



# The Development of Competency Enhancing Based on Buddhist Psychology for Engineering Personnel

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## *[Abstract]*

This mixed method research aimed to study the results of self-development based on Buddhist psychology principles to enhance the competency of engineering personnel. The 64 samples, using the G \* Power were divided into 32 people in experimental groups and 32 people in control groups. The research tools were the competency measurement, behavior observation and self-development program. The experimental training was divided into phase I for 3 days, 2 nights, phase II for 1 month and follow-up period for 1 month. Research data were analyzed by T-test, Two-way repeated measures ANOVA and content analysis. The research found that the competency enhancing program consisted of 14 activities and IOC of the program was between 0.875 –1. The program is suitable and effective for reduction to practice. The comparison of the average scores of the competencies shown that the engineering personnel competencies after the experiment were higher than before the experiment and higher than the control group with statistical significance at the level of .05

**Keywords:** Engineering Personnel, Buddhist Psychology, Competency

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## **Introduction**

Competency development for individuals is essential issue and competency that a person needs to have are knowledge, skills and personal attributes in order to be able to achieve the specified performance. Therefore, competency development is a practice for enhancing knowledge, skills and personal attributes to enable people to change and be able to live progressively and correctly life. In addition, development leads to self-awareness and realization of one's true value and potential (Achara Lortrakul , 2014, p.65-66, Kuajit Cheerakarn, 2012, Wanlaya Aphawutkhun, 2011). What is in a person determines the behavior of a person in order to meet job requirements under the organizational environment and to achieve the desired outcome (Boyatzis, R.E, 1982, p.11).

The Buddhist concepts that place importance to the mind consider that the moral competence of engineering personnel needs to be developed in tandem with the professional competency development as the Most ven. Prof. Dr.Phra Rajapariyatkavi said that the development of technology and industry requires the development of the mind as well. Thailand 4.0 era has focused on innovation, creativity, information technology that is involved in life. (Phra Rajapariyatkavi , 2019) and need to develop a holistic human as the viewpoint of Brahma Khunaporn (P.A. Payutto) said that the process of development of life is a holistic matter, which consists of various elements that are interrelated as a factor to each other and absolutely cannot be separated. Development must develop all 3 areas at the same time, namely behavioral, mental and intellectual, and this is a matter of human life all the time. (Phra Phrom Khunaporn (P.A. Payutto), 2008, p.30).

The Western psychologist's perspective presents ideas about personal development to enhance one's ability. For example, Rogers said that all people have wisdom; internal resource, to deal with problems that lead life to growth and to develop themselves fully functioning. This fundamental nature causes people to not need an expert to help answer or solve their problem, but they need a counselor who creates an atmosphere that allows them to

develop themselves and success in self-development is due to the perception factors. Self-efficacy means judging the competence of one's own activities in order to achieve the specified operational competency which is a goal under a specific situation (Roger, 1951) and the personality traits hidden within an individual can drive that person to perform well or according to the criteria set in the job that they are responsible for. Self-efficacy also refers to the relevance of knowledge, skills, and attributes that affect work and can be increased through training and development (McClelland, 1953).

Therefore, the researcher developed the competency enhancing program for engineering personnel in the Thailand 4.0 era by designing a set of activities in a capacity enhancing program that integrates dharmic principles and psychology for engineering personnel. The researcher applied 4 principles of Buddhism, such as the four paths of accomplishment (Iddhipāda), proper attention (Yonisomanasikāra), cultivation (Bhāvanā 4) and psychology principles which were Roger's person-centered counseling theory, Bandura's self-efficacy concept and McClelland's achievement motivation theory to be used as a tool to enhance engineering personnel competencies in Thailand 4.0. The research hypothesis was engineering personnel participating in the program had higher psychological competency score than before participating in the program and the objective of this research paper is to present the effects of the development of competency enhancing based on Buddhist psychology for engineering personnel.

## **Method**

### **Sample and Procedure**

The samples were engineering personals analyzed by G \* power at effect size = 0.92, power = .95 and alpha value = .05. They were equally divided into an experimental group with activities in the program (n = 32) and a control group with regular training activities (n = 32). Data were collected by testing before and after the experiment. This research was mixed method research and was divided into 2 phases, which were

## **Phase I Qualitative research**

The researcher has compiled the concepts, theories and research related to psychological and Buddhism competency enhancing and interviewed Buddhism and psychological experts in and best practice which was business organization leaders who have applied the Dharma principles in the organization. Then the information was synthesized to create a research conceptual framework and a competency enhancing program. Content validity was assessed by 3 experts, including experts in Buddhism. Psychologist and measurement and evaluation. Operating definitions of competency enhancing according to Buddhist psychology of engineering personnel consisted 4 indicators which were physical competency, precept competency, mental performance and wisdom competency.

## **Phase II Quantitative research**

The researcher conducted 14 training activities with the experimental group according to the program developed by the researcher. The training was divided into phase 1 for 3 days 2 nights, consisting of 13 activities for 28 hours and Phase 2 Kiddee Pooddee tamdee activities for 1 month and follow up phase for 1 month while the control group performed normal activities.

## **Measurement**

The research instruments were divided into:

1) Self-developmental program based on Buddhist psychology consists of 6 programs with 14 activities. Each activity takes 60-120 minutes for a total of 28 hours. The process takes 3 days 2 nights to complete the Phase 1 program and Phase 2 program consists of Kiddee Pooddee tamdee activities for 30 days. The details are as follows

### **1.1) Self-Development Program: Set A Knowing Yourself**

**Program objectives:** To provide participants with basic knowledge about self-development in order to build competency, recognize oneself

through self-analysis, strengths, weaknesses, and to find ways to develop themselves. The lesson learnt of self-understanding consist of 5 activities as follows

- (1) Special lecture activity on self-development for happiness of engineering personnel in Thailand 4.0
- (2) Expectation and fear activity
- (3) Basic knowledge activity regarding one's self development according to Buddhist psychology
- (4) Self- efficacy enhancing activity

**1.2) Self-Development Program: Set B Change the way you think, Change your life**

**Program objectives:** To enable participants to change their thinking methods, to practice their thinking skills and to have proper attention (Yonisomanasikāra) for success and happiness. There are 2 activities as follows

- (1) Techniques to stop bad thinking activity
- (2) Positive thinking for success activities

**1.3) Self-Development Program: Set C Understand yourself, Understand others**

**Program objectives:** To enable participants to understand themselves and to practice others understanding, emotional awareness, appropriately emotional management in co-existence with others. There are 2 activities as follows

- (1) Emotional management activities
- (2) Bond of love Activity

**1.4) Self-Development Program: Set DBo New goal setting**

**Program objectives:** To enable participants to create their own goals and common goals and to empower together for success and happiness. There are 2 activities as follows

- (1) Target maintaining activity
- (2) Goal empowerment activity

**1.5) Self-Development Program: Set E Happiness and success**

**Program objectives:** To provide participants to join the discussion with the prototype person from successful business organization and ask questions about ways to develop oneself for success and happiness. The activity of this set is group discussion on the topic of ideas for success

### **1.6) Self-Development Program: Set M Mental and wisdom development**

**Program objectives:** To enable participants to conduct themselves based on Buddhism and to build the faith in Buddhism through prayer, meditation and a terraced walk. There are 2 activities as follows

- (1) Mental cultivation activity
- (2) Body and mind exercise activity

### **1.7) Kiddee Pooddee tamdee activities**

**Program objectives:** Participants continue to practice after phase 1 by recording how they think and practice in their daily lives for 30 days.

## **2) Activity components**

The activity components were constructed from conceptual of training program construction and group process concept. The components of the activity consist of 1) Concepts / Theme / content 2) Objectives of behavioral activities 3) Period of time 4) Media and equipment 5) activity implementation 6) Measurement and evaluation. The advisory committee verified and confirms the accuracy of the content and the consistency of 14 draft activities with the research objectives.

The process of activities was carried out according to 3 main steps as follows

- 1) Introduction step: Creating faith and creating a learning atmosphere together
- 2) Activity step: Running the process as designed by group process and group thinking practice
- 3) Reflection step: Sub-group representatives present to the large group, discussion, experiences exchange, analysis sharing and group discussion.
- 4) Summary and application step: Discussing the benefits of activity

and applying to daily life by evaluating common ideas.

5) Measurement and evaluation step: observation of participatory observation, joint presentation and notebook

The instrument quality was found by a focus group to criticize the program and propose ways to improve. There were 8 experts consisting of psychological experts, Buddhism experts, measurement and evaluation experts and training process experts. The researcher revised the amendments according to the expert's recommendations and the evaluation report for the total of 12 items in the topic 1) Name of activity / topic of content / concept 2) Behavioral objectives 3) Process 4) Media and equipment 5) Measurement and Evaluation. Then, experts verified the validity of instruments again before trial. The results of item-objective congruence Indexes (IOC) was 0.875-1, indicating that the competency enhancing program for engineering personnel is appropriate and practical.

2) The instruments for data collection were the competency test which developed from Bhāvanā 4 and tested with 100 non-sample groups. Analysis of the discrimination and corrected Item-total correlation (CITC) has 2 selection criteria which are 1) item with coefficient higher than critical  $r$  ( $r = .244$ ,  $df = 98$ ,  $p$ -value.  $< .5$ ) and 2) the elimination criteria for discrimination analysis is that there is a statistically significant difference between the high and low groups at level of .05 and it was found that the CITC scores were between .21-19615. The reliability by Cronbach's alpha coefficient of overall items was .838 and the alpha coefficient by items summarized as follows: (1) The reliability by Cronbach's alpha coefficient of physical competency was .730 (2) The reliability by Cronbach's alpha coefficient of precept competency was .708 (3) The reliability by Cronbach's alpha coefficient of mental competency was .799 (4) The reliability by Cronbach's alpha coefficient of wisdom competency was .719.

T-Test was used to compare the effects of self-development program according to Buddhist psychology to enhance the competency of engineering personnel and the comparison of different mean values of the competency before the experiment, after the experiment and after the follow up of

engineering personnel between experimental group and control group with F-test was evaluated by two-way repeated measures ANOVA and separated by group by one-way repeated measures ANOVA.

## Results

The results of the comparison of the average scores of engineering personnel competency as overall of the experimental group found that engineering personnel competency scores before the experiment, after phase I, after phase II and the follow-up were significantly different at the level of .05. The comparing the average score of each component found the average physical competency score was higher than all components and the average score of physical competency in 4 phases were significantly different at the level of .05. and the comparison of the average scores of engineering personnel competency as overall and each side of the experimental group and control group after phase II found that engineering personnel competency scores before the experiment, after phase I, after phase II and the follow-up were both overall and each component were significantly different at the level of .05 as follows

1) In term of physical competency found that the average score of physical competency in 4 phases were significantly different at the level of .05. ( $F= 9.485^{***}$ ,  $p\text{-value}= .000$ ). It meant that the average score of follow up phase was higher than the average score of after phase I and before the experiment (Mean = 3.35, 3.01 and 2.85 respectively) and the average score of after phase II of the experiment was higher than the average score of after phase I and before the experiment (Mean = 3.31, 3.01 and 2.85 respectively).

2) In term of precept competency found that the average score of precept competency in 4 phases were significantly different at the level of .05. ( $F= 4.22^*$ ,  $p\text{-value}= .00$ ). It meant that the average score of follow up phase was higher than the average score before the experiment (Mean = 3.57 and 3.29 respectively) and the average score of after phase II of the experiment



was higher than the average score of after phase II was higher than the average score before the experiment (Mean = 3.56 and 3.29 respectively).

3) In term of mental competency found that the average score of mental competency in 4 phases were significantly different at the level of .05. (F= 4.22\*, p-value= .00). It meant that the average score of follow up phase was higher than the average score before the experiment (Mean = 3.58 and 3.21 respectively) and the average score of after phase II of the experiment was higher than the average score of after phase II was higher than the average score before the experiment (Mean = 3.49 and 3.21 respectively).

4) In term of wisdom competency found that the average score of wisdom competency in 4 phases were significantly different at the level of .05. (F= 7.468\*, p-value= .00). It meant that the average score of follow up phase was higher than the average score before the experiment (Mean = 3.508 and 3.10 respectively) and the average score of after phase II of the experiment was higher than the average score of after phase II was higher than the average score before the experiment (Mean = 3.47 and 3.10 respectively).

Table 1 Mean and Standard deviation of overall competency scores of engineering personnel in experimental group

Experimental group	Before experiment		After phase I		After phase II		Follow-up	
	M	SD	M	SD	M	SD	M	SD
Physical competency	2.85	.410	3.01	.463	3.31	.446	3.35	.429
Precept competency	3.29	.390	3.47	.430	3.56	.307	3.57	.315
Mental competency	3.21	.340	3.37	.436	3.49	.322	3.58	.333
wisdom competency	3.10	.412	3.28	.428	3.47	.357	3.50	.348
Overall competency	3.13	.333	3.30	.393	3.47	.285	3.50	.286

Table 1 shown that the average competency score of follow up phase was higher than the average score after phase I , after phase I and before the experiment and was (Mean = 3.508 and 3.10 respectively) and were at the level of much to very much. The average competency score of control group were between 2.89-3.57 and were at the level of much to very much.

To compare the competency scores of engineering personnel that measured before, after phase 1 and after phase 2 of the experimental group and the control group, the researchers analyzed by using two way repeated measures ANOVA as shown in Table 2

Table 2 Results of two way repeated measures ANOVA of experimental group and control group before experiment, after phase I and after phase II

S.O.V	Sum of Squares	df	Mean Squares	F	p-value
Between group					
experimental and control group	2.367	1	2.367	15.316*	.000
Errors	9.583	62	.155		
Within group					
Before experiment, After phase I and After phase II	1.338	1.476	.907	13.668*	.000
Interaction effects	.579	1.476	.392	5.914*	.008
Errors	6.070	91.512	.066		

\* Significantly at the level of .05

Table 2 shown that there was Interaction between groups and repeated measurements of the average competency score of experimental group and control group before experiment, after phase I and after phase II with statistical significance at the level of .05 ( $F = 5.914 *$ ,  $p\text{-value} < .05$ ) and found a relationship between the experimental group and the control group that there are different tests ( $F = 15.316 *$ ,  $p\text{-value} > .05$ ) and then analyzed the main effect and compared the pair scores with the Bonferroni Method

## Discussion

According to the results of the comparison of the average scores of engineering personnel competency before the experiment, after phase I, after phase II and the follow-up, it found that there were statistically significant differences at the .05 level. This can confirm that the competency enhancing program can be used to train engineering personnel to have higher competency based on Buddhist psychology based on the results of creating a training program to enhance marketers' competency in the 21st century. It is found that the marketing competency program in the 21st century based on Buddhist psychology can create the dimension of Buddhist psychology to business working and the research results have confirmed that the application of Buddhist psychology can enhance higher competency of a person after training (Janjaree Thanma, Kamalas Phoowachanathipong and Prakrupipitpariyatki, 2018). Moreover, it is also consistent with the study which integrates Dharma principles in Buddhism to create mental competency, such as the research on the process of enhancing resilience quotient in caregivers of patients with non-communicable diseases which found that the learning process through self-experience consisted of 8 steps, namely 1) know ourselves, understand others 2) monitoring and self-evaluations, 3) search for the state 4) achieve a goal 5) make efforts 6) expand the life plan 7) fit and do and 8) Measure skills and follow-up. Activities were divided into 13 workshop activities which are integrated in according to Buddhist psychology 6-I 3-R (I have, I am, I can, I message, I plan, I do, Right Understanding, Right Effort, Right Mindfulness) and goal of the process was to to learn from the process that person can overcome the situation (Kanokwan Kwan-on, 2018). In addition, the results of the development of these competencies can lead person to be effective leaders. For example, Boyatzis(1982) conducted a study of the competency of various leaders affecting effective management which were motivation, traits, skill, self-image and knowledge. These competencies can used to be a basis for studying the effectiveness of leaders and in the same direction as Khantong Wattanapradith's research (2013, p.238) which integrates Buddhism principles and psychological learning process. This research found motivation enhancing

process based on the 5 precepts for leaders has an overall average higher than before the experiment statistical significance at the level of 0.05. From the research mentioned that reflects that the results of the competency enhancing program for engineering personnel can be effectively covered in all 4 dimensions. This may be due to the design of activities in the program that covers all dimensions of development and measuring instruments with quality and accurate according to academic principles. In addition, the aforementioned research results are in line with Phra Phrom Kunaporn. (P.A. Payutto, 2019) that shows that every action, regardless of what behavior or activity, we can practice, develop and examine ourselves according to the threefold principles including precepts, concentration and wisdom at the same time

## Conclusion

The researcher brought the knowledge gained from the research to present it as a knowledge development which are divided into 5 parts and could show the development of competency enhancing program in the form of a diagram as follows:

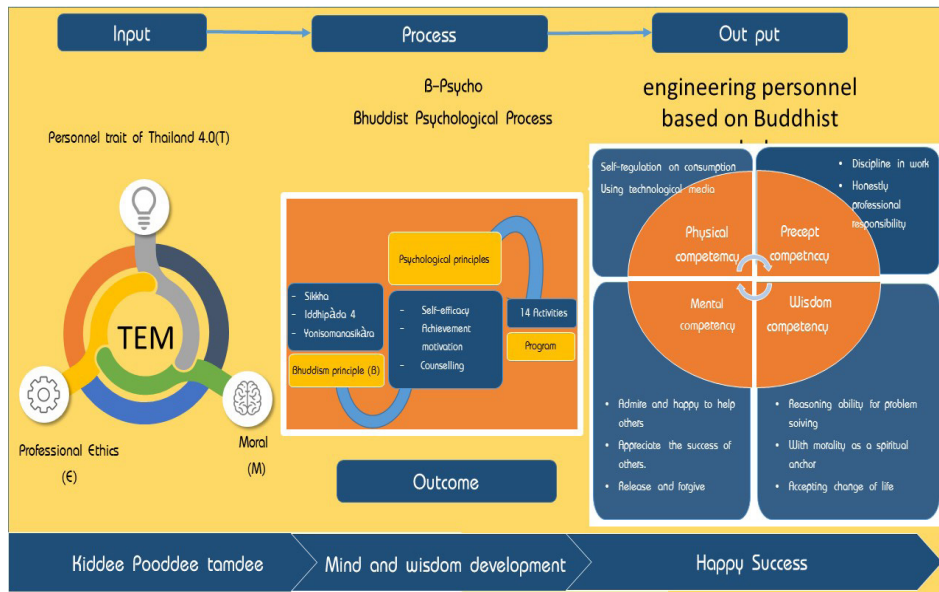


Fig. 1 the TEM B-Psycho Model diagram

The explanation of the TEM B-Psycho Model diagram was as follows

TEM means the study of 3 concepts and principles which were the national development policy in the Thailand 4.0, has driven human resources for national development, traits of engineering personnel and professional ethics. The synthesis of concepts and principles of integration with empirical data from interviews with experts in Buddhism and psychology including role models who are successful in business organizations in applying the Dhamma principles to develop personnel can be used to be the guidelines for the moral development of engineering personnel in the 1st development stage

**B-Psycho** means the integration of 3 concepts and theories in psychology for self-development including self-efficacy, achievement motivation and counseling based on Buddhist psychology with 3 principles of Buddhism including the four paths of accomplishment (Iddhipāda), the threefold principles or Sikkha 3 and proper attention (Yonisomanasikāra) with 14 activities. The 14 activities in the program consists of 1) concepts / theme / content 2) Behavioral objectives 3) Process 4) Media and equipment 5) Measurement and Evaluation. The process of activity implementation follows 3 main steps which are 1) Introduction 2) Activity 3) Reflection 4) Summarize and apply 5) Measure and evaluate. The development process has been verified by experts and tested for competency development according to the cultivation (Bhāvanā 4) which are body cultivation, precept cultivation, mind cultivation and wisdom cultivation. After that, it will be defined as indicators for the competency development of engineering personnel consisting of 4 dimensions, namely physical competency, precept competency, mental competency and wisdom competency and there are 25 sub-indicators

According to this knowledge enhancing project as mentioned above, the results of self-development in accordance with Buddhist psychology to enhance the competency of engineering personnel in all 4 areas, including physical competency, precept competency, mental competency and wisdom

competency, demonstrate the efficiency and effectiveness of the development of self-development program according to Buddhist psychology to enhance the competency of engineering personnel and to actually apply based on the form of self-development program based on Buddhist psychology and actually apply in the form of self-development program based on Buddhist psychology for competency enhancing. Therefore, it should apply the competency enhancing program based on Buddhist psychology to train for engineering personnel in order to have moral skills in parallel with the skills of innovation so as the national development in the Thailand 4.0.

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