. As the entrepreneurs set up an internal system to recruit co-operative education students, staff mentors firstly needed to submit a proposal of co-operative education student requisition to HR department. The proposal must include the information of co-operative</p>

**Table 5.4** (Continued)

Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education					
Universities	Political Factors	Financial Factors	Institutional Factors	Leadership Factors	Management Innovation Factors
<b>Rajamagala University of Technology</b> <b>Thayaburi</b>	co-operative education operation at this stage. For Microchip Technology Thailand Company Limited, its effectiveness of co-operative education operation had no significant relation with the political factors, since the company		co-operative education within the timeline, if they wanted to extend their co-operative education, they were allowed to stay until the new semester was open; A long-term plan was for entrepreneurs to take part in developing or adjusting the curriculum as to produce graduates that met the requirement of the entrepreneurs. 3.3 Roles and responsibilities of staff mentors in operating co-operative education: staff mentors must initiate projects for co-operative education students to complete. After that, the staff mentors would present those project to co-operative education students in other universities. During co-operative education		education students' projects and the calculation of the budget used if the company hired a permanent staff for the project in comparing to the cost that the company needed to pay if the company had co-op students to work for it instead, as a summary of a cost return. calculation of the budget used if the company hired a permanent staff for the project in comparing to the cost that the company needed to pay if the company had co-op students to work for it instead, as a summary of a cost return.

**Table 5.4** (Continued)

<b>Factors Influencing the Effectiveness of the Co-operative Education Operation in Thai Higher Education</b>					
<b>Universities</b>	<b>Political Factors</b>	<b>Financial Factors</b>	<b>Institutional Factors</b>	<b>Leadership Factors</b>	<b>Management Innovation Factors</b>
<b>Rajamagala University of Technology</b>	still kept running on co-operative education		period, the staff mentors had the responsibility to monitor, supervise, and give support to help the co-op students solve the project problems.		
<b>Thayaburi</b>	whether or not the government changed.				

## **CHAPTER 6**

### **CONCLUSION AND RECOMMENDATIONS**

The purposes of this research, entitled the “Effectiveness of Cooperative Education: A Case Study of Higher Education Institutions in Thailand,” were the following: 1) explore the key characteristics of co-operative education conducted in higher education institutions in Thailand; 2) to investigate the procedures of co-operative education employed in higher education institutions in Thailand; 3) to examine the evaluation of the effectiveness of co-operative education undertaken in higher education institutions in Thailand, and 4) to analyze the influential factors affecting the effectiveness of co-operative education of higher education institutions in Thailand. The investigation was basically carried out to survey the results of 5 influential factors: 1) political factors, 2) financial factors, 3) institutional factors, 4) leadership factors and management innovation factors. The data were collected from 3 university samples consisting of Suranaree University of Technology, Walailak University, and Rajamagala University of Technology Thayaburi. The distinctiveness of the co-operative education operation and implementation of those three universities was characterized from an analysis of in-depth interview data elicited from those university administrators, supervisors, and students. In addition to the data from those university stakeholders, interviews were also conducted with relevant parties from the co-operative education network companies of the universities, including Western Digital Thailand Company, Betagro Public Company, and Microchip Technology Thailand Company. The data from Non-Participant Observation and documentary research were also triangulated. In this chapter, the presentation of the information has been organized as follows:

6.1 Conclusion

6.2 Discussion

6.3 Recommendation

## **6.1 Conclusion**

### **6.1.1 The Key Characteristics Of Co-Operative Education Conducted In Higher Education Institutions in Thailand**

In this study, the key characteristics of co-operative education conducted in higher education institutions in Thailand refer to the characteristics of co-operative education found in the three universities—Suranaree University of Technology, Walailak University, and Rajamagala University of Technology Thayaburi—through the perspectives of the university administrators and co-operative supervisors. The results revealed that there were some differences among those three universities concerning the co-operative education concepts and rationales. However, there were still some elements that they had in common, which were the focus on the professional development of the students in the science and technology areas and the objectives of co-operative education, including preparation of the students for professional development, promotion of students' self-awareness to discover their own potential, and the ability to develop themselves at a maximum level in terms of their knowledge of skills through their real life experience in the workplace.

### **6.1.2 The procedure of Co-Operative Education Employed in Higher Education Institutions in Thailand**

In this study, the investigation of the procedure of co-operative education employed in higher education institutions in Thailand refer to the study of the procedures used in operating co-operative education in those three universities through the perspectives of the university administrators and co-operative supervisors. The results revealed that the similarities of those three universities were the 3 stages of co-operative education operation: 1) the pre-co-operative education stage, 2) the stage during the co-operative, and 3) the post co-operative education stage. In each stage, the activities can be described as follows, During the pre-stage, the focus was that the students were required to register for the pre-co-operative education course and also to pass the course. After that, the qualifications of the students would be filtered by the universities. Those qualifications were defined as follows. First, the GPA of an eligible co-operative student had to be not less than 2.00, cumulative up to

the last semester of the coursework study; 2) they had to have passed the basic criteria set by their faculties; and 3) they needed to submit the co-operative education requisition confirmation form with the ranking of 3 expected entrepreneurs; and 4) they had to have attended an examination and interviews with the entrepreneurs. The universities would announce the list of successful candidates and those students in the list had to enroll in co-operative education accordingly. Second was the stage during the students' cooperative education, and here they received the documents necessary for registering to enter the co-operative education in the workplace and then strictly followed the instructions for registration according to the plan. After that the supervisors from the universities would supervise the students at least once during their co-operative education. Third was the post-stage, when after the students had completed their co-operative education, they were required to have an interview with the supervisors from their departments in order to discuss their problems during the co-operative education. The supervisors would provide suggestions for the students to solve those problems or to improve themselves. After correction of the papers, the students would finally submit them to the supervisors and finally present the projects and share their co-operative experience at a seminar when they returned to the university.

### **6.1.3 The Effectiveness of Co-Operative Education Undertaken in Higher Education Institutions in Thailand**

The effectiveness of co-operative education undertaken in higher education institutions in Thailand in this study refer to the quality of the co-operative education students, the quality of the three co-operative education universities, and the quality of the three co-operative education entrepreneurs through the views of the university administrators, co-operative supervisors, co-operative students, management from entrepreneurs, and staff mentors that were in charge of supervising the co-operative students from those three universities and the three entrepreneurs—Western Digital Thailand Company, Betagro Public Company, and Microchip Technology Thailand Company (the universities' partner companies in the co-operative education networks). The results indicated the following.

The quality of the students could be evaluated from their working experience after their co-operative education. It was revealed that the co-operative students gained a lot of experience from their co-operative education and the students' work and projects were appropriately assigned by the staff mentors, based on the consideration of the students' areas of expertise and their field of their study such as model drawing, etc. The co-operative students were treated like a regular staff member in the workplace. The students' co-operative education projects were unusually designed in order to solve the problems found to exist in the companies. It was considered a good benefit return for the entrepreneurs since they could reduce their cost of investment and it was also an advantage for the students in terms of their opportunity or potentiality to get jobs after their graduation. Before the students participated in co-operative education, their qualifications had to be screened first. They would be eligible if their GPA was above 2.00. However, if their GPA was lower than that but still not lower than 1.90, the supervisors would consider them on a case-by-case basis. In contrast, the entrepreneurs did not take the GPAs as a part of their consideration in recruiting the co-operative students, since, for them, the GPAs could not really reflect the quality of the students. They rather considered the quality of the students from their work performance instead. Regarding the skills that the co-operative students gained from their co-operative education, they consisted of work preparation skills, language skills, responsibility skills, self-discipline skills, self-adjustment skills, and problem-solving skills. Those skills were considered indicators of the quality of the co-operative students. As clearly seen, the co-operative students improved almost all of those skills after their co-operative education. There were only some limitations, such as language problems, that remained as the students' difficulty while communicating with colleagues; however, this problem was finally been solved by using body gestures and hand writing substituting for oral communication.

In terms of the quality of the universities, the indicator was the quality of the instructors, considered based on the criteria set by the Office of Higher Education Commission, which included the requirement for the instructors to conduct research and publish it internationally, as well as to keep updating the instructional paradigms of the courses that they were teaching and apply them in their pedagogy. The instructors had to have graduated in the direct fields of study because engineering is a

specific field requiring specialists to teach such as the instructors from Electrical Engineering, Computer Engineering, Mechanical Engineering, Chemical Engineering, and so on. Another indicator of the quality of the universities was the quality of the curriculum. The curriculum of those universities had been updated and developed constantly in accordance with Thai Qualifications Framework, TQF, the Engineering Licensure, and other standards defined by the Office of Higher Education Commission. In developing the curriculum, entrepreneurs should be invited to take part in order to help design it according to the requirements of the labor market. They agreed to add more practical courses and designed the project work of the fourth-year students to be the same projects as those for co-operative education in order to allow the students to have more opportunity to learn more deeply about it. The plan for co-operative education could be in any semester and was not limited to only the second semester of the third year any longer. Regarding the co-operative procedures and duration, the students were required to enroll in a pre-co-operative education course of for hours, for 1 credit as a prerequisite. The course would provide information regarding general labor law, work and safety, and so on. In terms of co-operative operation, the Office of Co-operative Education and Professional Development was established by each university in order to take full responsibility for all co-operative education-related affairs. The university had the policy to enforce all curricula to join in the Co-operative Education Project. The Office of Co-operative Education and Professional Development would provide co-operative students with the necessary preparation before their co-operative education. During their co-operative education, co-operative supervisors would visit the students at least once in order to see how the students were living, suggest them in doing their reports, and discuss with staff mentors about the performance and the behaviors of those students. The projects usually were assigned and presented as individual work or pair work. The universities conducted co-operative education operation successfully by starting with the engineering faculty, which had had established an internal organization to take care of all co-operative education-related affairs. After the success of the implantation in the Faculty of Engineering, the university launched the policy to enforce all departments to embed co-operative education in their curriculum (100%) and established an organization to take care of the business for the whole university. However, since the

Faculty of Engineering still had its own co-operative education organization, the university co-operative education organization could not be fully functional as some tasks were redundant. This conflict implies a drawback regarding the establishment of co-operative coordination organization at the faculty level, especially if it was escalated later to a larger level. In terms of coordination between the supervisors and staff mentors, the supervisors would contact the staff mentors in advance in order to arrange appointments before visiting the co-operative students and would form a committee to grade the students' presentations. In terms academic coordination, the supervisors and the staff mentors might join hands in conducting research projects and working together to solve the students' problems during the co-operative operation, such as placing or assigning the co-operative students in the right jobs or departments that were directly related to their fields of study. In order to avoid a problem with the assignments or the positions that were irrelevant to the students' fields of study, the universities sorted out the problem by making a written memorandum of understanding with the entrepreneurs to ensure mutual understanding before the students began their co-operative education. In terms of knowledge and experience sharing between the universities and the entrepreneurs, there was collaboration between both parties which came out in the form of research collaboration and support. For example, the universities offered special rates for the calibration of the company tools, and the entrepreneurs also offered the opportunity for university staff to join their new technology training so that the staff could gain new knowledge and apply it in their instruction and research conduct. Finally, the collaboration was officially signed off in a memorandum of understanding between the universities and entrepreneurs.

In terms of the quality of the entrepreneurs, the indicators of high quality included the pre-service training provided for the co-operative students at the beginning of their entrance, such as training on basic knowledge about industrial behaviors, international standard system ISO/TS16949, the Health, Safety, and Environment Management System, Presentation Skills, Organizational Enhancement of Production, etc. Regarding the co-operative education operation, the procedure began with staff mentors first submitting a student trainee requisition as a proposal to the HR department. After that, HR would proceed with recruiting the students.

Initially, the applications would be filtered according to the company criteria. If the number of eligible candidates was not enough, the HR department would propose the vacancies to the universities again for another job announcement. The evaluation of the co-operative students' performance would be conducted twice, 1) by the university, and 2) by the entrepreneurs, as the students had to present their project to the committee that was comprised of the supervisors from the universities, the work supervisors, and others relevant members. The business size and duration of co-operative education could be other indicators of the entrepreneur's quality. Large business usually had a policy and a budget to support the co-operative operation. The company policy was not just a written one "on the shelf" but it was the company's actual code of conduct and practice. According to the policy, the recruitment plan was developed in advance. Considering the duration of the co-operative education, the longer it was, the better the entrepreneurs understood the co-operative education operation. The co-operative education returned benefits to all three parties, the universities, the co-operative students, and the entrepreneurs. Considering the budget provision, it was mostly from the government annual budget and some of the amount was from the company budget allocation. The total amount was actually not much compared to the benefit return from the co-operative students.

#### **6.1.4 The Influential Factors Affecting the Effectiveness of The Co-Operative Education of Higher Education Institutions in Thailand**

There were 5 influential factors affecting the effectiveness of the co-operative education of higher education institutions in Thailand: 1) political factors, 2) financial factors, 3) institutional factors, 4) leadership factors, and 5) management innovation factors. Those factors were elicited from the analysis of the interview data conducted with the university administrators, the co-operative supervisors, and the co-operative students from Suranaree University of Technology, Walailak University, and Rajamagala University of Technology Thayaburi. Additional data were also collected from the interview conducted with the company management and co-operative staff mentors from Western Digital Thailand Company, Betagro Public Company, and Microchip Technology Thailand Company (the universities' partner companies in the co-operative education networks). The results revealed the following.

The political factors had no influence on the effectiveness of the co-operative education operation. The findings strongly supported this as Suranaree University of Technology and Walailak University had conducted co-operative education operation for quite a long time already, at the same time as the universities were established, and that was considered long before the Office of Higher Education Commission began to work on it. Therefore, those two pioneer universities later became Thai model universities on co-operative education. For Rajamagala University of Technology Thayaburi, the political factors relatively affected its effectiveness of co-operative education operation at the beginning only when it had received government budget support from the Office of Higher Education Commission at approximately 10,000 THB per student. However, after the government support was abolished, the university still ran the co-operative education on its own. This later stage showed that no more political factors affected the effectiveness of its co-operative education operation.

Considering the effect on the entrepreneurs, political factors also had no influence on the effectiveness of their co-operative education operation because the government had not really taken serious action in supporting co-operative education in the private sector before. Whether or not the government changed, the entrepreneurs would run their co-operative education. Regarding the investigation of the financial factors' effect on the co-operative education operation of Suranaree University of Technology, Walailak University, and Rajamagala University of Technology Thayaburi, it was found that the universities conducted co-operative education since they started the business. At that time they received the government budget through the Block Grant system, under the management of the university Co-operative Education and Professional Development Center, as a single stop service for co-operative education affairs. The center helped run the co-operative financial system effectively. Disbursement of the budget could be done in the form of a budget requisition proposal as well as a written financial report each quarter of the year. If the budget was insufficient, the universities would cover that missing amount by themselves. Slightly difference of the effect of financial factors towards the effectiveness of co-operative education operation found from Rajamagala University of Technology Thayaburi. Rajamagala University began its co-operative education

pilot project in the Faculty of Engineering. Therefore, the faculty set up an internal organization to take responsibility for co-operative education-related affairs. After the success of the co-operative education operation in the pilot study with the Faculty of Engineering, the university had a policy to roll out co-operative education to all curricula (100%). According to the policy, it was necessary to have a university co-operative education office organized to serve all of the departments. However, the university Co-operative Education Office still could not fully function across the departments since one of them had its own Co-operative Education Organization such as the Faculty of Engineering. The responsibilities of the two co-operative education offices from the university and the faculty were duplicated. The problem appeared to be a drawback for the co-operative education operation, which started on a smaller scale and was developed to a larger scale. Considering the budget of the co-operative education, most of it was from the university's annual allocation, which was worth 80% of the tuition of the co-operative education, and the university co-operative education fund. The faculty would get a 2,500 THB budget for the supervision of one co-operative student, which was considered a very little amount.

For the entrepreneurs that had joined the project with the university, the financial factors really had an influence on the effectiveness of the co-operative education operation since it allocated the budget to support co-operative education every year. Nevertheless, when comparing the amount of the budget and the benefits returned, it was worthwhile.

In terms of institutional factors, the universities defined their own visions, objectives, missions, and goals for co-operative education operation, which involved co-operative students' preparation and development, and an opportunity provided for both public and private sectors to take part in the co-operative education operation and curriculum and professional development in accordance with local and international labor market demands. In planning for the co-operative education operation, the universities set up co-operative education as a compulsory course embedded in all of the curricula of all the bachelor degree programs. The Co-operative Education and Professional Development centers were the organizations responsible for developing the university strategic plans. They were designed in a series of short-term, medium-term, and long-term running programs consistent with

the main plan of the university and consisted of two types: an annual plan and a 5-year plan. All business related to co-operative education affairs would be under the working scope of the centers. Regarding the roles and responsibilities of the co-operative supervisors of those 3 universities, they were assigned to provide consultancy to students in selecting their positions in the co-operative education, as well as to provide an co-operative education orientation before the co-operative education, on-site supervision during the co-operative education, and evaluation of the students' performance after the co-operative education.

Regarding the information that the co-operative students received from the entrepreneurs, the entrepreneurs would arrange appointments with the co-operative students for registering to begin the work. They were provided information about the time, date, and locations of the registration, including the benefits given to them by the company, so that the students could have some time to prepare themselves in advance. Regarding the assignments and positions of the co-operative students, the entrepreneurs provided all of these for them as a project, and assignments based on the consideration of the direct connection with their fields of study. Regarding their engineering knowledge and understanding, the students still had doubts about the content knowledge of engineering that they had learned from the university before their co-operative education, but after the co-operative education, the students gained a much deeper understanding of that content knowledge through their firsthand experience in the workplace.

Regarding the institutional factors in terms of visions, objectives, missions, and goals for co-operative education operation, the results revealed that the entrepreneurs placed their focus on offering an opportunity to co-operative students for them to have firsthand professional experience and to promote research collaboration on professional skill development through the projects that they assigned to the students. The projects were basically designed for solving the existing problems found in the companies. Additionally, the entrepreneurs emphasized the development of staff mentors with the belief that all of the staff members trained would have a career path ahead to become a good leader. In planning for the co-operative education operation, the entrepreneurs assigned the HR department to be in charge of the co-operative student care. The department had developed a strategic

plan for recruiting co-operative students. In defining the scope and responsibilities of the staff mentors, the staff mentors were assigned to submit a proposal for the project work before the students' co-operative education and to present it to the university students after their co-operative education. The staff mentors were responsible for supervising and giving consultancy and support to students, and helping them to solve the problems that they confronted.

In terms of leadership factors, the universities focused on the clarity of the policy defined for the co-operative education. It was a top-down process. The instructors were supposed to be clearly informed about the co-operative education operation when the university accepted them to join the team. It was necessary to explain to them that the co-operative education was a part of the curriculum so that they could absorb it over time. One major characteristic of good leadership was flexibility. The leaders not only had to give commands to subordinates but they also had to provide support and facilities to all of them so as to achieve the goals. The process of the leadership work then was more likely to become bottom-up rather than top-down.

The leadership factors of the entrepreneurs in conducting the co-operative education were seen in the clear company policy defined by the management of each company. The management team put effort into moving the co-operative education forward so as to meet the goals and they were willing to help the organizations and staff achieve better awareness of the benefits of the co-operative that could be returned to the three parties, the universities, students, and entrepreneurs.

In terms of management innovation factors, the university had extended its co-operative education to other forms of instructional innovation, for example, the development of the first new curriculum for the master and doctoral programs in co-operative education in the world, the integration of active learning, and CDIO (Conceiving-Designing-Implementing-Operating) in order to produce engineers that were skillful in thinking, designing, developing, and controlling operational systems. In terms of the quality of the co-operative education of the universities, it could be measured by the university management innovation, which was considered based on the increasing rate of the co-operative students that were sent out to engage in co-operative education abroad in each year. International co-operative education had a

limitation on the budget because it was quite a huge expense for an internship abroad. The universities solved this problem by organizing co-operative international funding as a university management innovation.

The management innovation factors of the entrepreneurs were found as the entrepreneurs contacted engineering instructors from the universities to join the company research projects and they provided funding for those projects as well. One example of the entrepreneurs' management innovation was a project called "University Alliances or University Relationship." The project was constantly developed and the entrepreneurs had an opportunity to join with the universities in developing and updating the curriculum to be aligned with the labor market demands. The co-operative students also had a privilege to be able to work right after they graduated because they needed not to know how to start working anymore. The quality of the co-operative education of the entrepreneurs could be evaluated according to their management innovations such as the collaboration with foreign co-operative education companies, the plan to maintain co-operative education operations for the long term, and the knowledge management from the co-operative students' projects, new projects to support co-operative education like that of the University Alliances Project, and so on. It was obvious that they consistently improved and developed their co-operative education operation by creating innovations. For the staff mentors, if they wanted the co-operative students to join their team, they would have to submit a student requisition form to the HR department in advance together with an attachment of potential project information for the work that they wanted the students to do, such as the type of work, the budget they would have to use for running the projects, and the calculation of the cost return.

In summary of the present study, the findings revealed the effectiveness of the concepts and policy of co-operative education as it offered benefits to the three parties: the students, universities, and entrepreneurs. Therefore, the public organization, here referred to the Office of Higher Education Commission, which was in charge of the co-operative education, should fully provide support and take serious steps to promote co-operative education more widely in Thai higher education institutions.

## 6.2 Discussion

### 6.2.1 The Key Characteristics Of Co-Operative Education Conducted in Higher Education Institutions in Thailand

The concept and principles of co-operative education perceived by those three universities had some differences; however, still there were some similarities found, which were the focus on professional development of the students in the science and technology areas and the objectives of the co-operative education, including preparation of the students for professional development, promotion of their self-awareness to discover their own potential, and the ability to develop themselves at a maximum level in terms of their knowledge of skills through their real life experience of the workplace.

The objectives defined above by those three universities were congruent with the objectives of co-operative education defined by the Office of Higher Education Commission (2013: 11), which included the following: 1) developing satisfactory characteristics of graduates and their competence directly related to the labor market demands 2) escalating the collaboration between universities and entrepreneurs in order to develop the curriculum in accordance with the labor market; increasing the competitive capability in world competition; and 3) promoting a strong network of the co-operative education as a mechanism to mobilize the co-operative education policy, as well as encourage resource and knowledge sharing between universities and entrepreneurs. Therefore, the co-operative education of the three universities followed the same direction of the Office of Higher Education Commission.

With regard to the procedures of the co-operative education operation employed in Thai higher education institutions, these refer to the procedures of the co-operative education operation of those three universities. The findings revealed similarities of the co-operative operational procedures among the universities in the following three stages: 1) the pre-co-operative education stage, 2) the stage during the co-operative education, and 3) the post co-operative education stage. The details of each stage can be described as follows. First was the pre co-operative education stage: the focus of this stage was on the preparation of the co-operative students. The students needed to register and pass the pre co-operative education course as a

prerequisite. After that the university would screen the students' qualifications based on the requirements of a GPA of at least 2.00 or above, cumulative until the last semester of the coursework. The eligible students were also required to pass all compulsory courses or academic criteria set by their departments. Finally, the students would have to submit a confirmation form to participate in the co-operative education. The list of expected entrepreneurs would be enclosed with the ranking of their three selected choices. After screening the qualifications and proceeding with the documentation, the students would again have interviews with the entrepreneurs. The universities would later announce the results of the recruitment and it was an obligation for the students on the list to go for the co-operative education. Second was the stage during the students' co-operative education stage. This is when the co-operative students would receive the document for their entrance registration. When it was time to start the work, the co-operative students had to strictly follow the instructions. During the co-operative education, supervisors would visit the co-operative students at least once. Third was the post-co-operative education stage: after the co-operative education period came to an end, the co-operative students were required to have interviews with the supervisors at their faculties in order to discuss the problems found during their co-operative education and the supervisors would provide suggestions and solutions for the students. Then, the students would have a chance to develop themselves and submit a written report. After that the students would have to present their projects and share the work experience that they had gained during their co-operative education with their colleagues in a seminar. This was congruent with the co-operative education operation of Swinburne University of Technology. It was the first university in Australia that had run co-operative education for over 50 years. Its co-operative education curriculum was constantly developed and improved under the management of a co-operative coordination agency, the Industry Liaison Office. For the preparation of the co-operative students of the university before their co-operative education, the co-operative education manager from each department would provide a pre-training service for the co-operative students on various topics, such as writing application letters and preparation for job interviews. Other additional trainings would be provided by the Professional Service Office of the university and offered to all students in the

universities. The provision of an entrepreneur list for co-operative education and the supervision plan would be organized by co-operative education managers. The managers from each department worked together with the co-operative supervisors in order to select appropriate jobs and workplaces so as to create a job list for the co-operative students. The supervisors would be responsible for the students on their list of entrepreneurs. The nature of the jobs or assignments for the co-operative students would be designed by cooperative work between the supervisors and staff mentors. Those assignments originated from the existing industrial problems found in the workplace. Additionally, the co-operative students would be provided with an opportunity to learn the whole image of the business organization, as well as write journals every day. For the evaluation of the students' performance, the co-operative students had to accept and follow the criteria set by the supervisors and the staff mentors. A complete report of the projects from both during or after the students' co-operative education should be submitted and presented by those students within the timeline (Office of Higher Education Commission, 2008: 7-8).

### **6.2.2 The Effectiveness of Co-Operative Education Undertaken in Higher Education Institutions in Thailand**

The quality of the co-operative students could be measured according to the work experience that the students gained from their co-operative education. Most co-operative students revealed that they had gained a lot of experience from their co-operative education. Moreover, the staff mentors assigned them with appropriate tasks that were directly related to their fields of study or their areas of interest such as model drawing, etc. The staff mentors also treated the co-operative students like regular staff. The entrepreneurs created project work from which they could learn, and in doing the projects, the co-operative students were always able to solve the problems of the companies and it was good for the companies in terms of their cost reduction. In return, the co-operative students also received a benefit in terms of the opportunity to get a job offered by the companies after their graduation. Chapman (2009) stated that the best benefit of co-operative education for the students was the privilege that they got from the companies, since they would be a priority to get jobs because of their past experience from co-operative education with the companies.

There was a very high tendency for the co-operative students to get jobs after their graduation. As can be seen, 95% of vacancies were offered to the students when they were about to finish their co-operative education. Regarding the criteria for eligible co-operative students, they were set with the requirement of a GPA of at least 2.00 above. However, in a special case, if the GPA did not reach 2.00 but was not less than 1.90, the supervisors would consider the student on a case-by-case basis. For entrepreneurs, students' GPAs had no relation with the recruitment and it did not reflect the quality of the students. Instead, their performance at work was more likely the indicator of the student's quality. This is in contrast with the results of Burton's study (2000). He carried out a study with engineering students from the summer semesters of 1993 and 1994 at Clemson University. Equal sample groups between co-operative students ( $N = 190$ ) and non-co-operative students ( $N = 193$ ) were drawn in order to measure their academic achievement using the GPAs of the first-year students and their grades in a compulsory course for freshman in the engineering department. The output was their cumulative GPAs and their grades in their engineering major and specific classes for the sophomore, junior, and senior years. After using analysis of covariance (ANCOVA) to calculate the means, the results indicated that co-op students had a statistically-higher mean GPA than the non-co-operative students at the .05 level of significance. Co-operative education was able to cultivate several work skills on the part of the students, i.e. preparation skills, language skills, responsibility skills, self-discipline skills, self-adjustment skills, problem solving skills, etc. Those skills could represent the quality of the students. The results showed that most of co-operative students could improve themselves in almost all skills except the language skill. Still, they could solve the problems by using body gestures and written language instead.

In terms of the quality of the universities, it could be measured through the quality of its instructors based on the instruction criteria set by the Office of Higher Education Commission, and international research publications, as well as study visits to similar courses that they had been teaching in order to apply the knowledge to their own classes. The instructors should graduate in the fields directly related to their study because engineering is a specific science that requires specialists that are knowledgeable in its sub-fields such as electrical engineering, computer engineering,

mechanical engineering, chemical engineering, and so on. In terms of curriculum development and adjustment, it should be conducted under the Thai Qualifications Framework, the procedure of engineering licensure, and the Office of Higher Education Commission. Entrepreneurs should take part in developing and adjusting the curriculum in accordance with the labor market demands. More practical courses should be added and the course project of the fourth year should correspond to those projects in their co-operative education in order for the students to get a better understanding of what they had already begun. Regarding the co-operative education semesters, with no more limitations, the students should be able to register during any semester that they wanted to. For an appropriate design of the procedures and duration of the co-operative education, the students were required to enroll in the pre co-operative education course for 1 credit for 30 hours in advance. The contents of the course included knowledge about labor laws, work safety, etc. In terms of co-operative management, the university co-operative education and professional development center took full responsibility for the co-operative education operation. The center developed a policy to force all departments to join the co-operative education project and the center would provide preparation of the students before their co-operative education. During the co-operative education, the supervisors visit the co-operative students at least once in order to check how the students were living and to give suggestions to them about the report as well as to discuss with staff mentors about the co-operative students and their projects. After their co-operative education, the students would present their projects in pairs or individually. From the findings, it was discovered that some universities successfully operated their co-operative education project since they started their co-operative education program with the Faculty of Engineering. The faculty would set up an organization to be in charge of co-operative-related affairs. After the success of the co-operative education implemented in the Faculty of Engineering, and the universities realized its importance, they promoted it through the establishment of co-operative education in all curricula at 100%. They also set up a university co-operative education organization to support the co-operative education operation. However, there was a limitation: the organization could not work with all faculties because the Faculty of Engineering still had its own organization working in the same kind of jobs. The work

seemed to be redundant. This problem reflected a weakness of the co-operative education that was begun from a small scale and later expanded to a larger scale. For the cooperation between supervisors and staff mentors, the supervisors would contact the staff mentors to make an appointment for a student visit. The time and date would be arranged. They would also join the entrepreneurs as one of the committee members to give the score for the students' project presentation. Academically, the supervisors and the staff mentors would join hands in conducting the research work. Sometimes they worked together to sort out the students' problems such as the case where the students worked in the departments that had no project to be assigned; the supervisors and staff mentors would agree to transfer the students right away to other departments where they could do the project work and this problem was finally solved. Another problem found was that there only 10% of the co-operative students had been assigned to the project work of the entrepreneurs. This problem was solved by using a written memorandum of understanding between the universities and the entrepreneurs before the co-operative education took place. In exchanging and sharing information between the universities and the entrepreneurs, both parties worked together in conducting research and also the universities provided the service of industrial tool calibration for the entrepreneurs with special rates charged. This collaboration included trainings offered by the entrepreneurs for the university instructors to join. With those trainings, the instructors could increase their knowledge and learn new technology for integration in classroom teaching and research, resulting in a written agreement in the form of a memorandum of understanding between the universities and the entrepreneurs. The operation of the co-operative education in Thai higher education institutions appeared to be consistent with the operation of the co-operative education of the University of Waterloo (2005) it also had a co-operative education coordination center which was called Co-operative Education & Career Services. The pre-stage of the operation before the co-operative education was that the staff from CECS would act in providing consultancy about work and professions, and about personality development, in the form of seminars on several topics such as writing job application letters, job interview skills, etc. In terms of the selection of entrepreneurs to join the networks and the supervision provided for the students, field co-operative coordinators would collect the list of appropriate entrepreneurs and manage the

supervision of the co-operative students in the areas that they took responsibility for, under the supervision of the supervisors from each department. The characteristics of the assignments by the entrepreneurs to the students would be a kind of project work, with clear goals set, in order to be convenient to track them. There were meetings to follow the progress and to monitor the operation to ensure that the tasks were accomplished. For the students' performance evaluation, it was divided into 2 steps: 1) midterm evaluation through the review of the students' performance and in this step the students could have a chance to improve themselves; and 2) the official evaluation after the end of the co-operative education.

In terms of the quality of the entrepreneurs, it could be measured by the training that the entrepreneurs provided for the co-operative students at the beginning of their work, such as training on the basic knowledge of industrial behavior, international standard of ISO/TS16949, management systems on health and safety and working environment in the workplace, presentation techniques, activities to increase the company's productivity, and so on. In terms of the procedure of the co-operative education operation of the entrepreneurs, staff mentors would initially propose project work to the HR departments of the companies. After that HR department would proceed with recruiting the co-operative students. The HR department would first review the CVs of the applicants. If the number of eligible students was not enough, the HR department would send a request attached with the details of the positions to the universities for the universities to publish an announcement of the job application, or a request to the universities to propose the jobs that the co-operative students required. The evaluation of the procedure would take place in two steps: 1) the judgment of the universities; and 2) the students' presentation of their projects to the committee panel, including co-operative supervisors, staff mentors, and work supervisors. This result was consistent with the study conducted by Manida and Pat (2016), as they said that problem-based learning refers to learning that occurs from problem solving while dealing with projects. Its characteristics are defined differently by groups of experts. Basically, the interpretation of the PBL characteristics contain the following: 1) the complexity of the situation found in real life contexts; 2) collaborative work in groups; 3) new information and knowledge gained by the learners themselves; 4) a shift of the teachers' role from a lecturer to a facilitator; and

5) the tendency that the learners would be able to use the information from problem solving as a way to lead them to self-development and maintenance of their ability. In terms of the business size and duration of the co-operative education, it could be evaluated according to the policy made for the co-operative education operation. If the business size was large, the policy would be clearly established and the budget also allocated for the co-operative education operation. The policy was an action to take, not just a written guideline. In planning to recruit the co-operative students, the longer time that the entrepreneurs spent on the co-operative education operation, the better would be their understanding of the co-operative operation. The benefits could be returned to those three parties: the universities, the students, and the entrepreneurs. In terms of budget allocation, most entrepreneurs would receive annual budgets from the government or the entrepreneurs' own budget set aside for co-operative education. Its amount was not much compared to the benefit that the entrepreneurs got in return from the students' work.

### **6.2.3 The Influential Factors Affecting the Effectiveness of Co-Operative Education of Higher Education Institutions in Thailand**

There were four factors discovered as the influential factors affecting the effectiveness of co-operative education of higher education institutions in Thailand. They consisted of 1) political factors, 2) financial factors, 3) institutional factors, 4) leadership factors, and 5) management innovation factors. Details are described as follows:

The political factors actually had no effect on the effectiveness of the co-operative education operation of the universities since both Suranaree University of Technology and Walailak University started their co-operative education at the same time as the universities were established. That time was before the time that the Office of Higher Education Commission was aware of the importance of co-operative education. Eventually, both universities became role models of the universities incorporating co-operative education into their curricula. However, for Rajamagala University of Technology Thayaburi, the political factors affected the effectiveness of the co-operative education operation only at the beginning of the co-operative education implementation since it still received budget support for co-operative

education operation from the Office of Higher Education Commission at the amount of 10,000 THB per student. After the Office of Higher Education Commission stopped the support, the university needed to run the program with its own expenses and the political factors had no effect on the effectiveness of its co-operative education since then.

The major reason that the political factors had no influence on the effectiveness of co-operative education operation was that the government seemed to be inactive in providing support to the universities in order for them to maintain the program. Therefore, whether or not the government changed, the universities still continued its co-operative education on their own.

In terms of financial factors, both Suranaree University of Technology and Walailak University had received the government budget in the form of Block grant system, under the management of the Co-operative Education and Professional Development Center. The center was organized to provide service for all co-operative education-related affairs. Thus, the financial management was effectively operated. The allocation of the budget would be done through the proposal made in requesting a budget from the government. A quarterly report would also be presented. If the budget was not enough, the universities would cover that amount. This result agreed with that of Sombat Thamrong-Thanyawong (2003), as he stated that resources were an important factor in the success of pushing the policy into practice, i.e., if any plans or projects had almost all of the factors except resources, those plans and projects would never be accomplished. The failure began since they had not started yet. Brever and DeLeon (1983) stated that the resources needed for putting policy into practice included money for investment, time, human resources, and technological tools. On the other hand, Rajamagala University of Technology Thabakarn. Rajamagala University started its co-operative education pilot project in the Faculty of Engineering. Therefore, the faculty set up an internal organization to take responsibility for co-operative education-related affairs. After the success of the co-operative education operation from the pilot study with the Faculty of Engineering, the university had a policy to roll out co-operative education to all curricula (100%). According to the policy, it was necessary to have a university co-operative education office organized to serve all departments. However, the university co-operative

education office still could not fully function across the departments since one of them had its own co-operative education organization such as the Faculty of Engineering. The responsibilities of the two co-operative education offices from the university and the faculty were duplicated. The problem appeared to be a drawback of the co-operative education operations that started on a smaller scale and was developed to a larger scale. Considering the budget of co-operative education, most of the budget was from the university's annual allocation, which was worth 80% of the tuition of the co-operative education and the university co-operative education fund. The faculty would get a 2,500 THB budget for the supervision of one co-operative student, which was considered a very little amount.

Regarding the financial factors through the perspectives of the entrepreneurs, the results revealed that they could have some influence on the effectiveness of the co-operative education cooperation of the entrepreneurs. The entrepreneurs had allocated the budget for co-operative education operations every year, and the calculation of the amount of the budget was based on the comparison between the expenditure and the benefit returned to them from the projects carried out by co-operative students. The results of the comparison showed that the investment used for co-operative education operation was well worth it.

Institutional factors had an effect on the effectiveness of co-operative education operations. Since the universities had to define their visions, objectives, missions, and goals, all factors had to be included such as co-operative education preparation, the development of co-operative students, and an opportunity provided for collaborative work between public and private sectors in implementing an effective co-operative education network. The development of the curriculum and professional experience were constantly conducted through the teamwork in accordance with the requirements of international and local labor markets. In planning for the co-operative education, the universities had embedded the co-operative education into all curricula of the bachelors' degree programs. This result is congruent with the operation of co-operative education at the University of Water Loo (2005) the co-operative education had been operated for a long time already in the university and a clear policy of the operation had also been developed. The university began its co-operative education in 1957 and its policy had been constantly developed over

time. Its number of co-operative education students was the highest in the world. Then the Co-operative Education and Professional Development Center was organized in order to take responsibility for developing a strategic plan for co-operative education operations. The plans consisted of both short-term plans and long-term plans, consistent with the university 5-year plan. All related co-operative affairs would be operated by the Co-operative Education and Professional Development Center. In terms of roles and responsibilities of the co-operative coordinators and supervisors of those three sample universities, the supervisors would be the ones responsible for providing consultancy in selecting the entrepreneurs and positions for the co-operative students before their co-operative education. They had to visit the co-operative students in order to provide supervision as well as to evaluate the co-operative students' performance. The benefit of a clear policy agrees with the ideas of Berman (1978), who mentioned that the clarity of a policy is the root of the goals of a policy. If the policy was designed together with clear goals and objectives, putting the policy into practice was possible, and it also led to the achievement of the objective called "Turning the Policy into Practice; in other words called "programmed implementation."

In terms of the co-operative students, the information that the co-operative students would receive from the entrepreneurs would begin with an arrangement of appointments with the co-operative students for registering to start the work. They were informed of the time, date and locations for the registration, including the benefits given to them by the company so that the students could have some time to prepare themselves in advance. Regarding the assignments and the positions for the co-operative students, the entrepreneurs had provides all for them with a project and assignments based on the consideration of the direction relation of their work to their fields of study. Regarding engineering knowledge and understanding, the students still had doubt about the content of engineering that they had learned from the university before their co-operative education, but after their co-operative education, the students gained a much deeper understanding of that content knowledge through their firsthand experience in the workplace.

In terms of the entrepreneurs, in defining their visions, objectives, missions, goals, and philosophy of co-operative education, the entrepreneurs would focus on the

wide-open opportunity for the co-operative students to have real life experience in working, as well as research collaboration. The entrepreneurs also emphasized the skill development of its human resources. For the assignment of the co-operative students, they would be given project work that could develop or improve the business organization. The development of staff mentors was conducted in a way that could enable them to be ready for promotion as leaders in the future. For planning on co-operative education operation, the entrepreneurs would assign the HR department to be in charge of recruiting co-operative students in accordance with the defined strategic plan of the co-operative operation. In terms of the roles and responsibilities of staff mentors, they needed to submit a project proposal to the entrepreneurs and then present it to students from other universities. The staff mentors were also in charge of supervising the co-operative students and helped them to solve problems. This is consistent with the previous study of Brever and DeLeon (1983), who talked about the factors that influenced the process of putting policy into practice. The success would depend on the policy clarity and the source of the policy, the support of the policy, the complexity of the management, the motivation of practitioners, and the allocation of resources to support putting the policy into practice.

Regarding the leadership factors, they had a direct influence on the effectiveness of the co-operative education operation of the university. It focused on leadership in terms of the leaders that played an important role in developing an explicit policy for co-operative education so that the operation could be run accordingly and effectively. The process of the co-operative operation was in the form of a top-down process, consistent with the studies conducted by Younis and Davidson (1990), as they noted that the policy taken to be a guideline for practice was a top-down approach. The focus was placed on the policymakers. In other words, it was an approach where the policy was on the top and then was broken down into action. The operational staff would then put it into practice. In terms of instructors, the university should keep them informed about the university co-operative education operation when they were accepted to work at the organization. They needed to understand that co-operative education was a part of each curriculum. Over time, those instructors could gradually get into it. Regarding the characteristics of a good leader, he/she needed to be a person that is flexible and should not always give commands but

instead help his/her subordinates. The subordinates should be allowed to have an opportunity to make decisions on what they were responsible for. For example, the supervisors had the authority to decide whether the students that had obtained GPAs that were lower than 2.00 could participate in co-operative education or not. If the students got above C grades in all core courses of the curriculum, they were possibly permitted to join co-operative education, based on the supervisors' consideration. The supervisors could make a decision by themselves without the approval of the dean, etc. This process rather reflected the bottom-up approach more than the top-down approach, which agreed with the results of the related studies conducted by Younis and Davidson (1990) as they addressed the process of putting policy into practice by using the bottom-up approach, which seemed to be a radical change since it allowed operational staff to make decisions. Therefore, it was an approach that contrasted the traditional approach. This concept paid more attention to the results of the policy from the actions made by the operational staff.

The leadership factors for entrepreneurs also affected the effectiveness of co-operative operations. Generally, the company leaders were the ones that created a clear co-operative education policy. They were the key persons in pushing the co-operative operation forwards to meet its goals and were ready to give support to all members in the organization. They could promote the co-operative education in their organizations to let the staff see its importance and the benefits could be returned to all three parties, the universities, the students, and the entrepreneurs.

In terms of management innovation, it had an effect on the effectiveness of co-operative education since the universities had created many forms of extended co-operative education. For example, the universities developed the first curriculum in the world for co-operative education for master's degree and doctoral programs. The integration of active learning and CDIO would enable the co-operative students to become an engineer with the ability to think, design, build, and control the systems effectively. In terms of the quality of co-operative education operation for the universities, it could be evaluated via management innovation. It was revealed that an increasing number of Thai co-operative students go abroad for international co-operative education each year. The only problem found in the international co-operative education was the budget. Since going abroad meant spending a lot of

money, the university solved the problem by organizing funding for co-operative students that wanted to take international co-operative education operation. It was agreed with the results of the study on the development of management innovations of the Office of National Innovation (2004: 6) that application of the knowledge and management information was required in order to improve the old structure of the curriculum. The form of the management was cooperative working. There was a lot of new information shared in order to elicit new ideas and creativity about the curriculum in order to supply the demand of the customers. Income and profits were always returned to the entrepreneurs. The management innovations had an influence on the effectiveness of co-operative education of the entrepreneurs. The entrepreneurs had designed extended co-operative education; for example, they made contact with supervisors to join the company projects in order to bring about new research topics for entrepreneurs. Therefore, they provided funding to support co-operative education operations, for example in the project called "University Alliances or University Relationship." The cooperation that the universities had with the entrepreneurs was the development or adjustment of the existing curriculum together in order to design it according to the market demand. The students would have more opportunity to get jobs after their graduation. In terms of the quality of the co-operative education operation of the entrepreneurs, it could be measured by the management innovations of the entrepreneurs as they operated co-operative education with international institutions. They used management innovation in terms of planning for co-operative education operation and maintaining it. The entrepreneurs attempted to organize forums for knowledge management from the projects presented by the students. The project "University Alliances or University Relationship" would allow the opportunity for entrepreneurs to constantly improve themselves. If the staff mentors wanted to receive the co-operative students, they had to submit a co-operative students requisition form to the HR department, together with the details of the projects that they would assign to co-operative students. They also had to calculate the costs and the profits that the company would gain or lose if they accepted those co-operative students. The calculation was based on the concept called "cost return." Agreement with the results can be found in a related study conducted by Panu Limmanon (2003:14), as he noted that management innovation lies heavily in the

knowledge about management so as to improve the existing system of the organization. The form of management would be collaborative work with the company staff. The opportunity could promote the staff to share or exchange its ideas or creativity with other staff members in the organization, with an aim to meet the customers' satisfaction and for the end goal to generate the company's income and profits. For example, organizational management could be divided into 2 main characteristic groups: 1) regular supervision, which is the supervision with the regular staff working in the organization under the line; and 2) project supervision, which is the supervision performed through the assigned projects, in other words "The Matrix Organization." It was quite famous in 1970, index for evaluation of organizations' performance.

Moreover, the present study also discovered some additional information beyond the information investigated according to the objectives. This additional information is described as follows.

First, the alumni of the universities were a factor that helped promote co-operative education co-operation. Since it was not easy to find a quality workplace for co-operative students, the universities used alumni networks to help select appropriate workplaces or their connection in receiving the co-operative students to practice in the organizations in which they were working.

Secondly, there were very few universities with effective co-operative education operations, since the administrators of other universities did not realize the benefits or the importance of co-operative education. The instructors were not aware of them either. Another factor was the lack of a budget to support the operations. Operating co-operative education costs a lot for the entrepreneurs, such as the expense of supervision, including accommodation costs, travelling costs, and instructors' allowance costs. If the co-operative students work in a remote area far from the universities, the cost of co-operative operation would be higher. Additional costs would be the training costs allocated for the supervisors where the amount was over 10,000 THB per head, the cost that occurred from the establishment of a co-operative education Center, the hiring costs for staff to work in the center, etc.

Thirdly, the mobilization on the co-operative education of the Office of Higher Education Commission still lacked clear goals and directions. For example, few

students joined international co-operative education although the country had entered the ASEAN Community. The government should promote international co-operative education for Thai co-operative students. Currently, the Office of Higher Education Commission has not yet pushed the attempt to motivate well-known universities such as Chulalongkorn University, Thammasart University, and Kasetsart University to join co-operative education networks. Those universities could be a gear to mobilize co-operative education towards its great success. Moreover, the government has no policy to motivate quality entrepreneurs to join the co-operative education networks yet. There is a gap in that some entrepreneurs still have not accepted co-operative students into their organizations.

### **6.3 Recommendations**

#### **6.3.1 Recommendations for the Public Sector**

1) The government is well aware of the dissemination of co-operative education knowledge in higher education institutions. This knowledge includes the importance of co-operative education, the benefits of co-operative education for the co-operative students, the co-operative university, and the co-operative entrepreneurs, tax reductions and exemptions for entrepreneurs by using the amount spent for co-operative operation, the co-operative projects that co-operative students usually carry out during their co-operative education, and the cost and time reduction for the university in conducting public relations with entrepreneurs on the abovementioned issues.

2) The government should develop policy to force entrepreneurs to join co-operative networks, such as policy defined for the entrepreneurs in industrial estates, or collaborative agreements on co-operative education between the universities and entrepreneurs. Such policy can be a solution to get rid of the entrepreneurs' doubt about co-operative education. Agreements have been made to standardize the designs of the co-operative projects, the benefits given to students, and the students' allowance.

3) The government should have a policy to consistently promote co-operative education in Thai higher education institutions for the benefit of all stakeholders –students, universities, and entrepreneurs.

4) The government should define the standard of Thai education quality so that local and international employers can be satisfied with it. The quality of Thai labor is currently focused on English language skills and co-operative education, so as to escalate Thai education standards to meet international levels.

5) The government should have central funding for co-operative education so that it can help universities with co-operative education reduce their costs such as the allowance of supervisors for student visits and the budget for co-operative students that engaging in co-operative education abroad. The budget can include return airfare, VISA fees, registration fees for international English standard tests such as TOEFL and IELTS, etc.

6) Since the Thailand 4.0 policy emphasizes on science, technology, and innovations, the government should pay more attention to co-operative education so that industrial sectors and entrepreneurs are also aware of its importance.

7) In designing national policy and management, the government should have a clear direction in reforming Thai education and co-operative education should gain more attention. If the government focuses on public government, co-operative education would be a very important variable to trigger education in Thailand.

8) According to the results of the study on university quality, some of the universities have organized their own co-operative education centers but the centers' responsibilities do not cover all co-operative education operations, resulting in difficulties that the Office of Higher Education Commission should take immediate action to solve so that the policy could be moved forwards and work more effectively.

9) The government should have a policy on tax reductions for the entrepreneurs that join co-operative education programs and the universities that work on co-operative education research and development.

### **6.3.2 Recommendations for Universities in Thailand**

1) Universities and faculties should put more effort into motivating instructors to pay attention to co-operative education, as well as to plan to mobilize co-operative education. In managing co-operative education, the universities should provide more effective communication with the faculties and departments and remove co-operative education operational processes that are complex, such as the process in which the students that participate in co-operative education are required to submit documents to the faculties, which takes quite long time before the faculty pass them to the departments, and sometimes the process is delayed and finally the documents were lost, and other such processes.

2) Universities should develop a manual for co-operative education so that the staff can really understand and have a guideline on how to effectively work.

3) In terms of budgeting, universities should allow faculties and departments to be able to be reimbursed for the actual expense that they have used for co-operative education operations, such as accommodation expenses, travelling expenses, allowances, and so on. This would help motivate them to work in the area of co-operative education.

4) Co-operative centers and faculties should filter the workplaces for co-operative students. The positions that entrepreneurs offer should also be sorted out in order to fit the co-operative students with the right jobs on the list.

5) Universities should establish an online system to manage and operate co-operative education. It would be more convenient for all users, including students, universities, and entrepreneurs.

6) Universities should shift their old paradigm to a new one where the students should be offered co-operative education more than during one semester in order for them to have more work experience. Additionally, the universities should promote the English language skills of the students at all levels so as to prepare them to enter a world of competition.

7) Currently, as technology moves quickly, the universities should open new courses on the changing technology in order to support the students in catching up.

8) Universities should award or give honors to staffs or organizations that have exhibited the best practices of co-operative education to promote them with good morale in running co-operative education.

9) Universities should focus more on the students' process of learning by integrating problem-based learning, project-based learning, and problem based solving into their co-operative education learning.

10) Universities should conduct more research on how to put policy into practice more effectively.

### **6.3.3 Recommendations for Further Studies**

1) There should be further study on the quality of co-operative students, the quality of universities, and the quality of entrepreneurs so as to trace the achievement of the students from the universities that have been involved in co-operative education and the entrepreneurs that have joined the university networks. The goals are to lead co-operative students, universities, and entrepreneurs to exhibit the best practice and to meet international standards.

2) There should be a further study on the effectiveness of other forms of instruction such as work integrated learning and work-based learning and so on.

3) There should be a further study on the advantages and disadvantages of co-operative education by comparing the results of the performance of co-operative education universities and that of non-co-operative education. The investigations should cover both short-term and long-term plans, and include all relevant stakeholder—co-operative students, universities, and entrepreneurs.

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## **APPENDICES**

## Appendix A

### Interview Questions

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>1. Cooperative Education Effectiveness</b>					
<b>1.1 Quality of Students</b>					
1. Have the university and the entrepreneur evaluated the students' potential before they will be on their co-op internship?		✓	✓		✓
2. Have the university and the entrepreneur evaluated the students' performance after they finished their co-op internship?		✓	✓		✓
3. To what extent could you solve confronting problems and other problems during the co-op internship?			✓		✓
4. To what extent and what amount did you put your responsibility towards the assigned work?			✓		✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>1.1 Quality of Students</b> (Continued)					
5. What are your reflections in terms of your interpersonal skill, team work skill occurred from the co-op education, and your opinion towards the assigned work?			✓		✓
6. Could you effectively perform your tasks during the co-op internship to achieve the requirement of the entrepreneurs?			✓		✓
7. To what extent did you gain knowledge about how to work, new technology and innovations for work from co-op education?			✓		✓
8. To what extent did your co-op experience help yourself develop behaviors and skills that were beneficial to you in your job search?			✓		✓
9. To what extent did your co-op experience help yourself develop new knowledge that was helpful to you in your job search?			✓		✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>1.1 Quality of Students</b> (Continued)					
10. To what extent did you, from co-op experience, expose yourself to multicultural experiences and diverse cultures, beliefs and/or values?			✓		✓
11. Would you recommend participating in co-op to current students in Engineering major? Why or why not?			✓		
12. Do you have anything else they would like to add to the discussion pertaining to your co-op experiences?			✓		
<b>1.2 Quality of Higher Education</b>					
1. Does your organization have written interagency/organizational agreements (e.g., memoranda of understanding) related to the shared roles, duties, and responsibilities of staff?	✓	✓			

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>1.2 Quality of Higher Education</b> (Continued)					
2. Does your organization have a planning group or coalition? Who serves on the group? How is it decided who will participate? How are the roles and responsibilities of this group defined?	✓	✓			
3. Are your staff knowledgeable about the “Co-op” core components? How do they learn about those concepts?	✓	✓			
4. How committed are your program staff in implementing a co-op?	✓	✓			
5. How confident are you that your organization can implement with students and workplace of the co-op core components? What prompted you to feel this confident? Who shared your level of confidence? Who did not?	✓	✓			
6. Do co-op staff feel they have the knowledge, skills, and tools they need to play their part in their co-op?	✓	✓			

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>1.2 Quality of Higher Education</b> (Continued)					
7. How many years of engineering related work or consulting experience do you have, not including your teaching and academic research?	✓	✓			
8. Do co-op staff feel that there are major barriers or disincentives to getting the work done?	✓	✓			
9. Do co-op staff feel recognized and rewarded for doing their part? Do they know how well they are doing?	✓	✓			
10. How often do co-op staff receive feedback on their performance? What kinds of feedback do they receive? How do they get that feedback?	✓	✓			
11. How does your organization evaluate whether or not your organization is meeting objectives in the co-op control plan? Who evaluates? What data is collected for evaluation?	✓	✓			

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>1.3 Quality of Workplace</b>					
1. What was the title of your co-op position? In general terms, what was your job description?				✓	✓
2. How would you characterize your personal knowledge of or familiarity with co-op, i.e., how programs operate their main purposes, etc.?				✓	✓
3. How many years has your organization employed co-op students?				✓	✓
4. How does university develop the training plan jointly with the workplace?				✓	✓
5. How does the workplace develop the training plan for co-op students?				✓	✓
6. How does additional training (on new technologies, tools, process co-op, etc.) for employees at the workplace?				✓	✓
7. What best describes your management level within the workplace for training co-op students?				✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>1.3 Quality of Workplace</b> (Continued)					
8. What level do the employees at the workplace focus on product quality requirements or training co-op students?				✓	✓
9. Is the physical infrastructure (electricity, lighting, ventilation, etc) at the workplace adequate for product development or training co-op students?				✓	✓
10. Is physical security at the workplace sufficient to keep personnel, equipment, and intellectual property safe?				✓	✓
11. Who and what resources have been available to assist in training co-op students' implementation?				✓	✓
12. Does the workplace plan to expand and employ other co-op students in the next fiscal year?				✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>2. Political Factors</b>					
1. How do governmental regulations in the co-op affect the policy implementation?	✓			✓	
2. What effects have frequent political changes in Thailand had on the stability and the successful implementation of co-op policy?	✓			✓	
3. In view of the inconstant nature of Thailand government, how can the stability, viability, and growth of the co-op be promoted by co-op generally?	✓			✓	
4. Have there been major legislative modifications to your co-op program since its enactment? (like statutory amendments)	✓			✓	
5. How would you rate your Thailand's research efforts in evaluating or assessing the effectiveness or efficiency of the co-op?	✓			✓	

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>3. Economic Factors</b>					
1. To what extent do the Office of Higher Education Commission (OHEC) announced strong policy in supporting any universities employing co-op system by allocating some budget to cover the cost of your co-op?	✓			✓	
2. Other than the Office of Higher Education Commission (OHEC) budgets, what are this co-op sources of budgeting? How have these budgets been used?	✓			✓	
3. What financial or in-kind contributions do stakeholder organizations make to this co-op?	✓			✓	
4. Have you experienced any difficulty hiring or retaining qualified, co-op staff? Is the organization of qualified teacher adequate?	✓				
5. How have your co-op budgeting sources changed over time?	✓			✓	

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>3. Economic Factors</b> (Continued)					
6. What education and training does your co-op provide its staff? Who provides it? How often?	✓			✓	
<b>4. Institutional Factor</b>					
1. What was the initial goal of your co-op? Is the goal the same now?	✓	✓		✓	✓
2. Do stakeholders have a clear idea of what the co-op is trying to accomplish?	✓	✓		✓	✓
3. Does your co-op program have written interagency/organizational agreements (e.g. memoranda of understanding, etc.) related to shared roles, duties, and responsibilities of staff among the involved agencies?	✓	✓		✓	✓
4. Do you have co-op documents such as a mission statement, code of conduct, or procedural guidelines? If you have documents, have they been modified over the years? What prompted you to create these documents?	✓	✓		✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>4. Institutional Factor</b> (Continued)					
5. Does your organization have a planning group or coalition? Who serves on the group? How is it decided? Who will participate? How are the roles and responsibilities of this group defined?	✓	✓		✓	✓
6. Does the co-op program have a finalized 3-5 year strategic plan? Was your organization involved in the planning process? How were priorities identified?	✓	✓		✓	✓
7. Are there plans or changes that have been discussed in the past but not implemented?	✓	✓		✓	✓
8. Are there any stakeholders or representatives from the external organization that stand out as advocates for the co-op?	✓	✓		✓	✓
9. Who are the co-op external stakeholders? Which stakeholder groups have been most influential on your co-op? Why? Are there any stakeholder groups that the co-op should be engaging but has not? Why not?	✓	✓		✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>4. Institutional Factor</b> (Continued)					
10. How committed were stakeholder organizations' leaders to seeing the co-op implement the co-op?	✓	✓		✓	✓
11. Has stakeholder opinion impacted the level of commitment of your co-op administrator to the co-op? Of your co-op administrator? Of your staff?	✓	✓		✓	✓
12. How has the co-op engaged important stakeholder groups?	✓	✓		✓	✓
13. What education and training does the co-op provide to stakeholder groups? Who provides it? How often?	✓	✓		✓	✓
14. How does the co-op disseminate new knowledge regarding best practices in outside groups?	✓	✓		✓	✓
15. How has your organization benefited from engaging with the co-op? Have there been any disadvantages to the organization for participating?	✓	✓		✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>4. Institutional Factor (Continued)</b>					
16. How committed was your co-op administrator? How committed were co-op staff? Were there any important groups or individuals who seemed unsure or reluctant?	✓	✓		✓	✓
17. How would you evaluate the success of your co-op?	✓	✓		✓	✓
18. What issues were considered in deciding to implement a co-op? What were the “pros” and “cons”?	✓	✓		✓	✓
19. Has the co-op had any impact on the organization’s public image (e.g., marketing values)? What kind of impact? Is this impact measureable?	✓	✓		✓	✓
20. What goals do you have to the future of your co-op?	✓	✓		✓	✓
<b>4.1 Student</b>					
1. Has the entrepreneur informed the co-op students about the schedule of work before they come in to work?			✓		
2. How much time do co-op students usually spend in adjusting themselves with the working environment at the workplace? And to what extent can they make the adjustment?			✓		

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>4. Institutional Factor (Continued)</b>					
<b>4.1 Student</b>					
3. Briefly explain what you have understood about the knowledge of engineering profession and its working environment both before and after the internship.			✓		
4. May I have permission to review your co-op journal?			✓		
<b>4.2 University</b>					
1. What skills/attributes do you see students coming to your classes having?	✓	✓			
2. Briefly describe the engineering-related background, including professional experience of students that come to your classroom.	✓	✓			
3. Please describe the co-op program from your perspective, including any roles you play in the program.	✓	✓			
4. What is the purpose of the co-op program at your university?	✓	✓			
5. What skills and knowledge do you expect a student to leave your classes with?	✓	✓			
6. What skills and knowledge do you expect a student to leave your university with?	✓	✓			

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>4. Institutional Factor</b> (Continued)					
<b>4.2 University</b> (Continued)					
7. What do you expect a student to learn or what skills should they acquire while on a co-op? What are the outcomes?	✓	✓			
8. How are students prepared for their co-op experience?	✓	✓			
9. Compare an average student prior to and after one, two, or three co-op semesters.	✓	✓			
<b>4.3 The Workplace</b>					
1. Has the entrepreneur set up the working schedule for staff mentors and the plan for the co-op project of the students?				✓	✓
2. Did the staff mentors play their roles to supervise and to help the students solve problems when they were confronting with them?				✓	✓
3. Were the mentors able to access the students' working information and records at all time while the students were on internship?				✓	✓
4. Did the entrepreneurs provide the pre-training service about mentoring for the mentors before they were assigned to be the mentors?				✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>4. Institutional Factor</b> (Continued)					
<b>4.3 The Workplace</b> (Continued)					
5. Briefly explain interaction between the students, the staff, the mentors, and the supervisors, from the beginning of co-op, to the end of co-op.				✓	✓
6. Briefly explain your view towards the admission of the students for the co-op project and what difference between the students who joined the co-op and those who did not.				✓	✓
<b>5. Leadership Factors</b>					
1. Please tell me a little about your experience with this co-op program? When did you first come into the program? How many years have you been with this program? Has your role changed since you've been with the co-op program?	✓	✓		✓	✓
2. How long has your organization had co-op program?	✓	✓		✓	✓
3. Does your co-op program attempt to affect public policy for operation in your organization?	✓	✓		✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>5. Leadership Factors (Continued)</b>					
4. What challenges have you/others/the department as a whole faced through the implementation of this policy and have they been overcome? How?	✓	✓		✓	✓
5. Does the co-op administrator have a clear idea about what the co-op program is trying to accomplish? How do you know?	✓	✓		✓	✓
6. How committed were the organization formal leaders (i.e., Administrators) to implementing a co-op?	✓	✓		✓	✓
7. Does the co-op program have a finalized 3-5 year strategic plan?	✓	✓		✓	✓
8. How confident were you that the co-op could be implemented with students, university and workplace as the co-op core components? What prompted you to feel this confident? Who shared your level of confidence Who did not?	✓	✓		✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>5. Leadership Factors (Continued)</b>					
9. When your co-op was first formed, how supportive of the program were your organization administrators/formal leaders? Can you think of specific things that these individual did or said that expressed their support or lack of support? Were some more supportive than others?	✓	✓		✓	✓
10. How would you evaluate the success of your co-op?	✓	✓		✓	✓
11. How does your co-op program evaluate whether or not your organization is meeting objectives in the co-op control plan? Who evaluates? What data is collected for evaluation?	✓	✓		✓	✓
12. In the past 5 years, were there any of the activities outlined in the co-op model new to your co-op program? If yes, which ones? Were there activities that had been part of the program that are no longer part of the program?	✓	✓		✓	✓

Interview Question	Groups to be Interview				
	Administrators	Program Teachers	Students	Entrepreneurs	Mentors
<b>6. Management Innovation Factor</b>					
1. Have the university or the entrepreneurs offered any learning programs other than co-op program?	✓			✓	
2. From what tools or how does the quality of co-op education can be measured by the management innovation both now and in the future?	✓			✓	
<b>7. Other Questions</b>					
1. Have any major events occurred in your university or your organization that have taken time and attention away from the co-op? If so, what? What impact has this event had?	✓	✓		✓	
2. How much technical assistance have you received from the Office of Higher Education Commission (OHEC) or Thai Association of Cooperative Education (TACE) to help get you started? What technical assistance have you received? What would you like to receive?	✓	✓		✓	

## **BIOGRAPHY**

<b>NAME</b>	Miss Wilailak Khaosaard
<b>ACADEMIC BACKGROUND</b>	Bachelor's Degree in Business Administration (BBA), from Kasetsart University (2005) Master's Degree in Public and Private Management (MPPM), from National Institute of Development Administration (2009)
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