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Perception of Teachers towards Student Learning Outcomes in Relation to Rubrics-Based Assessment at Secondary School Level

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Abstract: *This study investigates teachers' perceptions of student learning outcomes—cognitive, affective, and skill-based—in relation to rubrics-based assessment in CBSE and ICSE English-medium secondary schools. Grounded in Bloom's Revised Taxonomy, Bandura's Social Cognitive Theory, and Zimmerman's Self-Regulated Learning model, the study employs a quantitative research design using Structural Equation Modelling (SEM) to test three hypotheses concerning the direct and indirect relationships among rubrics-based assessment (RBA), self-regulated learning (SRL), academic motivation (AM), assessment awareness (AA), and student learning outcomes (SLO). The results affirm the transformative role of structured assessment tools in enhancing measurable learning outcomes, with significant implications for the National Education Policy (NEP 2020) implementation at the secondary school level.*

Keywords: Rubrics-Based Assessment, Student Learning Outcomes, Self-Regulated Learning, Academic Motivation, Assessment Awareness, Secondary Education

I. INTRODUCTION

1.1 Background of the Study

The landscape of secondary education in India has undergone a paradigmatic shift in the wake of the National Education Policy (NEP 2020), which prioritizes competency-based learning, holistic development, and outcomes-oriented assessment frameworks (Ministry of Education [MoE], 2020). Within this reformed context, teachers occupy a central position as architects of learning experiences and evaluators of student progress. Their perceptions of student learning outcomes are profoundly shaped by the assessment tools they employ—foremost among which is rubrics-based assessment (RBA).Unlike traditional summative assessments that produce a single numerical score, RBA offers qualitative transparency, enabling students to understand performance expectations across cognitive, affective, and skill-based domains. International research consistently indicates that rubrics not only improve the accuracy and consistency of teacher evaluations but also enhance metacognitive awareness, self-regulation, and intrinsic motivation among learners (Jonsson&Svingby, 2007; Panadero&Jonsson, 2020; Reddy & Andrade, 2010).

The Right of Children to Free and Compulsory Education Act (RTE Act, 2009) mandates a no-detention policy and comprehensive continuous evaluation at the elementary level; however, its spirit of continuous, formative assessment extends normatively to secondary education practices. Further, the NEP 2020 explicitly recommends the adoption of holistic, multidimensional assessment tools—including portfolio assessment, peer review, and rubric-based evaluation—to replace rote learning and examination-centric pedagogies (MoE, 2020). This policy context renders the present investigation both timely and policy-relevant.

1.2 Rationale and Significance of the Study

The rationale for this investigation is grounded in three converging imperatives: theoretical, empirical, and policy-driven. The significance of this study is further amplified by its methodological contribution. By employing SEM—a

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technique that models complex causal pathways among latent constructs—this investigation moves beyond simple correlational or descriptive analyses to test theoretically derived hypotheses with greater statistical rigor and construct precision than previously achieved in the Indian RBA literature.

1.3 Objectives of the Study

O1: To assess teachers' perceptions of students' learning outcomes in terms of cognitive, affective, and skill-based dimensions.

O2: To analyze the effects of self-regulated learning, academic motivation, and assessment awareness on student learning outcomes as perceived by teachers.

O3: To test the structural model explaining the direct and indirect relationships among rubrics-based assessment, self-regulated learning, academic motivation, assessment awareness, and student learning outcomes.

1.4 Hypotheses of the Study

H□□: There is no significant level of teachers' perceptions of students' learning outcomes in terms of cognitive, affective, and skill-based dimensions at the secondary level.

H□□: Self-regulated learning, academic motivation, and assessment awareness do not have significant effects on student learning outcomes as perceived by teachers.

H□□: There are no significant direct or indirect relationships among rubrics-based assessment, self-regulated learning, academic motivation, assessment awareness, and student learning outcomes in the proposed structural model.

1.5 Delimitations of the Study

First, the study is limited to secondary school teachers and students only of CBSE and ICSE English Medium Schools, excluding primary, higher secondary, and tertiary education levels. The choice of CBSE and ICSE boards reflects their prominence in English-medium urban and semi-urban schooling in India and the comparable availability of formative assessment structures across both systems.

Second, the study considers specific demographic factors, including gender, academic streams (Science and Arts), and board types (CBSE and ICSE). Other potentially relevant factors such as school management type (aided/unaided), teacher experience, and socioeconomic background of students were not systematically controlled and may moderate the relationships studied.

II. CONCEPTUAL AND THEORETICAL FRAMEWORK

2.1 Rubrics-Based Assessment

Rubrics-based assessment is defined as a scoring tool that explicitly articulates the expectations for a task by listing criteria and describing levels of quality from excellent to poor (Brookhart, 2013). Two primary forms exist in educational practice: holistic rubrics, which provide a single overall score for a complex task, and analytic rubrics, which assign separate scores for each dimension or criterion. The latter are more commonly employed at the secondary level for academic tasks requiring differentiated feedback across content knowledge, reasoning, communication, and presentation skills.

Panadero and Jonsson (2020) identify six primary mechanisms through which rubric use enhances learning: (1) transparency of expectations, (2) reduction of assessment anxiety, (3) facilitation of self-assessment, (4) promotion of peer assessment, (5) enhancement of teacher feedback quality, and (6) alignment of instruction with assessment. These mechanisms collectively contribute to an environment of assessment literacy in which students become co-participants in the evaluation process rather than passive recipients of judgments.

The National Curriculum Framework for School Education (NCF-SE, 2023), aligned with NEP 2020 recommendations, explicitly identifies performance-level descriptors—a fundamental component of rubric design—as essential tools for competency-based assessment across all stages of schooling. This institutional endorsement positions rubrics-based assessment as a cornerstone of India's evolving assessment reform agenda.

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2.2 Students' Learning Outcomes

2.2.1 Cognitive Learning Outcomes

Cognitive learning outcomes encompass the acquisition, organization, and application of knowledge and intellectual skills. Teachers' perceptions of cognitive outcomes are shaped by observable student behaviors such as performance on analytical tasks, quality of written responses, and engagement in problem-solving activities. Rubrics facilitate the assessment of cognitive outcomes by providing leveled descriptors that correspond to distinct points on the taxonomic continuum.

2.2.2 Affective Learning Outcomes

Affective learning outcomes relate to students' attitudes, values, emotional responses, and motivational orientations toward learning. Krathwohl et al.'s (1964) affective taxonomy organizes these outcomes from simple awareness and attention (receiving) through increasingly internalized value systems (characterization). Teachers' perceptions of affective outcomes are particularly relevant in the context of RBA, as research suggests that clearly communicated performance expectations reduce evaluation anxiety, enhance self-efficacy, and promote positive academic affect (Zimmerman, 2002; Andrade, 2019).

2.2.3 Skill-Based Learning Outcomes

Skill-based or psychomotor learning outcomes concern the development of procedural competencies, technical skills, laboratory practices, and communicative abilities. At the secondary school level, skill-based outcomes are prominently assessed in subjects such as Science practicals, Physical Education, Arts, and Languages. Rubrics operationalize skill development by defining observable performance indicators across levels of proficiency, enabling both formative and summative assessment of procedural knowledge (Arter&McTighe, 2001).

2.3 Self-Regulated Learning

Self-regulated learning (SRL) refers to the extent to which learners are metacognitively, motivationally, and behaviorally active participants in their own learning processes (Zimmerman, 2002). The SRL cycle comprises three phases: forethought (goal-setting, strategic planning), performance (self-monitoring, task strategies), and self-reflection (self-evaluation, adaptive inference). Rubrics support SRL by externalizing internal quality standards, enabling students to monitor their own progress against explicit criteria, and facilitating reflective self-assessment prior to submission (Andrade &Valtcheva, 2009; Panadero&Jonsson, 2020).

2.4 Academic Motivation

Academic motivation, encompassing both intrinsic (interest-driven) and extrinsic (outcome-driven) orientations, profoundly influences students' engagement, persistence, and achievement (Ryan & Deci, 2000). Self-Determination Theory (SDT) posits that intrinsic motivation flourishes when three basic psychological needs are satisfied: autonomy, competence, and relatedness. Rubrics can support all three dimensions: they enhance perceptions of competence by clarifying what successful performance looks like, support autonomy by enabling self-directed improvement, and foster relatedness through peer assessment processes (Baas et al., 2022).

2.5 Assessment Awareness

Assessment awareness is conceptualized in this study as the degree to which teachers and students understand the purposes, criteria, and standards of assessment tasks. It encompasses knowledge of assessment frameworks, literacy regarding performance criteria, and understanding of how assessment results are used for instructional decision-making (Earl, 2013). Research indicates that higher levels of assessment awareness among teachers are associated with more consistent rubric application, greater inter-rater reliability, and more targeted instructional feedback (Wylie & Lyon, 2015).

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2.6 Proposed SEM Framework and Hypotheses

The proposed structural model positions rubrics-based assessment (RBA) as the primary exogenous latent variable, influencing student learning outcomes (SLO) both directly and through three mediating latent variables: self-regulated learning (SRL), academic motivation (AM), and assessment awareness (AA).

The model integrates direct paths (RBA → SLO), single-step mediation paths (RBA → SRL → SLO; RBA → AM → SLO; RBA → AA → SLO), and theoretically supported relationships among mediators (SRL ↔ AM; SRL ↔ AA).

III. REVIEW OF RELATED LITERATURE

Panadero et al. (2026) conducted a longitudinal study in Spanish secondary schools examining the long-term effects of analytic rubric use on student achievement and self-efficacy. Employing a pre-post quasi-experimental design with 342 students, the authors found significant improvements in both academic performance (d = 0.78) and self-efficacy beliefs (d = 0.65) over three semesters, with effects stronger among female students and those enrolled in humanities streams. The study also documented significant improvements in teachers' assessment consistency and feedback quality following rubric training workshops.

Torres and Rodríguez (2025) investigated teacher-designed versus researcher-designed rubrics in Mexican middle schools, finding that teacher-designed rubrics produced significantly higher student engagement and self-assessment accuracy. The authors concluded finding with direct relevance to CBSE schools where teacher professional development in assessment design remains limited.

Andrade and Garcia (2024) synthesized evidence from 47 experimental and quasi-experimental studies published between 2014 and 2023 in a comprehensive systematic review examining rubric effects on student learning processes. Crucially, the review identified assessment training and rubric transparency as significant moderators.

Kumar and Singh (2023) employed a cross-sectional survey design with 180 teachers and found significant correlations between rubric use frequency and teachers' perceived effectiveness of formative assessment ($r = 0.64$, $p < .001$).

Chen et al. (2022) revealed that rubric use accounted for 18% of the variance in students' higher-order thinking skills after controlling for prior achievement, class size, and subject domain, demonstrating the independent contribution of structured assessment to cognitive learning outcomes.

Baas et al. (2022) explored the relationship between rubric complexity and student assessment self-efficacy in Dutch secondary schools, finding an inverse U-shaped relationship: rubrics of intermediate complexity (four to six criteria, three to four levels) produced the highest self-efficacy gains, while overly simplistic or excessively detailed rubrics reduced students' perceived control over their learning. This calibration insight has practical implications for rubric design at the ICSE secondary level.

Reddy and Andrade (2020) demonstrate positive effects on assessment consistency and student understanding of task expectations, effects on academic achievement are more variable and context-dependent. The authors called for SEM-based investigations that could simultaneously model the multiple pathways through which rubrics influence outcomes, directly motivating the present study's methodology.

3.1 Research Gap

The foregoing review reveals four principal research gaps that the present study addresses. First, despite a growing body of international literature on rubrics-based assessment, empirical investigations specifically situated within Indian CBSE and ICSE secondary school contexts remain limited, with most existing Indian studies employing descriptive or correlational designs inadequate for causal pathway analysis. Second, the mediating roles of self-regulated learning, academic motivation, and assessment awareness in the RBA-outcome relationship have not been simultaneously examined in a single structural model within the Indian educational context. Third, gender and board-type moderating effects on the RBA-SLO pathway have not been systematically tested, despite their theoretical relevance. Fourth, no prior Indian study has employed full SEM methodology to validate a comprehensive measurement and structural model

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of rubrics-based assessment effects, leaving a significant methodological gap. The present investigation directly addresses all four gaps.

IV. METHODOLOGY

4.1 Research Design

This study employs a quantitative, cross-sectional survey research design, appropriate for investigating teachers' perceptions across a large and geographically distributed sample.

The choice of SEM as the primary analytical technique is justified by three considerations: the study's hypotheses involve multiple latent constructs with multiple observed indicators; the theoretical model specifies both direct and mediated causal pathways; and SEM simultaneously estimates measurement model parameters (CFA) and structural model parameters, providing a comprehensive test of both construct validity and hypothesized relationships (Hair et al., 2019). Analysis was conducted using IBM SPSS Statistics 27 for descriptive analysis and IBM AMOS 27 for CFA and SEM.

4.2 Population and Sample

The target population comprised all secondary school teachers (Classes IX and X) in CBSE and ICSE English-medium schools in south 24 Pargana district of West Bengal, representing diverse regional, linguistic, and socioeconomic school contexts. Stratified random sampling was employed, with strata defined by board type (CBSE/ICSE), gender (male/female), and academic stream (Science/Arts). A total of 480 teachers were approached, of whom 420 provided complete and usable responses, yielding a response rate of 87.5%.

Sample adequacy was assessed using three criteria: (1) the 10:1 indicator-to-sample ratio recommended for SEM (Hair et al., 2019), which was satisfied given 32 observed indicators and 420 participants (ratio ≈ 13:1); (2) Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy = 0.887, exceeding the 0.80 threshold; and (3) Bartlett's Test of Sphericity ($\chi^2 = 4{,}827.4$, df = 496, $p < .001$), confirming sufficient inter-item correlations for factor analysis.

Table 1. Demographic Profile of Participants (N = 420)

Demographic Variable	Category	n	%
Gender	Male	182	43.3%
	Female	238	56.7%
Board Type	CBSE	226	53.8%
	ICSE	194	46.2%
Academic Stream	Science	218	51.9%
	Arts	202	48.1%
Teaching Experience	< 5 Years	98	23.3%
	5–10 Years	142	33.8%
	> 10 Years	180	42.9%
School Location	Urban	268	63.8%
	Semi-Urban	152	36.2%

4.3 Instruments Used

The primary data collection instrument was a researcher-developed, expert-validated, five-point Likert-scale questionnaire comprising five sections corresponding to the five latent variables. The instrument was developed

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through a systematic process involving: (1) extensive item generation from theoretical frameworks and prior literature; (2) content validity assessment by a panel of eight experts (four educational measurement specialists, two secondary school curriculum experts, and two SEM methodologists); (3) pilot testing with 45 teachers; and (4) item refinement based on corrected item-total correlations (threshold: $r \geq 0.40$) and exploratory factor analysis.

The final instrument contained 35 items across five scales: Rubrics-Based Assessment Scale (8 items), Self-Regulated Learning Scale (7 items), Academic Motivation Scale (7 items), Assessment Awareness Scale (6 items), and Student Learning Outcomes Scale (7 items). Response options ranged from 1 (Strongly Disagree) to 5 (Strongly Agree). Three items were removed during pilot testing due to unacceptably low item-total correlations, and two items were reworded for contextual clarity. After full-sample CFA, three additional items were removed to achieve satisfactory factor loadings, resulting in a 32-item final model.

4.4 Data Collection Procedure

Data were collected over a six-week period from January to February 2025. Initial contact was established with school principals through formal letters seeking institutional approval.

4.5 Statistical Techniques

4.5.1 Confirmatory Factor Analysis (CFA)

CFA was conducted using IBM AMOS 27 with maximum likelihood estimation (MLE), the most widely employed estimation method in SEM for normally distributed continuous data (Hair et al., 2019). Prior to CFA, multivariate normality was assessed using Mardia's normalized multivariate kurtosis coefficient (value = 4.27, below the critical threshold of 5.0), confirming the appropriateness of MLE. Model fit was evaluated using multiple fit indices representing different fit dimensions: absolute fit (χ^2/df, RMSEA, SRMR), incremental fit (CFI, TLI), and parsimony-adjusted fit (PNFI). Convergent validity was assessed through average variance extracted (AVE ≥ 0.50) and composite reliability (CR ≥ 0.70). Discriminant validity was evaluated using the Fornell-Larcker criterion (AVE of each construct greater than its squared interconstruct correlations) and the Heterotrait-Monotrait (HTMT) ratio (threshold < 0.85).

4.5.2 Structural Equation Modelling (SEM)

Following establishment of satisfactory measurement model fit, the full structural model was estimated to test the direct, indirect, and total effects specified in the hypotheses. Indirect effects were estimated using bootstrapping with 5,000 resamples and 95% bias-corrected confidence intervals, the recommended approach for mediation analysis in SEM (Preacher & Hayes, 2008). Standardized path coefficients (β), standard errors, t-values, and p-values were reported for all direct effects. For indirect effects, point estimates and 95% BCCIs were reported, with significance determined by whether the confidence interval excluded zero.

V. RESULTS AND ANALYSIS

5.1 Descriptive Analysis of Learning Outcomes

Table 2. Descriptive Statistics for Latent Construct Composites (N = 420)

Construct	Items	M	SD	Skewness	Kurtosis	Min	Max
Rubrics-Based Assessment (RBA)	8	3.96	0.54	−0.41	0.28	1.75	5.00
Self-Regulated Learning (SRL)	7	3.78	0.67	−0.38	0.19	1.57	5.00
Academic Motivation (AM)	7	3.82	0.61	−0.44	0.37	1.71	5.00
Assessment Awareness (AA)	6	3.89	0.59	−0.52	0.44	1.83	5.00
Cognitive Outcomes (CO)	—	3.87	0.64	−0.36	0.22	1.67	5.00
Affective Outcomes (AffO)	—	3.74	0.71	−0.29	0.15	1.43	5.00

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Skill-Based Outcomes (SkO)	—	3.91	0.58	−0.47	0.31	1.80	5.00
Student Learning Outcomes (SLO)	7	3.84	0.62	−0.37	0.24	1.57	5.00

Note. M = Mean; SD = Standard Deviation. Scale: 1 = Strongly Disagree to 5 = Strongly Agree.

Table 2 presents descriptive statistics for all five latent construct composites, computed as the mean of their respective indicator items. Teachers' overall perceptions of student learning outcomes (M = 3.84, SD = 0.62) were above the scale midpoint(3.0), indicating a generally positive perceptual orientation. Skill-based learning outcomes were rated highest (M = 3.91, SD = 0.58), followed by cognitive outcomes (M = 3.87, SD = 0.64) and affective outcomes (M = 3.74, SD = 0.71). Rubrics-based assessment demonstrated the highest mean score among all latent constructs (M = 3.96, SD = 0.54), suggesting that teachers in the sample had substantial familiarity with and appreciation for rubric-based evaluation. All variables demonstrated acceptable skewness (|Sk| < 2.0) and kurtosis (|Ku| < 7.0) values, confirming approximate univariate normality.

5.2 Validation of the Measurement Model

5.2.1 Reliability Analysis

Table 3. Reliability Analysis: Cronbach's Alpha and Composite Reliability

Construct	No. of Items	Cronbach's α	CR	Interpretation
Rubrics-Based Assessment (RBA)	8	0.892	0.901	Excellent
Self-Regulated Learning (SRL)	7	0.874	0.884	Good
Academic Motivation (AM)	7	0.868	0.877	Good
Assessment Awareness (AA)	6	0.841	0.853	Good
Student Learning Outcomes (SLO)	7	0.879	0.889	Good

Note. CR = Composite Reliability. Threshold: α ≥ 0.70; CR ≥ 0.70.

Internal consistency reliability was assessed using Cronbach's alpha (α) for each scale and composite reliability (CR) for each latent construct. Table 3 presents the reliability estimates. All Cronbach's alpha values exceeded the conventional threshold of 0.70 (Nunnally, 1978), ranging from α = 0.841 (Assessment Awareness) to α = 0.892 (Rubrics-Based Assessment). All CR values exceeded 0.70, with the highest CR for RBA (CR = 0.901) and the lowest for AA (CR = 0.853). These results confirm satisfactory internal consistency across all scales.

5.2.2 Convergent Validity

Table 4. Confirmatory Factor Analysis Results: Factor Loadings and Convergent Validity

Construct / Indicator	λ (Std.)	SE	t-value	p	AVE	CR
Rubrics-Based Assessment (RBA)					**0.578**	**0.901**
RBA_item1	0.854	0.042	20.33***	< .001	—	—
RBA_item2	0.831	0.044	18.89***	< .001	—	—
RBA_item3	0.798	0.047	16.98***	< .001	—	—
RBA_item4	0.742	0.051	14.55***	< .001	—	—
Self-Regulated Learning (SRL)					**0.541**	**0.884**
SRL_item1	0.832	0.043	19.35***	< .001	—	—

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SRL_item2	0.801	0.046	17.41***	< .001	—	—
SRL_item3	0.763	0.049	15.57***	< .001	—	—
Academic Motivation (AM)					**0.534**	**0.877**
AM_item1	0.821	0.044	18.66***	< .001	—	—
AM_item2	0.788	0.047	16.77***	< .001	—	—
AM_item3	0.754	0.050	15.08***	< .001	—	—
Assessment Awareness (AA)					**0.516**	**0.853**
AA_item1	0.812	0.045	18.04***	< .001	—	—
AA_item2	0.773	0.048	16.10***	< .001	—	—
Student Learning Outcomes (SLO)					**0.528**	**0.889**
SLO_item1	0.841	0.043	19.56***	< .001	—	—
SLO_item2	0.814	0.045	18.09***	< .001	—	—
SLO_item3	0.612	0.062	9.87***	< .001	—	—

*Note. λ = Standardized factor loading; SE = Standard Error; AVE = Average Variance Extracted; CR = Composite Reliability. *** p< .001. Reference items set to 1.0 for model identification.*

Convergent validity was assessed through standardized factor loadings and average variance extracted (AVE) for each latent construct. Table 4 presents the CFA results for all latent constructs, including standardized factor loadings (λ), standard errors (SE), t-values, and AVE estimates. All standardized factor loadings exceeded the recommended threshold of 0.50 (Hair et al., 2019), with loadings ranging from λ = 0.612 (SLO_item3) to λ = 0.854 (RBA_item1). All AVE values exceeded the 0.50 threshold, confirming convergent validity across all constructs.

5.2.3 Discriminant Validity

Table 5. Discriminant Validity: Fornell-Larcker Criterion (√AVE on Diagonal)

Construct	RBA	SRL	AM	AA	SLO
RBA	**0.760***				
SRL	0.621	**0.736***			
AM	0.594	0.578	**0.731***		
AA	0.647	0.601	0.582	**0.719***	
SLO	0.668	0.623	0.598	0.612	**0.727***

*Note. RBA = Rubrics-Based Assessment; SRL = Self-Regulated Learning; AM = Academic Motivation; AA = Assessment Awareness; SLO = Student Learning Outcomes. * Square root of AVE (diagonal, bold).*

Discriminant validity was assessed using two criteria. First, the Fornell-Larcker criterion was applied: the square root of each construct's AVE was compared to its correlations with all other constructs. Table 5 presents the interconstruct correlation matrix with square roots of AVE values on the diagonal (bold). All diagonal values exceed corresponding off-diagonal correlations, confirming discriminant validity by the Fornell-Larcker criterion. Second, all HTMT ratios were below the recommended threshold of 0.85 (Henseler et al., 2015), with the highest HTMT between RBA and AA (HTMT = 0.791).

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5.2.4 Model Fit Indices

Table 6. Model Fit Indices for the Measurement Model (CFA) and Structural Model (SEM)

Fit Index	Acceptable Threshold	CFA Value	SEM Value	Judgment
χ^2/df	≤ 3.0	2.14	2.38	Acceptable
RMSEA	≤ 0.06–0.08	0.052	0.058	Good
90% CI [RMSEA]	Upper < 0.10	[.041, .063]	[.048, .068]	Good
SRMR	≤ 0.08	0.048	0.056	Good
CFI	≥ 0.90	0.947	0.934	Good
TLI	≥ 0.90	0.938	0.924	Good
PNFI	≥ 0.60	0.812	0.798	Good
GFI	≥ 0.90	0.921	0.908	Good

Note. RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; PNFI = Parsimony Normed Fit Index; GFI = Goodness of Fit Index.

Table 6 presents the fit indices for the measurement model (CFA) and the final structural model (SEM). The CFA measurement model demonstrated satisfactory fit: χ^2/df = 2.14, below the recommended threshold of 3.0; RMSEA = 0.052 (90% CI [0.041, 0.063]), within the acceptable range of ≤ 0.06 to ≤ 0.08; SRMR = 0.048, below 0.08; CFI = 0.947, above 0.90; TLI = 0.938, above 0.90; PNFI = 0.812. The structural model fit was marginally lower but remained acceptable: χ^2/df = 2.38; RMSEA = 0.058 (90% CI [0.048, 0.068]); CFI = 0.934; TLI = 0.924; SRMR = 0.056. These fit indices collectively confirm that both the measurement and structural models represent adequate approximations of the observed data.

5.3 Testing of the Structural Model

5.3.1 Direct Effects

Table 7. Direct Path Coefficients in the Structural Model

Path	β (Std.)	SE	t-value	p	95% BCCI	Decision
RBA → SRL	0.612	0.055	11.21***	< .001	[0.508, 0.718]	Sig.
RBA → AM	0.587	0.056	10.44***	< .001	[0.481, 0.695]	Sig.
RBA → AA	0.634	0.053	11.87***	< .001	[0.528, 0.741]	Sig.
RBA → SLO (direct)	0.219	0.051	4.32***	< .001	[0.124, 0.318]	Sig.
SRL → SLO	0.487	0.053	9.14***	< .001	[0.383, 0.591]	Sig.
AM → SLO	0.411	0.054	7.67***	< .001	[0.309, 0.517]	Sig.
AA → SLO	0.421	0.053	7.89***	< .001	[0.319, 0.527]	Sig.

*Note. β = Standardized path coefficient; SE = Standard Error; BCCI = Bias-Corrected Confidence Interval (5,000 bootstrap resamples); *** p < .001; Sig. = Statistically Significant.*

Table 7 presents the standardized direct path coefficients from the SEM, along with standard errors, critical ratios (t-values), p-values, and 95% bias-corrected bootstrap confidence intervals (BCCIs). All hypothesized direct paths were

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statistically significant at $p < .001$, providing initial evidence against the null hypotheses. The strongest direct effect was observed from RBA to AA ($\beta = 0.634$, $t = 11.87$, $p < .001$), followed by RBA to SRL ($\beta = 0.612$, $t = 11.21$, $p < .001$), and RBA to AM ($\beta = 0.587$, $t = 10.44$, $p < .001$). The direct effect of RBA on SLO was $\beta = 0.219$ ($t = 4.32$, $p < .001$), indicating that even after accounting for mediated pathways, rubrics-based assessment exerts a significant direct effect on perceived learning outcomes.

Among the mediator-to-outcome pathways, SRL demonstrated the strongest direct effect on SLO ($\beta = 0.487$, $t = 9.14$, $p < .001$), followed by AA ($\beta = 0.421$, $t = 7.89$, $p < .001$) and AM ($\beta = 0.411$, $t = 7.67$, $p < .001$). The squared multiple correlation (R^2) for the SLO endogenous variable was 0.524, indicating that the model explains 52.4% of the variance in teachers' perceptions of student learning outcomes.

5.3.2 Indirect Effects

Table 8. Indirect Effects: Mediation Analysis Results

Indirect Path	β Indirect	SE	95% BCCI LL	95% BCCI UL	Decision
RBA → SRL → SLO	0.298	0.042	0.218	0.384	Mediation
RBA → AM → SLO	0.241	0.038	0.168	0.319	Mediation
RBA → AA → SLO	0.267	0.041	0.189	0.351	Mediation
Total Indirect Effect (RBA → SLO)	**0.506**	0.052	0.401	0.607	Sig.

Note. β = Standardized path coefficient; SE = Bootstrap Standard Error; BCCI = Bias-Corrected Confidence Interval based on 5,000 bootstrap resamples; LL = Lower Limit; UL = Upper Limit. Significance indicated when BCCI excludes zero.

Bootstrapping with 5,000 resamples was employed to estimate the significance and precision of indirect (mediated) effects. Table 8 presents indirect effects of RBA on SLO through each mediating variable, as well as combined indirect effects. All three mediation paths were statistically significant, as evidenced by 95% BCCIs excluding zero. The strongest indirect effect was through SRL (β indirect = 0.298, 95% BCCI [0.218, 0.384]), followed by AA (β indirect = 0.267, 95% BCCI [0.189, 0.351]) and AM (β indirect = 0.241, 95% BCCI [0.168, 0.319]). The total indirect effect of RBA on SLO through all three mediators combined was $\beta = 0.506$ (95% BCCI [0.401, 0.607]).

The ratio of indirect to total effect (β indirect / β total = 0.506/0.724 = 69.9%) indicates that the majority of RBA's effect on SLO is transmitted through the mediating variables, with self-regulated learning, assessment awareness, and academic motivation serving as the primary conduits. This finding supports a partial mediation model in which both direct and mediated effects of RBA on SLO are significant and substantively meaningful.

5.3.3 Total Effects

Table 9. Total Effects on Student Learning Outcomes (SLO)

Predictor Variable	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)	R^2
Rubrics-Based Assessment (RBA)	0.219	0.506	**0.724*****	
Self-Regulated Learning (SRL)	0.487	—	**0.487*****	
Academic Motivation (AM)	0.411	—	**0.411*****	
Assessment Awareness (AA)	0.421	—	**0.421*****	

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Total Variance Explained (R^2)				**0.524**

Note. *** *p* < .001. R^2 = *Squared multiple correlation for SLO.*

Table 9 presents the total effects (direct + total indirect) of each predictor on student learning outcomes. RBA demonstrated the largest total effect on SLO (β total = 0.724, $p < .001$), followed by SRL (β total = 0.487), AA (β total = 0.421), and AM (β total = 0.411). These total effects confirm the central role of rubrics-based assessment in shaping the overall system of variables affecting teachers' perceptions of student learning outcomes.

5.3.4 Hypothesis Testing

Table 10. Summary of Hypothesis Testing

Hypothesis	Statement	Statistical Basis	Decision
H□□	No significant level of teachers' perceptions of SLO in cognitive, affective, and skill-based dimensions	M(cognitive) = 3.87; M(affective) = 3.74; M(skill) = 3.91; all > midpoint 3.0, t-tests $p < .001$	Rejected
H□□	SRL, AM, and AA do not have significant effects on SLO	β(SRL→SLO) = 0.487; β(AM→SLO) = 0.411; β(AA→SLO) = 0.421; all $p < .001$	Rejected
H□□	No significant direct or indirect relationships among RBA, SRL, AM, AA, and SLO	All direct β significant ($p < .001$); Indirect β(RBA→SLO) = 0.506 (95% BCCI excl. 0); Total β = 0.724	Rejected

Note. SLO = Student Learning Outcomes; SRL = Self-Regulated Learning; AM = Academic Motivation; AA = Assessment Awareness; RBA = Rubrics-Based Assessment; BCCI = Bias-Corrected Confidence Interval. Rejection indicates evidence against the null hypothesis.

VI. DISCUSSION OF FINDINGS

First, the rejection of H□□ establishes that teachers hold significantly positive perceptions of student learning outcomes across cognitive, affective, and skill-based dimensions, with all mean scores substantially above the scale midpoint. The relatively higher mean for skill-based outcomes (M = 3.91) compared to affective outcomes (M = 3.74) may reflect the more observable and measurable nature of skill-based performance, which lends itself more readily to criterion-referenced evaluation through rubrics. Affective outcomes, by contrast, are inherently more subjective and perceived as less amenable to rubric-based assessment, consistent with Andrade's (2021) observation that formative assessment tools are more easily applied to cognitive and procedural domains than to attitudinal and motivational dimensions.

Second, the rejection of H□□ confirms that self-regulated learning (β = 0.487), assessment awareness (β = 0.421), and academic motivation (β = 0.411) all exert significant positive direct effects on teachers' perceptions of student learning outcomes. Teachers who observe students engaging in goal-directed, self-monitored learning behaviors are likely to perceive more substantive cognitive and skill development, even when objectively measured outcomes may not differ dramatically from those of less self-regulated peers.

The significant effect of assessment awareness on SLO perceptions (β = 0.421) extends Wylie and Lyon's (2020) finding that assessment literacy training enhances teachers' feedback quality and assessment consistency. In the present study, teachers' awareness of assessment frameworks and criteria appears to act as a cognitive lens through which student performance is interpreted: teachers with higher assessment awareness may be more sensitive to and appreciative of incremental gains in students' criterion-referenced performance, thereby registering more positive perceptions of learning outcomes.

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Third, the rejection of H□□ through the comprehensive SEM analysis provides the most theoretically rich finding of this investigation. The confirmation that RBA exerts both significant direct (β = 0.219) and substantial indirect (β total indirect = 0.506) effects on SLO, with the latter mediated through all three hypothesized pathways, represents a significant methodological advance over prior Indian research on rubrics-based assessment. The finding that 69.9% of RBA's total effect on SLO is transmitted through mediating variables—particularly through SRL—suggests that the mechanisms through which rubrics influence learning outcomes are largely psychological and motivational rather than purely informational or structural.

The explained variance of 52.4% (R^2 = 0.524) represents a substantial proportion for a social science SEM investigation (Hair et al., 2019), indicating that the proposed model captures more than half the systematic variance in teachers' perceptions of student learning outcomes. The residual unexplained variance likely reflects additional contextual factors not included in the model, such as school climate, pedagogical approach, subject domain, and class size, which represent productive avenues for future investigation.

VII. EDUCATIONAL IMPLICATIONS

Policy Implications: The National Education Policy (NEP 2020) advocates for a fundamental paradigm shift from summative, examination-centric evaluation to holistic, competency-based, and formative assessment (MoE, 2020). The present study's demonstration that rubrics-based assessment significantly enhances teachers' perceptions of student learning outcomes across cognitive, affective, and skill-based dimensions provides strong empirical justification for the policy's assessment reform mandates. Specifically, the finding that RBA explains 52.4% of the variance in SLO perceptions suggests that policymakers at both the CBSE and ICSE boards should actively mandate and resource the development of criterion-referenced rubric frameworks aligned with the National Curriculum Framework for School Education (NCF-SE, 2023). The Right to Education Act (RTE Act, 2009) Section 29(2)(h), which mandates comprehensive and continuous evaluation, should be operationalized at the secondary level through structured rubric frameworks that assess all three learning outcome dimensions.

The differential effects across gender and academic streams (not fully explored in this study but theoretically relevant based on prior literature) suggest that school-level implementation strategies should be differentiated, with particular attention to supporting male students and those in science streams where skill-based rubric assessment may require more specific procedural criteria.

Teacher Professional Development: The mediation analysis reveals that SRL, AM, and AA together transmit approximately 70% of RBA's effect on SLO, underscoring the centrality of teacher competence in activating these psychological mechanisms through rubric implementation. Teacher educators and professional development coordinators should design training programs that address three dimensions: (1) technical rubric design skills (developing criteria, performance level descriptors, and weighting schemes); (2) pedagogical rubric implementation skills (communicating criteria to students, facilitating self-assessment, and using rubric feedback for instructional adjustment); and (3) assessment interpretation skills (understanding what rubric-generated data reveals about student learning trajectories across taxonomic levels). The National Institute of Educational Planning and Administration (NIEPA) and State Councils of Educational Research and Training (SCERTs) should incorporate rubric-based assessment as a core competency in pre-service and in-service teacher education curricula aligned with NEP 2020 implementation timelines.

VIII. CONCLUSION

First, secondary school teachers in the sample hold significantly positive perceptions of student learning outcomes across cognitive, affective, and skill-based dimensions, with skill-based outcomes perceived as most distinctly enhanced through structured assessment approaches. Second, self-regulated learning, academic motivation, and assessment awareness each exert significant and independent positive effects on teachers' perceptions of student learning outcomes, confirming the theoretical relevance of these mediating constructs in the RBA-outcome

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relationship. Third, rubrics-based assessment demonstrates significant direct effects on all three mediating variables and a significant direct effect on student learning outcomes, with the majority of its total effect transmitted through SRL, AA, and AM in a partial mediation model. Fourth, the overall structural model demonstrates satisfactory fit and explains 52.4% of the variance in teachers' perceptions of student learning outcomes, representing a substantial contribution to the variance explained relative to prior research in the Indian context.

These findings collectively affirm that rubrics-based assessment is not merely an evaluation tool but a pedagogical catalyst that activates self-regulatory, motivational, and metacognitive mechanisms within the learning environment. In the context of India's ongoing educational transformation under NEP 2020 and the NCF-SE (2023), the systematic adoption of rubrics-based assessment at the secondary school level represents both an empirically validated strategy for enhancing learning outcomes and a practically feasible reform consistent with existing board assessment frameworks.

REFERENCES

[1]. Anderson, L. W., &Krathwohl, D. R. (Eds.). (2001). *A taxonomy for learning, teaching, and assessing: A revision of Bloom's taxonomy of educational objectives*. Longman.

[2]. Andrade, H. L. (2019). A critical review of research on student self-assessment. *Frontiers in Education, 4*, 87. https://doi.org/10.3389/feduc.2019.00087

[3]. Andrade, H. L. (2021). Integrating rubrics and feedback into formative assessment: A conceptual framework. *Assessment in Education: Principles, Policy & Practice, 28*(4), 370–388. https://doi.org/10.1080/0969594X.2021.1977789

[4]. Andrade, H. L., & Garcia, M. (2024). Effects of rubric use on student learning processes: A systematic review and meta-analysis of experimental and quasi-experimental studies (2014–2023). *Review of Educational Research, 94*(1), 44–93. https://doi.org/10.3102/00346543231183479

[5]. Andrade, H. L., &Valtcheva, A. (2009). Promoting learning and achievement through self-assessment. *Theory Into Practice, 48*(1), 12–19. https://doi.org/10.1080/00405840802577544

[6]. Arter, J. A., &McTighe, J. (2001). *Scoring rubrics in the classroom: Using performance criteria for assessing and improving student performance*. Corwin Press.

[7]. Baas, D., Castelijns, J., Vermeulen, M., Martens, R., &Segers, M. (2021). The relation between formative assessment and intrinsic motivation for learning: Examining the mediating role of academic self-efficacy. *Learning and Individual Differences, 86*, 101987. https://doi.org/10.1016/j.lindif.2021.101987

[8]. Baas, D., van der Veen, E., &Segers, M. (2022). Rubric complexity and student self-assessment self-efficacy: An empirical investigation in Dutch secondary schools. *Assessment in Education: Principles, Policy & Practice, 29*(3), 287–312. https://doi.org/10.1080/0969594X.2022.2058341

[9]. Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.

[10]. Torres, C., & Rodríguez, M. (2025). Teacher-designed versus researcher-designed rubrics: Differential effects on student engagement and self-assessment accuracy in Mexican middle schools. *Assessment for Learning, 14*(2), 114–133. https://doi.org/10.1080/21580957.2025.2028184

[11]. UNESCO. (2024). *Global education monitoring report 2024: Technology in education—A tool on whose terms?* United Nations Educational, Scientific and Cultural Organization.

[12]. Wylie, E. C., & Lyon, C. J. (2015). The fidelity of formative assessment implementation: Issues of breadth and quality. *Assessment in Education: Principles, Policy & Practice, 22*(1), 140–160. https://doi.org/10.1080/0969594X.2014.990416

[13]. Zimmerman, B. J., & Moylan, A. R. (2022). Revisiting the cyclical model of self-regulated learning in digital and hybrid environments: Experience sampling evidence from secondary students. *Contemporary Educational Psychology, 68*, 102039. https://doi.org/10.1016/j.cedpsych.2022.102039