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Equipping Minority Students with Critical Reading and
Thinking Abilities for Better Participation in Singapore Schools

by

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EQUIPING MINORITY STUDENTS WITH CRITICAL READING AND THINKING ABILITIES FOR BETTER PARTICIPATION IN SINGAPORE SCHOOLS

Kamsiah Abdullah

Malay language is taught as a second school language or the mother tongue for Malay students who form the largest minority group in Singapore, comprising 15% of the population according to the 1994 Statistics. Although the performance of Malay students in other school subjects has shown improvement, much more could be done especially in the teaching of thinking skills, to enhance their school performance. In a modern society like Singapore, faced with a myriad of ever challenging situations and problems, a person need to be equipped with the skills to think through a problem critically and creatively. They should be able to make good judgements and decisions based on informed, well-balanced assessments to become constructive members of society. Furthermore, literature on the subject has shown the close relationship between critical thinking and reading with intelligence, academic ability, personality and general abilities factor. Critical reading is thus an important skill to be acquired. In schools the ability to read critically should be fostered and developed. For the Malay students especially, acquiring these skills in their mother tongue, their strong subject, could generate a transfer effect in their other school subjects.

While critical thinking and reading skills are identified in the new curriculum (1994) as important skills to be acquired, these two areas were not given proper emphasis in the Malay language classrooms. For effective teaching of critical thinking and reading specific skills underlying the construct need to be established and pupils' strength and weaknesses in the subskills need to be identified.

Critical Reading and Thinking Model

This paper describes the process whereby such skills were determined through the

development of a standardized instrument, The Revised Malay Language Critical Reading Test (RMLCRT), intended to measure the critical reading ability of Malay secondary school pupils and hence to a better understanding of the nature of their critical reading and thinking ability.

Critical reading ability is here defined as the ability to recognize, comprehend, apply, analyse, synthesize and evaluate written texts in a critical manner which refers to the reflective, open-minded, logical and rational way of solving problems. Critical reading then involves both the process of critical thinking and the process of reading comprehension. The outcome of an effective process of critical thinking and reading should therefore be good critical judgement which is based on the knowledge, ability and disposition of the reader. Initial inquiry involved a comprehensive search for the construct of critical reading and thinking ability and the skill or subskills underlying the construct.

Two main theories, the schema theory of reading comprehension (advanced by Rumelhart, Kintsch, Anderson and Pearson and others) and the critical thinking theory (formulated by Robert Ennis) formed the basis of this view of critical reading-thinking. According to the schema theory, schemata or mental frameworks are formed from experiential knowledge or knowledge of the world which includes the value-systems and beliefs held by the reader.

In the complex process of reading and thinking all types or levels of thinking: reasoning, deduction, induction, assimilation, discrimination (following Worden's 1980 model) and clarification, identification, recognition, inference, synthesis etc (Ennis's 1985 theory) are postulated to be utilized during critical thinking process. The outcome of critical thinking can be good or bad, effective or ineffective. It follows that specific thinking process during reading must involve triangulation among the reader (with prior background

knowledge) with the piece of text, as well as the author or the originator of the text.

Construction of The Malay Language Critical Reading Test

The Malay Language Critical Reading Test (MLCRT) consists of 82 items subsumed under ten subskills:

- o the ability to evaluate deductive inferences
- o the ability to evaluate inductive inferences
- o the ability to evaluate the soundness of generalizations,
- o the ability to recognize hidden assumptions.
- o the ability to identify bias in statements,
- o the ability to recognize author's motive,
- o the ability to identify fact or opinion,
- o the ability to identify relevant and irrelevant materials,
- o the ability to recognise similarities and differences,
- o the ability to evaluate strength of arguments.

Initially the test was piloted and trialed to a small sample of pupils. It was also assessed by Malay language specialists who gave positive feedback on its coverage and content. The actual test was administered to a total of 1444 representative sample of Malay students in both the Express and Normal Stream from all the five levels of the selected Secondary schools. After item analysis was performed on the test, some weak items including the first subskill were discarded. The test was revised and resulted in the RMLCRT which has 65 items. The RMLCRT was again analysed using the traditional method as well as the Rasch analysis. The main objective of this analysis was to examine the relative effectiveness of the items in terms of the total scores. Item effectiveness was measured using four criteria:

- a) its facility indices,

- b) its discrimination power measured by the point biserial correlation,
- c) its internal pattern through item characteristic curves,
- d) its correlation with the subskill.

Distribution of The Revised MLCRT

The distribution of the RMLCRT shows the scale to be normally distributed. The mean obtained by the actual sample of 1444 was 33.72 with a standard deviation of 9.64 and a standard error of .257. The maximum score and minimum score obtained were 58 and 4 respectively. The median was at the score of 34, while the mode was at the raw score of 32.

Characteristics of RMLCRT Items

The items of this scale are psychometrically sound and had quite strong internal consistency. The item facilities, item discrimination, standard deviation and correlation of the items with the revised scale are presented in Table 1. According to this method of analysis, the facility indices of the 65 items ranged from .21 to .89 with a mean index of .499 which shows the items to be of moderate difficulty as a whole. Its discrimination power, calculated using the point biserial correlation, ranged from .14 to .58, much better than that of MLCRT where some items were found to be weak discriminators.

Item Characteristic Curve of RMLCRT

The Item Characteristic Curve (ICC) which shows the percentage of pupils passing an item as a function of total raw score on the test was used to reveal defective items in the test. It was constructed because, even acceptable facility indices and discrimination indices sometimes could not reveal the effective functioning of the item across all levels of ability. To be effective, the proportion of examinees who answer a test item correctly should increase steadily with increases in total scores on the test. (Aiken L.R. 1971). An ICC of the

percentage of pupils passing a particular RMLCRT item as a function of the total raw score on the RMLCRT was produced by charting the percentage of correct responses of five roughly equal groups of MLCRT testees based on their total scores. The result shows that all the 65 items were psychometrically sound and free from bias to any group.

Analysis of RMLCRT Using the Rasch Analysis

In line with one of the objectives of this study which is to find the norm of critical reading ability of Singaporean Malay pupils, a model of critical reading ability taking into account the difficulty of the items in the test itself was considered. The Rasch Model was chosen as its item selection technique is purported to be sample-free as well as item-free; that is, the scores which result from Rasch analysis are not a function of the items used to construct the tests or of the samples used to calibrate the instrument (Hashway, R.M. 1978). The result from this analysis will therefore be more generalizable than that using the traditional item analysis technique.

In the Rasch model, the fit mean square represents a measure of the degree to which the observed item characteristic function conforms to the model, the larger the fit mean square obtained for a particular item, the more the item characteristic curve departs from the Rasch logistic function. The smaller the fit mean square the greater the correspondence between the observed characteristic function and the function postulated by the Rasch model.

Rasch test scores are referred to as true scores. This means that an equation can be written between observed Rasch test scores and the true scores. The standard error associated with a particular measurement is a measure of the error inherent in that measurement. True scores are conceptualized as Rasch measurements or equivalently, positions on the same dimension as the observed Rasch measurement, which are determined without error. Because such error-free measurement exists in theory alone, it is necessary

to associate the observed Rasch measurement with a corresponding true score and error term (Hashway R.M. 1978).

In theory the Rasch test score is unlimited, any number between negative infinity and positive infinity can be valid logarithmic Rasch scores. Since Rasch test scores are interval test measurements, various transformations can be performed from the test scores. In the present study the ability scale was transformed into Standardized T-Scores with a mean of 50 and a standard deviation of 10. All the items have the same discrimination parameter, and all have a guessing parameter of 0. The programme eliminated items with zero variance and examinees with zero or perfect number scores.

Table 2 shows the parameter estimates produced by Rasch analysis when ability standardization was selected. Here the final estimates of 65 items of RMLCRT were computed and sorted according to the order of difficulty of the items on the scale. Thus Item 43 was the easiest while Item 22 was found to be the most difficult. The average difficulty of all the items was 0.15 in Theta metric and 51.5 in scaled score metric. The discrimination of the scale was fixed at .511 for all items.

In the table the Pearson Chi-square lack of fit statistics are also presented along with their degrees of freedom which is fixed by the programme at a maximum of 20 groups. High and statistically significant chi-square suggested that some items were not adequately described by the Rasch model.

Table 3 shows the Theta scale of the pupils' ability in critical reading in terms of the number of their correct responses to the RMLCRT. The Rasch ability scale is also transformed into percentile and scaled scores (T-score). The scaled score at the last column in the tables gives the scaled difficulty of the items in relation to the ability of the pupils. Thus the 40 pupils with average ability (Theta 0.03) were on the 61st percentile. A scaled

item score of 50 fitted the theta value of .03 on the ability scale.

The test characteristic curve of the RMLCRT scale calculated using ability (Theta) as the basis, is given in Figure 1. The curve reveals a positive relationship between ability and the difficulty of the test. For example a person with an ability measure of -1.0 had more than 50 % chance of obtaining 25% of the items correct whereas a person with estimated ability of 2.0 had more than 50% probability of answering 75% of the items correctly.

Figure 2 shows the Item by Pupil distribution map where the percentage of items and the percentage of examinees were matched in the same scale based on ability. The distribution shows a good fit between item difficulty and pupil's ability.

Pupils' Estimated Critical Reading Ability Across Grade Level

The estimated critical reading ability of the pupils based on Rasch analysis was further sorted into the five grade levels and the two streams, the Express and Normal Pupils. This will give a clearer picture of the respective abilities of the pupils' in each grade level and stream.

Pupils' Estimated Critical Reading Ability by Stream

The estimated ability of the Sec 1 pupils was the lowest, at -.171 while the Sec 4 pupils were the highest, with a mean estimated ability of .204. The Sec 5 pupils were low in their ability as this level is meant for the academically weaker Normal pupils only. An analysis of variance was performed on the five groups in order to examine whether the differences in abilities were significant. The F-value obtained was 7.42 with 4 degrees of freedom and statistically significant beyond the .001 level.

The difference in ability between the Normal and Express pupils was clearly indicated, with the Express pupils having mean estimated ability of .382 compared to the Normal pupils whose estimated ability was only -.219. The differences in ability measured

by analysis of variance technique gave an F- value of 109.94 with 1 degree of freedom, significant at .001 level.

The breakdown of the data gave a clear picture of the ranking of the pupils' estimated ability: the abilities of the Express pupils clearly exceeded that of the Normal pupils in all grade levels. Thus there was also a consistent pattern of ability with regard to grade level and stream. Pupils in the lower grade level have a lower estimated ability than pupils at a higher grade level, also pupils in the Express stream seem to have higher critical reading ability than those in the Normal stream.

Reliability of the RMLCRT Scale

The reliability of the RMLCRT or its internal consistency was examined by using Cronbach's Alpha. The Coefficient Alpha value obtained for the RMLCRT was 0.86, an increase of .02 from that of the actual MLCRT which has an alpha of .84. Using Spearman equal length split-half reliability where the first and second part of the test comprised of 33 and 32 items respectively, the reliability coefficient achieved was .87. This gives evidence of the reliability of the instrument.

Reliability of the RMLCRT by Grade Level, Stream and Gender

The reliability of the MLCRT by grade level (using the alpha coefficient) ranged from .83 to .89. The lowest reliability recorded was for Sec 1 pupils (alpha = .83) while the highest came from the Sec 3 pupils with reliability coefficient of .88. The reliability of the instrument among Express stream pupils was higher than that of the Normal stream pupils, the standardized Alpha value for the Express stream being .86 compared to only .82 for the Normal stream. As for gender, the result shows the RMLCRT scale to be reliable for both girls and boys, Standardized Alpha = .87.

Validity Studies of RMLCRT

Three types of analysis were conducted to show evidence of the content and construct validity of the RMLCRT. They were:

1. The views of the expert in the language and their responses as evidence of content validity.
2. Item-total correlation to show the internal consistency of the construct.
3. Factor analysis of RMLCRT with selected external variables as evidence of concurrent validity.

The Content and Face Validity of RMLCRT

The content validity of the items was empirically tested, using the test responses of the experts. From this exercise disputable items were deleted, so that the revised instrument was free of disputable items. The face validity of the items was earlier confirmed by the experts who found it to be free of any intrinsic bias.

The Concurrent Validity of RMLCRT

The strength of correlations between RMLCRT and other external tests and variables thought to have similar characteristics were used as preliminary evidence of its concurrent validity. The tests which should correlate relatively strongly with RMLCRT were the cognitive and ability types such as the Primary School Leaving Examination (PSLE), Mathematics, Science, Malay and general reading comprehension scores. Tests which are not similar in nature but which would also have a positive relationship with RMLCRT should be of the affective type or the non-cognitive type such as the Critical Thinking Disposition Test (CTDI), a new test developed by the researcher.

From the correlation coefficient, it was found that there was a moderately high correlation ($r = .54$) between RMLCRT with PSLE, a test of general academic ability and general reading comprehension ($r = .47$). Correlations of RMLCRT with Mathematics,

Science, English language grades were moderately high. These coefficients indicate the relatively strong relationship between RMLCRT and cognitive variables. Compared with an affective measure, like the CTDI, a marked difference was observed - correlation between RMLCRT and CTDI was only .18 even though it was significant beyond .001 level.

Following this, a more robust procedure, the Varimax rotated factor analysis was then conducted using the RMLCRT along with other selected tests and variables, to look into the internal loadings of RMLCRT in relation with these other external variables. The result is presented in Table 4. Twelve variables including RMLCRT were factor analysed to examine the common trait or traits. Only factors having latent roots or eigenvalues greater than 1 were considered. Using the Principal Component Analysis and then the Varimax rotation procedure, four factors emerged with eigenvalues above 1. The first factor extracted had an eigenvalue of 4.11 and accounts for 34.2% of the variance. The second factor had an eigenvalue of 1.9 and recorded 15.9% of the variance. Factor 3 and 4 had extracted 8.8% and 8.5% of the variance respectively. Altogether the four factors extracted 67.4% of the variance.

The first factor loaded on variables and tests which are related to cognitive factors such as PSLE (.89), Stream (-.81, favouring the Express stream), PSLE Mathematics (.81) PSLE Science (.78), and PSLE English (.69). The second factor extracted was a group of variables which were related to Malay Language, that is reading comprehension, RMLCRT, Malay Language in PSLE and strong Malay language (less English) home background. The third factor explaining 8.8% of the variance loaded on two variables related to pupils' socio-economic status - their mother's and father's education. The last factor, factor 4 had only one variable, the Critical Thinking Disposition of the pupils.

The important finding is that critical reading represented by RMLCRT clustered

together with reading comprehension and another test which has Malay language as the common factor. The RMLCRT also had some common traits with general ability tests. However it did not share much common traits with critical thinking disposition and socio-economic factors such as parent's educational level. It could therefore be posited that the RMLCRT has convergent validity with cognitive types of test such reading tests and Malay language variables but it has discriminant validity with socio-economic variables.

Subskill Difficulty Based on Rasch Analysis

The outcome of the Rasch Item analysis was then utilized to estimate the difficulty of the nine RMLCRT subskills. The average Rasch Item difficulty and the scaled difficulty of items belonging to each subskill was also calculated. Table 5 produced the result, sorted according to the order of difficulty from the easiest to the most difficult subskill.

The outcome of the Rasch analysis indicated that 'the ability to recognize hidden assumptions' was the most difficult skill with an average Rasch item difficulty of 0.93, whereas 'the ability to identify similarities and differences' was the easiest subskill with Rasch item difficulty of -2.28. The above order of the difficulty level of the subskills could give some useful pedagogical directions. The easier subskills could be taught first at the lower levels before introducing the more difficult subskill which is not easily attainable by pupils of average ability.

Uses of the instruments

As a reading and thinking test, the RMLCRT could be fruitfully used as a formative and predictive test for critical reading ability in Malay Language. As a predictive test, it could be used to estimate and thereby categorise pupils according to their critical reading ability for the purpose of instruction. Pupils who are more critical could then be given a different kind of instruction from those who are less critically minded. Generally the higher

the scores obtained by the pupils, the higher their ability. The norm and percentile rank constructed could be used to gauge the ability of the pupils. For instance, Student A who obtained a score of 20 has a T score of 41 and is placed approximately on the -0.87 on the Rasch ability scale, will therefore need more instruction in critical reading than student B who obtained a raw score of 47 which is equivalent to a T score of 64 and an estimated Rasch ability scale of 1.36 on critical reading ability.

As a formative test, the RMLCRT could be used to identify the strengths and weaknesses of secondary school pupils in their critical reading tasks. The subskill study could provide a detailed aspect to be focussed on during teaching. The pupils' score on specific subtests could be used as a guide to prioritize certain subskill to be taught. For example if a class of pupils were found to do poorly in the detection of bias in writing, then instruction in that skill could be further developed. On the other hand, if certain topics were found to be too easy, then it could be skipped or given less prominence.

Implications for Teaching

The school curriculum should develop a more rational curriculum which incorporates critical reading as an important component to cultivate 'good critical thinkers', that is having the critical spirit, the capacity for independent thinking and the readiness to explore and inquire. In practical terms perhaps it is the language classroom that is most suitable for such innovation. Therefore the present suggestion is directed toward language teaching, specifically Malay language teaching in Singapore.

1. A special critical reading and thinking component should be incorporated as part of the Malay Language syllabus in order to promote critical awareness and to enhance thinking skills among the pupils. This will be in line with the general effort to include more "thinking" components in all aspects of the curriculum.

2. All the nine subskills should be taught at least from Secondary One onwards so that when pupils complete Secondary 4 or 5 they would have been exposed to most if not all of the important aspect of critical reading.
3. Generally, the easier subskills should be taught first before teaching the more difficult ones. For example, the subskill which had been identified to be easier such as the ability to evaluate inductive inferences could be introduced fairly early before attempting the more complex ones such as 'the ability to identify hidden assumptions in statements'. In any case, the reading material and the targeted skill should be appropriate psychologically and cognitively to the pupils concerned.
4. A variety of tasks on critical reading and thinking should be given for proper mastery of the skill; the tasks could be in the form of both oral and written exercises. It should be conducted in a "communicative" way rather than in the traditional or structured way. The most important consideration is to obtain full participation and elicit genuine interest from the pupils. The pupils should be guided and facilitated to explore the ways of thinking and thoughts behind a piece of writing and to raise questions.
5. Good texts will be an asset to learning and teaching. Texts used should be taken from authentic materials and should be functional and meaningful for the pupils. To use Mathew Lipman's (1991) terms, the texts should be literary, psychologically and intellectually acceptable.
6. Teachers are crucial to the successful implementation of the curriculum. They should be a good model of the *inquirer* and the *critical thinker*; he or she must be able to use his or her imagination and creativity in planning meaningful tasks and lessons. Above all he or she has to show a caring attitude and integrity to do the utmost to

promote reflective and independent thinking in the class.

7. An in-service programme for Malay Language teachers should be mounted so that a clear understanding of the objectives and methods of teaching critical reading and thinking could be devised and disseminated, before its incorporation into the schools. This programme could be offered by the various institutions either independently or jointly with the Ministry of Education in order to facilitate the successful implementation of the programme.
8. Curriculum developers, writers of Malay Language textbooks and those involved in the production of teaching materials should also realize the importance of critical reading and the methods used to promote Malay critical readers and thinkers.

Finally, a more accepting and open environment for critical thought should be created for the inculcation of critical, creative and independent thinking. This, of course, creates a great challenge for the teachers and is more easily said than done. It means that teachers, parents and students themselves have a role in developing the better thinkers and hence better members of society for the future.

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Table 1
Item Analysis of RMLCRT Scale

Subskill A: 'The Ability To Evaluate Inductive Inferences'

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
1	851	.50	.59	.14**	.42**
2	1150	.46	.80	.20**	.39**
4	657	.49	.46	.15**	.37**
5	935	.50	.65	.20**	.41**
6	560	.47	.39	.13**	.37**
7	623	.49	.43	.15**	.32**
15	1154	.46	.80	.26**	.36**
18	1280	.42	.89	.27**	.35**
19	767	.50	.53	.21**	.34**
20	891	.50	.62	.16**	.33**

Subskill B : 'The Ability To Evaluate The Soundness Of Generalizations'

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
3	739	.50	.51	.12**	.38**
9	566	.40	.39	.24**	.40**
10	917	.50	.64	.19**	.29**
13	490	.46	.34	.10**	.43**
14	712	.50	.49	.19**	.45**
21	704	.50	.49	.21**	.49**
24	830	.50	.57	.22**	.21**
25	591	.48	.41	.14**	.37**

Subskill C: The Ability To Recognize Hidden Assumptions

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
34	658	.49	.46	.22**	.58**
35	301	.39	.21	.15**	.40**
36	535	.47	.37	.25**	.51**
37	550	.47	.38	.20**	.52**

Subskill D: The Ability to Recognise Bias in Statements

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
8	1059	.48	.73	.22**	.29**
28	574	.48	.40	.20**	.48**
29	531	.47	.37	.20**	.55**
30	527	.47	.37	.20**	.53**
31	917	.50	.64	.30**	.42**
32	585	.46	.34	.13**	.38**
33	915	.50	.63	.36**	.46**

Subskill E: The Ability To Recognise Factual Values and Opinion

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
12	362	.42	.25	.21**	.41**
38	591	.48	.41	.28**	.47**
39	752	.50	.52	.29**	.49**
40	424	.44	.29	.19**	.39**
41	1088	.47	.75	.43**	.61**
42	724	.50	.50	.31**	.52**
43	1148	.46	.80	.42**	.62**
44	842	.50	.58	.40**	.52**
45	1001	.50	.69	.43**	.61**

Subskill F: The Ability To Recognize Author's Motives

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
11	610	.49	.61	.23**	.44**
16	858	.50	.59	.22**	.42**
23	462	.45	.32	.19**	.41**
26	1164	.46	.81	.34**	.43**
48	491	.46	.34	.20**	.37**
51	604	.48	.42	.18**	.34**
52	612	.48	.42	.35**	.44**
57	453	.45	.31	.18**	.42**
58	574	.48	.40	.43**	.40**

Subskill G: The Ability To Identify Sources And Types Of Written Materials.

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
17	664	.49	.46	.18**	.38**
22	299	.39	.21	.24**	.37**
27	244	.36	.64	.21**	.39**
53	860	.50	.60	.34**	.56**
54	852	.50	.59	.44**	.59**
59	651	.50	.45	.19**	.45**
60	707	.50	.49	.39**	.53**
61	677	.49	.47	.38**	.56**

Subskill H: The Ability To Recognize Similarities And Differences.

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
46	972	.49	.67	.39**	.63**
47	1027	.48	.71	.46**	.67**
49	482	.46	.33	.17**	.42**
50	930	.50	.64	.31**	.60**
55	942	.50	.65	.48**	.68**
56	828	.50	.57	.42**	.64**

Subskill J: The Ability To Evaluate The Strengths Of Arguments.

Item No.	Frequency Correct	Standard Deviation	Facility Indices	Biserial Correlation	Correlation to Scale
62	702	.50	.49	.41**	.69**
63	736	.50	.51	.35**	.68**
64	741	.50	.51	.36**	.73**
65	484	.46	.33	.17**	.55**

Table 2
Raw Score Conversion Table of RMLCRT

Number Corr.	(Theta) Ability	Std. Error	Freq- uency	Cum Freq	Percen- tile	Scaled Score
1	-4.85	1.164	1	199	14	2
2	-4.03	0.831	2	201	14	10
3	-3.53	0.686	4	205	14	15
4	-3.18	0.601	5	210	15	18
5	-2.89	0.543	2	212	15	21
6	-2.66	0.501	4	216	15	23
7	-2.45	0.469	5	221	15	25
8	-2.27	0.443	4	225	16	27
9	-2.11	0.423	4	229	16	29
10	-1.96	0.405	5	234	16	30
11	-1.83	0.391	8	242	17	32
12	-1.70	0.378	13	255	18	33
13	-1.58	0.367	22	277	19	34
14	-1.46	0.358	25	302	21	35
15	-1.35	0.350	30	332	23	36
16	-1.25	0.343	32	364	25	38
17	-1.15	0.336	45	409	28	39
18	-1.05	0.331	29	438	30	39
19	-0.96	0.326	42	480	33	40
20	-0.87	0.321	42	522	36	41
21	-0.78	0.317	40	562	39	42
22	-0.69	0.314	36	598	41	43
23	-0.61	0.311	34	632	44	44
24	-0.52	0.308	30	662	46	45
25	-0.44	0.306	30	692	48	46
26	-0.36	0.304	29	721	50	46
27	-0.28	0.303	30	751	52	47
28	-0.20	0.301	33	784	54	48
29	-0.12	0.300	29	813	56	49
30	-0.04	0.299	35	848	59	50
31	0.03	0.299	40	888	61	50
32	0.11	0.299	59	947	66	51
33	0.19	0.299	50	997	69	52
34	0.27	0.299	50	1047	72	53
35	0.34	0.300	42	1089	75	53
36	0.42	0.300	43	1132	78	54
37	0.50	0.302	47	1179	82	55
38	0.58	0.303	60	1239	86	56
39	0.66	0.305	36	1275	88	57
40	0.74	0.307	40	1315	91	57
41	0.82	0.309	38	1353	94	58
42	0.91	0.312	53	1406	97	59
43	0.99	0.315	35	1441	99	60
44	1.08	0.318	30	1471	99	61
45	1.17	0.322	29	1500	99	62
46	1.26	0.327	25	1525	99	63
47	1.36	0.332	26	1551	99	64
48	1.45	0.338	17	1568	99	65
49	1.55	0.344	23	1591	99	66
50	1.66	0.351	13	1604	99	67
51	1.77	0.360	12	1616	99	68
52	1.88	0.369	5	1621	99	69
53	2.01	0.380	8	1629	99	70
54	2.13	0.392	6	1635	99	71
55	2.27	0.407	6	1641	99	73
56	2.42	0.424	1	1642	99	74
57	2.59	0.445	0	1642	99	76
58	2.77	0.471	1	1643	99	78
59	2.98	0.503	0	1643	99	80
60	3.21	0.545	0	1643	99	82
61	3.50	0.603	0	1643	99	85
62	3.86	0.688	0	1643	99	89
63	4.35	0.833	0	1643	99	94
64	5.18	1.165	0	1643	99	102
65	*****	*****	0	1643	99	***

Table 3
Final Parameter Estimates for RMLCRT
Sorted in Item Difficulty Order

Item	Discrim	Rasch		Chi Sq.	df	Scaled Diff
		Item Diff	SE(b)			
43	0.511	-1.301	0.063	154.531	19	37
18	0.511	-1.283	0.063	120.318	19	37
26	0.511	-1.152	0.062	82.949	19	38
41	0.511	-0.950	0.060	176.479	19	40
15	0.511	-0.938	0.060	43.549	19	41
47	0.511	-0.884	0.060	143.960	19	41
55	0.511	-0.835	0.060	87.934	19	42
50	0.511	-0.659	0.059	33.379	19	43
8	0.511	-0.639	0.058	35.749	19	44
46	0.511	-0.627	0.058	112.056	19	44
45	0.511	-0.608	0.058	161.422	19	44
2	0.511	-0.600	0.058	73.434	19	44
54	0.511	-0.534	0.058	35.782	19	45
9	0.511	-0.499	0.058	69.556	19	45
20	0.511	-0.491	0.058	78.356	19	45
53	0.511	-0.472	0.058	36.443	19	45
5	0.511	-0.438	0.058	35.329	19	46
56	0.511	-0.366	0.057	40.758	19	46
31	0.511	-0.362	0.057	41.203	19	46
33	0.511	-0.313	0.057	87.769	19	47
27	0.511	-0.227	0.057	36.671	19	48
19	0.511	-0.219	0.057	89.332	19	48
44	0.511	-0.182	0.057	40.777	19	48
64	0.511	-0.100	0.057	12.608	19	49
63	0.511	-0.082	0.057	28.776	19	49
3	0.511	-0.015	0.057	107.931	19	50
16	0.511	-0.000	0.057	10.457	19	50
24	0.511	0.048	0.057	21.730	19	50
60	0.511	0.063	0.057	27.055	19	51
10	0.511	0.074	0.057	24.753	19	51
39	0.511	0.077	0.057	20.931	19	51
62	0.511	0.089	0.057	43.797	19	51
4	0.511	0.126	0.057	137.064	19	51
61	0.511	0.170	0.057	30.416	19	52
59	0.511	0.189	0.057	66.739	19	52
17	0.511	0.215	0.057	61.540	19	52
42	0.511	0.274	0.057	38.519	19	53
14	0.511	0.360	0.057	30.368	19	54
34	0.511	0.379	0.057	57.101	19	54
6	0.511	0.386	0.057	171.853	19	54
28	0.511	0.420	0.057	127.185	19	54
11	0.511	0.431	0.057	82.777	19	54
25	0.511	0.458	0.057	32.002	19	55
21	0.511	0.458	0.057	21.221	19	55
51	0.511	0.458	0.057	103.615	19	55
58	0.511	0.511	0.057	74.267	19	55
52	0.511	0.526	0.058	22.210	19	55
38	0.511	0.537	0.058	39.521	19	55
7	0.511	0.645	0.058	57.685	19	56
1	0.511	0.660	0.058	46.641	19	57
37	0.511	0.730	0.058	48.243	19	57
49	0.511	0.821	0.059	67.369	19	58
65	0.511	0.853	0.059	90.648	19	59
36	0.511	0.877	0.059	25.319	19	59
30	0.511	0.918	0.059	65.907	19	59
13	0.511	0.926	0.059	118.931	19	59
57	0.511	0.971	0.060	142.225	19	60
32	0.511	0.987	0.060	90.450	19	60
48	0.511	1.008	0.060	63.812	19	60
29	0.511	1.139	0.061	27.040	19	61
23	0.511	1.169	0.061	63.186	19	62
40	0.511	1.319	0.063	34.435	19	63
12	0.511	1.599	0.066	70.939	19	66
35	0.511	1.727	0.068	70.605	19	67
22	0.511	2.185	0.075	32.075	19	72

FIGURE 1
RMLCRT Characteristic Curve

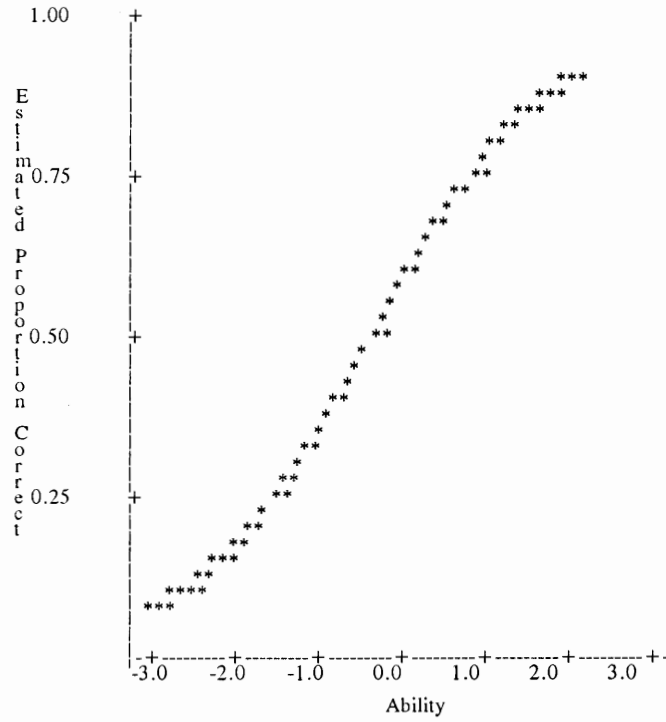
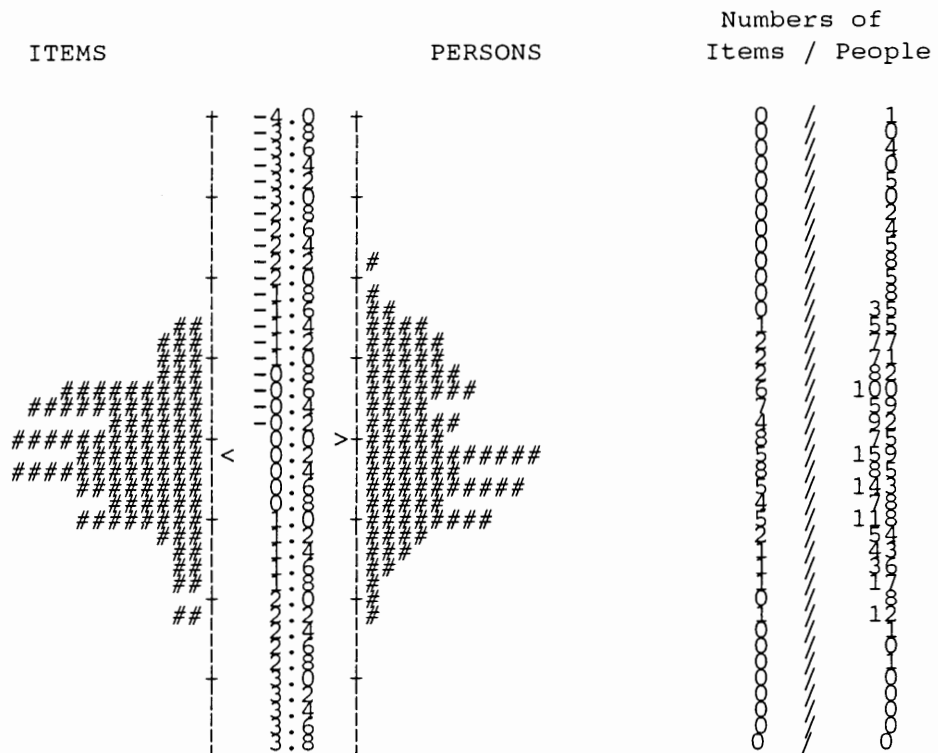


FIGURE 2
RASCH ITEM BY PERSON DISTRIBUTION MAP



Summary Information:	Average Difficulty	S.D. Difficulty	Average Ability	S.D. Ability
(Theta Metric)	0.15	0.74	0.00	1.00
(Scaled Score Metric)	51.5	7.4	50.0	10.0

Table 4
Extraction of Variables and Tests Using Varimax Rotation

<u>Variables</u>	<u>Factor 1</u>	<u>Factor 2</u>	<u>Factor 3</u>	<u>Factor 4</u>
RMLCRT	.43	.56	-	-
PSLE	.89	-	-	-
PSLEML	-	.67	-	-
PSLEENG	.69	-	-	-
PSLESC	.78	-	-	-
PSLEMATH	.81	-	-	-
COMPRES	-	.76	-	-
CTDI	-	-	-	.90
BILINGUAL	-	-.48	-	-
STREAM	-.81	-	-	-
M-EDN	-	-	.85	-
F-EDN	-	-	.88	-

Table 5
Rasch Item Difficulty of Subskills of RMLCRT

<u>Subskills</u>	<u>Mean Rasch Item Difficulty</u>	<u>Mean Rasch Scaled Difficulty</u>
1. The ability to identify similarities and differences.	-2.28	47.7
2. The ability to evaluate inductive inferences.	-2.15	47.9
3. The ability to identify facts and opinions.	0.09	50.8
4. The ability to evaluate generalizations.	0.19	52.0
5. The ability to evaluate strengths of arguments.	0.19	52.3
6. The ability to identify sources and uses of material.	0.20	52.1
7. The ability to recognize biased statements.	0.31	53.0
8. The ability to identify author's motives.	0.44	54.3
9. The ability to recognize hidden assumptions.	0.93	59.3