

Chapter Five

Achievement Levels by Selected Abilities Related to the Subjects

5.1 Introduction

In constructing the achievement tests, the test items were designed using accepted taxonomies of learning outcomes that have been made use of by the curriculum developers in each subject. Language and Mathematics curriculum developers utilized taxonomies other than Bloom's in listing the learning outcomes and preparing subject content. In First Language, vocabulary, comprehension, syntax, writing and appreciation are the abilities tested. In Mathematics, knowledge and skills, communication, connections, reasoning and problem solving abilities are considered.

Taxonomy-

A Principle for the classification of educational objectives.

-David Satterly

Instructional Objectives-

Instructional objectives have been one of the most useful guides to teacher and specialist in curriculum who have sought help in stating the dissevered out comes of instruction in behavioral language.

-Kibler R.J., Etal

In Science and Technology, abilities such as knowledge, comprehension, application, analysis and synthesis are tested. In this chapter, achievement levels of students in each ability of the three subjects are discussed using the facility values of the items. In addition, these achievement levels in related abilities, in year 2005 are compared with 2008. (Though the interpretations are done using facility values, caution is necessary in this regard, because in the construction of tests the facility values of the items used are not at the same level, as the complexity of ability is increased, the facility values of the complex items are lower. This is a basic requirement in test construction. This is reflected in achievement levels too.)

5.2 Achievement Levels in Abilities of First Language

The abilities tested in First Language, items utilized and the facility values obtained in 2005 and 2008 are given in Table 5.1 and Figure 5.1.

Table 5.1 - Facility Values of Abilities Selected in First Language (2005 and 2008)

Facility Values by abilities							
Abilities	Content Areas	Item Numbers	Facility Value of abilities		Facility Values		
			2005	2008	2005	2008	Difference
Vocabulary	Synonyms	1,2,3,4	0.72	0.74	0.73	0.74	+0.01
	Antonyms	5,6,7,8	0.75	0.76			
	Multiple meanings	9,10,11,12	0.72	0.75			
	Usages	13,14,15, 16	0.72	0.73			
Comprehension	Prose	17,18,19, 20	0.69	0.70	0.59	0.58	-0.01
	Poems	21,22,23, 24	0.48	0.46			
Syntax	Punctuation	25,26	0.44	0.5	0.51	0.53	+0.02
	Subject, predicate	27,28,29, 30, 31	0.50	0.50			
	Spellings	34,35,36, 32, 33	0.58	0.58			
Appreciation	Appreciation	37,38	0.46	0.41	0.46	0.41	-0.05
Writing	Prepositions	39,40,41, 42, 43	0.55	0.55	0.33	0.30	-0.03
	Meaningful sentences	44,45,46	0.19	0.10			
	Essay	47	0.25	0.25			

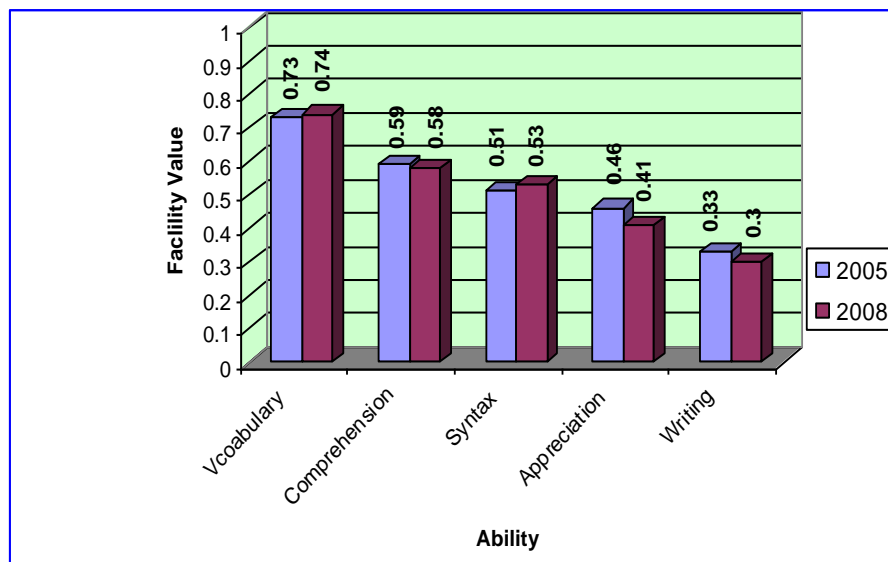


Figure 5.1: Facility Values to the Main Abilities Tested in First Language - 2005 and 2008

The term “facility value” is used as a synonym to the term “discrimination index”. In calculating this value what is done is to find out the percentage of students who have been able to answer the item correctly. The result is getting the percentage of students who have scored correct in this item or, for what percentage of students this item has been easy. Though psychologists have used the term “difficulty index” to denote this value, nowadays it is that the terminology used is the “facility value” or the “facility index”.

When Table 5.1 and Figure 5.1 are studied, a few patterns of achievement levels noted. First the difference in the achievement levels (facility values) in the two years are very small. In all five areas, vocabulary, comprehension, syntax, appreciation and writing, the facility values do not represent a major change, when inquired on the basis of first decimal point. In vocabulary the facility value has increased, showing a better performance level in 2008. This is mainly due to the emphasis made by teachers during the instruction in the classroom on synonyms, antonyms, words with multiple meanings and simple usage of the language. It should be the target of teachers to develop vocabulary and increase in the achievement level of students with the expectation of achieving facility values above 0.80. In relation to comprehension, though there is an improvement in the process of understanding prose and comprehending necessary information, generally a downward trend is noted. This is why the difference in the two years in comprehension shows minus values. There is a positive trend, in syntax. This is due to the attention paid by teachers, to develop the abilities of students in punctuations. Literary appreciations shows a lowering trend in the two studies. The same patterns can be seen in writing; the ability of students in writing meaningful sentences has not improved.

The next pattern is the decreasing nature of the facility values when the complexity of the abilities is tested. Two reasons can influence this trend. One is the ability level of students. The other is the facility values of the item incorporated in the test. When all the facility values and the differences are taken together, there seems to be little difference in achievement levels. However, if an improvement has to be

achieved, curriculum developers and programme implementers as well as the monitoring personnel should make more meaningful interventions in the process.

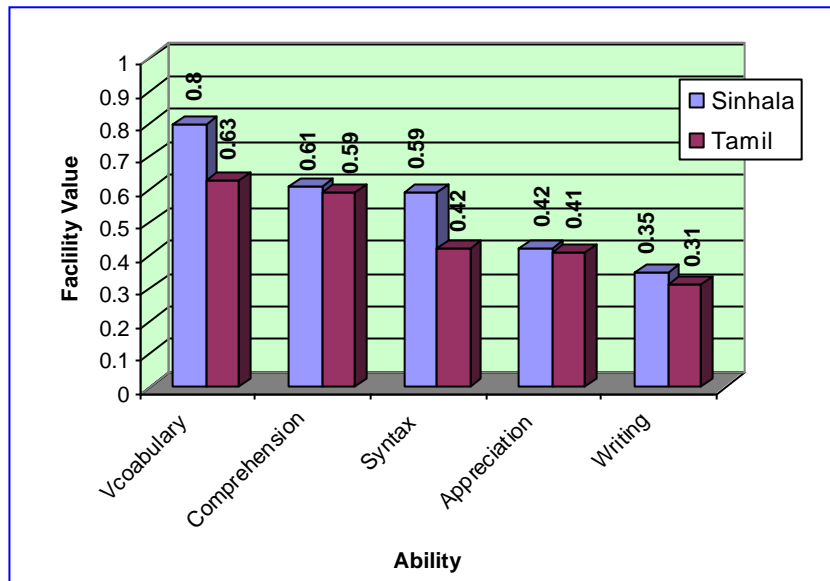


Figure 5.1.1: Differences in Achievement Levels in First Language Sub Skills (Sinhala and Tamil)

Differences in achievement levels in First Language skills (Sinhala and Tamil) are given in Figure 5.1.1. In all sub skills, the performance of students in Tamil Language is lower than the performance of students in Sinhala Language. The differences of facility value in sub skill such as vocabulary and syntax are 0.17, 0.17 respectively and there is no big difference in other sub skills comprehension , application and writing. The facility value in sub skills writing is low in both languages.

5.3 Achievement Levels in Abilities in Science and Technology

In Science and Technology, as the curriculum developers have made use of bloom's taxonomy, in developing Grade 08 achievement tests too the same taxonomy has been utilized. However, the category of evaluation was not considered in designing the test as it would be too hard for Grade 08 students.

**Table 5.2 - Facility Values Related to Abilities in Science and Technology
(2005 and 2008)**

Abilities	Item Numbers	Facility Values		Difference between 2005 and 2008
		2005	2008	
Knowledge	1,2,3,4,5,6,7,8	0.54	0.58	0.04
Comprehension	9,10,11,12, 13,14,15,16, 17,18,19	0.58	0.63	0.05
Application	20, 21,22,23,24, 25,26, 27,28	0.49	0.52	0.03
Analysis	29,30,31, 32,33,34,35,36,37,38	0.53	0.55	0.02
Synthesis	39,40	0.37	0.42	0.05

Facility values of five selected abilities calculated for years 2005 and 2008 are given in Table 5.2 and Figure 5.2. On average, these values show positive differences in the two years, in the five abilities. The lowest improvement is seen in the ability, analysis. The highest improvement is in comprehension and synthesis. When compared with other sub-skills, lower level improvement in application and analysis is noted. It may be that the use of learnt concepts in real life situations and use of experiments at class room level is not very consciously practiced.

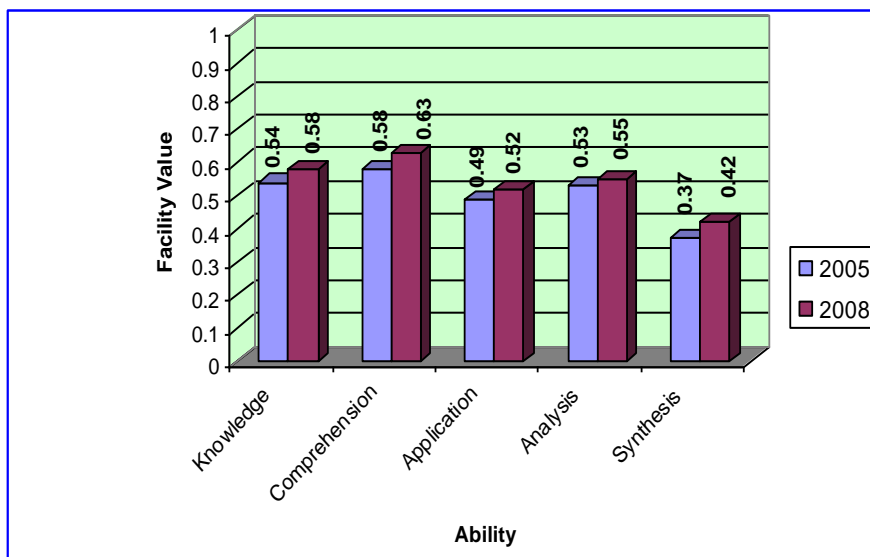


Figure 5.2: Facility Values for the Main Abilities in Science and Technology 2005 and 2008

What is to be highlighted is that in the manual of instruction provided for the teachers, the guidance for developing an analysis of application of students has to be enriched, more specifically. Providing learning events that lead to the

development of application of analysis of students in Science and Technology has to be a major concern of the curriculum developers and the teachers.

5.4 Achievement Levels in Abilities in Mathematics

In Mathematics, Table 5.3 and Figure 5.3 give the necessary information on the facility values of the five abilities tested. The categorization of these abilities is utilized by the curriculum developers in designing the text books and teachers guides. Therefore, during test construction, these five abilities were focused on, in designing the items.

What is most significant in Mathematics is the average increase noted in the process of teaching and learning at classroom level, in the last three years. This is why a favorable improvement in the achievement level of the students have been achieved, showing an upward movement in the facility values. The ability of problem solving has shown a higher improvement than the other four sub-skills. This means the ability of students to make use of the principles and concepts learnt in the classroom in real life situations. This seems to be a favorable development in the Sri Lankan schools.

Table 5.3 - Facility Values Related to Abilities in Mathematics (2005 and 2008)

Abilities	Item Numbers	Facility Values		Difference between 2005 and 2008
		2005	2008	
Knowledge and Skills	1,2,3,7,8,10,11,15,16,18,20,22,24,28,37,38	0.45	0.50	+0.05
Communication	4,9,13,19,26,27,36	0.52	0.56	+0.04
Connections	5,6,12,14,23,30,31,34	0.45	0.50	+0.05
Reasoning	17,21,29,32,33,35,39	0.37	0.42	+0.05
Problem Solving	25,40	0.48	0.55	+0.07

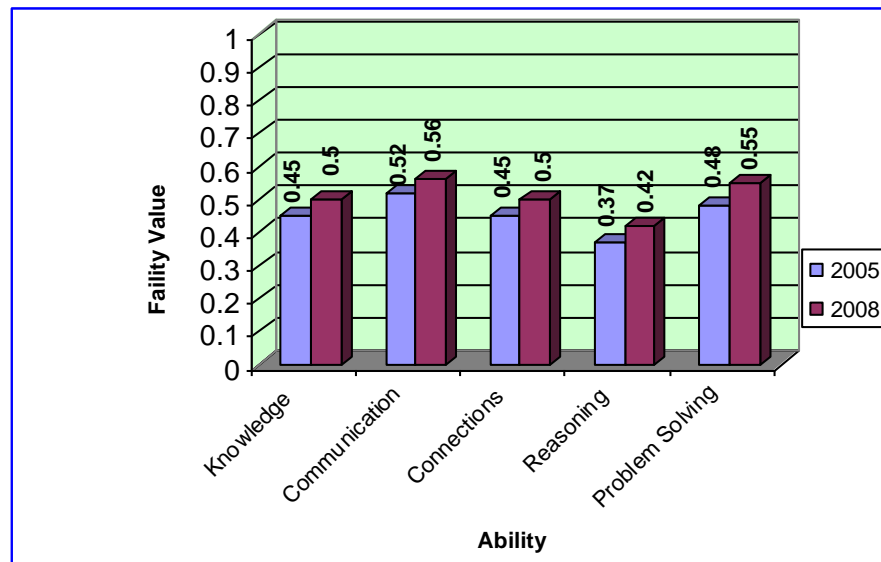


Figure 5.3: Facility Values for the Main Abilities in Mathematics-
2005 and 2008

5.5 Summary

Three different taxonomies used by curriculum developers have been the guiding principle behind the identification of abilities in constructing test papers. In First Language, vocabulary, comprehension, syntax, writing and appreciation are the abilities tested. In mathematics, knowledge and skills, communication, connections, reasoning and problem solving abilities are considered. Abilities such as knowledge, comprehension; application, analysis and synthesis were measured in Science and Technology. In First Language in all five areas of vocabulary, comprehension, syntax, appreciation and writing, the facility value does not represent a major change. When the complexity of abilities increase the facility values of the abilities are decreases and this feature is common to both studies. In science and Technology there is a positive change in all five abilities knowledge, comprehension, application, analysis and synthesis. In Mathematics there is an average increase in the performance of students in all five skills tested. This may due to the favorable improvement in curriculum and learning - teaching procedures at classroom level.

Key points

Achievement levels by abilities related to the subjects

First Language

- A slight improvement in vocabulary
- Comprehension no improvement seen
- No improvement in Syntax
- A slight improvement in writing
- appreciation no improvement in Appreciation

Mathematics

Improvement is shown in all sub skills

- knowledge and skills
- communication
- connections
- reasoning
- problem solving

Science and Technology

Improvement is shown in all sub skills

- knowledge
- comprehension
- application,
- analysis and
- synthesis