What is High Quality Education?

This document asks what makes for 'high quality' in secondary and tertiary education, and seeks to identify the potential strands of 'quality', such that we can arrive at a shared conception that guides the design and evaluation of syllabi, learning resources (including textbooks), teaching strategies (including classroom activities), and assessment (continuous formative and final summative).

Given the realities on the ground, it is more than likely that the vision of high quality in education outlined in this document is beyond what we can exepct to achieve in the next five, or even ten years. However, it is crucial that we clearly articulate where we want to be twenty-five years from now, such that we can at least start moving in that direction.

1. High Quality in Education

1.1 The Committment

The Government of India has made a legal commitment to providing high quality primary and secondary education to all children in the country. This commitment has two components: quality and coverage. Let us reserve the problem of coverage for a different occasion. As for quality, to strive towards 'high quality' education, we need to do the following:

- *clarify the concept of 'high quality' in education*, and its alignment with the design of curricula and syllabi, textbooks and other learning materials, classroom instruction, continuous formative assessment, final summative assessment, educational policies, and infrastructure;
- *critically evaluate* the quality of the education currently provided by Boards of Studies, schools, and teachers;
- *identify the gaps and weaknesses*, as well as *areas for further improvement*;
- conceive of *raising quality* as not just from 'needs improvement' to 'good', but from 'good' to 'very good', from 'very good' to 'excellent', and from 'excellent' to 'outstanding'; and
- provide *guidance, resources, and assistance* to Boards of Studies, schools, and teachers to raise the quality of education.

1.2 Clarifying the Concept of 'High Quality' in Education

The first step in this enterprise is to forge a shared set of *values, criteria,* and *standards* on the basis of which we can arrive at non-arbitrary judgments on quality, and take the necessary steps to improve quality. For this, we need to collectively grapple with a fundamental question:

What is 'high quality' in education?

If we agree that:

Education is a process that aims to bring about learning among the young,

it follows that

High quality education is a process that *aims at and succeeds in* bringing about high quality learning among the young.

That conclusion leads to the next question:

What is high quality learning?

Learning involves both a *process* of learning and the *outcomes* that result from that process. For learning to be of high quality, both the process and the outcomes have to be of high quality. It follows then that:

High quality education is a process that, through *highly effective and efficient means*, aims at *highly valued learning outcomes*.

In order to critically evaluate the quality of education that a Board of Studies, an institution, or a teacher provides, we need to evaluate:

the *value of the **goals*** (the intended learning outcomes) aimed at, and
the *effectiveness and efficiency of the **means***: syllabi, learning and teaching resources (including textbooks), teaching strategies (including classroom activities), assessment (continuous formative and final summative), educational policies, infrastructure, and so on.

2. The Attributes of a Highly Educated Person

Most systems of education aim at the *understanding* of a body of knowledge and the skills of knowledge *application*. Considerations of high quality demand that we go beyond this bare minimum to *higher order learning outcomes*.

Such resetting of educational goals would involve the following dimensions:

1) ***Understanding*** of: (extending the scope of understanding to not just what is currently viewed as 'knowledge' (1a), but also what is articulated in (1b-e))

a. concepts and propositions of current knowledge; [*basic understanding*]
b. justification (evidence and/or reasoning) in support of those concepts and propositions, and against alternatives we currently reject; [*critical understanding*]
c. concepts and propositions that integrate currently fragmented bodies of specialized knowledge in different subjects of study; [*integrated knowledge*]
d. concepts and propositions of the modes of knowledge construction; [*inquiry concepts*]
e. the interconnections between modes of knowledge construction across subjects of study. [*integrated inquiry*]

2) ***Ability*** to: (extending the scope of abilities to not just applicational ability (2a), but also the abilities outlined in (2b-i))

a. apply the concepts and popositions of knowledge to solve familiar as well as unfamiliar/novel problems; [*mechanical application* and *innovative application*]
b. acquire knowledge on one's own from documented sources of knowledge, without having to depend on a teacher; [*independent learning*]

c. critically evaluate knowledge claims (including what is claimed as knowledge in textooks) and decide for oneself what to accept, what to reject, and what to reserve for future consideration; [*critial thinking*]
d. construct knowledge on one's own, using a broad range of inquiry strategies; [*independent inquiry*]
e. read, understand, and critically evaluate writings for educated non-specialists (newspaper and magazine articles, popular books); [*critical reading*]
f. find effective and efficient solutions to problems in the professional, public, and personal spheres of life; [*creative problem solving*]
g. clearly, precisely, and effectively articulate one's ideas through speech and writing, as needed in professional, public, and personal spheres of life; [*communication*]
h. identify and pursue effective and efficient courses of action to pursue one's goals; [*practicality*]
i. collaborate with others in a non-homogeneous group to work towards common goals. [*team work*]

3) ***Predispositions, habits of thought and action, attitudes, and mindset***, including:
(going beyond knowedge and inquiry)

a. intellectual curiosity;
b. the joy of learning and the pleasure of finding things out on one's own;
c. ability to take criticism in the spirit of self-improvement;
d. intellectual skepticism: unwillingness to accept claims unless supported by adequate reasons;
e. open-mindedness: willingness to modify one's beliefs and practices when confronted with good reasons to do so;
f. willingness to doubt and question the values, norms, beliefs, and practices of authorities and peers, as well as one's own;
g. intellectual commitment to the value of truth, rationality, rigour, and clarity and precision of thought and expression;
h. moral commitment to the value of truthfulness, honesty, integrity, courage, the well-being of all creatures, preventing harm to other creatures, and so on;
i. readiness to pursue what is demanded by one's committments in (3g-h).

When combined with the capacity to engage in scientific inquiry (as one of the components of (2d)), the learning outcomes of (3a-g) would form what the Indian Constitution refers to as the '*scientific temper*'.

If the goal of institutionalized education is to help the young become 'educated', it is crucial to begin with the question, *Who is an educated person?* The learning outcomes specified in (1)-(3) may be viewed as a tentative first draft of the attributes of an educated person, thereby answering that question.

3. Deriving the Criteria and Standards for Evaluating Quality

Given (1)-(3) (or a more comprehensive or modified version of these goals), the concept of quality in education can be viewed as:

> *The greater the range of learning outcomes we select as the desired goals, and*
> *the greater the efficiency and effectiveness of the means we use to bring about those outcomes,*
> *the higher the quality of education.*

This gives us a way to identify the criteria for evaluating the quality of education that a program, institution, or teacher provides. As an example, consider the following options for a science textbook:

Textbook A: Chapters X, Y, and Z help students

(i) understand the concepts and propositions of the heliocentric theory, atomic theory, and evolutionary theory.

Textbook B: Chapters X, Y and Z, in addition to (i), help students

(ii) understand the evidence and arguments in support of these theories.

For instance, they address questions like: What is the justification for believing that:

- the earth revolves around the sun and spins on an axis tilted to the plane of revolution?
- all existing and extinct species on the planet evolved from a single ancestor species?
- atoms and molecules exist?"

Textbook C: Chapters X, Y and Z, in addition to (i) and (ii), go beyond them to help students

(iii) learn the art and craft of theory construction and theory evaluation in scientific inquiry.

Given a school textbook or a chapter from it for critical evaluation, we can now ask whether it is of type A, B or C. All else being equal, a type B textbook is superior to a type A textbook, and a type C textbook is superior to a type B textbook.

Let us take a look at what a type C textbook aims to do. One of the components of scientific inquiry is the art and craft of theory construction. Another component is the art and craft of observational inquiry, often involving instruments, experiments, and/or statistics. If we accept the educational goal of helping students acquire the ability to construct knowledge using a broad range of inquiry strategies ((2d)), we have a commitment:

4) ***Commitment to students***: to help them

a. develop and strengthen the ability to:
   - discover and formulate interesting and worthwhile questions to investigate;
   - identify and implement methodological strategies appropriate for those questions;
   - arrive at answers based on the results, and conclusions based on the answers;
   - critically evaluate the answers and conclusions, and take steps to remedy weaknesses and flaws;
   - justify (prove, defend, provide evidence and/arguments for) the conclusions to the satisfaction of a skeptical community of fellow inquirers; and
   - critically evaluate the conclusions and justification advanced by others.

b. understand the concepts of inquiry that support the abilities, including:
   - ingredients of inquiry: questions, methodology, justification, and critical thinking;
   - modes of inquiry: questions of
     - truth (mathematical, scientific, conceptual, historical inquiries),
     - value (aesthetic, moral inquiries), and
     - action (design, policy, procedure, ...);
   - justification: grounds, background assumptions, reasoning, and conclusions;
   - reasoning: systems of reasoning/logic that underlie justification in mathematical, scientific, and conceptual inquiries.

Items in (4b) need elaboration. To illustrate from mathematical and scientific inquiries:

5) a. Mathematical inquiry: axiom, definition, conjecture, theorem, mathematical proof;

b. Scientific inquiry: statistical inquiry, experimental inquiry, theoretical inquiry; data point, observational generalization, correlation, causal generalization, theory, interpretation; prediction.

The specifications in (4) and (5) could be taken as a partial syllabus for independent inquiry. They set fairly high standards for textbooks, classroom instruction, and assesment, with the consequence that they must satisfy criteria of evaluation illustrated in (6):

6) All else being equal, a textbook that helps students
- develop the ability to justify their conclusions to the satisfaction of a skeptical community of fellow inquirers;
- understand the distinction between correlational and causal generalizations; or
- develop the ability to come up with mathematical conjectures and prove them;

is better than one that doesn't.

We began this section with the educational goal of developing among the young the capacity for independent inquiry (2d), and then proceeded to unpack the strands of inquiry ((4)-(5)) that lead students to go beyond mere understanding and application, and think like a mathematician, like a scientist, like a philosopher, like a historian, like a literary critic, like an engineer, and so on.

Though this is a worthy dream, it is an ambitious and challenging dream. To make it feasible, we also need to collectively decide on our relative priorities in allocating available time and resources. For instance,

- how many pages (out of 200 pages) of a class IX textbook can we afford to devote to basic understanding (1a) and application (2a), such that there is room for critical understanding, integrated knowledge, and understanding of concepts of inquiry (1b-e), as well as independent learning, critical thinking, and independent inquiry (2b-d)?
- how much class time can a teacher devote to (1a) and (2a) such that the students, parents, and administration are satisfied about "covering topics", such that there is time for the higher order learning outcomes?
- what percentage of marks should be allocated to the assessment of (1a) and (2a), such that there are marks left for assessing higher order learning outcomes?

If we do not address these hard questions and explicitly articulate our collective answers, textbooks, teachers, and examinations will continue to focus on traditional goals of eduation, paying only lip service to high quality eduation.

4. A Note on Constructivism

Like most *–isms* (communism, positivism, postmodernism, anarchism, pluralism, relativism, holism, reductionism, scientism, …), the term 'constructivism' is both multiply ambiguous and vague. But since the National Curriculum Framework subscribes to the educational philosophy of consructivism, it is important to articulate what the educationally relevant tenets of constructivism are, in order to examine how syllabi, textbooks, classroom activites, and assessment incorporate the constructivist ideas.

As I understand it, the central tenets of the constructivist theory of education, chances are that they would be along the following lines:

7) 'Academic knowledge' is a body of propositions that the academic community takes as true beyond reasonable doubt. This 'knowledge' is disseminated to students in school/college.

8) In an academic community, the truth of a proposition is determined on the basis of the values, norms, and exemplars of that community, not necessarily shared by other knowledge paradigms (such as religious, traditional, folk, or commonsense knowledge).

9) The values, norms, and exemplars of an academic community are those of rational inquiry. The 'scientific temper' that the Indian Constitution refers to is a special case of rational inquiry.

10) Rational inquiry involves a commitment to:

a) *Logical Consistency:* Logically contradictory propositions and combinations of propositions are unacceptable.

b) *Logical Consequence:* If we accept a set of propositions (including definitions and axioms), we must also accept the logical consequences of those propositions.

c) *Rational Justification:* Conclusions must be rationally justified.

d) *Grounds and Background Assumptions*: The grounds and background assumptions for the justification of knowledge claims must be endorsed by the inquiry community.

e) *Coherence:* Of two competing sets of propositions, the more coherent one is accepted.

11) Knowledge exists at both a individual level (what an individual judges to be true beyond reasonable doubt) and at a collective level (what a community judges to be true beyond reasonable doubt).

12) Individual knowledge is constructed on the basis of input from personal experience, verbally expressed observational reports, knowledge claims of other individuals, reflection and reasoning on these inputs, and verbally mediated interactions. The same factors are relevant in collective knowledge at the societal level.

13) Education is the process through which the young generation is exposed to the collective beliefs, values, norms, criteria, standards, habits, and exemplars of practices of the older generation, to guide them in forming their own beliefs, values, norms, criteria, standards, habits, and exemplars of practices.

14) To be consistent with the spirit of rational inquiry, constructivist education has a responsibility to help students to develop

a) the capacity to engage in collective and individual rational inquiry and critical thinking across the whole range of academia, including mathematics, physical sciences, biological sciences, human sciences, and the humanities; and

b) a critical understanding and appreciation of the beliefs, values, norms, and practices of the academic community as well as other communities.

I have not found an explicit statement of constructivist tenets in the literature, but I doubt if the proponents of constructivism would disagree with the statements in (7)-(14). These statements would be useful as a starting point to collectively arrive at an agreement on how we as a community of educators in the Indian context think the term 'constructivism' should be understood.

I hasten to add that my purpose in formulating (7)-(13) is not push a particular set of positions, but to point attention to the kinds of issues that we need to think about. We could then take (7)-(13) as forming a first draft of a series of revisions, resulting in a paper that clearly articulates an agreed upon 'definition' (or at least an explicit clarification) of the core tenets of constructivism as relevant for education.

5. Evaluating and Revising Curricula

5.1 Constraints, Choices, and Execution

The quest to improve the quality of education involves

A. a set of external ***constraints*** imposed on us such that we have to work within them;

B. the ***choices*** we can make within those constraints; and

C. the ***execution*** of those choices.

The Board of Studies of an educational program has to work within the constraints imposed by the financial and human resources available to it, by the quality of the administrators and teachers, by the quality of the students, and by the government. However, within these constraints, it still has a wide range of options in syllabus design, recommendation of textbooks, and design of the final summative assessment tasks.

Likewise, a teacher has to work within certain constraints imposed by available resources; the college administration; the syllabus, textbooks, and final assessment decided by the Board of

Studies; the quality of the students admitted to the program; and so on. But within those constraints the teachers can still exercise a certain degree of choice, however limited, in matters of classroom pedagogy, continuous formative assessment, and so on.

Making such choices from among available options is a matter of educational *design*. Executing these choices successfully is a matter of *implementation*. The distinction between design and implementation is much like choreographing a dance or composing a piece of music on the one hand, and performing that choreography or composition as the actual event on the other. Every educator — whether a teacher, administrator, textbook writer, or member of a Board of Studies – is both a designer and an implementer.

5.2 The Role of the Syllabus in Curriculum Alignment

Suppose we define ***high quality education*** as one that:
aims at *learning outcomes that are of high value;* and
employs *highly effective and efficient means* to bring about those outcomes.
This would mean that quality in education is a function of the educational *goals* (intended learning outcomes) and the *means* to achieve those goals.

A **SYLLABUS** may be viewed as an *explicit statement of our educational goals*, both at a broad global level and at a specific or specialized level. For instance, a syllabus might spell out a learning outcome with different degrees of specificity, as illustrated below, (A) being the most fleshed out, and (C) being the most general:

A. By the end of the program, we expect students to have an understanding of the evidence and arguments that bear upon the choice between the heliocentric and geocentric theories of the solar system. This includes an understanding of the terrestrial and celestial phenomena that act as the grounds for a critical evaluation and justification of those theories.

   Phenomena to be explained:
   Terrestrial: daily temperature cycle, yearly temperature cycle, correlations between temperature and location;
   Celestial: daily cycle of the sun, yearly cycle of the sun, nightly cycle of the planets and stars, retrograde motion of planets, Foucault's Pendulum.

   Components of the theory to explain the above phenomena:
   revolution of the earth around the sun; rotation of the earth around an axis; tilt of the axis of rotation to the plane of the revolution.

B. By the end of the program, we expect students to have an understanding of the evidence and arguments that bear upon the choice between the heliocentric and geocentric theories of the solar system.

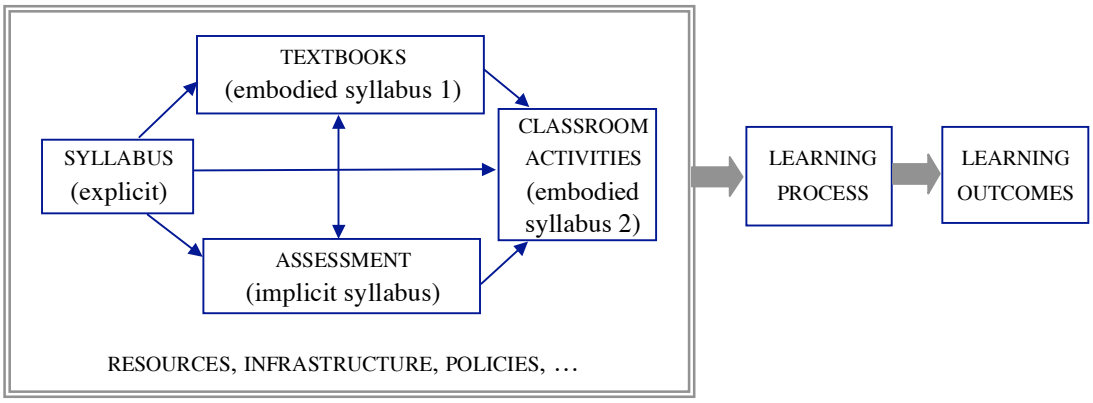
C. By the end of the program, we expect students to have an understanding of the evidence and/or arguments that bear upon some of the important conclusions presented to them as 'knowledge'.

At the national level, for instance, a syllabus might specify (C). In conformity with such a syllabus, a Board of Studies might flesh out (C) as (B). And a particular textbook might incorporate (B) as (A).

ASSESSMENT TASKS seek to find out *whether and how well the students have achieved the learning outcomes* specified in the syllabus. Examination questions from previous years signal to students and teachers what the students need to learn for them to pass, or to do well in a course or program. Hence, the learning outcomes tested in an examination become an **IMPLICIT SYLLABUS**, in contrast to the explicit syllabus given to students as part of the curriculum. High quality in education demands that *the implicit syllabus be **aligned** to the explicit syllabus*.

TEXTBOOKS and **CLASSROOM ACTIVITIES** flesh out and implement what is articulated in the explicit syllabus, and prepare students to cope with the demands of the implicit syllabus of the assessment tasks and exams. Textbooks and classroom activities then become the **EMBODIED SYLLABUS**. High quality in education demands that *the embodied syllabi be aligned to the explicit and implicit syllabi*.

The **CURRICULUM** of an educational program or an individual subject or course in a program may be viewed as the *total plan of education* of the program/subject/course to bring about the desired learning in students. If we adopt this view of the curriculum, its different components and their relation to each other can be diagrammed as follows:



CURRICULUM

Note: The Need for a Survey

Even though most of the learning outcomes discussed above are consistent with the National Curriculum Framework, and are likely to be uncontroversial, possibilities of divergence still exist. The attached survey is an inititial attempt to figure out and address such divergences.