Development of instruments to assess the achievement of national competencies at the end of primary education cycle

Samir Ranjan Nath
Sanat Kumar Ghosh
Shaheen Akter

295

Table of Contents

297

Abstract

This report presents a detailed description of development of assessment tools for the evaluation of students' learning achievement on the basis of 53 terminal competencies specified by the National Curriculum and Textbook Board (NCTB) of the Government of Bangladesh. This is the first attempt in the country to cover all the terminal competencies in assessment process. A team of school-teachers, teacher educators, curriculum experts, education psychologists, test development experts participated in the process. The competencies were divided into two broad categories viz., cognitive and non-cognitive. Two separate tools were developed for assessing the two types of competencies on the basis of pilot studies in both rural and urban areas. For the cognitive competencies a paper and pencil based test instrument containing 66 items was developed. For the assessment of non-cognitive competencies a tool was developed to have teachers' appraisal of students qualifications. It is expected that valid and reliable estimates of students' performance could be obtained through these tools.

Intorduction

Background

The decade of the 1990's was very significant in the development of primary education development in Bangladesh. During the period a number of important efforts were initiated. Bangladesh being one of the signatories of the Declaration of the World Conference on Education For All (WCEFA) is pledge bound to meet the EFA goals, and the Compulsory Primary Education Act (Government of Bangladesh, 1990) inter alia, was passed. During the fourth five-year plan (1990-95), steps were taken for the improvement of primary education and the thrust was on introduction of compulsory primary education (CPE). During this plan period the NCTB proposed a competency-based curriculum which was implemented in 1992 (NCTB and UNICEF, 1988). The major objectives of the new curriculum are to (i) increase the enrolment rate, (ii) decrease the dropout rate, (iii) improve the quality of primary education, and (iv) improve girls participation in education. The NCTB has adopted attainable 53 terminal competencies which are to be achieved by each child completing the five-year cycle of primary education (NCTB and UNICEF, 1988). Based on these terminal competencies the graded learning continua are identified and the textbooks for grades I to V with teachers' guides are revised accordingly. Thus, an endeavour has been undertaken to reach the goal of quality education for all. However, the country did not pay adequate attention on monitoring the progress towards EFA.

Rationale

After the successful publication of the first report the *Education Watch* 1999 created much interest among the stakeholders, especially the donors, media and the grassroot organisations. It was observed that quality of primary education was not touched much in the first year. The stakeholders, however, suggested giving more attention to quality issues in future *Watch* reports.

The first *Education Watch* assessed the learning achievement of children through the 'ABC' instrument, which is a curriculum-independent test instrument (UNICEF 1992,

1

Chowdhury et al 1994). However, the role of curriculum-based competencies in any modern educational programme is very significant. It meets squarely the aims and objectives of any particular level of education on one hand and the learning needs of the learners of that educational level on the other. Furthermore, the textbook development, teaching-learning process, evaluation system, teacher training and supervision programmes are all related with and dependent on the adopted competencies.

At the primary level the government has introduced competency-based education system since 1992 with the expectation that at the end of five years education cycle each student will achieve all the 53 competencies. How far the expectations have been fulfilled so far? A few studies on achievement of competencies (Alam 1997, Rahaman et al 1999, Banu 1997, Guha Roy, Mitra and Ray, 1995) were carried out but these restricted themselves within a selected number of competencies, mostly the cognitive type. Hardly any study is found on *affective* or *psychomotor* type of competencies. The above studies also had limitations in relation to geographical coverage, school type and sampling techniques adopted. Again, none measured the achievement level at the end of grade V. Thus, there is an important need to evaluate learning achievements of the students on the 53 competencies at the end of 5-year primary education cycle. This is required to observe the quality issues of the primary education in the context of Bangladesh. Again, the government is now considering a revision of the competencies for primary level. Hence, studies on terminal competencies may help locate strengths and weaknesses of the present competencies for further revisions.

The national competencies

It is already mentioned that the National Curriculum and Textbook Board (NCTB) under Ministry of Education of the Government of Bangladesh has specified 53 terminal competencies which are to be achieved by the children completing the five-year cycle of primary education. The competencies are taught to the students throughout the cycle of five years. In general, the processes of achieving the competencies starts at grade I which continues up to grade V. However, there are some competencies which may not start

2

achieving at the beginning of the cycle or even some may be achieved before ending the cycle. Whatever the situation is, the competencies that the children achieve during the five-year period can collectively called as national competencies for primary cycle.

Table 1. Classification of the national terminal competencies at primary level according to the Bloom's taxonomy

Domains	Competencies (Serial nos.*)	Number
Cognitive	19, 25, 26, 28, 29, 30, 31, 32, 33, 38, 50, 52, 53	13
Affective	1, 4, 7, 16, 36, 37	6
Psychomotor	5, 6, 8, 12, 13, 17, 18, 34, 35, 44, 45, 46, 47	13
Cognitive + Affective	15, 23, 49	3
Cognitive + Psychomotor	3, 9, 10, 11, 21, 22, 24, 27, 39, 40, 48	11
Affective + Psychomotor	2, 14, 20, 42, 43	5
Cognitive + Affective + Psychomotor	41, 51	2

* Details of the competencies are available in Annex 1

According to Bloom et al (1956) learning outcomes can broadly be categorised into three major domains. These are cognitive, psychomotor and affective. Although these are not mutually exclusive, one domain is inter-linked with others and one helps achieving another. It is possible to differentiate the terminal competencies according to behavioural expressions. The area of knowledge and thinking is under the cognitive domain. Physical activities, habit formation, skills development, performance in real life etc. can be put under psychomotor domain. On the other hand, belief, faith, outlook, attitude, interest etc. belong under affective domain of learning. Classifying the 53 terminal competencies on the basis of above categories it can be seen that 29 fall under cognitive domain, of which only 13 are fully and others are mixed with psychomotor and/or affective type of competencies. There are 40 competencies under non-cognitive domains, of which 19 are fully non-cognitive (psychomotor or affective) and others are mixed with cognitive

3

competencies. Table 1 presents domain-wise classification of the national terminal competencies. A full list of the competencies is available in Annex 1.

For the practical purpose of assessing the students the competencies were divided into two broad categories, cognitive and non-cognitive. A test instrument was developed to assess the achievement of cognitive terminal competencies. On the other hand, for assessing the achievement of non-cognitive competencies instead of a test instrument a tool was developed in order to have teachers' appraisal of students' qualifications. The development processes of the two instruments are described in the following section.

Test instrument for cognitive competencies

Education, in general, is known as an extensive, diverse and complex enterprise. The measurement of such enterprise is also considered as difficult. However, there is a long tradition of measuring educational outcomes. Although it may be possible that measurement technique of all the educational outcomes are not currently known. Again, if any educational outcome is considered to be important, it must be measurable.

Testing students represent one particular measurement technique. A test is a set of questions or items, each of which has a correct answer. Examinees, in general, answer orally or in writing or in both. However, measuring attitudes, interests, preferences or personality require different types of testing. There are two types of tests that may be considered for testing cognitive development of the students. These are norm-referenced test and criterion-referenced test. Such division is done on the basis of interpretation of the test scores. The norm-referenced interpretations involve comparing one person's score with that of other individuals. On the other hand, the criterion-referenced interpretations involve comparing one person's score with a set of absolute performance standards (Ebel and Frisbie, 1991). In the present context, criterion-referenced testing was found most suitable to assess the achievement of students either individually or in-groups on the criteria of national cognitive competencies.

Assumptions

The followings were the three basic assumptions in developing the test instrument:

1. **Criterion based**: The items in the test instrument were constructed on the basis of terminal cognitive competencies those are expected to achieve by children at the end of grade V. Each of the competencies was considered as criterion and test items were developed against each of the criterion.

2. **Minimum expected level**: In reality children can learn a competency through curriculum and curriculum transaction processes spread through grades I to V. Even at grade V, there are many issues put in the textbooks in order to fulfil a certain competency. For practical purpose, considering the competency-based education system, the principle of minimum expected level of learning was set against each competency and the items were developed accordingly.

3. **Non-normal distribution of scores**: It was considered that the scores against the competencies that children would attain might not follow the properties of classical normal distribution. It is because, under 'minimum expected level' assumption the competencies and the items would be assessed dichotomously. In relation to total achievement, it can be said that the distribution of the 'total number of competencies attained' need not necessarily follow the properties of normal distribution. Thus, a skewed distribution of scores is possible.

Procedure for instrument development

The instrument was developed through workshops participated by experts from grassroots to national levels (see Annex 2 for list of participants). A total of three workshops were organised for the purpose. A pilot study was also conducted for the purpose.

The first workshop was held in December 1999. There were 17 participants from different government and non-government organisations. One important feature is that

5

most of the participants involve in day to day teaching learning activities at primary level. At the beginning of the workshop the research team gave a presentation on the objective of the workshop. A general discussion on the terminal competencies followed the presentation. The participants were then divided into different groups. Each group was asked to develop a full set of items that cover all the cognitive competencies. The group members first identified the topics/areas covered in the textbooks (from grades I to V) fulfilling each competency. The members agreed on the 'minimum expected level' for the competencies after a through discussion and drafted the items. Before this workshop the participants also attended another workshop for assessing the textbooks in line with terminal competencies. This helped them understanding the situation better. At the end of the workshop five sets of instruments were suggested.

The second workshop was held in January 2000 to develop a set of instrument from the above five sets that would be used for field trial. The participants included national level experts, primary school teachers and the members of the research team. Some of the participants also participated the first workshop. Fourteen persons participated in the second workshop. The participants not only choose items from the above five sets; they were free to develop new items if needed. However, over 80% of the items were taken from the above sets with minor modifications.

The members of the research team developed another set of test instrument for field trial. In developing this set the research team followed the spirit of the second workshop. The items were taken from rest of the items of the first five sets with minor modifications. However, some new items had to be developed.

Two sets of instrument, one developed in the second workshop (set *Ka*) and another by the members of the research team (set *Kha*), were taken to the students for field trial. Six field investigators were appointed and a pilot study was conducted.

6

The third workshop was held in July 2000 with the objective of finalising the instrument on the basis of the pilot study findings. The members of the 'Technical Committee' and some of the participants of the previous two workshops participated in the workshop. With details of statistical techniques a procedure for item selection was presented on behalf of the study team. First, the participants discussed about the procedure presented and finalised it, and then finalised the whole test instrument through finalising the items.

The pilot study

Study area

The pilot study was conducted in two areas, one in a rural area of Comilla district and other in Dhaka metropolitan city. Ward number 41 under Dhaka metropolitan city and Jagannathpur union under Sadar thana of Comilla district were the study areas.

The schools

Six types of primary schools were considered for the study. These are

Government primary school,

Non-government primary school,

Madrassa,

Kindergarten,

Secondary attached primary school, and

NGO school.

List of schools offering primary education (or equivalent) in the area was prepared through a survey. In each area one school of each type was randomly selected for assessing the students.

Subjects

Children completed grade V in December 1999 were the subjects of the pilot study. Lists of such children were collected from the schools and all the children were invited to participate in the study. The field investigators went to the respective residences/current

7

secondary schools to invitem. A total of 207 children participated in the study, 99 from rural and the rests from urban areas. Table 2 shows the distribution of children by school type and area.

Table 2. Distribution of children by school type and area

Type of school	Rural Comilla	Dhaka Metropolitan City	Total
Government primary	14	35	49
Non-government primary	21	11	32
Madrassa	10	24	34
Kindergarten	9	3	12
Secondary attached	21	13	34
NGO school	24	22	46
Total	99	108	207

The test

It is already mentioned that two sets of instrument (*Ka* and *Kha*) were uses in the field trial. Each child was given both sets of instrument on two separate dates. Retest was done on a separate date with an interval of 15 days. Thus, each child had to seat in the tests on four different dates. The tests were held in the schools where the children completed fifth grade. The field investigators conducted the tests with the help of the respective school teachers.

The field activities were carried out during February – March 2000.

The analysis

There were many items against each of the competencies in the two sets of instrument considered for the field trial. The task was to select adequate number of items against each competency through a statistical procedure. Two techniques were utilised in order to select the items against the competencies. The techniques were,

a. Cohen's Kappa statistic

b. Relationship between total score and individual item

8

a. Cohen's Kappa statistic: It is a measure of the degree of non-random agreement between observations of the same test. In other words, it is a measure of the agreement between the evaluation of two rates when both are rating the same object. The calculation of this statistic is as follows:

The difference between the observed proportion of cases in which the rates agree and the proportion expected by chance is divided by the maximum difference possible between the observed and expected proportions, given the marginal totals.

$$\text{i.e., Kappa, } K = \frac{P_o - P_e}{1 - P_e}$$

Where, P_o = Proportion of cases the measurements agree

P_e = Proportion of cases they can be expected to agree by chance alone

If Kappa is positive, then the measurements agree more often than expected by chance.

If Kappa = 1, then the agreement is perfect.

If Kappa = 0, then the agreement is no better than by chance.

If Kappa is negative, then the measurements disagree more than expected by chance.

b. Relationship between total score and individual item: Only the observations inr the first tests of the sets (*Ka* and *Kha*) were considered for this exercise. It was done separately for each of the subject. For each subject area, the children were grouped into five according to their total scores in that subject. The groups were done in such a way that approximately equal number of children fall in each group.

Item selection

Under a certain competency those items were selected which had biggest Kappa value (with $p < 0.01$) and the item scores were positively correlated with total score of the

9

subject (p<0.01). For example, against competency number 28 (which is from mathematics) there were four items, two in each of the sets. Kappa values for the items of set *Ka* were 0.44 and 0.31; and for the items of set *Kha* were 0.27 and 0.21. All the four values were significantly higher than zero (p<0.01) (Table 3). Again, the relationship between the items and the total scores was also statistically significant (Table 4). Thus, the items from set *Ka* were selected for final instrument. Such analysis for all the competencies are available in Annexes 3 and 4.

Table 3. Mastery level and Kappa value against the items of competency # 28: an example

Set	Items	Masters	Non-masters	False masters	Kappa	Significance
Ka	M1	53.3	21.3	25.4	0.44	P<0.001
Ka	M2	36.1	29.0	34.9	0.31	P<0.001
Kha	M1	42.5	22.2	35.3	0.27	P<0.01
Kha	M2	38.5	22.9	37.6	0.21	P<0.01

Table 4. Relationship between total score and performance in individual item of competency # 28: an example

Set	Items	Total score in Mathematics					Significance
		0 – 6	7 – 10	11 – 13	14 – 18	19 – 27	
Ka	M1	15.8	57.8	83.3	85.7	100.0	P<0.001
Ka	M2	15.8	55.6	69.4	82.9	94.7	p<0.001

It was thought that at least two items would be selected against each competency. However, in some cases this principle could not be obeyed. For example, in religious studies only one item covered the whole length of the competency (there is only one cognitive competency under religious studies). It may be mentioned that no item was put against this competency in the field trial sets. The new item was developed later in the instrument finalisation workshop.

In Bangla and mathematics the themes of the competencies are so broad that more items had to be selected under these two subjects. On average, more than three items were

10

selected in Bangla and Mathematics. In Bangla 10 items were selected against three competencies and in mathematics 17 items were selected against 5 competencies. The participants of the instrument finalisation workshop did not follow the item selection principles for one item under competency # 25. Instead of the item B4 of set *Kha* (to describe the national flag of Bangladesh in five sentences) they selected the item B4 of set *Ka* (to describe own home in five sentences). The participants agreed that although the Kappa value of the item of set *Kha* was slightly bigger than the item of set *Ka*, (0.32 vs. 0.29) it would be very difficult for the students to write five sentences about national flag.

Environmental studies (science and society combined) were the biggest subject in terms of number of competencies, 15 competencies fall under this subject. Two-item principle could be maintained for each of the competencies of environmental studies except one. For competency number 15 (to know about the country) three items were selected because of broadness of the theme of the competency. Thirty-one items were selected in environmental studies.

Table 5 presents the number of competencies covered and number of items selected for final instrument by subject. It can be seen that two competencies (both on speaking ability in Bangla and English) were not covered in the instrument.

Table 5. Number of competencies covered and number of items selected
in the instruments by subject area

Subject area	Number of competencies		Number of question items		
	Adopted by NCTB	Considered for test	Test *Ka*	Test *Kha*	Final set
Bangla	4	3	10	10	10
English	4	3	7	7	7
Mathematics	5	5	18	12	17
Environmental studies	15	15	30	30	31
Religious studies	1	1	0	0	1
Total	29	27	65	59	66

11

Among the 66 items selected for final instrument, 43 came from set *Ka*, 22 came from set *Kha* and one was newly developed. That is, of the total items in the final instrument about two thirds came from set *Ka*. Table 6 gives such information in detail.

Table 6. Distribution of items in the final instrument by subject area and field trial sets

Subject area	Test *Ka*	Test *Kha*	Newly developed	Total
Bangla	8	2	0	10
English	7	0	0	7
Mathematics	13	4	0	17
Environmental studies	15	16	0	31
Religious studies	0	0	1	1
Total	43	22	1	66

After selecting the items for the final version of the instrument distractor response analysis of the MCQ type items were done. Distractors of the most of the items were found alright. However, distractors of some of the items were rearranged/reshaped on the basis of the response of the assessed children.

Validity of the instrument

The content validity of the instrument could be justified in the following ways:

1. The primary basis of the items was the national cognitive competencies that adopted by the National Curriculum and Textbook Board (NCTB) and expected to be achieved by the children completing grade V. Thus, the instrument may be validated with respect to the national competencies.

2. A group of practitioners (teachers) who work in different government, private and NGO schools primarily developed the items. These teachers are aware about the competencies and the level of reflection in the textbooks through day to day practices in the classrooms. This created an opportunity in developing a practical instrument.

12

3. A team of national experts re-validated the items twice. Once by cross checking each of the items against the respective competency before the field trial and again during the final selection.

Reliability of the instrument

The reliability of each of the individual item could be understood from Kappa value (Annex 3). The item selection process ensured the reliability of each of the selected items. What about the reliability of the whole test instrument? As we considered each of the items dichotomously i.e., each child correctly answered a certain item or not, it was decided that Kuder-Richardson formula number 20 (KR 20) would be appropriate in assessing reliability of the whole instrument. The formula is as follows,

$$KR\ 20 = \frac{n}{n-1} \left(1 - \frac{\Sigma p_i q_i}{\sigma^2}\right)$$

Where, n is the number of items

p_i is the proportion of children correctly answered a certain item

$q_i = 1 - p_i$

σ^2 is the variance of number of correct items

The reliability coefficients of the sets *Ka* and *Kha* were found respectively 0.93 and 0.92. Reliability coefficient for the final set of instrument, taking items from two sets, was found 0.94. Thus, the final set of instrument is 94% reliable.

Time required administering the test

There was no fixed amount of time in administering the tests. That is the investigators wait until the last child submits the answer paper. It was observed that on average, the children required 105 minutes to answer the questions of set *Ka* and 86 minutes to answer the questions of set *Kha*. The 75th percentile of required time was respectively 125 and 95 minutes for *Ka* and *Kha* sets (Table 7).

13

Table 7. Required time to administer tests (in minute)

Test	Mean	Median	Mode	75th percentile	Minimum	Maximum
Ka	105	103	100	125	51	155
Kha	86	85	90	95	45	135

The participants of the 'instrument finalisation workshop' felt that the test should be administered within a time frame. They observed that in our school situation students always face time bound exams. They discussed the matter on the basis of above statistics and decided that the test administration time should be fixed at two hours for the final instrument.

The test instrument

It was already mentioned that 66 items were finally selected for the test instrument. The selected items against each of the competencies are presented in Annex.5. The taxonomic analyses of the test items are presented in Annex 6. A summary of such analyses is shown in Table 8. Nearly two-thirds of the items are of knowledge level and there is not a single item which could reach evaluation level.

Table 8. Distribution of items under taxonomic class level

Taxonomic class level	Number of items	Percentage
1. Knowledge	43	65.2
2. Comprehension	8	12.1
3. Application	7	10.6
4. Analysis	5	7.6
5. Synthesis	3	4.5
6. Evaluation	0	0.0
Total	66	100.0

Note: Serial numbers 2 to 6 could be collectively called as 'understanding class'

The correct response of some items

Annex 7 presents the correct responses of some of the items, which include all the MCQ type of items and some other items under mathematics. Out of total 66 items in the

14

instrument, 48 are of MCQ type and the rest are open-ended. The positions of the correct responses of MCQ items are equally distributed among the destractors.

Assessment principle

The students will be assessed against the competencies i.e., whether a child achieves a certain competency or not. The assessment principle against each of the competencies is presented in Annex 8.

Assessment instrument for non-cognitive competencies

The goal of education, reflected in various documents including the education commission reports, is not only to develop children's cognitive knowledge but also to develop children in the areas of psychomotor and affective domains. It is already mentioned that such spirit was also reflected in various competencies developed for primary level. Again, the National Curriculum and Textbook Board (NCTB) called these competencies as "attainable" and thus, important for assessment. In our school situation assessment of the non-cognitive competencies did not get much attention as it was given for the cognitive competencies. However, it is also true that assessment of non-cognitive competencies is not so easy. Highly sophisticated psychological tests (viz., Minnesota School Affect Assessment) may address the competencies under non-cognitive domains. But how it can be used in the thousands of primary schools at national level? Moreover, how far our teachers are ready to implement that? Under these circumstances, considering the importance of the non-cognitive learning outcomes, a sample assessment technique widely acceptable to the teachers is required to develop to meet the demands of our education system.

An attempt was taken here to address the non-cognitive competencies for children's terminal assessment. A qualitative way of assessment through teachers' appraisal of students' qualifications was tried to develop in this regard. Although the competencies develop in the children through the long term processes of schooling and non-schooling

15

activities a question may arise, why only the teachers are the assessors. It is because, a) the teachers are trained in the competencies, so they have the possibility to know better about these compared to any others. b) The teachers are responsible for the all-round development of their students. So they have the opportunity to observe the non-cognitive learning matters closely from the pedagogical point of view. c) They have long experience in practising assessment techniques. d) Most of the parents are not much aware or educated to assess their children's acquisition of competencies. e) Consideration of different types of assessors (parents, teachers, friends, relatives etc.) would not be feasible to maintain standard norm for national assessment. f) Uses of this instrument may help the teachers to develop the skills in the non-cognitive assessment.

Assumptions

Following are the basic assumptions in developing the appraisal tool.

1. **Non-cognitive competencies**: Part of the whole lot of competencies that do not say about knowledge was considered as non-cognitive competencies. That is competencies under psychomotor and affective domains are subject of this tool. The psychomotor domain of learning outcomes deals with expressed behaviour like habits, performance, etc. whereas the affective domain concerned with learners' belief, faith, attitude, etc. Competencies under these two domains constitute the non-cognitive competencies.

2. **Qualitative assessment tool**: The non-cognitive competencies are difficult to measure quantitatively. Thus, importance was given on qualitative assessment of the competencies and an inventory tool was considered suitable for the purpose.

3. **Teacher as the best assessor**: Although the parents, relatives or friends may know about the development of some of the non-cognitive competencies in children, only teachers were considered as most suitable assessors in the national context of education.

16

314

The draft instrument

Three types of perception measurement tools were used for the field trial. These are:

    a) A five-point scale

    b) An 11-point measurement

    c) Percentage

a) **A five-point scale**: A five-point measurement scale was used to assess the progress of the students in different competencies. The levels were: very satisfactory = 1, satisfactory = 2, medium = 3, not satisfactory = 4, not at all = 5.

b) **An 11-point measurement**: The teachers were asked to assess the level of the students in 10 marks. Each competency was assessed over 10.

c) **Percentage**: The teachers were asked to assess the students in 100 marks against each of the competencies.

In each case there was a provision to keep it blank if the assessor find it difficult to assess (against any competency or to a certain student).

Field trial procedure

Following procedure was followed in the field trial of the above instruments.

1) A group discussion was held with the assessor teachers before assessing a group of students. The class teacher of the assessed students was a must in the group. The discussion covered the goals and depth of the competencies, how these are spread among the students and the assessment procedure.

2) A group of randomly selected students (14 in number) of grade V was the subjects of the exercise.

3) The teachers were asked to assign level/marks to each of the selected students against the competencies. The teachers did the task remembering at least one evidence supporting the assigned level/marks.

4) A re-assessment was done with an interval of 15 days. Same group of teachers did the re-assessment.

17

315

5) In the assessment – re-assessment exercise, the 11-point scale matched in 50-60% of the cases. Un-match was higher for other techniques. It may because the teachers are more familiar to such scale as they use it for regular assessment of the students.

6) The teachers opined that a better result might be obtained if sets of criteria are set against the competencies. It may be helpful to assess students on a regular basis.

7) A set of criteria for each of the non-cognitive competencies was developed in a meeting, where the researchers, a head master of a school and an education psychologist were present. It was also decided in the meeting to assess the students individually by the teachers not in a group of two or three.

8) A pilot study was arranged to assess the reliability of the above-mentioned tool.

The pilot study

Study area

The pilot study for this tool was done in four unions under three thanas of Mymenshing district. These are Char Iswardia union under Mymenshing Sadar thana, Tarakanda union under Tarakanda thana, and Char Nilakshia and Sirta unions under Katwali thana.

The schools

Four categories of primary schools were considered for the pilot study. These are government primary school, non-government primary school, madrassa and NGO operated non-formal primary school. List of above schools under each union was collected through a survey and in each union one school of each type was randomly selected. Thus, 16 schools, four from each category, were taken for the study.

Subjects

Children currently enrolled in grade V were the subjects of the pilot study. In each school the list of the students of grade V was taken from the register book and 14 children (7 boys and 7 girls) were randomly selected from the list. In some cases where the above number of students was not available in grade V all children of the class were considered

18

316

for the purpose. A total of 201 students (about half of them are girls) were selected for the study. Following Table shows the distribution of children by school type and sex.

Table 9. Distribution of students by school type and sex

Type of school	Boys	Girls	Total
Government primary	28	28	56
Non-government primary	27	25	52
Madrassa	23	14	37
NGO school	25	31	56
Total	103	98	201

The assessors

In each school two teachers were selected as assessors. The head teachers were asked to select two teachers who are aware about the non-cognitive development of the students of grade V. In most cases the class teacher of grade five and another one teacher was chosen. In some cases the head teacher him/herself participated as assessor. In case of NGO operated non-formal schools only one teacher acted as assessor. It should be mentioned that these are one-teacher schools.

The assessment

At the beginning of assessment a discussion meeting was held among the assessors and the field investigators. The meeting discussed about the competencies and the non-cognitive development of the children. A set of criteria against each of the competencies, which was prepared by the researchers, was also given to the assessors (Annex 9). The assessors were then asked to assess the selected students independently on the basis of these criteria. However, they were allowed to freely discuss about the competencies but not about the assessment of individual students. The assessors assessed the students using the 11-point measurement tool described earlier. Reassessment was held after 15 days of assessment. Same teachers reassessed the same students on the basis of same criteria. The assessors kept the assessment sheet blank if they find it difficult to assess (against any

19

competency or to a certain student). The pilot study was done in August 2000. Annex 10 provides the tool.

Data analysis

As two teachers assessed each student, the first task of data analysis was to calculate the mean score against each competency for all the students. There was no need to calculate the means where the schools had only one teacher. The mean scores were then transferred into a three-point scale in the following way.

Table 10. Mean score in 11-point measurement tool and corresponding points in transformed three-point scale

Mean score in 11-point measurement tool	Transformed three-point scale
0.00 – 4.00	Not satisfactory
4.01 – 7.00	Moderately satisfactory
7.01 – 10.00	Satisfactory

The assessment and re-assessment data generated through transformed three-point scale were then matched to find the reliability of the assessment.

Results

Table 11 presents the proportion of cases matched between the assessment and re-assessment exercises against each of the competencies. These proportions range between 53.3 and 81.6. It was observed that three competencies matched in less than 60% of the cases, 17 matched in 60–65% of the cases, 9 matched in 66–70% of the cases, 10 matched in 71–80% of the cases, and only one competency matched over 80% of the cases. Such analysis separately done for different types of schools showed that the proportions of matched cases against different competencies were higher for government primary schools compared to the other types of schools. Out of 40 competencies, 34 matched over 70% of the cases of government school students. Un-match was much higher in Madrassa and NGO operated non-formal schools. Table 12 presents such analysis in detail.

Table 11. Proportion of cases matched between assessment and reassessment results.

Competency Number*	% matched	Competency Number*	% matched
Psychomotor type		**Affective type**	
5	68.6	1	72.0
6	63.5	4	73.6
8	69.0	7	71.2
9	68.2	15	62.2
10	63.2	16	63.7
11	60.5	23	63.5
12	65.2	36	73.2
13	60.2	37	68.2
17	81.6	49	63.7
18	62.7	**Psychomotor + Affective**	
21	62.7	2	73.1
24	70.5	3	78.1
26	62.7	14	67.7
27	58.2	20	69.5
34	67.7	35	61.7
40	64.3	41	60.2
44	75.1	42	58.3
45	61.2	43	71.5
46	71.6	51	53.3
47	67.5		
48	62.7		
52	62.0		

* A full description of the competencies against these numbers is available in Annex 1.

Table 12. Number of competencies matched in assessment and reassessment exercises by percentage of matched cases and type of schools

Percentage of matched cases	Government primary	Non-government primary	Madrassa	Non-formal primary	All schools
< 60	2	10	21	18	3
60 – 65	1	6	6	12	17
65.01 – 70	3	6	6	5	9
70.01 – 80	18	14	6	5	10
80.01+	16	4	1	0	1
Total	40	40	40	40	40

21

Conclusion

Of the two assessment tools developed here on the basis of 53 terminal competencies, one was for the cognitive competencies and the other one was for the non-cognitive competencies. The assessment instrument for the cognitive competencies was found valid and reliable for all students completing grade V, irrespective of type of school. However, the assessment tool for the non-cognitive competencies was not found much reliable like as the former one. Reliability of assessment done by the teachers of non-government primary, madrassa and non-formal schools was very low. Thus, the tool should be used only for government school.

Acknoledgements

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23

Annex 1

The terminal competencies

১. সর্বশক্তিমান স্রষ্টা ও বিশ্বের পালনকর্তা আল্লাহ্‌র একত্বে অটল বিশ্বাস স্থাপন করা ।

২. আল্লাহ্‌র অসীম অনুগ্রহের জন্য কৃতজ্ঞবোধ করা এবং সকল কাজে তাঁকে স্মরণের মাধ্যমে সে কৃতজ্ঞতা প্রকাশ করা ।

৩. আল্লাহ্‌র রাসুল হযরত মোহম্মদ (দঃ) এর / স্ব স্ব ধর্ম প্রবর্তকের জীবন চরিত জামা এবং তাদেও শিক্ষা ও আদর্শ অনুসরণ করা ।

৪. স্রষ্টার সকল সৃষ্টিকে ভালবাসা ।

৫. সকল ধর্মালয়ীর প্রতি সম্মান ও সহনশীলতা প্রকাশ করা ।

৬. নারী-পুরুষ, ধনী-নির্ধন, পেশা ও জীবন ধারার বৈচিত্র্য নির্বিশেষে সকলের প্রতি সম্মান প্রদর্শন করা ।

৭. কায়িক শ্রমযুক্ত কাজে আগ্রহী হওয়া ও শ্রমজীবী মানুষের প্রতি আগ্রহী হওয়া ।

৮. পিতামাতা, গুরুজন, প্রতিবেশী ও আত্মীয় স্বজনদের প্রতি সম্মান প্রদর্শন ও কর্তব্য পালন করা ।

৯. পরিবারের সদস্য হিসেবে নিজ দায়িত্ব ও কর্তব্য সম্পর্কে জানা এবং গৃহকর্মে অংশগ্রহন করা ।

১০. সমাজের সদস্য হিসাবে নিজ দায়িত্ব ও কর্তব্য সম্পর্কে জানা এবং সামাজিক কর্মকাণ্ডে অংশগ্রহন করা ।

১১. বাংলাদেশের নাগরিক হিসাবে নিজ দায়িত্ব ও কর্তব্য সম্বন্ধে জানা এবং নাগরিক দায়িত্ব পালন করা ।

১২. অপরের মতামত প্রকাশের সুযোগদান এবং ব্যক্ত মতামতের প্রতি সম্মান প্রদর্শন ।

১৩. বিদ্যালয় কর্তৃক গৃহীত বিভিন্ন কার্যক্রম সম্বন্ধে সম্মিলিতভাবে সিদ্ধান্ত গ্রহনে সক্রিয় ভূমিকা পালন করা ।

১৪. সততা ও নিষ্ঠার সাথে দায়িত্ব ও কর্তব্য পালনের মাধ্যমে যোগ্য দলনেতা ও দলের সদস্য হিসাবে গড়ে ওঠা ।

১৫. দেশকে জানা ও ভালবাসা ।

১৬. জাতীয় ঐতিহ্য ও সংস্কৃতিতে (ভাষা, লোক সঙ্গীত, চারু ও কারুকলা এবং প্রখ্যাত ব্যক্তিত্ব) গৌরব বোধ করা ।

১৭. জাতীয় পতাকা ও জাতীয় সঙ্গীতের প্রতি শ্রদ্ধা প্রদর্শন করা ।

১৮. সম্পদের অপচয় পরিহার করা ।

১৯. সুস্হ জীবন যাপনের জন্য সবল দেহ গঠনের গুরুত্ব বুঝা ।

২০. খেলাধুলা এবং শরীরচর্চায় অংশগ্রহনের মাধ্যমে সবল দেহ গঠনে আগ্রহী হওয়া ।

২১. দৈহিক ও পারিপার্শ্বিক স্বাস্থ্যবিধি জানা ও পালনকরা ।

২২. সুষম খাদ্য সম্পর্কে জানা, এর গুরুত্ব বুঝা এবং এরূপ খাদ্য গ্রহণের অভ্যাস করা ।

২৩. সাধারণ রোগ-ব্যাধি, এগুলির কারণ ও সতর্কতামূলক ব্যবস্থা সম্পর্কে জানা এবং সতর্কতা অবলম্বনে আগ্রহী হওয়া ।

২৪. সহজ বাংলা ভাষায় ছাপা ও হাতে লেখা বিষয়বস্তু বুঝে শুদ্ধভাবে পড়তে পারা এবং পঠন দক্ষতা অর্জনের মাধ্যমে বাংলা ভাষায় লিখিত বিষয়বস্তু পড়ে জ্ঞানার্জন অব্যাহত রাখতে সমর্থ হওয়া ।

২৫. পর্যবেক্ষণ, অভিজ্ঞতা ও মনোভাব সহজ বাংলা ভাষায় শুদ্ধ ও স্পষ্টভাবে লিখে প্রকাশ করতে পারা, সাধারণ চিঠি ও দরখাস্ত লিখতে পারা এবং বিভিন্ন ফর্ম পূরণ করতে পারা ।

২৬. সহপাঠী ও অন্যান্যদের সাথে মনোভাব ও অনুভূতি সঠিক ও কার্যকরভাবে প্রকাশ ও আদান প্রদানের ক্ষেত্রে শুদ্ধ চলতি বাংলায় কথা বলতে পারা।

২৭. সহজ চলতি বাংলায় কথোপকথন, বক্তৃতা, বর্ণনা ইত্যাদি মনোযোগ সহকারে শুনে মূলভাব বুঝতে পারা।

২৮. সংখ্যার মৌলিক ধারণা লাভ করা এবং সংখ্যা ব্যবহার করতে পারা।

২৯. গণিতের চারটি মৌলিক নিয়ম জানা ও ব্যবহার করতে পারা।

৩০. দৈনন্দিন জীবনের সমস্যা সমাধানে হিসাব নিকাশের সহজ কৌশলগুলি প্রয়োগ করতে পারা।

৩১. মুদ্রা, দৈর্ঘ্য, ওজন, ক্ষেত্রফল, আয়তন ও সময়ের এককগুলি জানা ও ব্যবহার করতে পারা।

৩২. জ্যামিতিক আকার আকৃতিগুলি চেনা ও বুঝা।

৩৩. তথ্য সংগ্রহের সামর্থ্য অর্জন করা।

৩৪. পাঠ্য বহির্ভূত বই-পুস্তক, সংবাদপত্র এবং সাময়িক পত্রিকা পাঠের অভ্যাস গঠন করা।

৩৫. স্বাধীনভাবে চিন্তা করা এবং নিজের মত ব্যক্ত করার সমার্থ্য অর্জন করা।

৩৬. নতুন ধ্যান ধারণা গ্রহণ এবং অপরের সঙ্গে সেসব ধারণা সম্পর্কে আলোচনায় আগ্রহী হওয়া।

৩৭. নিজের উন্নয়নের জন্য অপরের গঠন - মূলক সমালোচনা গ্রহন ও ব্যবহারে আগ্রহী হওয়া।

৩৮. পর্যবেক্ষণ ও অনুসন্ধানের মাধ্যমে নিকট প্রাকৃতিক ও সামাজিক পরিবেশকে জানা ও বুঝা।

৩৯. জিজ্ঞাসা সুনির্দিষ্ট করা, পরিবেশের বিভিন্ন বস্তু পর্যবেক্ষণ ও শ্রেনীকরণ করা এবং সহজ অনুমান করার "বৈজ্ঞানিক অনুসন্ধান দক্ষতা" অর্জন করা।

৪০. কারণ ও ফলাফলের সম্পর্ক সনাক্ত করা এবং দৈনন্দিন জীবনের সাধারণ সমস্যা সম্পর্কিত সহজ পরীক্ষণ করা।

৪১. বিজ্ঞান ও প্রযুক্তির ব্যবহারে দৈনন্দিন জীবন যাত্রার মানোন্নয়ন পর্যবেক্ষণ করা, সনাক্ত করা এবং এর গুরুত্ব উপলব্ধি করা।

৪২. নকসা অঙ্কন, চিত্রাঙ্কন, মাটির কাজ, কাগজের কাজ সংগীত, নৃত্য, নাটক ইত্যাদি শিল্পকলার মাধ্যমে নিজেকে প্রকাশ করতে পারা।

৪৩. প্রাকৃতিক ও সামাজিক পরিবেশের সৌন্দর্য্য পর্যবেক্ষণ ও উপলব্ধি করা।

৪৪. নিজস্ব জিনিসপত্র ও পরিবেষ্টনী সৌন্দর্যমণ্ডিত করার অভ্যাস গঠন করা।

৪৫. নিয়ম শৃঙ্খলা অনুসরণ করা।

৪৬. ব্যক্তিগত ও জনসাধারণের সম্পদের যত্ন নেওয়া।

৪৭. সময়ানুবর্তিতার অভ্যাস গড়ে তোলা।

৪৮. বিভিন্ন সম্পর্কযুক্ত ব্যক্তির সংগে কিরূপ আচরণ করতে হবে তা জানা এবং তদানুযায়ী শিষ্টাচার অনুশীলন করা।

৪৯. অন্যান্য দেশের শিশুদের সম্পর্কে জানা এবং বিভিন্ন ধরনের জীবনধারা সম্পর্কে আগ্রহী হওয়া।

৫০. ইংরেজী ভাষায় ছাপা ও হাতে লেখা সহজ বিষয় বস্তু পড়তে পারা।

৫১. ইংরেজী ভাষায় সহজ কথোপকথন, গল্প ও ছড়া শোনা, বুঝা এবং আনন্দ লাভ করা।

৫২. নিজ পর্যবেক্ষণ ও ধারণা বুঝাবার জন্য ইংরেজীতে সহজ বাক্য বলতে পারা।

৫৩. ইংরেজীতে শুদ্ধ ও স্পষ্ট করে পরিচিত বস্তুর সংক্ষিপ্ত বিবরণ লিখতে পারা।

25

Participants of different workshops organised for test instrument development

Government primary schools
1. Mr. AKM Aminul Hoque, Asst Teacher, Zigatola Govt. Primary School, Zigatola
2. Ms. Rehana Begum Mazumder, Asst Teacher, Zigatola Govt. Primary School, Zigatola
3. Mr. Md. Atiqur Rahman, Asst Teacher, Zigatola Govt. Primary School, Zigatola
4. Mr. Jasimuddin Ahmed, Head Master, Zigatola Govt. Primary School, Zigatola
5. Ms. Shamsun Naher, Head Master, Dhanmondi Govt. Primary School, Dhanmondi
6. Mr. Nurul Amin, Asst Teacher, Azampur Govt. Primary School, Azampur
7. Mr. Abdul Ghani, Head Master, Ideal Govt. Primary School, Motijheel
8. Ms. Shaheen Akter, Head Master, Govt. Ideal Primary School, Mohammadpur

Primary Teacher Institutes
9. Md. Abu Hossain Biswas, Instructor, PTI Manikganj
10. Md Kubbat Ali Khan, Instructor, PTI Manikganj
11. Ms Mushrafa Hussain, Instructor, PTI Gazipur
12. Ms. Nargis Akhter, Instructor, PTI Gazipur

National Academy for Primary Education
13. Mr. Sk. Md. Ruhul Amin, National Academy for Primary Education (NAPE), Mymensingh

National Curriculum and Textbook Board
14. Mr. Ziaul Hasan, National Curriculum and Textbook Board (NCTB)

Directorate of Primary Education
15. Ms. Johara Ummay Hassan, Deputy Director, Directorate of Primary Education

Institute of Education Research (IER), University of Dhaka
16. Mr. Md Nazmul Haque, Associate Professor, Institute of Education and Research, University of Dhaka
17. Dr. Siddiqur Rahman, Professor, Institute of Education and Research, University of Dhaka

National experts
18. Mr. Md. Shafiul Alam, Former Director, BANBEIS
19. Professor Md. Ali Azam, Advisor, UNICEF Dhaka and Former Member (curriculum), National Curriculum and Textbook Board (NCTB)
20. Professor Md. Ali, Former Member (curriculum), National Curriculum and Textbook Board (NCTB)

Gano Sahajjo Sangstha
21. Ms. Hasina Habib, Co-ordinator, GSS
22. Mr. Mostafa Panna, Curriculum Developer, Gana Sahajjho Sangshtha

Proshika
23. Mr. ANM Habibur Rahman, Co-ordinator, Material Development Unit, Proshika

Campaign for Popular Education (CAMPE)
24. Mr. Ashish K Biswas, Material developed, Campaign for Popular Education
25. Mr. Ruhul Amin Chowdhury, Programme Manager, Campaign for Popular Education
26. Ms Rasheda K Choudhury, Director, Campaign for Popular Education

BRAC
27. Ms. Farida Yesmin, Master Trainer, BRAC Education Programme
28. Ms. Shaheen Akter, Senior Staff Sociologist, BRAC
29. Mr. Md Abul Kalam, Staff Sociologist, BRAC
30. Mr. Samir R Nath, Research Statistician, BRAC
31. Dr. Sanat K Ghosh, Consultant, BRAC
32. Dr. AMR Chowdhury, Director Research, BRAC

27

325