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Best School Practices for Enhancing Conceptual Clarity in Complex Problem Solving at Grade 12

An Evidence-Based Framework for Inclusive Indian Classrooms

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***Abstract*—Grade 12 is the point at which Indian students meet their most complex academic problems, the multi-step and abstract tasks on which board examinations, entrance tests and further study depend. This paper identifies school practices with strong evidence for building conceptual clarity on such problems and adapts them to Indian schools so that they serve all students. It combines secondary analysis of six national sources, namely UDISE+ 2024-25, PARAKH Rashtriya Sarvekshan 2024, ASER 2023, Ministry of Education analyses of board results for 2022 to 2024, CBSE Class 12 results for 2024 to 2026 and the NCERT survey of student well-being, with a structured synthesis of research on instruction. Only 47.2 per cent of students who start school are retained to Class 12, the Grade 9 national average in mathematics is 37 per cent with wide gaps by school management and social group, and only 43.3 per cent of rural youth aged 14 to 18 can perform a three-digit by one-digit division. Class 12 failure rates are higher in state boards than in national boards, the CBSE pass percentage fell from 88.39 to 85.20 between 2025 and 2026 while competency-focused questions now carry half the theory paper, and 81 per cent of students cite studies, examinations and results as their main source of anxiety. The evidence synthesis identifies five clusters of high-yield practice, organised into the CLEAR-12 framework of Connect and diagnose, Layer the problem, Elicit thinking, Assess for learning and Reach every learner, with subject exemplars and a twelve-month implementation plan that requires no additional funding.**

***Index Terms*—conceptual clarity, complex problem solving, Grade 12, senior secondary education, competency-based assessment, inclusive education, NEP 2020, CBSE, India**

I. INTRODUCTION

Grade 12 is a decisive year in Indian schooling. Board examination results determine admission to higher education, and the same year carries preparation for national entrance tests such as JEE, NEET and CUET. The problems students meet in this year are complex in a precise sense. They require several connected concepts at once, they cannot be solved by recalling a single formula, and they often present an unfamiliar context. A question in physics may combine electrostatics with energy conservation. A question in economics may ask students to apply elasticity to a policy case they have never seen. A question in accountancy may require them to reconstruct accounts from incomplete records.

Conceptual clarity is the ability to understand the underlying principles of a subject well enough to recognise them in new situations, explain them in one's own words and use them flexibly. It is different from procedural fluency, the ability to carry out a known method accurately. Research has long shown that the two support each other, but that procedures learned without concepts break down when problems change form [1], [2].

This distinction has become urgent in India because assessment policy has moved toward concepts. The National Education Policy 2020 calls for a shift from rote learning to competency-based learning and assessment [3]. Following this, CBSE raised the share of competency-focused questions in the Class 11 and 12 theory papers from 40% to 50% from the 2024-25 session [4]. Students whose learning rests on memorised procedures are now at a measurable disadvantage.

At the same time, national data show that many students reach Grade 12 without the foundations that conceptual work requires, and that these gaps fall unequally across school types and social groups. Schools therefore need practices that build conceptual clarity on complex problems and that work for every student in the classroom, not only for the most prepared.

This paper addresses three research questions:

RQ1: What do national data reveal about the conceptual readiness, progression and well-being of students approaching and completing Grade 12 in India?

RQ2: Which school practices have the strongest research evidence for building conceptual understanding of complex problems at the senior secondary level?

RQ3: How can these practices be organised into a framework that Indian schools can implement for all students, including those at risk of exclusion?

II. THE INDIAN CONTEXT: WHAT THE NATIONAL DATA SHOW

This section presents the national evidence that defines the problem. All figures are taken from the official or published sources listed in Table 8 and the reference list.

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Who reaches Grade 12

UDISE+ 2024-25 shows that India's school system retains most children through the primary years but loses a large share in the secondary stage. Retention falls from 92.4% at Class 5 to 47.2% at Class 12 (Fig. 1). The gross enrolment ratio at the higher secondary level is 58.4%, compared with 78.7% at the secondary level. The dropout rate at the secondary stage (Classes 9 and 10) is 11.5%, higher for boys (13.3%) than for girls (9.6%), and only 75.1% of students move from secondary to higher secondary [5].

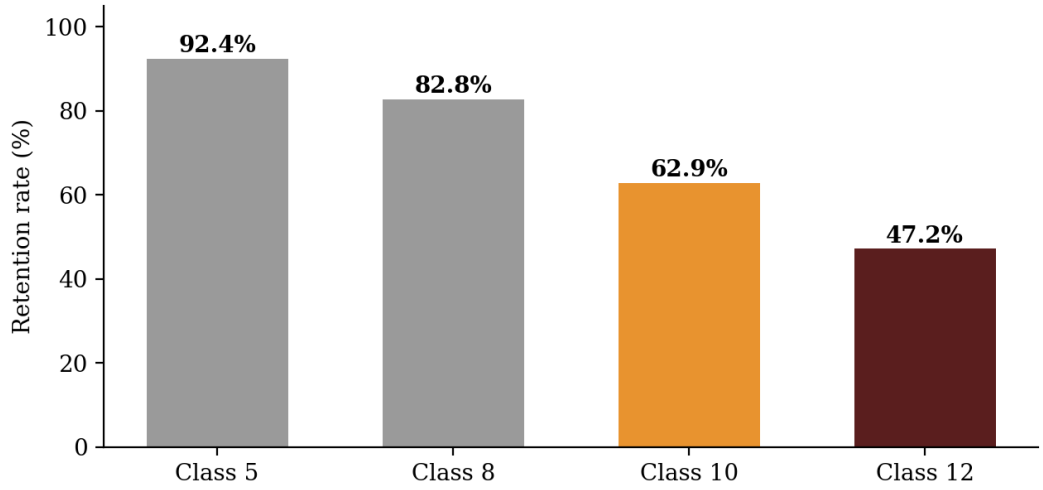


Fig. 1. Retention rate by stage, India, 2024-25. Source: UDISE+ 2024-25 [5].

TABLE 1. KEY ACCESS AND PARTICIPATION INDICATORS FOR THE SECONDARY AND HIGHER SECONDARY STAGES, INDIA, 2024-25

Indicator	Value	Level
Gross enrolment ratio (GER), secondary (Classes 9–10)	78.7%	All India
Gross enrolment ratio (GER), higher secondary (Classes 11–12)	58.4%	All India
GER, higher secondary, Scheduled Tribe students	51.9%	All India
Dropout rate, secondary: boys / girls / total	13.3% / 9.6% / 11.5%	All India
Transition rate, secondary to higher secondary: girls / boys / total	77.9% / 72.4% / 75.1%	All India
Retention rate to Class 10 / Class 12	62.9% / 47.2%	All India
GER, secondary / higher secondary	90.3% / 71.7%	Haryana

Source: UDISE+ 2024-25 [5], as compiled by Mehta [6].

Two implications follow for Grade 12 classrooms. First, the students who reach Grade 12 are a selected group, but they still include many first-generation learners and students who barely cleared Class 10. Second, the high loss at the transition from Class 10 to Class 11 means that conceptual difficulty in the senior stage is not only an academic problem. It is also a retention problem.

Conceptual learning declines across the grades

PARAKH Rashtriya Sarvekshan 2024, conducted by NCERT in December 2024, assessed 21,15,022 students in 74,229 schools, including 8,52,801 students in Grade 9 [7]. It is the most recent nationally representative measure of learning close to the senior secondary stage. The national average in mathematics falls from 60% in Grade 3 to 46% in Grade 6 and 37% in Grade 9 (Fig. 2a). At Grade 9, mathematics is the weakest of the four subjects tested, with science and social science at 40% and language at 54%.

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TABLE 2. GRADE 9 AVERAGE SCORES (%) BY SUBJECT, GENDER, SCHOOL MANAGEMENT AND SOCIAL GROUP, PARAKH RASHTRIYA SARVEKSHAN 2024

Category	Language	Mathematics	Science	Social Science
India average	54	37	40	40
Boys	52	37	41	39
Girls	56	36	40	41
State Government schools	48	33	37	37
Government-Aided schools	49	33	37	37
Private recognised schools	59	39	44	42
Central Government schools	69	48	51	49
Scheduled Castes	50	35	39	38
Scheduled Tribes	47	32	36	36
Other Backward Classes	53	37	40	39
Others	60	40	44	43

Source: PARAKH Rashtriya Sarvekshan 2024 [7], as reported by Shivani [8].

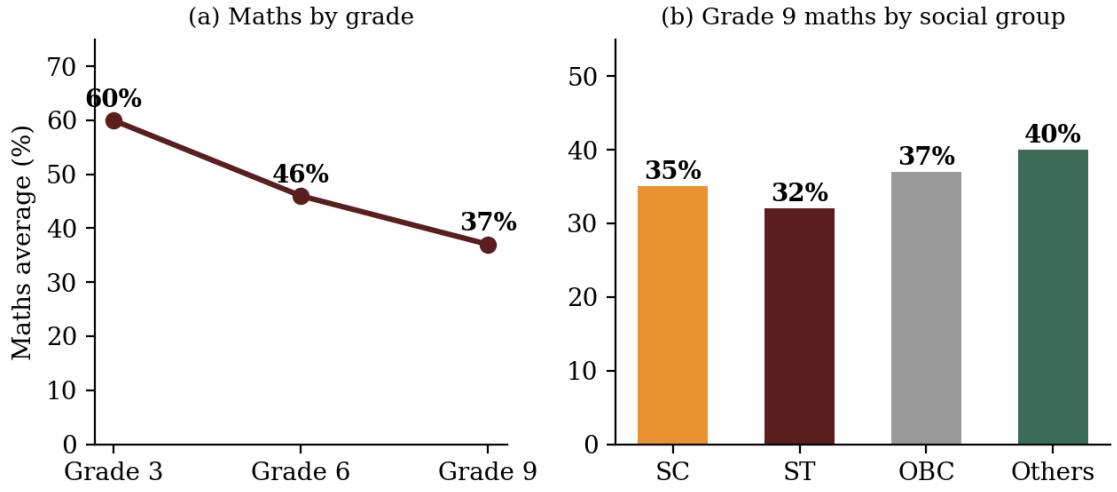


Fig. 2. (a) National average mathematics score by grade; (b) Grade 9 mathematics score by social group. Source: PARAKH Rashtriya Sarvekshan 2024 [7].

The gap by school management is large. Students in Central Government schools such as Kendriya Vidyalayas and Jawahar Navodaya Vidyalayas score 15 points higher in mathematics than students in State Government schools (48% against 33%), and 21 points higher in language (Fig. 3). Scheduled Tribe students record the lowest scores in every subject. Commentary on the PARAKH data also notes that procedural and recall items are answered reasonably well while items requiring multi-step reasoning or abstraction score much lower, and that fewer than half of mathematics teachers reported connecting learning to students' experiences or using puzzles regularly [8]. These are precisely the competencies that Grade 12 complex problems demand.

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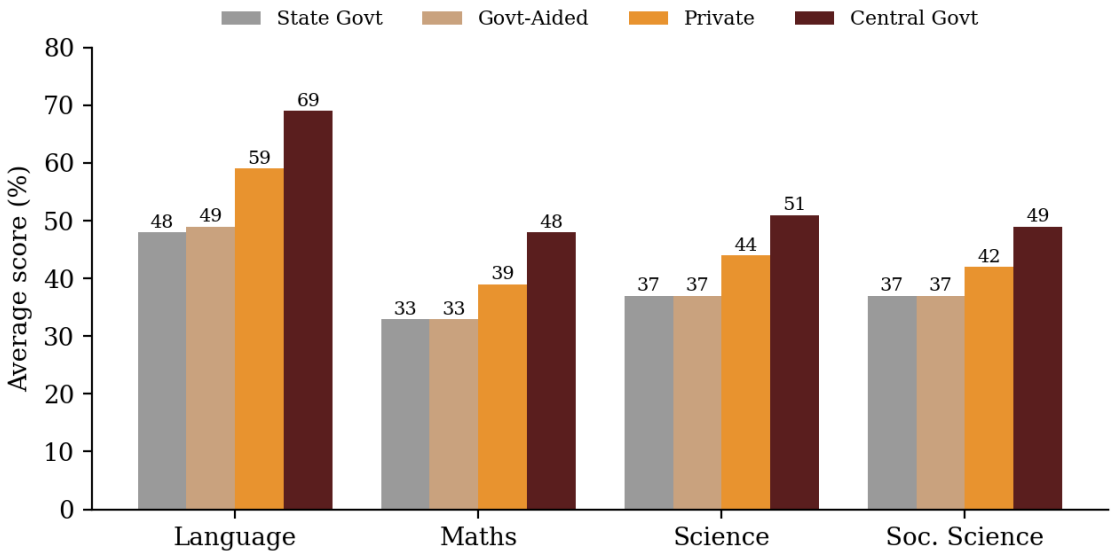


Fig. 3. Grade 9 average scores by subject and school management. Source: PARAKH Rashtriya Sarvekshan 2024 [7].

Foundational gaps persist among youth aged 14 to 18

ASER 2023 "Beyond Basics" surveyed 34,745 rural youth aged 14 to 18 in 28 districts across 26 states [9]. Although 86.8% were enrolled in an educational institution, only 73.6% could read a Standard II level text fluently in their regional language and only 43.3% could solve a three-digit by one-digit division problem, a skill expected by Standard III or IV (Fig. 4). Among those who could do division, a much larger share could complete everyday financial calculations than among those who could not.

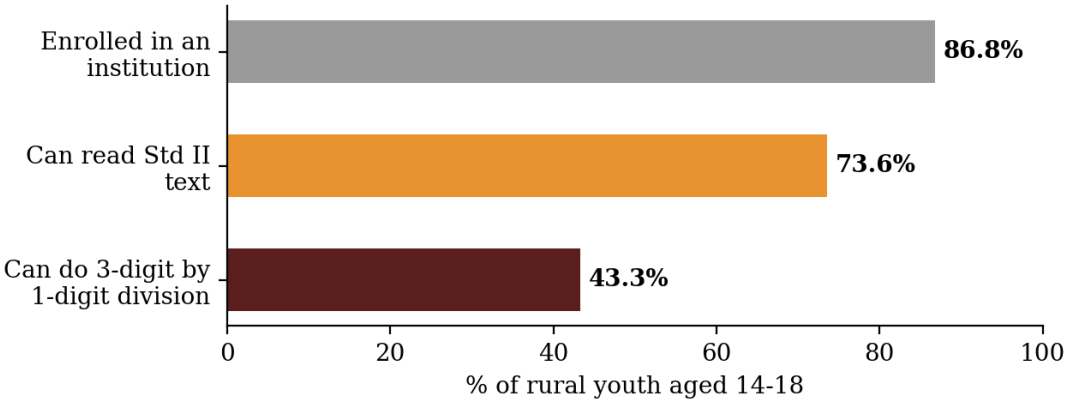


Fig. 4. Enrolment and foundational skills among rural youth aged 14–18. Source: ASER 2023 "Beyond Basics" [9].

TABLE 3. SELECTED FINDINGS FOR RURAL YOUTH AGED 14–18, ASER 2023

Indicator	Value
Youth surveyed (28 districts, 26 states)	34,745
Enrolled in an educational institution	86.8%
Not enrolled at age 14 / age 18	3.9% / 32.6%
Currently in Std XI or XII	28%
Can read Std II level text: all / females / males	73.6% / 76% / 71%
Can do 3-digit by 1-digit division: all / males / females	43.3% / 45% / 42%
Class XI or higher students enrolled in Arts/Humanities	55.7%

Source: ASER 2023 "Beyond Basics" [9].

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ASER is a rural household survey and does not test Grade 12 content. Its relevance here is that a meaningful share of the senior secondary cohort carries unresolved gaps in arithmetic and reading, the two tools every complex problem in science, commerce and the humanities relies on.

Board examination outcomes

The Ministry of Education's analysis of 2023 results from 59 boards found that about 32.4 lakh Class 12 students did not complete the grade, of whom 27.2 lakh failed and 5.2 lakh did not appear. The failure rate in Class 12 was 12% in national boards and 18% in state boards [10]. In the 2024 results, 20.16 lakh students failed Class 12, and open school boards recorded a Class 12 pass rate of only 57% [11].

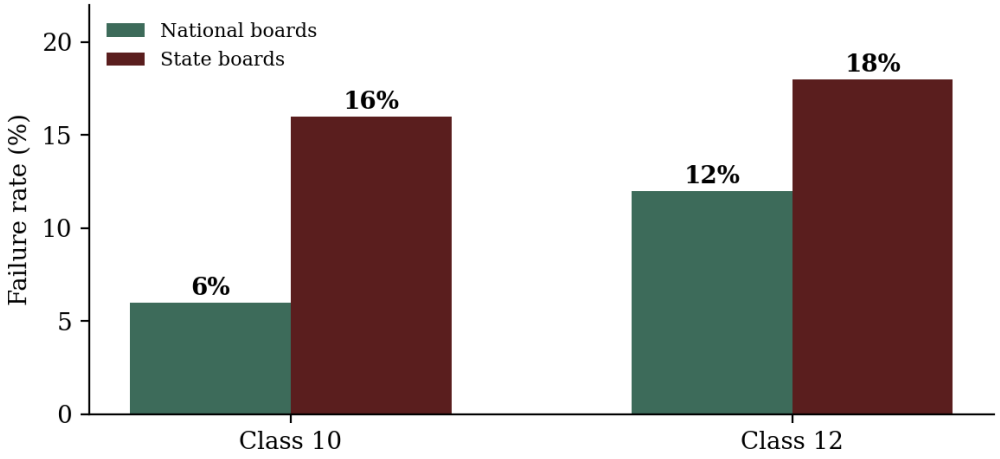


Fig. 5. Failure rates in Class 10 and Class 12 board examinations, national and state boards, 2023. Source: Ministry of Education analysis of 59 boards, as reported by PTI [10].

TABLE 4. CLASS 12 BOARD EXAMINATION OUTCOMES, INDIA

Indicator	Value	Year of examination
Class 12 students not completing the grade (failed + not appeared)	23.4 lakh (18.6 + 4.8)	2022
Class 12 students not completing the grade (failed + not appeared)	32.4 lakh (27.2 + 5.2)	2023
Class 12 failure rate: national boards / state boards	12% / 18%	2023
Class 12 students who failed	20.16 lakh	2024
Class 12 pass rate, open school boards	57%	2024
CBSE Class 12: appeared / passed / pass %	16,92,794 / 14,96,307 / 88.39%	2025
CBSE Class 12: placed in compartment	1,29,095 (7.63%)	2025
CBSE Class 12: appeared / passed / pass %	17,68,968 / 15,07,109 / 85.20%	2026

Sources: Ministry of Education analyses as reported in [12], [10], [11]; CBSE Class 12 result announcements [13], [14].

CBSE results show a stable gender pattern and a recent fall. The pass percentage rose from 87.98% in 2024 to 88.39% in 2025, then fell to 85.20% in 2026. Girls outperformed boys in all three years, and the gap widened to 6.73 percentage points in 2026 [13], [14] (Fig. 6). The fall in 2026 came in the second year of the 50% competency-focused paper pattern. The available data do not allow a causal claim, but the timing reinforces the need for practices that prepare students for application-based questions.

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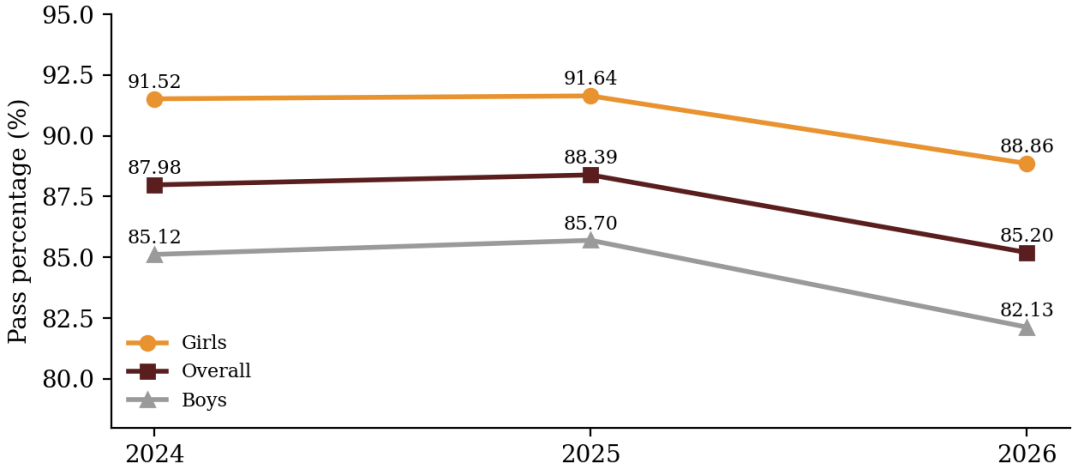


Fig. 6. CBSE Class 12 pass percentage by gender, 2024–2026. Source: CBSE result announcements, 2024–2026 [13], [14].

The shift in assessment design

CBSE Circular Acad-30/2024 changed the composition of the Class 11 and 12 theory papers from the 2024-25 session [4]. Table 5 shows the change. Half the paper now consists of competency-focused questions, including case-based and source-based items, and the share of constructed-response questions fell to 30%. Competency-focused questions are designed to test the application of concepts in real-life situations.

TABLE 5. COMPOSITION OF CBSE CLASS 12 THEORY PAPERS BEFORE AND AFTER THE 2024-25 REFORM

Question type	2023-24	2024-25 onwards
Competency-focused questions (MCQs, case-based, source-based integrated, other types)	40%	50%
Select-response questions (MCQs)	20%	20%
Constructed-response questions (short and long answer)	40%	30%

Source: CBSE Circular No. Acad-30/2024 dated 3 April 2024.

Student well-being and the conditions for learning

The NCERT survey on mental health and well-being, conducted by the Manodarpan cell between January and March 2022, covered 3,79,842 students in Classes 6 to 12, of whom 2,21,261 were at the secondary stage [15]. Its findings are directly relevant to conceptual learning, because anxiety, poor concentration and reluctance to ask questions all reduce the cognitive resources available for complex problems.

TABLE 6. SELECTED FINDINGS ON STUDENT WELL-BEING, CLASSES 6–12, NCERT SURVEY 2022

Indicator	Value
Students citing studies, examinations and results as major causes of anxiety	81%
Of which: studies / examinations and results	50% / 31%
Students reporting mood swings	43%
Students reporting lack of concentration	29%
Students hesitant to ask questions	28%
Students satisfied with school life	73%
Students reporting difficulty learning online	51%

Source: NCERT [15].

The survey also found that satisfaction with school and personal life declines from the middle to the secondary stage, and that the secondary stage is marked by fear of board examinations and uncertainty about future admissions. A student who is afraid to ask a question cannot have a misconception corrected. Well-being is therefore part of the instructional problem, not separate from it.

III. REVIEW OF RESEARCH ON CONCEPTUAL LEARNING

Why complex problems are hard

Studies of expertise explain why complex problems defeat students who know many facts. Chi, Feltovich and Glaser [16] found that physics experts sorted problems by the underlying principle, such as conservation of energy, while novices sorted them by surface features, such as “inclined plane” or “pulley”. Novices therefore fail when a familiar principle appears in an

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unfamiliar setting, which is exactly what competency-based questions do. Cognitive load theory adds that working memory is limited. When students must search for a method while also holding many pieces of information in mind, little capacity remains for learning the structure of the problem [17].

Practices with strong evidence

Worked examples and faded guidance. Students who study fully worked solutions before solving problems themselves learn more efficiently than those who begin with unaided problem solving, especially in the early stages of learning a topic [18]. Guidance is then removed step by step, so that students gradually take over the reasoning.

Active learning and peer explanation. A meta-analysis of 225 studies in science, engineering and mathematics found that active learning raised examination scores by about 6% and that students in traditional lecture classes were 1.5 times more likely to fail; the average failure rate was 21.8% with active learning against 33.8% with lectures [19]. In a survey of 6,542 physics students in 62 courses, Hake [20] found that interactive-engagement courses produced an average normalised conceptual gain of 0.48, about twice the 0.23 achieved by traditional courses. Peer instruction, in which students answer a conceptual question individually, discuss it with neighbours and answer again, produced sustained gains in both conceptual and quantitative problem solving over ten years at Harvard [21].

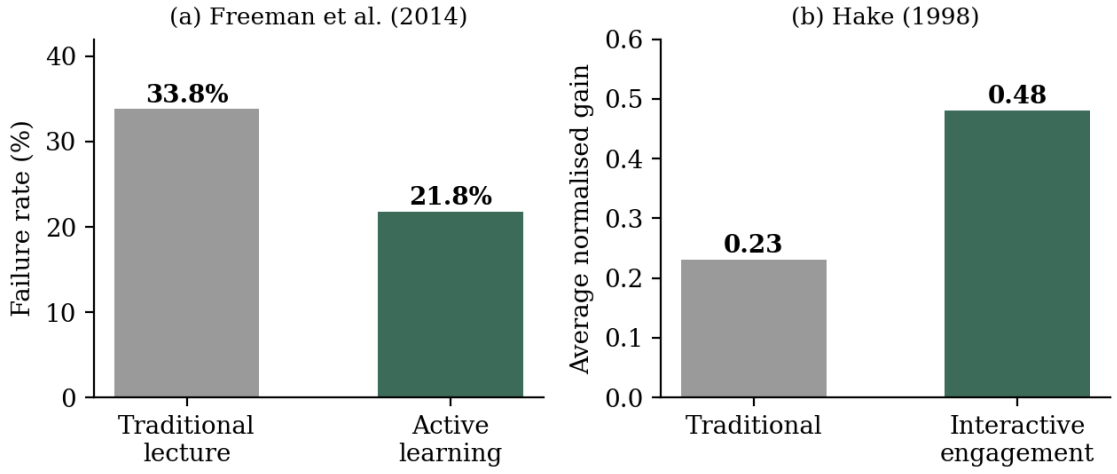


Fig. 7. International evidence on active learning: (a) failure rates under traditional lecturing and active learning; (b) conceptual gains in traditional and interactive-engagement physics courses. Sources: Freeman et al. [19]; Hake [20].

Productive struggle before instruction. When students first attempt a carefully designed problem and then receive instruction that builds on their attempts, conceptual understanding improves. A meta-analysis of productive failure found a moderate advantage for conceptual knowledge over instruction-first approaches, larger when the design was implemented faithfully [22].

Retrieval and spaced practice. Testing oneself on material produces better long-term retention than re-reading it [23]. In a review of ten common learning techniques, practice testing and distributed practice were rated of high utility, while highlighting and re-reading were rated of low utility [24]. These are the techniques Indian students use least and the ones that most directly support retention of concepts until the board examination.

Formative assessment. Black and Wiliam's [25] review of classroom assessment found that strengthening formative assessment produced learning gains with effect sizes between 0.4 and 0.7, with the largest benefits for lower-achieving students. This finding is important for equity.

Mastery learning and tutoring. Bloom [26] reported that students taught through one-to-one tutoring with mastery checks performed about two standard deviations above students in conventional classes. Schools cannot provide a tutor for every student, but peer tutoring, mastery checks and remedial groups capture part of this effect.

Inclusive design. Universal Design for Learning (UDL) proposes that teachers plan from the start for variability among learners by offering multiple means of engagement, representation and action and expression [27]. In India, the Rights of Persons with Disabilities Act, 2016 makes inclusive education a legal obligation.

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TABLE 7. SUMMARY OF RESEARCH EVIDENCE ON PRACTICES THAT BUILD CONCEPTUAL UNDERSTANDING

Practice	Key study	Reported finding
Active learning	Freeman et al. [19], meta-analysis of 225 studies	Examination scores about 6% higher; failure 21.8% against 33.8% under lecturing
Interactive engagement	Hake [20], 6,542 students, 62 courses	Normalised conceptual gain 0.48 against 0.23
Peer instruction	Crouch & Mazur [21], ten years of use	Sustained gains in conceptual and quantitative problem solving
Productive failure	Sinha & Kapur [22], meta-analysis	Moderate advantage on conceptual knowledge over instruction-first, larger with high-fidelity design
Worked examples	Sweller & Cooper [18]	Faster, more efficient learning of problem structure than unaided problem solving
Retrieval and spaced practice	Roediger & Karpicke [23]; Dunlosky et al. [24]	Better long-term retention than re-study; rated high utility
Formative assessment	Black & Wiliam [25]	Effect sizes 0.4–0.7; largest gains for lower achievers
Mastery learning and tutoring	Bloom [26]	Tutored students about two standard deviations above conventional classes
Expert problem representation	Chi et al. [16]	Experts classify problems by principle; novices by surface features

Source: Author's synthesis of the cited studies.

The research gap

Most of the evidence above comes from outside India and from university courses. Indian national surveys, for their part, stop at Grade 9 or Grade 10 and do not measure Grade 12 learning directly. There is little published work that connects Indian data on learning gaps and well-being to specific Grade 12 classroom practices, or that addresses the full diversity of students in Indian senior secondary classrooms. This paper addresses that gap.

IV. METHODOLOGY

Design

The study uses a two-part design. The first part is a secondary analysis of published national data on access, learning, examination outcomes and well-being (RQ1). The second part is a structured synthesis of research evidence on instructional practice, followed by adaptation of the findings to the Indian Grade 12 context (RQ2 and RQ3). No primary data were collected, and no students or teachers were surveyed for this paper.

Data sources

TABLE 8. NATIONAL DATA SOURCES USED IN THE STUDY

Source	Agency	Coverage	Used for
UDISE+ 2024-25	Ministry of Education	All recognised schools in India	Enrolment, dropout, transition, retention
PARAKH Rashtriya Sarvekshan 2024	NCERT (PARAKH)	21,15,022 students in 74,229 schools; Grades 3, 6, 9	Learning levels by subject, management and social group
ASER 2023 "Beyond Basics"	ASER Centre (Pratham)	34,745 rural youth aged 14–18, 28 districts	Foundational skills of the senior secondary age group
Analyses of board results, 2022–2024	Ministry of Education (DoSEL)	59 to 66 school boards	Failure and non-completion in Class 12
CBSE Class 12 results, 2024–2026	CBSE	All CBSE Class 12 candidates	Pass percentage by gender and year
Mental Health and Well-being of School Students (2022)	NCERT Manodarpan cell	3,79,842 students, Classes 6–12	Anxiety, concentration, help-seeking
CBSE Circular Acad-30/2024	CBSE	Classes 11–12 from 2024-25	Composition of question papers

Source: Compiled by the author.

Selection of practices

Practices were included if they met three criteria: (a) support from at least one meta-analysis, large multi-site study or controlled experiment; (b) a direct effect on conceptual understanding or problem solving, not only on recall; and (c) feasibility in an Indian school with existing staff, timetables and resources. Each included practice was then examined for its suitability for students with weak foundations, students learning in a second language, students with disabilities and students under examination stress.

Limitations of the method

National surveys do not test Grade 12, so Grade 9 and age-group data are used as the closest available indicators of readiness. Some national figures are drawn from official data as reported by the Press Trust of India and education news services, because complete official reports were not all publicly available in tabular form. International research

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evidence may not transfer fully to Indian classrooms, which is why the framework in Section 6 is offered for school-level testing.

V. Findings

The analysis of national data supports five findings.

The conceptual gap is cumulative. Mathematics scores fall from 60% at Grade 3 to 37% at Grade 9, and only 43.3% of rural youth aged 14 to 18 can do basic division. Grade 12 teachers inherit gaps from earlier grades and cannot assume that prerequisite concepts are secure.

The gap is unequal. At Grade 9, students in State Government schools score 15 points below those in Central Government schools in mathematics, and Scheduled Tribe students score lowest in all subjects. Practices that work only for well-prepared students will widen these gaps.

Assessment now rewards concepts. Half of the CBSE Class 12 theory paper is competency-focused. Students who rely on memorised procedures face a structural disadvantage, and the 3.19-point fall in the CBSE pass percentage in 2026 is consistent with this pressure.

Examination failure is concentrated and costly. Over 20 lakh students failed Class 12 in 2024, state boards fail students at a higher rate than national boards, and open school boards pass only 57% of Class 12 candidates. Each failure risks permanent exit from education.

Anxiety undermines learning. Eighty-one per cent of students cite studies, examinations and results as major sources of anxiety, and 28% are hesitant to ask questions. Practices that rely on students exposing their thinking must therefore be designed to feel safe.

The research synthesis shows that the practices with the strongest evidence are those that make student thinking visible and correct it early: worked examples followed by faded guidance, peer discussion of conceptual questions, low-stakes retrieval and frequent formative assessment. These practices also produce their largest benefits for lower-achieving students, which makes them suited to the inequalities found in the national data.

VI. The CLEAR-12 Framework

The findings are organised into a school-level framework named CLEAR-12. Four instructional components (Connect, Layer, Elicit, Assess) rest on a fifth, foundational component (Reach every learner). The number 12 marks its design for the Grade 12 year.

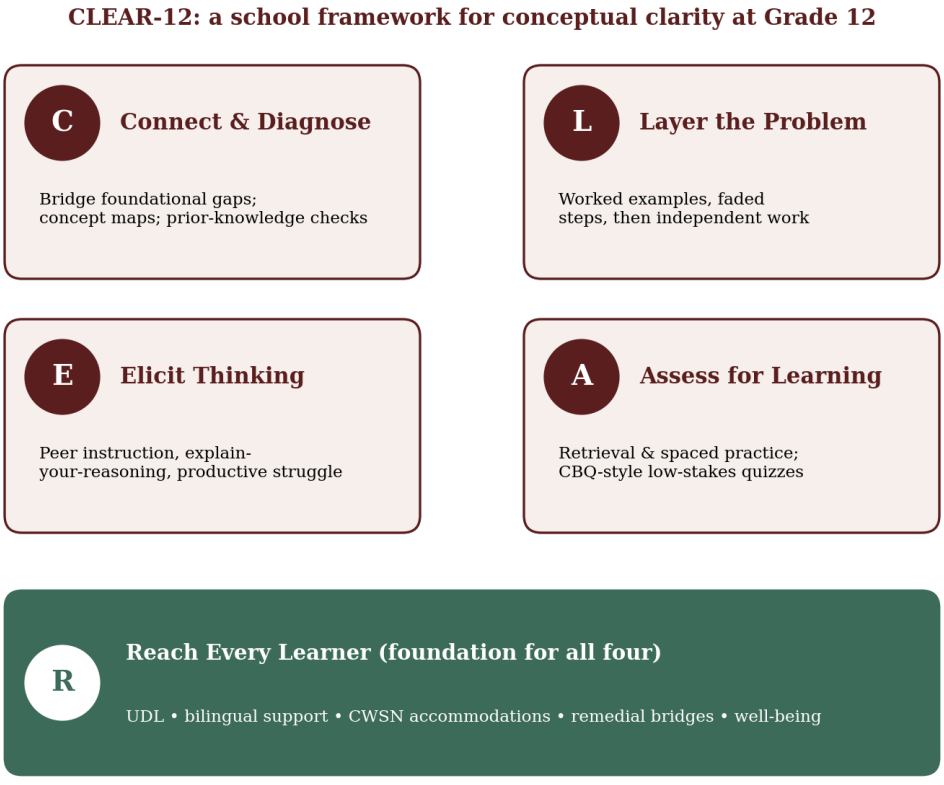


Fig. 8. The CLEAR-12 framework for conceptual clarity at Grade 12. Source: Developed by the author.

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TABLE 9. CLEAR-12 COMPONENTS, PRACTICES, EVIDENCE BASE AND INCLUSIVE ADAPTATIONS

Component	Classroom practice	Evidence base	Adaptation for all learners
C – Connect and diagnose	Short diagnostic test of prerequisites at the start of each unit; concept maps linking new topics to earlier ones; 15-minute bridge sessions on gaps found	Formative assessment [25]; PARAKH and ASER gap data	Bridge sessions in the student's stronger language; visual concept maps for students with reading difficulties
L – Layer the problem	Fully worked example, then partly completed examples, then independent problems; complex problems broken into labelled sub-steps that name the principle used	Worked examples [18]; cognitive load [17]	Step cards and formula sheets for students who need them during practice; extra worked examples for slower learners
E – Elicit thinking	Two-minute conceptual question, individual vote, pair discussion, re-vote; "explain your reasoning" before calculation; occasional attempt-first problems	Freeman et al. [19]; Hake [20]; Crouch & Mazur [21]; Sinha & Kapur [22]	Anonymous voting (cards or slips) so that hesitant students participate; mixed-ability pairs
A – Assess for learning	Weekly ungraded retrieval quiz with CBQ and case-based items; spaced revision of earlier units; error analysis of each test	Roediger & Karpicke [23]; Dunlosky et al. [24]; CBSE [4]	Quizzes in bilingual form where permitted; compensatory time and scribe practice for students entitled to them under board rules
R – Reach every learner	UDL lesson planning; remedial groups by diagnosed gap; teacher–counsellor coordination; stress-literacy sessions before examinations	CAST [27]; RPwD Act [28]; NCERT [15]	Individual plans for children with special needs; mentoring for first-generation learners; referral through the school counsellor to the Manodarpan helpline (8448440632) or Tele-MANAS (14416)

Source: Developed by the author from the evidence in Section 3.

Subject exemplars

Table 10 shows how the framework applies to typical complex problems in Grade 12 subjects.

TABLE 10. CLEAR-12 APPLIED TO COMPLEX PROBLEMS IN GRADE 12 SUBJECTS

Subject	Typical complex problem	How CLEAR-12 is applied
Physics	Motion of a charged particle in combined electric and magnetic fields	Diagnose vector and force concepts from Class 11; worked example separating the two forces; peer vote on direction of deflection before any calculation
Chemistry	Predicting the effect of temperature and pressure on an equilibrium system	Concept map linking Le Chatelier's principle, Gibbs energy and rate; attempt-first case from an industrial process; weekly retrieval of earlier units
Mathematics	Application of derivatives to optimisation in a real context	Bridge session on functions and graphs; faded examples moving from formula to modelling; students explain why the critical point is a maximum
Biology	Inheritance problem combining two traits with linkage	Visual Punnett representations; peer explanation of independent assortment; error analysis of common misreadings
Accountancy	Preparing accounts from incomplete records	Worked example with each adjustment labelled by principle; partly completed statements; case-based questions as in CBSE papers
Economics	Applying elasticity and market equilibrium to a policy case	Source-based questions from current Indian data; pair discussion of predicted outcomes before graphing
Political Science and History	Analysing a source to explain a constitutional or historical change	Source-based integrated questions; structured claim–evidence–reasoning writing frames for all students

Source: Developed by the author.

VII. IMPLEMENTATION IN SCHOOLS

The framework is designed to work within existing resources. Table 11 sets out a twelve-month implementation plan for a senior secondary school.

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TABLE 11. TWELVE-MONTH IMPLEMENTATION PLAN FOR CLEAR-12

Period	School actions	Indicators to monitor
April–May	Orientation of Grade 11–12 teachers; diagnostic tests of prerequisites in each subject; identification of students needing bridge support, special accommodations or counselling	Share of students tested; gap profile by subject
June–July	Weekly professional learning meeting per subject; adoption of worked-example and peer-instruction routines; first bridge sessions	Number of lessons using the routines; attendance at bridge sessions
August–September	Weekly retrieval quizzes; error analysis after unit tests; teacher–counsellor coordination on students with high anxiety	Quiz participation; unit test trends for the lowest-scoring quarter
October–November	Half-yearly examination with at least 50% competency-focused items; individual feedback conferences	Score on competency-focused items compared with recall items
December–January	Spaced revision of all units; pre-board examinations; stress-literacy sessions; practice for students using scribes or compensatory time	Pre-board pass rate; students reporting high anxiety
February–March	Board examinations; counselling support; review of the year's data by the school leadership team	Board pass rate; compartment rate; students retained to the end of Grade 12

Source: Developed by the author.

Three conditions matter most. First, the principal must protect time for teachers to meet weekly by subject, because the routines are learned through shared planning. Second, assessment data must be used to change teaching, not only to grade students. Third, the school counsellor must be part of the academic team, so that students' anxiety and help-seeking are addressed alongside their learning.

VIII. DISCUSSION

The national data and the research evidence point in the same direction. India's assessment system has moved toward conceptual understanding, but many students arrive at Grade 12 with weak foundations, unequal preparation and high anxiety. The practices with the strongest evidence for building conceptual understanding are also those that benefit lower-achieving students most and that make student thinking visible early. They do not require new technology or additional funding. They require changes in how class time is used and how assessment is treated.

The equity dimension deserves emphasis. PARAKH shows a 15-point gap in Grade 9 mathematics between State Government and Central Government schools. The Central Government schools also post the highest Class 12 pass rates in CBSE, with Jawahar Navodaya Vidyalayas at 99.29% and Kendriya Vidyalayas at 99.05% in 2025 [13]. These schools work with students from varied backgrounds, which suggests that systematic teaching practices, stable staffing and regular monitoring can narrow gaps. The CLEAR-12 framework attempts to make such practices available to every school.

The gender pattern also needs attention. Girls outperform boys in CBSE Class 12 results and have lower secondary dropout, yet ASER shows girls behind boys in basic arithmetic and PARAKH shows girls slightly behind in Grade 9 mathematics. Schools should therefore support girls' confidence in mathematics-based subjects while also addressing boys' higher dropout and lower pass rates.

Finally, the well-being data show that conceptual learning and mental health are linked. Practices such as anonymous voting, ungraded retrieval quizzes and peer discussion lower the social cost of being wrong. They make it easier for the 28% of students who hesitate to ask questions to reveal their misunderstandings.

IX. LIMITATIONS AND FUTURE RESEARCH

This study relies on secondary data and international research. It does not measure the effect of CLEAR-12 in Indian schools. Grade 12 learning is not directly measured by any national survey, and some figures are drawn from official data as reported in the press. Future research should test the framework through school-based action research or a controlled comparison across schools, using the indicators in Table 11. Studies should report results separately for girls and boys, social groups, students with disabilities and students learning in a second language. A national assessment of conceptual understanding at the senior secondary stage would also greatly strengthen the evidence base.

X. CONCLUSION

Conceptual clarity on complex problems is now central to success at Grade 12 in India, because examinations and further study demand it. National data show that the foundations for this clarity are weak and unequally distributed, and that student anxiety adds to the difficulty. The research evidence identifies a small set of practices that work: diagnose and bridge gaps, layer problems from worked examples to independent work, make students explain their thinking, assess frequently without high stakes, and design every lesson for the full range of learners. The CLEAR-12 framework brings these practices together in a form that Indian schools can adopt within their existing resources. Applied consistently, it can help schools move from teaching for marks to teaching for understanding, and ensure that every student, not only the best prepared, reaches that understanding.

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