Bangladesh's Mathematics Curriculum Revision of Primary Education Supported by JICA Technical Cooperation Project

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Background

- Japan International Cooperation Agency (JICA) has been supporting mathematics education in Bangladesh through technical cooperation projects for nearly 20 years.
- JICA supports the revision of primary mathematics curriculum and textbooks in the primary education development program (PEDP)-IV, which began in 2019.
- Japanese experts has worked with them keeping in mind especially two perspectives: <u>development of Bangladeshi mathematics educational experts</u> and <u>respecting</u> <u>their initiatives.</u>

This presentation aims to illustrate achievements and challenges of the mathematics curriculum revision process.

Structure of Bangladesh's mathematics curriculum in primary education

Example: Grade 5

	Terminal competencies	Subject-wise attainable competencies	Grade-wise attainable competencies	Learning outcomes
•	To be capable of make decision by applying scientific concepts and process on daily life.	Collect, process, and analyze different information, and make decision	Arrange the unorganized data and identify various information by drawing graphs (Bar graph and line graph)	 Will be able to arrange the given unorganized data in order and Will be able to draw graphs (Bar graph & line graph) using the organized data/table Will be able to make decisions by analyzing various information of bar and line graphs.

Terminal competencies:

Non-subject-specific competencies obtained by the end of primary education. (8 in total)

Subject-wise attainable competencies:

Mathematical competencies obtained by the end of primary education. (8 in total)

The grade-wise attainable competencies:

Mathematical competencies obtained in the specific grade. (20 in total)

Learning outcomes:

Specific outcomes achieved in the specific grade.

Curriculum revision process

Stages	Processes		
1	Need assessment and situation analysis		
	Data regarding the strengths and weaknesses of existing implemented and achieved curriculum from relevant stakeholders are collected.		
2	Determination of terminal competencies		
	A group of experts comprising teachers, teacher educators, teacher trainers, and curriculum specialists draft terminal competencies.		
3	B Evaluation of terminal competencies		
	Another group of experts rationally evaluates and finalizes the draft terminal competencies.		
4	Development of essential learning continuum		
	A subject-based curriculum committee, comprising subject specialists from various sections, develops subject-wise and grade-wise attainable competencies.		
5	Development of a detailed curriculum		
	The same committee develops a detailed curriculum.(learning outcome, content, teaching-learning activities, instruction for assessment)		
6	Evaluation of the essential learning continuum and detailed curriculum		
	A group of experts rationally evaluates the detailed curriculum and finalizes it.		
7~9	Approval Curriculum Development and Revision Core Committee (CDRCC) National Curriculum Coordination Committee (NCCC) Ministry of Primary and Mass Education(MoPME)		

The actual revision were took place from stage 2 to 6. The participated organizations from step 2 to 6 were the same, but the members were different between development stage (Step 2, 4 & 5) and evaluation stage (Step 3 and 6).

How Bangladesh experts and Japanese experts corroborated in the revision process

Step 1

Japanese experts discussed regularly with three Bangladeshi experts.



- ✓ Japanese experts discussed problems and challenges of the current curriculum regularly with three Bangladeshi experts of the committee.
- ✓ A draft of the revised curriculum is prepared.

Step 2

Three Bangladeshi experts presented the draft to other committee members in the formal committees (Steps 2–9)

- ✓ The three experts took initiative of the meeting.
- ✓ They discussed with other members and got consensus content by content.

Why this strategy?

- > To maximize the capacity development of Bangladeshi mathematics educational experts.
- > To promote Bangladesh's initiatives.

Japanese experts discussed regularly with Bangladeshi experts.









Three Bangladeshi experts presented the draft to other committee members in the formal committees and led the discussion (Steps 2–9)

Examples of discussion and changes

Content	Discussion
1. The number digit should be expanded using Bangladesh's number system i.e., 1 lakh and 1 crore in Grade 3 and 4.	In addition to the base-10 place value system, <mark>the local nature of the</mark> Bangladeshi language should be considered.
2. The "composition and decomposition of 10" is written explicitly in the curriculum.	Importance of the composition and decomposition of 10 for the addition and subtraction.
3. Addition of 1-digit numbers $(1 + 1 \cdot \cdot \cdot 9 + 9)$ and its inverse subtraction $(1 - 1 \cdot \cdot \cdot 18 - 9)$ are written explicitly in the curriculum.	Structure of addition of 1-digit numbers $(1 + 1 \cdot \cdot \cdot 9 + 9)$ and its inverse subtraction $(1 - 1 \cdot \cdot \cdot 18 - 9)$ for the base of base of operation more than 2-digits.
4. The number line is introduced from Grade 1.	Importance of number line as a mental model
5. Proper, improper, and mixed fractions are introduced in Grade 3 instead of Grade 5.	Types of fraction are necessary even in addition and subtraction, which are introduced in Grade 3 and 4.
6. Concerning the decimal numbers, up to hundredth place is taught in class 4 and up to thousandth place is taught in class 5 instead of teaching in class 5 at once.	It is better to study decimal numbers continuously for 2 years by arranging them spirally.
7. Finding equivalent fraction by calculation is introduced in Grade 4 instead of Grade 5.	Finding equivalent fraction by calculation is difficult without learning common multiple and least common multiple. The idea of equivalent fraction is introduced in Grade 3 by using number line or figures, but equivalent fraction by calculation using common multiple and L.C.M is learned in Grade 4.
8. Counting in twos, threes, and so on for understanding number patterns and acquiring number sense is introduced in Grade 1 instead of Grade 2.	"Number patterns" is important to acquire number sense. It is better to introduce in early stage of mathematics education.
9. The comparison of fractions is introduced after the study of fractions as measurement in Grade 3.	Comparing the size of fractions by using only part-whole fraction leads students misunderstanding.
10. Characteristics of solids move to from Grade 2 to Grade 5.	Solids are used for focusing on their faces in Grade 2. However, the detail characteristics should be introduced after learning all the plane shapes.
11. In the current curriculum, students learn all units of time (day, hour, minute and second) and the relationship among them in class 2. The unit "second" was moved to Grade 3.	Same as other measurement unit, it is better to separate Grades to learn continuously and spirally.

Changes in verbs used in grade-wise attainable competencies



Increased the verbs:

- ✓ classified as higher-order thinking skills in the revised Bloom's Taxonomy (Anderson, Krathwohl, & Bloom, 2001).
- ✓ related to **attitudes and social skills**.

Conclusion (Way forward)

1) Trusted relationship with Japanese experts (Precondition)

✓ The trust built up over 15 years of project work between Bangladesh and Japan, and the capacity development of the mathematics experts worked as indispensable preconditions for this time curriculum revision.

2) Use of evidence in curriculum revision (Challenge for the near future)

- ✓ The priority was given to revise the scope and sequence of learning content according to the international trend. The attention was not paid to the actual situation of children with evidence very much.
- ✓ Result of the need assessment (Stage1) was overlooked during the curriculum revision process.
- ✓ One of the future challenges is to revise the current curriculum based on evidence.

3) Recording the process and discussion of curriculum revision (Challenge for a long-term future)

- \checkmark <u>It is important to ensure the continuity of the curriculum revision.</u>
- ✓ In order to do that, it is necessary to keep detailed records of the discussion, and reflect the revision process:
 - What processes were taken to revise the curriculum.
 - What kind of discussion occurred based on what kind of evidences, relevancies and so on.
 - What changes occurred.

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