# CHAPTER III

## REVIEW OF THE WORK DONE IN MENTAL TESTING

<table>
<thead>
<tr>
<th>TITLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Introduction</td>
<td>43</td>
</tr>
<tr>
<td>3.2 The Pre-Scientific Stage</td>
<td>43</td>
</tr>
<tr>
<td>3.3 The Scientific Stage</td>
<td>45</td>
</tr>
<tr>
<td>3.3.1 Stanford-Binet Intelligence Scale</td>
<td>46</td>
</tr>
<tr>
<td>3.3.2 The 1960 Revision of Stanford-Binet Scale</td>
<td>47</td>
</tr>
<tr>
<td>3.4 Performance Tests</td>
<td>50</td>
</tr>
<tr>
<td>3.5 Group Tests of Intelligence</td>
<td>52</td>
</tr>
<tr>
<td>3.5.1 Group Test of Intelligence Developed Abroad</td>
<td>53</td>
</tr>
<tr>
<td>3.5.2 The Intelligence Tests &amp; Group Tests of Intelligence Developed in Thailand</td>
<td>57</td>
</tr>
<tr>
<td>3.6 Rationale for the Present Test</td>
<td>70</td>
</tr>
<tr>
<td>3.7 Conclusion</td>
<td>72</td>
</tr>
</tbody>
</table>
CHAPTER III
REVIEW OF THE WORK DONE IN MENTAL TESTING

3.1 INTRODUCTION

The review of theories and past literatures are very important to the investigator. It provides the investigator to understand what is necessary and to see the problems, to prepare the work design and acquire ideas to select the proper tools and samples. It also helps to solve the problem systematically and useful for guideline in the field and adapt technique for research.

Measuring intelligence of the man has been for a long time and has been developed until the present, which has been important for testing. The intelligence tests have various forms and steps. Some tests are complement, reliant, popular and remain as they are. This chapter presents the study of related theories and standard intelligence tests that were developed in the past time. The development of intelligence tests discussed in this chapter can be studied under two stages:

(i.) The Pre – Scientific Stage
(ii.) The Scientific Stage

3.2 THE PRE-SCIENTIFIC STAGE

In 1966, Dubois stated that Chinese had the test to select the civil servants for more than 3000 years ago. The ancient Greek used the test to evaluate physical and mental level of people.

The interesting psychological tests were first recognized in the nineteen-century for the purpose to care the feeble-mindedness and mental disorder, properly that were brunt treated and abandoned at that time. Psychologists had tried to categorize mental disorder patient from feeble-
mindedness. Esquirol, the French physician explained and categorized to

group mental retard from normal to idiocy. He tried to develop the
classification system and type of mental retardation and came up with several
methods\(^1\). He concluded the principle of person's language for the test to
measure mental retard, which was verbal test. The current tests also
comprehensive are verbal test. Therefore verbal ability is important to
individual's intelligence.

Other person who was also interested in this subject was the
French, Dr. Seguin. He trained the mental retarded persons on the ground that
mental retarded person can be healed. He found that the schools for mentally
retard persons in 1837 and it was widely known. His technique to train sensory
nerve and muscle is still the valid method in the today's institution for mental
retardation. This method was found by Seguin have become the non-verbal
intelligence test. The Seguin's Form Board is the test that required the
students to put the various shape of wood bar in their proper slot as fast as
possible.

Galton, the British biologist who was interested in human's
heredity, believed that the similarities between parents or relatives could be
determined by testing\(^2\). Galton designed several simple tests for testing
sensory nerve which is in the brain. He believed that sensory nerve of an
individual can determined his intelligence. His stated that we perceived all
information through feeling nerve. The greater different sensory nerve is scope
of decision and intelligence which is more increasable. He also note the idiots
are less to differ the heat from cold, or pain. There was evidence that

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confirmed Galton's belief that the ability of providing all sensitive nerve is at
the most among people with high intelligence.

In 1881, Galton began using of psychological test to find college
students' intelligence by testing them one at a time. The test consist of the
measure of muscle power, speed of movement, response to pain, the ability of
watching and listening, determining of weight, memory and the like. The test
emphasized on feeling nerve and action time.

Most of the tests that European psychologists had gathered
around late 19th century tended to cover the more complex variable. Kraplin
used test for the base of habitual person for testing the mental retarded
patients. In that test, majority of part of the test involved numeric calculations
about the result of training, memory, tiredness and confusion. Later
Ebbirghaus, the German psychologist use arithmetic calculation, memorizable
aid and completing the sentences for children in schools. Completing
sentences were complex test but the test result apparently corresponds with
academic score. In addition, Ferrari used the test with the patient. The test is
various forms to cover variables such as memory, imagination, determination,
comprehension and docility. These tests lead to the development of
intelligence test later3.

3.3 THE SCIENTIFIC STAGE

Nowadays, intelligence tests are based on the work of French
psychologists, Alfred Binet. Associated with him was, first, V. Henri, and later,
Theodore Simon. There was no doubt that the Binet was the shining light and
genius of this most important contribution to modern psychological methods,

even though many others contributed to the developments. Thus, Binet is considered as the father of the scientific approach in intelligence testing.

### 3.3.1 Stanford-Binet Intelligence Scale

The Stanford-Binet Intelligence Scale is the healthiest surviving descendent of Binet's original scale. Binet developed his test to identify slow learner in Paris schools. Using a definition of intelligent behavior that stressed the ability to take and maintain a definite direction or set, the capacity to adapt in order of obtain a giving and the power of self-criticism. He developed a test which was first published in 1905 and later revised in 1908 and 1911. Although the test departed from the current practices along many dimension, three aspects were of greatest importance.

- The use of complex motor tasks as test items,
- The use of an age standard, (the concept of mental age was first introduced in 1908 revision), and
- The attempt to measure general mental faculties.

The test became popular and several attempts were made to translate it and adapt it for American usage. The adaptation that caught on in the United States was Terman's version, first published in 1916, which has become known as the Stanford-Binet Test. Terman's test was an extension and improvement of Binet's scale and in many respects uses Binet's scale only as a point of departure. The 1916 version was important for several reasons. It was the first test to provide detailed administrative and scoring instructions, recognizing that variations from these directions could produce wide differences in scores. Second, the concept of the IQ was introduced. Third, the need for securing a representative sample of subjects for standardizing the test was recognized.
The 1937 revision did not attempt to measure anything different from the 1916 form but only to do a better job of measurement. Two forms of the test were constructed, Form L and Form M. The test covered the age range from \(1\frac{1}{2}\) to 18 years and was standardized on over 3000 children. Selection for items was based on three criteria:

1.) The item measured considerable behavior intelligence.

2.) The percentage of children passing the item increased rapidly with age.

3.) The mean mental age (MA.) of children passing and failing the item differed significantly.

The test was very heavily loaded with verbal materials to measure other types of intellectual functioning and the administrative procedure was time consuming. But compare to the earlier form of the Stanford-Binet and other available intelligence tests, the 1937 revision cover a wider range of abilities, core a wider age range and provide more detailed instructions for administration and scoring.

### 3.3.2 The 1960 Revision of Stanford-Binet Scale

As Brown\(^4\) states, "When taking a decision regarding the desirability of revising an existing test, a test constructor must consider the advantages of a revision e.g. elimination of obsolete materials, utilization of new techniques of test construction etc. and then weigh these against the disadvantages of such a revision e.g. the time and cost of revision and rendering irrelevant much of the normative, validity and experimental data about the test".

In this revision more effective items have been retained and rearranged, and deviation IQ has been introduced.

In order to illustrate the content of the test, four different age levels have been picked up. Its brief description is as follow:

1.) **Age-II**
   
   (1.) Three-hole Form Board : Placing three geometric objects in form board.
   
   (2.) Delayed Respond : Identifying placement of hidden object after 10 – seconds delay.
   
   (3.) Identifying parts of the body : Point out features on paper doll.
   
   (4.) Block Building Tower : Build four-block tower by imitating examiner's procedure.
   
   (5.) Picture Vocabulary : Naming common objects from pictures.
   
   (6.) Word Combinations : Spontaneous combination of two words.

2.) **Age-VI**
   
   (1.) Vocabulary : Correctly define six words on 45 words list.
   
   (2.) Differences : Telling difference between two objects.
   
   (3.) Mutilateral Pictures : Pointing out missing part of pictured objects.
   
   (4.) Number Concepts : Counting number of blocks in a pile.
   
   (5.) Opposite Analogies : Solve analogies like "summer is hot : winter is ________".
   
   (6.) Maze Tracing : Finding shortest path in a simple maze.

3.) **Age-X**
   
   (1.) Vocabulary: Correctly define eleven words from the list of words.
   
   (2.) Block Counting : Counting number of cubes in three dimensional picture, some cubes are not apparent.
(3.) Abstract Words: Definition of abstract words.
(4.) Finding Reasons: Giving reasons for laws and preferences.
(5.) Word Naming: Naming as many words as possible in one minute.
(6.) Repeating six digits: Repeat six digits in order.

4.) Average Adult

(1.) Vocabulary: Define 20 words correctly.
(2.) Ingenuity: Algebraic word-problems involving mental manipulation.
(3.) Difference between Abstract Words: Differentiate two related abstract words.
(4.) Arithmetic Reasoning: Word problems involving simple computations.
(5.) Proverbs: Giving meaning of proverbs.
(6.) Orientation: Finding orientation after a verbal series of changes in directions.
(7.) Essential Differences: Give principle difference between two related concepts.
(8.) Abstract Words: Give meanings of abstract adverb.

There are two limitations of Binet's Test as follows:

1. Being verbal tests, it cannot be administered to the illiterate, deaf and mute, and
2. Being individual tests, it consumes a great deal of time.

To minimize these limitations, two types of tests have been developed. They are:

1. Performance Tests, and
2. Group Tests.
3.4 PERFORMANCE TESTS

According to Mehrens and Lehmann, "A test is called a performance test if the tasks demand a manipulation of objects e.g. making geometrical configurations with blocks, rather than an oral or written response".\textsuperscript{5}

This type of test is most helpful in assessing the level of intellectual functioning for people who have language disabilities, deafness, blindness etc.

Some examples of performance tests are the Wechsler Scale (1939), Pinter-Patterson Scale (1917), the Cornell-Coxe Scale, the Arthur Point Scale (1930), the Cattel Infant Intelligence Scale, the Merrill-Plamer Scale, and the Leiter Adult Intelligence Scale. The Koh's Block design (1923), Porteus Maze Tests (1914,1924,1950 & 1959), Alexander's Passalong Test, Collins and Drever's Test are all Performance Tests.

\textit{Wechsler Scales}\textsuperscript{6}

The Stanford- Binet Scale has certain drawbacks as a measure of adult intelligence i.e. (1) The items developed for children have been inappropriate for adults. (2) The use of the mental age concept is of a questionable utility for adults. And (3) The available normative data were collected on children and not on adults.

The Wechsler-Bellevue Intelligence Scale was first published in 1939 and the scale was modified and restandardized as the Wechsler Adult Intelligence Scale (WAIS) in 1955.


The Wechsler Intelligence Scale for Children (WISC) was published in 1949. It was designed for ages 5 to 15. The Wechsler Pre-school and Primary Scale of Intelligence (WPPSI) was published in 1967 for the ages 4 to 6 1/2. For all the tests, Wechsler has computed deviation IQs.

The eleven sub-tests of WAIS have been described in brief as follows:

1.) **Verbal Scale**

   It consists of six sub-tests. They are as follows:

   (1.) Information: It has 29 items which measure the range of the examinee’s knowledge, retention of learned from school.

   (2.) Comprehension: It has 14 items which measure the judgment and common sense.

   (3.) Arithmetic: It has 14 items, testing concentration, arithmetic ability and problem-solving skill.

   (4.) Similarity: It has 13 items, measuring logical thinking and conceptual ability; a good measure of general intelligence.

   (5.) Digit Span: It has items which tests attention and immediate memory by items requiring examinee to repeat series of digits either forward or backward.

   (6.) Vocabulary: It has 40 words of varying difficulty. It is the best single index of full-scale IQ; indicates range of knowledge and cultural background.

2.) **Performance Scale**

   It consists of five sub-tests. They are as follows:

   (1.) Digit Symbol: It measures flexibility and ability for new learning through a task requiring the substitution of symbols for number.

   (2.) Picture Completion: It has 21 items that require examinee to tell
what is missing in a picture of a common object which measures perceptual ability, particularly ability to differentiate essential from unessential details.

(3.) Block Design: Examinee reproduces design with colored blocks. It measures ability to analyse and organize from cubes.

(4.) Picture Arrangement: Require examinee to arrange a group of pictures to tell a coherent story. It measures ability to comprehend a total situation.

(5.) Object Assembly: Task is to assemble pieces of a puzzle form a common object. It tests perceptual ability and persistence.

The individual's score is based on the number of items answer correctly. For this reason, the WAIS is referred to as a point scale.

3.) Other Wechsler Scale

The Wechsler Intelligence Scale for Children (WISC) is an extension to lower age levels. The format of the WISC is similar to the adult scales; only one WISC sub-test (Mazes) does not appear in adult form. The items were constructed to test the children that find the mazes exit quickly.

In 1967, Wechsler Preschool and Primary Scale of Intelligence (WPPSI) was published for the age-groups 4 to 6½. The format of sub-test is quite similar to the WAIS and WISC, but certain changes have been made (e.g. inclusion of more non-verbal tasks) to make the test appropriate for pre-schoolers.

3.5 GROUP TESTS OF INTELLIGENCE

Group tests of intelligence are typically composed of several types of items: vocabulary, general information, arithmetic and reasoning items. In particular, group tests of general intelligence are often heavily
weighted with vocabulary items, either in the traditional form or in varied form, such as selecting the correct word for use in sentences or in items of analogies. The widespread use of vocabulary items reflects the empirical finding that vocabulary is the best single index of intelligence. General information items are included to estimate the individual's range of knowledge. Arithmetic items generally involve simple computations. Reasoning items may be verbal or non-verbal analogies. By and large, group tests include the item types that have proven to be the most valid indices of intellectual ability.

Group tests share certain common features. Group administration permits more efficient testing of large number of persons. Group tests are usually paper and pencil tests with items cast in the multiple-choice format.

Although group intelligence tests were originally designed to be economical for individual tests, and still are widely used in this manner, they have assumed an existence of their own. Group intelligence measures are also used for industrial and business screening. These tests are generally short, are constructed along traditional lines, and include items covering the common components of intelligence ability.

Now due to increasing popularity and demand of group tests, a need for construction and standardization of group tests of intelligence has been felt. A brief outline of the existing group tests is given below.

3.5.1 Group Tests of Intelligence Developed Abroad

Noteworthy group tests7 that developed in other countries.

1.) Verbal Group Tests

1. **American Council Psychological Examination (ACPE) (1924)**

   It was developed by L.L. & T.G. Thurstone in 1924 and has passed through various revisions. It is meant for college entrance.

2. **Army Alpha Examination (1916-1939)**

   It is meant for secondary school students and adults. It consists of sub-tests like information, reasoning and practical judgment.

3. **Army Central Classification Tests (ACCT) (1945)**

   It was developed during World War II and was meant for age group 9 to 16 and adults. The items are based on vocabulary, arithmetic, reasoning & block counting and they are arranged in spiral omnibus form.


   It is a verbal test meant for Grades III-XII.

5. **Kuhlmann-Anderson Intelligence Tests (1963)**

   It is meant for K.G. to Grade XII. It has 30 separate parts.

6. **Primary Mental Abilities Test (1963)**

   It is meant for K.G. to Grade XII. It consists of items measuring verbal meaning, spatial ability, perceptual ability, number facility, and reasoning ability.

2. **Non-Verbal Group Tests**

   1. **Culture-Free Intelligence Tests (1950)**

      It was developed by R.B. Cattell, for age 4 to adult. It is a non-verbal test consisting of matrices and other reasoning tasks. It is independent of language skill but is not truly free of cultural influences.

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(2.) Davis- Eells Games (1953)

It was developed by Davis and Eells for pupils Grades I-II & III -VI, which full of pictorial items.

(3.) Progressive Matrices (1951)

It is a non-verbal test for age-group 5½ to 11 years and was developed by J.C. Raven & H.K. Lewis.

(4.) Semantic Test of Intelligence (1952)

It is a non-verbal test for testing conceptual reasoning.

(5.) SRA. Tests of General Ability (TOGA) (1960)

The test was developed by J.C. Flanagan for K.G. to Grade XII. It eliminates school learned skills. The tests consist of two sub-tests, viz., information and reasoning. All the test items are in pictorial form.

“TOGA Part I (information) scores appear to relate more closely to Thurstone’s Verbal Comprehension Factor and part II (reasoning) seems to relate to his reasoning factor”.⁹

It provides a measure of general intelligence using items not dependent upon formal school learning.

3.) Verbal & Non-Verbal Group Tests

(1.) California Test of Mental Maturity (CTMM)

It was developed by S.R. Sullivan, W.W. Clark, B.W. Tiege for K.G. to Grade XII with variety of items. Separate “Language” and “Non-language” IQs are offered. It is a widely accepted, current test.

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(2.) **Lorge-Thorndike Intelligence Tests (1954)**

The test is meant for K.G. to high school students. The test consists of verbal and non-verbal items.

(3.) **Otis-Lennon Mental Ability Test (OLMAT) (1967)**

In 1922 A.S.Otis constructed the intelligence test was called "Otis Self-Administering Test of Mental Ability". Later, R.T.Lennon developed A.S. Otis's test which well known "Otis-Lennon Mental ability Test (OLMAT)." This test has five levels to test students from K.G to Grade XII. It consists language and non-language reasoning items to measure intelligence quickly. There are four parts as follows:

1) Verbal Comprehension: It has about 25-31% of all items which measured comprehensively i.e. antonym words, synonym words and sentences.

2) Verbal Reasoning: It measured verbal reasoning ability that has about 31-40% of all items. It consists of word-letters matrix, verbal analogies, verbal classifications, inferences and logical selection.

3) Figural reasoning: It measured reasoning ability by figures that it has about 19% of all items. The test consists of figural analogies and figural series.

4) Quantitative Reasoning: It measured the number and quantities that it has 16-19% of all items. Test consists of number series and arithmetic reasoning.

(4.) **Pinter General Ability Tests (1945)**

It consists of separate language and non-language tests for Grade IV to IX.
3.5.2 The Intelligence Tests & Group Tests of Intelligence

Developed in Thailand

1.) The Intelligence Tests in Thailand

The questions to test mental abilities or intelligence test in Thailand have been since the ancient time. The most questions were for example riddles and like that could be in hundreds of types and forms. But they were in systematically categorized. The selection of military officers and civil servants usually focus on intelligence of the applicant. The word "Intelligence" means "fast thinking", it came from Bhali word "Chun". These proved that word intelligence were known among Thai for along time.

For the measured intelligent behaviors there were no evidence about when they were first designed. Test by Metathipbodee: The test has 75 items and required 30 minutes to complete. The type of the test was verbal test. In 1935 Tuy Chumsai modified Standford – Binet's Test to make it usable in Thai language, and in 1945 he made the geometry form to test students in Chulalongkron University. There were no acceptable results.

In 1956, the ministry of Education appointed a committee to design intelligence test, in which Tuy Chumsai was chief of committee. The intelligent construction was base on Therston's theory. The results of applications were not well known. Latter in 1957, Chaval Parrattanakul constructed "The Skilled Diagnosis Mental Test" for Thai students for Grade VII-XII. This test measured for momentous factors, which have two sections, first section was figure type

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10 Ibid., p.36.
and second was verbal. This test was widely accepted, although it was used as the police entrance. In 1961, The Ministry of Education established The Educational and Psychological Test Office, supported by The Teacher Training Department. The office's mission was to design and researched a standardized intelligence tests which suitable for Thai pupils. Tuy Chumsai was selected the chief of office again, and the office was located at Prasanmit Educational College. In 1962, the staff constructed the learning abilities test. It consists of nine different circles, and lines inside. It is similar the old IQ.Test and knowledge “Learning Quotient (LQ.)” in 1963, the office modified intelligence test, which has 4 sub-tests for students Grade IX but it was not widely use.

In year later, the intelligence tests were constructed many tests by many groups of person. However Intelligence Tests constructed in Thailand was not popular.

2.) Group Tests of Intelligence Developed in Thailand

In Thailand, verbal group test and non-verbal group tests of intelligence which have been developed in Thai language since 1935. The following Table No. 3.1, states the information about the tests that were developed in Thailand.

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15 Ibid., p.68.
Table 3.1
Tests Developed in Thailand

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of the Test Investigator</th>
<th>Verbal, Non-verbal or Mixed</th>
<th>Grade or Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mental Ability Test Tuy Chumsai</td>
<td>Verbal</td>
<td>3-12 Years.</td>
</tr>
<tr>
<td>2.</td>
<td>Group Test of Intelligence Chaval Parrattanakul</td>
<td>Verbal</td>
<td>Grade VII to IX</td>
</tr>
<tr>
<td>3.</td>
<td>Non-Verbal Group Test of Intelligence Tuy Chumsai</td>
<td>Non-Verbal</td>
<td>7-14 Years.</td>
</tr>
<tr>
<td>4.</td>
<td>Group Test of Mental Ability Pranee Suthipong</td>
<td>Verbal</td>
<td>Grade V to X</td>
</tr>
<tr>
<td>5.</td>
<td>Group Test of Mental Ability Jiraphan Chansriwong</td>
<td>Verbal</td>
<td>Grade V to VII</td>
</tr>
<tr>
<td>6.</td>
<td>Culture-Fair Test of Mental Ability Promphan Senarphitak</td>
<td>Verbal</td>
<td>Grade V to VII</td>
</tr>
<tr>
<td>7.</td>
<td>Group Test of Mental Ability Team work</td>
<td>Verbal</td>
<td>Grade VII</td>
</tr>
<tr>
<td>8.</td>
<td>Group Test of Intelligence Nongnuch Punchasi</td>
<td>Verbal</td>
<td>14-15 Years.</td>
</tr>
<tr>
<td>9.</td>
<td>Group Test of Intelligence Kasem Saraithip</td>
<td>Non-Verbal</td>
<td>16-17 Years.</td>
</tr>
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</table>

The present test being Verbal Test and Non-verbal Test nature, the investigator has attempted to peep into the existing verbal test and non-verbal group tests of intelligence, which were developed in Thailand. They are as follows:

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1. Tuy's Non-Verbal Group Test of Intelligence (1963)

Tuy Chumsal constructed about “The Intelligence Test for Students Belonging to Age Group 7 to 14” which type is a non-verbal test. The test purposed to measure memory ability to visualize perception and memory by observing. He initially believed that memory was the basic ability for learning. This test has 60 items and time-limit was 45 minutes.

1) Objectives of study

(1) To construct intelligence test for students belonging to age group 7 to 14.

(2) To establish norms and standardization intelligence test.

(3) To study the significant of difference sex, age and area of schools.

2) Variables of study

(1) Independent variables

1.1 Sex i.e. boys and girls

1.2 Age i.e. 7, 8, 9, 10, 11, 12, 13 and 14 years.

1.3 Area of school i.e. urban and rural area.

(2) Dependent variable

Scores on intelligence test

3) Sample of study

The sample was 1,250 students of Grade I to IX in Thailand which age group between 7-14 years. It was selected by random sampling method.

4) Reliability & Validity of study

The reliabilities of the test were between .68-.93 and validity was .45.

6) Major findings

(1) It was not significant of sex difference at .05 level.
The different age group of students was significant at .05 level. The students belonging to age group 14 were intelligence higher than 13, 12, 11, 10, 9, 8, and 7 years. The age group of students 7 years and 8 years were different.

This test could be used to evaluate intelligence to Thai students belonging to age group 7 to 14 but it was not popular.

2. Parnee's Verbal Group Test of Mental Ability (1967)

Parnee Suthipong studied about "Mental Ability Test of Students Grade V to X", M.Ed. Dissertation, Srinakarinvirot University in 1967. This test was a verbal test, which has 85 items and time limit was 60 minutes. It has two parts i.e. (1) verbal ability and (2) numerical ability.

1) Objectives of study

(1) To develop mental ability test for students Grade V to X.

(2) To establish norms and standardization mental ability test to students Grade V to X.

(3) To study the mental ability of students which sex and grade difference.

2) Variables of study

(1) Independent variables

1.1 Sex i.e. boys and girls.

1.2 Grade i.e. V, VI, VII, VIII, IX, and X.

(2) Dependent variable

Scores on mental ability test

3) Sample of study

The sample was 9,842 students which randomized from students Grade V-X in 1st Educational region in Thailand.
4) Reliability & Validity

The reliability of test was .79 and validity was .47.

5) Major findings

The major findings were as follows:

(1) The verbal ability of different sex i.e. boys and girls increase rapidly which they were Grade V and VI, after that it would decrease slightly and would increase again in Grade IX.

(2) The girls' verbal ability was higher than boys in every grade.

(3) The verbal ability of boys and girls was not different in primary schools but in secondary schools was difference.

(4) The numerical ability of boys and girls was not different in every grade.

3. Jiraphan's Group Test of Mental Ability (1973)

Jiraphan Chansriwong studied about "Mental Ability Test for Students Grade V to VII in Bangkok", M.Ed. Dissertation Chulalongkron University in 1973. She adopted mental ability test from 1st version & 2nd version of Raven's advance Intelligence Test and modified suitably for Thai students and their environment. This test was a verbal test that consisted of five sub-tests i.e. (1) Antonyms (2) Analogies (3) Unmatched Words (4) Arithmetic Reasoning and (5) Numerical Series. Initially it was 100 items and the time limit was 54 minutes.

1) Objectives of study

The objectives of her studied were as follows:

(1) To develop mental ability test that was suitable for Thai students and their environment i.e. social, culture and tradition.

(2) To establish norms and standardization of mental ability test of
students Grade V to VII in Bangkok.

(3) To study mental ability of students in Bangkok.

2) Variables of study

(1) Independent variables

1.1 Sex i.e. boys and girls.

1.2 Grade i.e. V, VI and VII.

(2) Dependent variable

Scores on mental ability test

3) Sample of study

The sample was 3,565 students, which was randomly selected from schools in Bangkok.

4) Reliability & Validity

The reliability of the test was .726 and validity was .54.

5) Major findings

(1) The mental ability of students in Bangkok was middle level.

(2) It was not significant of mental ability that students were different sex i.e. boys and girls at .05 level.

(3) The students' mental ability different grade was significant at .05 level. Students' mental ability Grade VII was higher than Grade VI and V.

4. Promphan's Culture-Fair Test of Intelligence (1970)

Promphan Senarphitak studied about "The Intelligence Culture Fair Test of Minority Students in Northern Part of Thailand", M.Ed. dissertation, Srinakarivirot University in 1970. He modified "Mental Ability Test of Students Grade V – VII" which was constructed by Jiraphan Chansriwong (1969). It was a verbal test that has three parts i.e. (1) verbal ability (2) verbal reasoning
ability and (3) numerical ability. This test has 85 items and the time limit was 50 minutes.

1) Objectives of study

The objectives of his study were as follows:

(1) To establish norms and standardization of intelligence test

(2) To study intelligence of minority students in Northern part of Thailand i.e. Aka, Lisor, Muser and Kahaeng.

(3) To compare the mean scores of intelligence of Thai students and minority students.

2) Variables of study

(1) Independent variables

1.1 Sex i.e. boys and girls.

1.2 Grade i.e. V, VI and VII.

(2) Dependent variable

Scores on intelligence test

3) Sample of study

The sample was 435 students which studying in primary schools Grade V, VI, and VI in three provinces there were Chiangrai Province, Tak Province and Kanchanaburi Province.

4) Reliability & Validity

The reliability of test was .918 and validity was .43.

5) Major findings of study

The findings of his study were:

(1) The intelligence of minority was middle level.

(2) It was significant of intelligence at .05 level that students were grade difference.
(3) The difference of intelligence between the minority students and Thai students were not different between the two groups.

(4) The reliability was found that high level and can be used with persons who are from the different backgrounds and locations, which would not favor either group. But the person must be literate in Thai language, because the problems were written in the language.

5. Chaval's Group Test of Intelligence (1970)

Chaval Parratanakul and co-investigators had developed and researched "The Standard Test Project for Students Grade VII". This project presented to Education Department of Srinakarinvirot University, Bangkok in 1970. This test was a verbal test that consisted four parts i.e. (1) verbal ability (2) numerical ability (3) conceptual ability and (4) spatial ability. It has 87 items and time limit was 60 minutes.

1) Objectives
The objectives of project were as follows:

(1) To construct various standard intelligence tests in Thai language for students Grade VII in Thailand.

(2) To establish norms and standardization of intelligence test for students Grade VII.

(3) To develop standard intelligence test that suitable for Thai students Grade VII.

2) Variables

(1) Independent variables

1.1 Sex i.e. boys and girls.

1.2 Age i.e. 10,11 and 12 years.

1.3 Area of schools i.e. urban and rural.
(2) Dependent variable
Scores of intelligence test

3) Sample
The sample of this test was 12,750 students of Grade VII from 259 first-class schools in Bangkok.

4) Reliability & Validity
The reliabilities of the test were between .60 to .80 and validity was .40.

Sahad Vithriya had studied "The General Mental Ability of Students Grade IV to V in Ayuthaya Province", M.Ed. Dissertation, Bangkok, Chulalongkorn University in 1966. This test is a verbal test which has 45 items and the time limit was 50 minutes. It consisted of four sub-tests i.e. (1) reading part (2) writing & spelling part (3) science part and (4) arithmetic part.

1) Objectives of study
The objectives were as follows:

(1) To establish norms and standardization of general ability test for students Grade IV to V in Ayuthaya Province.
(2) To compare the mean scores of general ability of students Grade IV and V.
(3) To study the different sex of students' general ability.

2) Variables of study
(1) Independent variables
1.1 Sex i.e. boys and girls
1.2 Grade i.e. IV and V.
(2) Dependent Scores on general ability test

3) Sample of study

The sample of test was 750 students of Grade IV to V from schools in Ayuthaya Province, which were selected by random sampling method.

4) Reliability & Validity

The reliability of the test was .75 and validity was .51.

5) Major findings

The major findings of study were as follows:

(1) The general ability of students Grade V was higher than students Grade IV.

(2) It was not significant of general ability at .05 level of students different sex i.e. boys and girls.

7. Nongnuch's Group Test of Intelligence (1982)

Nongnuch Panchasi studied about “Intelligence Test for Students Belonging to Age Group 14-15 in Chiangmai Province”, M.Ed. Dissertation, Bangkok, Srinakarinirote University in 1982. This test was a verbal test that she adopted from “Otis-Lennon Mental Ability Test (OLMAT) form J, Advanced Level”. It has 70 items and time limit was 60 minutes which consisted three parts i.e. (1) verbal ability (2) numerical ability and (3) reasoning ability.

1) Objectives of study

The objectives of study were as follows:

(1) To establish norms and standardization of intelligence test for students belonging to age group 14-15 in Chiangmai Province.
(2) To compare the mean scores of students’ intelligence were different age group 14-15 years.

(3) To study the students’ intelligence that sex and age were difference.

2) Variables

(1) Independent variables

1.1 Sex i.e. boys and girls.
1.2 Age i.e. 14 and 15 years.
1.3 Area i.e. urban and rural area.

(2) Dependent variable

Scores of intelligence test

3) Sample of study

The sample was 450 students of Grade X in Chiangmai Province which were selected by random sampling method.

4) Reliability & Validity

The difficulties of this test were between .02 to .80, the reliability was .85 and validity was .62.

5) Major findings

The major findings of study were:

(1) The students’ intelligence in Chiangmai Province was middle level.

(2) The intelligence of students belonging to age group 15 years was higher than students age group 14 years.

(3) It was not significant of different sex at.05 level i.e. boys and girls.
8. Kasem's Group Test of Intelligence (1980)

Kasem Saraithip studied about "Intelligence Test for Students Belonging to Age Group 16-17 in Suphanburi Province", M.Ed. Dissertation, Bangkok, Srinakariniwirot University in 1980. This test was a verbal test that was modified from the Colored Progressive Matrices Test. It has four parts and seven sub tests i.e. (1) Spatial Relationship part (Test I: sensing right & left and Test II: manipulation of area), (2) Logical Reasoning part (Test III: similarities and Test IV: inference), (3) Numerical part (Test V: number series and Test VI: numerical quantity) and (4) Verbal Concept part (Test VII: verbal concept). The test has 80 items and the time limit was 60 minutes.

1) Objectives of study

The objectives of study were:

(1) To establish norms and standardization of intelligence test for students belonging to age group 16-17 in Suphanburi Province.

(2) To compare the mean scores of intelligence of students were different grade.

(3) To study the difference of students’ age group were different.

2) Variables of study

(1) Independent variables

1.1 Sex i.e. boys and girls.

1.2 Age i.e. 16 and 17 years.

1.3 Grade i.e. XI and XII.

(2) Dependent variable

Scores of intelligence test

3) Sample of study

The sample of this test was 778 students of higher schools of Grade XI to XII in Suphanburi Province, which were selected by random
sampling method.

4) Reliability & Validity

The reliability of the test was .83 and reliabilities each parts were spatial part .70, logical reasoning .73, numerical reasoning .75 and verbal concept .70. The difficulties of each part were .56, .59, .49 and .63 for spatial, logical reasoning, numerical reasoning and concept respectively. The validity was .49 and each part for spatial part, logic reasoning part, numerical reasoning part and verbal part were .49, .33, .25 and .40 respectively.

5) Major findings

The major findings of his study were:

(1) The significant of students' age group were different i.e. students' intelligence age group 17 years were higher than 16 years at .05 level.

(2) The intelligence of students Grade XII was higher than students Grade XI.

(3) It was not significant of sex i.e. boys and girls at .05 level.

3.6 RATIONALE FOR THE PRESENT TEST

Now days there are a great demand of different types of intelligence tests by the teachers, administrators, counselors, researchers and parents. Looking to the development of tests in advanced countries, works done in Thailand seem to be less. Hence, the present test, investigator has modestly ventured to develop one more test along with a very few existing verbal and non-verbal tests for the students studying in higher secondary schools of Thailand.

On classifying the available tests on the basis of types, age-level, grades, content, etc., it was observed that a very few intelligence test with verbal and non-verbal group tests exist in Thailand. It was also felt from the
review of the development of tests in Thailand and abroad that it was essential for the group tests of intelligence to consider some of the factor like time-limit, number of sub-tests, and weightage to environmental factors along with heredity factors.

As Anastasi puts it: "A practical difficulty encountered with separate sub-tests is that less careful examiners may make timing errors. Such errors are more likely to occur with several short time-limits than with a single long time-limit"\(^{17}\)

To eliminate this difficulty, the test ought to utilize less number of sub-tests and minimum possible time limit.

For the role of heredity and environment in the determination of individual's intelligence Ebill, Noll and Bauer state: "The belief that intelligence is completely dependent on genetic influences without appreciable change by environmental factors is now seldom held. The current tendency is to give both heredity and environment some of the credit for performance of intelligence tests".\(^{18}\)

The reason that investigator interests to develop intelligence test for Thai students belonging to age group 14-17 in Southern part of Thailand because from study of the intelligence tests that developed in Thailand they don't have intelligence test especially for students' age group 14-17 years in Southern Thailand. The most of intelligence tests were developed for students in other part of Thailand i.e. Bangkok and Northern part of Thailand. The intelligence test is very important tool for measuring student's intelligence. In Thailand, students belonging to age group 14-17 years that studying higher


secondary schools in Grade X to XII and after they complete they will entrance to study in the university. The knowledge of their intelligence will help students to learn and select the subjects. Therefore, it helps the teachers and councils to guide for further. Now days in Southern part of Thailand there is no suitable intelligence test for Thai students belonging to that age group. So that investigator was interested to study and develop group test of intelligence test which is suitable for society as per, culture, tradition and environment of Southern part of Thailand. The investigator believes that the study may be very useful for Thai students entering the university.

3.7 CONCLUSION

From review of the work done of intelligence tests, it was found that most of them were of foreign countries, which are not suitable for Thai society, culture and environment. In Thailand only few intelligence tests are constructed for Thai students and most of them are verbal tests, which are suitable for students having good language. Especially, in Southern part of Thailand there is no intelligence test for students belonging to age group 14-17. After review of the different tests, the intelligence test that may be suitable for students are verbal and non-verbal test because it consists words and figures that are useful for students having poor language. It was decided to construct an intelligence test on the principle of (1) Otis-Lennon Mental Ability Test (OLMAT), it was verbal test which was developed by R.T. Lennon for students from K.G. to Grade XII. and (2) Test of General Ability (TOGA), it was non-verbal test which was developed by J.C. Flanagan for students from K.G. to Grade XII. The present test is an intelligence group test to measure intelligence of students belonging to age group 14-17.