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## **THE NEED ASSESSMENT FOR IMPROVING THE COMPETENCE OF THAI TEACHERS IN THE MEASUREMENT AND EVALUATION OF ANALYTICAL THINKING**

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### **Abstract**

*The needs assessment is the process for determining and addressing needs. It is gaps between current conditions and desired conditions. It is the process of collecting information about a competency need that could be met by conducting training. The needs assessment process helps the person requesting training to specify the training need. The objectives of this research were: 1) to study the needs and reality competence of Thai teachers to improve the competence in the measurement and evaluation of analytical thinking, 2) to prioritize the needs to improve Thai teachers competence in measurement and evaluation of analytical thinking. The research was undertaken by using a need assessment research that consisted of 2 steps including the conceptual research framework, and the need assessment to improve the competence in the measurement and evaluation of analytical thinking. The samples were 440 teachers from 4 regions and Bangkok Metropolitan selected by the multi-stage random sampling. The research instrument was a three rating scale about teachers competency using the dual-response format.*

*The reliability coefficients of questionnaire ranges from .93-.97. The data obtained were analyzed by using the arithmetic mean and the standard deviation. The needs assessments were assessed by the Modified Priority Needs Index (PNI modified) compared with the average by paired samples t-test. The research finding were: 1) The degree of need competence of Thai teachers competence in measurement and evaluation of analytical thinking including the overall average was high (mean = 2.91, S.D. = .66) and the degree of reality competence of Thai teachers competence in measurement and evaluation of analytical thinking including all aspects of the overall average was medium (mean = 2.03, S.D. = .30). A significant difference was found between the need competence and the reality competence of Thai teachers to improve competence in measurement and evaluation of analytical thinking, 2) Thai teachers competence in measurement and evaluation of analytical thinking of the samples were essential requirements for all items with the PNI modified between 0.40 to 0.48. In the future, based on this research, the training curriculum will be developed for the Thai teachers to improve the competence in the measurement and the evaluation of analytical thinking.*

### **Keywords**

Need Assessment, Competence of Teachers, Measurement and Evaluation, Analytical Thinking

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## **1. Introduction**

The quality of teachers is critical to quality education development (Quality educational study, 2017). Teachers with distinction harvest students with superiority. Thus, the role of teachers in perfect human development in terms of physical, mental, intellectual, knowledgeable, moral, ethical, and socially well-balanced life. Teacher quality is a vital factor that influences students' learning dynamics (Pinsuda Sirirungtasri, 2014), especially since the 21<sup>st</sup> century is a period of change in all social aspects. All stakeholders in education must therefore adapt the learning processes to fit global dynamics. Learning in the 21<sup>st</sup> century involves practical lessons. Students living in this century are required to have one key attribute, which is problem-solving skills. Analytical thinking is one of the foundations that will shape such skills, enabling students to develop their skills through the educational process assessment and evaluation is a part of the educational process that helps determine student quality. In providing education to students, teachers are directly responsible for transferring knowledge, organizing learning

experiences, evaluating learning processes, and applying learning assessment so as to improve student quality in accordance with the course targets (Klaharn, 2017)

A needs assessment is a strategic planning tool for any learning activity, often used for improvement in individuals. By knowing the learners' needs, can incorporate knowledge, skills, and behavior content to improve performance and address gaps that may exist between actual performance and desired performance. The learning objectives should be based upon recognized needs. (Samuel, 2011) This leads to a needs analysis to determine the cause of the performance problem and the appropriate solution that will close the gap in performance, regardless of whether the solution is training (Kaufman, 1993).

A Needs assessment clarifies what the problem is and why it exists, before creating solutions. Needs assessment has been defined as the process of measuring the extent and nature of the needs of a particular target population so that services can respond to them (Hooper 1999). Needs assessment is a determination of the "gap" between the situations occurring in the organization and what a preferred occurrence would be (Clark, 1998). Identifying the training needs is the necessary start for course planning. (Training needs assessment, 2007). Before training design issues are considered, a careful needs analysis is required to develop a systematic understanding of where training is needed, what needs to be taught or trained, and who will be trained. Unless such a needs assessment has been adequately performed it may be difficult to rationally justify providing training. Such a needs assessment should enable an explanation to be given on why the training activities should be done, and also show that training is, in fact, the best solution for the performance problem or development need. A needs assessment can be an important tool for any trainer or organisation planning a programme or course. Accurate needs assessment can help develop a programme or course based on the real needs of the people that it is serving. As time is often limited in training programmes, courses which takes learners' needs into account can ensure that what is most useful for learners is covered. (Royse et al., 2009). Needs assessment is an important activity in planning, preparation or development. The activity programme will meet and meet the real needs of the target group. The results of a needs assessment will guide subsequent decisions including the design, implementation, and evaluation of projects and programs that will lead to achieving desired results. (Watkins, Meiers and Visser, 2012).

## 2. Purpose of the Study

The principal purposes of the study were as follows.

- To study the needs and reality competence of Thai teachers to improve the competence in the measurement and evaluation of analytical thinking.
- To prioritize the needs to improve Thai teachers competence in measurement and evaluation of analytical thinking.

## 3. Literature Review

Concept of needs assessment

### 3.1 There are three levels of Training Needs ([https://en.wikipedia.org/wiki/Needs\\_assessment](https://en.wikipedia.org/wiki/Needs_assessment))

**3.1.1 Organizational Assessment** evaluates the level of organizational performance. An assessment of this type will determine the skills, knowledge, and ability needs of an agency. It also identifies what is required to alleviate the problems and weaknesses of the agency as well as to enhance strengths and competencies. Organizational assessment takes into consideration factors such as changing demographics, political trends, technology, and the economy.

**3.1.2 Occupational Assessment** examines the skills, knowledge, and abilities required for affected occupational groups. Occupational assessment identifies how and which occupational discrepancies or gaps exist, as well as examining new ways to do work that could fix those discrepancies or gaps.

**3.1.3 Individual Assessment** analyzes how well an individual employee is doing a job and determines the individual's capacity to do new or different work. Individual assessment provides information on which employees need training and what kind.

### 3.2 The Benefits of Training needs Assessments are:

- Training needs are put in context of organizational needs (business drivers)
- Validation and/or augmentation of sponsor's ideas about the need for training
- Assurance that training design will respond to need
- Identification of non-training issues influencing performance
- Assurance of survival of training function
- Establishment of a foundation for post-training evaluation

Needs assessments can help improve the quality of policy or program decisions thus leading to improvements in performance and the accomplishment of desired results. Improving results that is, moving from current to desired performance is typically a worthwhile and

valuable effort. The results of a needs assessment will guide subsequent decisions including the design, implementation, and evaluation of projects and programs that will lead to achieving desired results.

### **3.3 One approach four steps to conducting a needs assessment**

#### **3.3.1 Step 1 Perform a "Gap" analysis**

The first step is to check the actual performance of our organizations and our people against existing standards, or to set new standards. There are two parts to this:

- Current situation

We must determine the current state of skills, knowledge, and abilities of our current and/or future employees. This analysis also should examine our organizational goals, climate, and internal and external constraints.

- Desired or Necessary Situation

We must identify the desired or necessary conditions for organizational and personal success. This analysis focuses on the necessary job tasks/standards, as well as the skills, knowledge and abilities needed to accomplish these successfully. It is important that we identify the critical tasks necessary, and not just observe our current practices. We also must distinguish our actual needs from our perceived needs our wants. The gap between the current and the necessary will identify our needs, purposes and objectives.

There are some questions to ask to determine where training and development or even human resource development (HRD) may be useful in providing solutions:

- Problems or deficits. Are there problems in the organization which might be solved by training or other HRD activities?
- Impending change. Are there problems which do not currently exist but are likely due to changes, such as new processes and equipment, outside competition and/or changes in staffing?
- Opportunities: Could we gain a competitive edge by taking advantage of new technologies, training programs consultants or suppliers?
- Strengths: How can we take advantage of our organizational strengths, as opposed to reacting to our weaknesses? Are there opportunities to apply HRD to these areas?
- New directions: Could we take a proactive approach, applying HRD to move our organizations to new levels of performance? For example, could team building and related activities help improve our productivity?

- Mandated training: Are there internal or external forces dictating that training and/or organization development will take place? Are there policies or management decisions which might dictate the implementation of some program? Are there governmental mandates to which we must comply?

### **3.3.2 Step 2 Identify Priorities and Importance**

The first step should have produced a list of needs for training and development, career development, organization development and/or other interventions. Now we must examine these in view of their importance to our organizational goals, realities and constraints. We must determine if the identified needs are real, if they are worth addressing, and specify their importance and urgency in view of our organizational needs and requirements. For example:

- Cost-effectiveness: How does the cost of the problem compare to the cost of implementing a solution? In other words, we perform a cost-benefit analysis.
- Legal mandates: Are there laws requiring a solution? (For example; safety or regulatory compliance.)
- Executive pressure: Does top management expect a solution?
- Population: Are many people or key people involved?
- Customers: What influence is generated by customer specifications and expectations?

If some of our needs are of relatively low importance, then we would do better to devote our energies to addressing other human performance problems with greater impact and greater value.

### **3.3.3 Step 3 Identify Causes of Performance Problems and/or Opportunities**

Now that we have prioritized and focused on critical organizational and personal needs, we will next identify specific problem areas and opportunities in our organization. We must know what our performance requirements are, if appropriate solutions are to be applied. We should ask two questions for every identified need:

- Are our people doing their jobs effectively?
- Do they know how to do their jobs?

This will require detailed investigation and analysis of our people, their jobs and our organizations both for the current situation and in preparation for the future.

### **3.3.4 Step 4 Identify Possible Solutions and Growth Opportunities**

If people are doing their jobs effectively, then perhaps we should leave well enough alone. However, some training and/or other interventions might be called for if it's important enough to move our people and their performance in new directions. But if our people are not

doing their jobs effectively, then training may be the solution if there is indeed a knowledge problem. Organization development activities may provide solutions when the problem is not based on a lack of knowledge and is primarily associated with systematic change. These interventions might include strategic planning, organization restructuring, performance management and/or effective team building. Depending on the scope of the project a needs assessment can be a costly and labor-intensive project. A general twelve step process might entail the following:

- Confirm the issue and audiences
- Establish the planning team
- Establish the goals and objectives
- Characterize the audience
- Conduct information and literature search
- Select data collection methods
- Determine the sampling scheme
- Design and pilot the collection instrument
- Gather and report data
- Analyze data
- Manage data
- Synthesize data and create report

For this reason, the research was to study the needs and reality competence of Thai teachers to improve the competence in the measurement and evaluation of analytical thinking and to prioritize the needs to improve Thai teachers competence in measurement and evaluation of analytical thinking. In the next step of this research, A needs assessments can help improve the quality of program thus leading to improvements in competence of desired results. The results of a needs assessment will guide subsequent decisions, including the design, implementation, and evaluation of programs that will lead to a competence desired results.

## **4. Methodology**

### **4.1 Population and Sample**

The population was 73,125 teachers hired for large public elementary and secondary schools in Thailand (data as of 2015, from [https://www.m-society.go.th/ewt\\_news.php?nid](https://www.m-society.go.th/ewt_news.php?nid)).

## 4.2 Sample and Sampling Method

The multi-stage random sampling method was carried out as follows.

- Cluster random sampling divided the population into five regions, i.e. north, central, south, northeast, and Bangkok. One province was selected for each of the four regions and added to Bangkok to give a total of five provinces namely Nan Province, Nakhon Pathom Province, Surat Thani Province, Chaiyaphum Province and Bangkok Province.
- Simple random sampling provided one large public elementary school and one large public secondary school for each province to make a total of 10 schools.
- Simple random sampling provided 40 teachers from each selected school to make a total of 400 teachers.

In most cases, only around 50-60 percent of respondents return the questionnaire (Somwang Pitayanuwat, 2007), so the researcher therefore handed out 20 percent more questionnaires, making a total number of 480 questionnaires were sent and 440 questionnaires were returned.

## 4.3 Determination of the Studied Sample Size

In determining the sample size, the following Yamane (1973: 125) formula was used to determine the exact number of the sample.

$$n = N/1 + Ne^2$$

Where	n	means	sample size
	N	means	population size = 73,125 persons
	e	means	sampling errors = .05

The computation of sample size was carried out as follows:

$$73125/1 + 73125(.05)^2 = 397.83 = 400 \text{ persons}$$

## 4.4 Research Instruments

- Unstructured interview was used for school administrators, elementary school teachers and secondary school teachers on issues regarding the state of the problems and priority needs with regard to teachers' analytical thinking skills in assessment and evaluation.
- Questionnaires for teachers on the potential and priority needs regarding analytical thinking skills in assessment and evaluation consisted of two parts. Part 1 was regarding the respondent's general information. Part 2 was comprised of 16 questions in a dual-response format, about teacher's potential and priority needs, with a three-level rating scale of answers.



#### **4.5 Development Procedure of Instruments**

- Review literature and studies related to the core curriculum of the Basic Education Act BE 2551 (2008)
- Create a questionnaire in a dual-response format with a three-level rating scale of answers, for assessing potential and priority needs regarding teachers' analytical thinking skills in assessment and evaluation.
- Create the instruments: 1) a questionnaire in a dual-response format with a three-level rating scale of answers, with 16 questions about teacher's potential needs and priority needs regarding teachers' analytical thinking skills in assessment and evaluation,
- Conduct content-validity testing by submitting these six instruments to five experts for consideration. The calculated IOC values were .80-1.00.
- Perform a reliability test of the questionnaire on potential and priority needs regarding teachers' analytical thinking skills in assessment and evaluation by trying it out with a sample-like group of 30 people. (Computed Cronbach's alpha coefficients were .93-.97)

#### **4.6 Data Collection**

To protect the rights of the sample group, the researcher sent out a consent letter to all respondents and asked them to answer all questions freely and truthfully. Information gathered would not negatively affect the respondents. The researcher performed overall data collection as follows.

- A consent letter was submitted by the agency to sampled-school administrators for data collection.
- The questionnaire on potential and priority needs, regarding teachers' analytical thinking skills in assessment and evaluation, was mailed to schools in rural provinces. Each school's academic department was responsible for data collection. With regard to schools in Bangkok, data were collected by the researcher.

### **5. Data Analysis and Statistics Used**

Data from the interviews were analyzed using content analysis. Data from the questionnaire on potential and priority needs were analyzed using mean and standard deviation. Score ranges were defined as high = 1-1.66, moderate = 1.67-2.33, and low = 2.34-

3.00. Differences between means of the actual condition and desired condition were tested via dependent samples t-test and modified priority needs index (PNI modified) through the formula

$$\text{PNI modified} = I - D/D.$$

Where PNI modified means modified priority needs index  
 I means level of desired condition  
 D means level of actual condition

## 6. Results

The results are shown in the table below.

Results of the study purposed by the researcher as per the objectives are as follows.

### 6.1 Study results from teachers' potential and priority needs regarding analytical thinking skills in measurement and evaluation

Data from the questionnaire on potential and priority needs regarding teachers' analytical thinking skills in measurement and evaluation are shown in the following table.

**Table 1:** *Teachers' actual and desired levels of knowledge regarding analytical thinking skills in measurement and evaluation (n=440)*

	Dimension	level of actual condition			level of desired condition			PNI
		$\bar{x}$	SD	level	$\bar{x}$	SD	level	
1	Concepts of learning measurement and evaluation	2.00	.57	moderate	2.9	.32	high	.45
2	Educational measurement	2.06	.54	moderate	2.89	.31	high	.40
3	Selection of measurement tools and evaluation of learning assessment as per educational behaviors	2.09	.61	moderate	2.92	.29	high	.40
4	Advantages and limitations of test-type and non-test-type measurement tools	2.03	.57	moderate	2.89	.32	high	.42
5	Plan of test making	2.04	.62	moderate	2.90	.29	high	.42
6	Properties of good a measurement tools	2.02	1.16	moderate	2.90	.30	high	.44

7	Creation and operation of measurement tools and evaluation as per learning goals	2.09	.61	moderate	2.92	.28	high	.40
8	Score and score interpretation	2.05	1.13	moderate	2.90	.31	high	.41

**Table 1** (Continued)

	Dimension	level of actual condition			level of desired condition			PNI
		$\bar{x}$	SD	level	$\bar{x}$	SD	level	
9	Educational behaviors	2.02	.58	moderate	2.96	.32	high	.47
10	Concepts of learning measurement and evaluation according to the core curriculum of the Basic Education Act BE 2551 (2008)	2.07	.58	moderate	2.90	.30	high	.40
11	Concepts and principles of analytical thinking	2.01	.59	moderate	2.91	.29	high	
12	Nature of analytical thinking	1.96	.59	moderate	2.90	.29	high	.48
13	Measurement tools and evaluation of analytical thinking	2.01	.61	moderate	2.90	.30	high	.44
14	Creation of measurement tools and evaluation of analytical thinking	1.96	.59	moderate	2.90	.29	high	.48
15	Application of measurement tools and evaluation results for students' development	2.05	.59	moderate	2.90	.30	high	.41
16	Practical skills for creation of measurement tools and evaluation of analytical thinking	2.04	.63	moderate	2.91	.29	high	.43
Overall mean		2.03	.66	moderate	2.91	.30	high	

The table shows that the overall mean of teachers' actual level of knowledge in assessment and evaluation in analytical thinking skills is at a moderate level ( $\bar{x}$  =2.03,

SD=.66). When considering individual aspects, the two items with the highest mean were selection of assessment tools and evaluation of learning assessment as per educational behaviors, and creation and operation of assessment tools and evaluation as per learning goals. Both items had the same mean ( $\bar{x}=2.09$ , SD=.61). Items with the lowest mean were nature of analytical thinking, and creation of assessment tools and evaluation of analytical thinking. Both items had the same mean ( $\bar{x}=1.96$ , SD=.59). Meanwhile, the overall mean of teachers' desired level of knowledge was high ( $\bar{x}=2.91$ , SD=.30). When considering individual aspects, the item with the highest mean was educational behaviors ( $\bar{x}=2.96$ , SD=.32) and the item with the lowest mean was educational measurement ( $\bar{x}=2.89$ , SD=.31).

Evaluation of the sample's priority needs gave a PNI modified of 0.40-0.48. The overall PNI modified was equal to 0.43. The items with the highest priority needs (the highest PNI modified) were nature of analytical thinking, and creation of assessment tools and evaluation of analytical thinking. Both had a PNI modified equal to 0.48.

**Table 2:** *Comparison of Teachers' actual and desired mean of knowledge regarding analytical thinking skills in measurement and evaluation*

condition	n	mean	SD	$\bar{d}$	S <sub>d</sub>	t	df	p
actual	440	1.39	.018	1.513	.443	71.58	439	.000
desired	440	2.91	.012					

P<.05

The Table shows that the sample group of teachers showed differences between the need/desired competence and the reality/ actual competence of Thai at a statistical significance level of .05.

## 7. Discussion

A needs assessment is a part of planning processes, often used for improvement in individuals, education/training, organizations, or communities. It can refine and improve a product such as a training or service a client receives. It can be an effective tool to clarify problems and identify appropriate interventions or solutions. (Fulgham and Shaughnessy, 2008) According to Triner, Greenberry and Watkins (1996). Though beginning with training as the desired solution, it has been argued, diminishes the value of the needs assessment, the popularity of the term "training needs assessment" has made it part of the training and adult learning

lexicon. The state of problems was studied and teachers' priority needs regarding measurement and evaluation in analytical thinking skills were investigated. Findings suggested that teachers' competency was moderate and they wanted to improve their capability to a high level. When considering the individual aspects, it was found that nature of analytical thinking, and creation of measurement tools and evaluation of analytical thinking acquired the lowest scores corresponding to Nuntiya Chaimatchim, Oranuch Seesaard, and Tatsirin Sawangboon (2014) were studied the needs assessment for science teachers development in measurement and evaluation of critical thinking competency in the secondary school Kalasin Province, which indicated that teachers' knowledge and understanding in analytical thinking skills were at the lowest. Consistent with the findings of Incecay and Incecay (2010) were studied a case study on needs assessment of English language teachers, which indicated that it is apparent that the needs of the teachers are also important in the design and the implementation process of the syllabus and the program. At the same time, PNI Modified analysis was conducted by the researcher. Results with the highest PNI Modified showed that nature of analytical thinking, and creation of measurement tools and evaluation of analytical thinking were the two needs most wanted by teachers, which drew attention to Suwimon Wongwanich's (2007) proposal. In her modified priority needs index, measurement and evaluation in analytical thinking skills was called teachers' priority need. Prior to trying out the course, the researcher tested appropriateness and possibility of the training course as required by the curriculum development process, with advice from five experts. Congruence was valued at .80-1.00. Means of appropriateness and possibility for each aspect were high to highest. All indicated that the developed course attained the quality standard, and was appropriate and possible for deployment.

## **8. Recommendation**

- Results showed that the aspects with the highest priority needs for training had the highest PNI<sub>Modified</sub>; they were nature of analytical thinking, and creation of assessment tools and evaluation of analytical thinking. Therefore, related parties can use the information provided in this research to develop teacher's competence in assessment and evaluation by focusing on analytical thinking skills, especially with regard to proficiency in test making which focuses on analytical thinking skills as part of assessment and evaluation.

- Further research should be pursued for sustainable development. It should be focused on the development of teacher's competence in using analytical thinking skills as part of assessment and evaluation.

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