

Evaluation of Learning Reform Results Based on the National Education Act, B.E. 2542: Evaluation of Students' Outcomes

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ABSTRACT

This study aimed to study, measure and evaluate the learners' desired characteristics based on the National Education Act, B.E.2542, to compare the mean differences among learner groups and schools with different backgrounds and jurisdictions, and to compare the variances across schools, jurisdictions and provinces. The research sample consisted of 23,855 Pratomsuksa 6 and Matayomsuksa 3 under 4 jurisdictions. The research instruments were 2 sets of objective type scales, each of which measured academic knowledge, thinking skills, inquiry and working skills, and good citizenship. The major findings were as follows : 1) The learners' performance were good only in good citizenship and satisfactory for the other three indicators. 2) There were significance differences in the four indicators across provinces and jurisdictions only at Matayomsuksa 3 levels. 3) The variance component analyses indicated that there were great variances in performance among schools within jurisdiction, and among learners within schools.

In the past, evaluative research on learning reform, except the national test, were evaluation of learners using quantitative data measuring from learners' perception, rather than data obtaining from standard performance test. As a consequence, there were problems concerning the comparison of learning reform results across schools. Moreover, there was no measurement on learners' desired characteristics based on the National Education Act, B.E. 2542 (ONEC, 1999). In this evaluative research, the researchers therefore analyzed, and developed the scale measuring 4 dimensions of learners' desired characteristics, namely: academic knowledge, thinking skills, inquiry and working skills, and good citizenship based on the National Educational Act, B.E. 2542. The scale was then administered to evaluate the desired characteristics of the learners in order to learn whether, after 3 years of the promulgation of the National Education Act, B.E. 2542, the learners' desired characteristics were quite satisfactory or not.

Theoretical Background

In this study, the learners' desired characteristics based on the National Education Act, theory of test development and evaluation theory were employed in the construction and development of the scale.

Objectives

1) To study the factors measuring the learners' desired characteristics based on the National Education Act, B.E. 2542. 2) To construct and developed the scale measuring the learners' desired characteristics at Pratomsuksa 6 and Matayomsuksa 3 based on the National Education Act, B.E. 2542; and to develop the evaluative criteria. 3) To compare the differences of means of the learners' desired characteristics, among the group of learners having different gender, jurisdictions, and provinces, and among the schools under different jurisdictions, locating in different provinces. 4) To compare the variances of the learners' desired characteristics across schools within jurisdiction, between jurisdictions, between provinces; and to compare the variance of the learners' desired characteristics within school, between schools, and between schools under different jurisdictions. 5) To evaluate the learners' desired characteristics.

Research Method

This research was a descriptive research employing 5 steps of research method as follows:

1. To synthesize the related literature and to identify the factors measuring the learners' desired characteristics based on the National Education Act, B.E. 2542.
2. To construct and develop the scale measuring the learners' desired characteristics as stated in step 1.
3. To develop the evaluative criteria.
4. To administer the scale measuring the learner's desired characteristics, which was developed in step 2.
5. To evaluate the learner's desired characteristics.

Population and Sample

The population for this study consisted of all Pratomsuksa 6 and Matayomsuksa 3 students (Grade 6 and 9 students) in schools providing basic education under the jurisdiction of the Department of Secondary Education (DSE), the Office of National Primary Education Commission (ONPEC), the Office of Private Education Commission (OPEC), and the office of Local Administration Organization (OLAO).

The research sample consisted of 23,855 students selected from the population, employing multi-stage sampling procedure as follows:

1. Using Yamane's and Cohen's formula, the researchers set the sample size of 10,000 grade 6 students and 10,000 Grade 9 students. The sample size was adapted in responding to the 20% rate of missing data, resulting in a final sample size of 12,500 for each of the 2 groups of students.
2. The 5 provinces were purposively selected, one from each of the 5 geographical regions. They were Ratchaburi from the Central Region, Chiangrai from the North, Phuket from the South, Khon Kaen from the Northeast, and Choburi from the East.
3. The 10 districts were randomly selected, 2 from each of the 5 selected provinces, employing simple random sampling. In addition, Muang District was purposively selected from each of the 5 provinces.

4. The 199 schools were randomly selected from the selected districts after stratifying schools based on jurisdiction and sizes.

5. From each of 199 selected schools, 50% of classrooms were randomly selected in big schools, and all classrooms in small and medium schools were used as sampled classrooms.

6. All students in the selected classroom were the sample in this study. Approximately, there were 2,500 students from each of the 5 provinces.

Data Collection

There were 2 groups of variables in this study. The dependent variables consisted of 4 dimensions of the learners' desired characteristics. The independent variables consisted of gender, school size, jurisdiction, and province.

The research instrument was the scale measuring the desired characteristics of the learners. It was constructed and developed in 5 steps as follows:

1. Synthesized the structure of the learners' desired characteristics based on the National Education Act, B.E. 2542.

2. Designed and constructed the scale measuring the learners' desired characteristics with an emphasis on the scale that took short administration time, had integrative characteristics of items, each of which could be measured 1–2 indicators at the same time, and employed partial credit scoring method. There were 2 sets of scales, each for Grade 6 and 9.

3. Developed the criteria for partial credit scoring, for each of the two scales.

4. Detected the quality of the scales as follows:

4.1 The researchers examined the content validity of the two scales by checking the scale content with the structure of the scales.

4.2 The researchers examined the objectivity of the two scales by administering the pilot test with 27 Grade 6 students and 15 Grade 9 students, and checked for the students' understanding of the stem and the multiple choices for each item, and the method used in answering by using the computerized answer sheet.

4.3 The researchers checked the quality of each item, and their reliability by

administering the scale with 48 Grade 6 students and 62 Grade 9 students. The scoring results were obtained and analyzed to get the reliability coefficients of the scales.

5. To improve the scale by modifying some difficult items in order to simplify the scale.

The researchers administered the scales with the sampled students during December 2-13, 2002, using 3 administering teams, The test dates were December 2-4 for schools in Chiangrai, Ratchaburi and Phuket, and December 11-13 for schools in Khon Kaen and Choburi.

Data Analysis

Several methods of data analyses were employed based on the research objectives. Regarding to the first objective, content analysis was employed. For the second objective, correlational analysis and confirmatory factor analysis were employed. For the third objective, one-way and three-way anova were employed. For the fourth objective, 3-level multi-level analysis using hierarchical linear model were employed. For the fifth objective, descriptive statistics was employed.

Conclusion

1. Learners' Desired Characteristics Factors

There were 4 dimensions of learners' desired characteristics factors. 1) Academic knowledge factor consisted of knowledge in 5 subjects: Thai, social studies, sciences and technology, mathematics and English. 2) Thinking skills factor consisted of 4 indicators: analytical thinking, evaluative thinking, determining and choosing methods for problem - solving, and imaginative thinking. 3) Inquiry and working skills factor consisted of 3 indicators: learning process, learning eagerness and working skills. 4) Good citizenship consisted of 4 sets of indicators: a) unity, dignity of being Thai, and environment conservation; b) possessing self-disciplines, being responsible, and honest; c) good physical and mental health; and d) appreciation in arts, music and sports.

2. Scale Construction and Development Results

2.1 Characteristics and Quality of the Learners' Desired Characteristics Scale.

The two scales had similar 2-part structure. The first part was a 53 item-scale measuring the learners' academic ability and thinking scale. The second part was a 33-item scale measuring learners' perceived inquiry and working skills and good citizenship. The quality of the two scales in terms of difficulty index, discrimination index, reliability, concurrent and construct validity were displayed in Table 1, the details of which indicated a satisfactory quality of every parts of the scales.

Table 1 Statistics Indicating Scale Quality by Type and Part of Scales

Quality	Pratomsuksa 6	Matayomsuksa 3
Average difficulty index	0.57	0.55
Average discrimination index	0.24	0.24
Reliability		
- Academic knowledge	0.66	0.60
- Thinking skills	0.63	0.59
- Inquiry skills	0.90	0.89
- Good citizenship	0.87	0.86
Content Validity		
- Thai	0.33	0.44
- English	0.22	0.45
- Mathematics	0.27	0.40
Construct Validity	chi-square = 21.25 df = 27 P-value = 0.77	chi-square = 14.40 df = 23 P-value = 0.91

2.2 Evaluation Criteria for Learners' Desired Characteristics

1) Evaluative Criteria at the Learners' Level

In the process of quality evaluation both in each academic subject and each dimension of the learners' desired characteristics, the researchers had set the relative criteria using the 90% confidence interval of the estimator of the true scores. The interval to be used as the cutting points for the evaluation ranged from (mean - 1.654 SEM) and (mean + 1.645 SEM) where the standard error of measurement (SEM) was equal to $SD\sqrt{1-reliability}$ (Sirichai Kanjanavasee, 2001). The evaluative criteria for each subject and indicator, therefore, had been designed to compose of 3 levels: unsatisfactory,

satisfactory and good, where the scores within the range of the 90% confidence interval were considered to be satisfactory. The cutting points of all evaluative criteria were shown in Table 2

Table 2 The Evaluative Criteria for Each Part of the Scale

dimensions	unsatisfactory	satisfactory	good
Academic Knowledge and Thinking skills	< 30	30-60	> 60
Inquiry skills and good citizenship	< 40	40-70	> 70

It should be noted that the criteria for the evaluation of inquiry skills and good citizenship part was quite higher than the other part.

2) Evaluative Criteria at the School Level

In this study, the researchers designed the evaluative criteria at the school level based on the standard criteria for external evaluation of basic education schools, which was developed by the Office of National Education Standards and Quality Assessment (Public Organization) (ONEC, 2000). The criteria had been designed to compose of 4 levels according to the quantity of the learners who had goodly passed the scale. The first level (improvement required), indicated that at most 24% of the learners had passed. The second level (satisfactory), indicated that (25-49)% of the learners had passed. The third level (good) indicated that (50-74)% of the learners had passed, and the fourth level (very good) indicated that at least 75% of the learners had passed.

3. The Comparison Results of Learners' Desired Characteristics Means

3.1 The Comparison among Learners with Different Gender, Jurisdiction and Provinces

1) Academic Subjects

It was found in Pratomsuksa 6 level that there were interaction effects between gender, jurisdiction and province on almost all of the 5 academic subjects. In Matayomsuksa 3 level, however, there were interaction effects between gender, jurisdiction and province on every academic subjects. From the significant interaction effects, it could not be identified which jurisdiction or province that had better reform results, when comparing to other groups of learners. It could be only identified that the learning reform results

of the learners on academic subjects depended largely on both jurisdiction and province. The difference among schools having different jurisdictions and provinces would be presented later.

2) Indicators of Desired Characteristics

Both in the Pratomsuksa 6 and Matayomsuksa 3 levels, there were significant interaction effects between jurisdiction and province on all of the 4 indicators of Learners' desired characteristics. The interaction effects signified that the learning reform conducted to the learners could not be identified whether which province or jurisdiction had higher results than others, because the learning reform results depended on both province and jurisdiction, the details of which would be present later.

3.2 The Comparisons among schools with Different Jurisdiction and Provinces.

1) Academic Subjects

Since there was no interaction effect between jurisdiction and province, the researchers were able to compare the differences of academic subject means across jurisdiction and across province. In Pratomsuksa 6, there was no differences in means of all academic subjects across province, but there were significant differences across jurisdiction. In social studies, sciences and technology, and mathematics, schools under the Office of Private Education had higher means as compared to those under the Office of the National Primary Education Commission. In Matayomsuksa 3, schools in Choburi had higher means of Social Studies than those in Khonkaen; schools under the Office of Private Education had higher means of English as compared to those under the Department of Secondary Education.

2) Indicators of Desired Characteristics

Of the four indicators measuring learners' desired characteristics in Pratomsuksa 6 level, there was no significant differences across province and jurisdiction in all indicators, except inquiry skills where the schools under the Office of National Primary Education had higher means than those under the municipal schools, and the schools in Khon Kaen had higher means than those in Choburi. For the Matayomsuksa 3 level, there were significant differences across provinces as indicated in Table 3.

Table 3 The Comparison Results of Means of Learners’ Desired Characteristics across Province and Jurisdiction

Indicators	Pratomsuksa 6	Matayomsuksa 3
Academic Knowledge	No difference	OPEC > DSE
Thinking Skills	No difference	Cholburi > all other provinces
Inquiry Skills, etc	ONPEC > MUNI Khonkaen > Cholburi	ONPEC > DSE and OPEC Khonkaen > Cholburi, Ratchaburi and Phuket
Good Citizenship	No difference	Khonkaen > Ratchaburi and Phuket

4. The Comparison Results of Learners’ Desired Characteristics Variances

4.1 The Comparisons among schools with Different Jurisdictions and Provinces

As a consequence of unequal learners’ desired characteristics means of schools across province and jurisdiction, the researchers, therefore, could estimate variance components of learners’ desired characteristics among schools within jurisdiction, among jurisdictions, and among provinces. It was found in both Pratomsuksa 6 and Matayomsuksa 3 that the highest variances of the 4 indicators of learners’ characteristics were the variance among schools within jurisdiction. Those results signified that there were inequalities among schools within jurisdiction. In particular, the highest and the lowest variances were that in thinking skills and these in inquiry and working skills, respectively.

4.2 The Comparisons among Learners within Schools, among schools and among jurisdictions.

The researchers analyzed the data separately by province using 3-level hierarchical linear model (Raudenbush, S. W. and Bryk, A. S., 2002). and found that the variance components in the learners’ desired characteristics, in all of the 4 indicators, for Pratomsuksa 6 and Matayomsuksa 3 were in the same pattern. The highest variance were those among learners within schools, The next highest were those among schools. Considering each of the 4 indicators, it was found that the highest variance component which signified great inequality was the variance in academic subjects among learners within schools. The next highest variance was that of thinking skills.

5. Evaluation Results of Learners' Desired Characteristics

5.1 The Learner Level

The evaluation results of the learners' desired characteristics at the learner level using the evaluative criteria, indicated that the amount of learners at each of the 3 levels were about the same, as shown in Table 4.

Table 4 Percentage of Learners Distributed across three levels of Evaluation Results of Four Indicators

Indicators	Unsatisfactory		Satisfactory		Good	
	P.6	M.3	P.6	M.3	P.6	M.3
Academic Knowledge	11.45%	16.75%	77.99%	80.32%	10.56%	2.90%
Thinking Skills	12.35%	2.68%	82.37%	85.84%	5.28%	11.49%
Inquiry Skills	24.95%	29.43%	67.20%	65.75%	7.85%	4.82%
Good Citizenship	12.12%	11.62%	61.41%	65.40%	26.47%	22.98%

5.2 The School Level

The evaluation results of the learners' desired characteristics at the school level using the evaluative criteria, indicated that the amount of schools at each of the 3 levels were about the same as shown in Table 5

Table 5 Percentages of Schools Distributed across Three Levels of Evaluation Results of Four Indicators

Indicators	Level	School Quality			
		Unsatisfactory	Satisfactory	Quite Good	Good
Academic Knowledge	P.6	90.00%	7.50%	1.25%	1.25%
	M.3	99.19%		0.81%	
Thinking Skills	P.6	98.13%	1.25%		0.62%
	M.3	91.94%	6.45%	1.61%	
Inquiry Skills	P.6	96.25%	3.75%		
	M.3	95.97%	4.03%		
Good Citizenship	P.6	43.75%	49.38%	6.87%	
	M.3	59.68%	36.29%	4.03%	

Recommendations

1. In this research, the learners' desired characteristics was measured only once, therefore it could not identify the change of the learners' desired characteristics as the results of the learning reform. There should be an evaluations and a further follow-up of learning reform by employing at least two periods of data collection in order to measure clearly the growth of learners' desired characteristics.

2. The evaluation results indicated that the learners' desired characteristics in the aspects of academic knowledge: English, mathematics, sciences and technology, and thinking skills were unsatisfactory. The multi-level analysis indicated that there were great inequality in those aspects among schools. It was recommended, therefore, that the teachers should be promoted and developed in those subjects, in learning process organizations. In addition, there should be an acceleration to develop a new generation of sciences and mathematics teachers to replace the old ones.

3. It was found from the research results that there were big differences in learners' desired characteristics, and that it was quite difficult to conclude whether those differences occurred because of learning reform or learners' factors such as socioeconomic status, parental education, and learners' intelligence. Therefore, it was recommended that there should be a further study exploring the factors affecting learners' desired characteristics and there should be an inquiry seeking strategies to develop the learners' desired characteristics.

References

- Kanjanavasee, S. (2001). **Classical Test Theory**. Bangkok: Chulalongkorn' University Printing House.
- Kaplan, D. and Elliot, P. R. (1997). A model based approach to validating education indicators using multilevel structural equation modeling. **Journal of Educational and Behavioral Statistics**. 22(3): 323-347.
- Wiratchai, N. (1999). **Model LISREL: Analysis Statistics for Research**. Bangkok: Chulalongkorn' University Printing House.

ONEC. (1999). **National Education Act of B.E. 2542(1999)**. Bangkok: Seven Printing Group Co., Ltd.

ONEC. (2000). **Education Standards for External Quality Evaluation: Basic Education Level**. Bangkok: ONEC.

Raudenbush, S. W. and Bryk, A. S. (2002). **Hierarchical Linear Models: Applications and Data Analysis Methods**. 2nd California: Sage Publications, Inc.