Evolution of Formative Assessment in Mathematics for Grades 6-8: From GCERT's Form A to PARAKH's Holistic Progress Card

Jignesh Jamanbhai Khunt[1], Ms. Hetal Jignesh Khunt[2], Mr. Vijaybhai Karabhai Modhwadiya[3], Dr. Dharmesh A. Vaghela[4]

[1,2] School No 8, Rajkot Corporation, Ra. Shayar Zaverchand Meghani Primary School
[3] Jay Bharat Primary School, Rajkot Corporation
[4] School No 61, Rajkot Corporation

***Abstract*—This research paper analyzes the historical evolution of formative assessment in mathematics education for grades 6-8 in Gujarat, India. The study examines the transition from GCERT's Form A to PARAKH's Holistic Progress Card (HPC) through the lens of National Achievement Survey (NAS) data from 2017 and 2021. The NAS 2021 results reveal a concerning decline in mathematics performance, with Gujarat's average score dropping from 47% (2017) to 36% (2021), and 74% of students performing at or below basic level. The paper investigates the limitations of traditional assessment methods and explores the potential of innovative frameworks like PARAKH's 360-degree assessment model to address these challenges through comprehensive, student-centric evaluation approaches.**

***Index Terms*—Formative Assessment, Mathematics Education, PARAKH, GCERT, Holistic Progress Card, National Achievement Survey, Educational Evaluation.**

I. INTRODUCTION

The educational assessment process represents an integral component of effective teaching and learning methodologies. In mathematics education, where students' fundamental understanding and logical reasoning abilities are developed, the role of formative assessment becomes particularly crucial. The National Achievement Survey (NAS) data from 2017 and 2021 reveals alarming trends in mathematics learning outcomes, highlighting the urgent need for reformed assessment practices. Grades 6-8 represent a critical period for developing foundational mathematical concepts, making this transition phase essential for implementing effective formative assessment strategies.

This research paper traces the evolutionary journey of formative assessment in Gujarat state, examining the shift from GCERT's Form A to the recently proposed Holistic Progress Card (HPC) by PARAKH under the National Education Policy 2020. The study particularly focuses on addressing the identified challenges in mathematics education through innovative assessment frameworks that promote comprehensive student development.

II. RESEARCH METHODOLOGY

This study employs a qualitative research methodology, analyzing documentary evidence from GCERT, NCERT, and NEP-2020 policy documents. Statistical data from national and state-level surveys – NAS (2017 and 2021) – has been utilized to understand the current status of mathematics learning levels. A comparative study of assessment models proposed by educational institutions has been conducted, with particular emphasis on the theoretical frameworks and implementation strategies of different assessment approaches.

III. DATA ANALYSIS AND OBSERVATIONS

A. Current Status of Mathematics Learning Levels

NAS 2017 Findings:

- Average mathematics score for Grade 8 in Gujarat: 47% (National average: 42%)

- 35.2% of students in limited knowledge category (0-50%)

NAS 2021 Findings:

- Average mathematics score for Grade 8 in Gujarat: 36% (National average: 36%)
- 74% of students at 'Basic' or 'Below Basic' performance level
- Lowest performing areas: Rational numbers (22%), Perimeter and area (26%), Exponential form (27%)
- Performance distribution: Below Basic (25%), Basic (49%), Proficient (20%), Advanced (6%)

B. Effectiveness and Limitations of GCERT Form A

Positive Aspects:

- Integration with daily teaching practices
- Assessment of multiple skills including listening, reading, writing, and questioning abilities
- Teacher-friendly documentation format

Identified Limitations:

- Time-consuming implementation process
- Limited scope for assessing all aspects of mathematical thinking
- Inadequate provision for individualized student feedback
- Primarily teacher-centered approach

C. Potential and Limitations of PARAKH HPC

Potential Benefits:

- Comprehensive evaluation (academic, social-emotional, life skills)
- 360-degree approach (self-assessment, peer assessment, teacher assessment)
- Clear performance levels (BEGINNER, PROFICIENT, ADVANCED)
- Digital integration capabilities
- Parent-teacher collaboration framework

Implementation Challenges:

- Complex implementation process
- Requirement for technological infrastructure
- Need for extensive teacher training
- Necessity for mindset change among stakeholders
- Time management considerations

IV. FINDINGS AND SUGGESTIONS

A. Key Findings

1. Significant Performance Decline: Mathematics scores dropped by 11% between 2017 and 2021 in Gujarat
2. Critical Learning Gaps: 74% of students lack basic mathematical proficiency
3. Content-Specific Challenges: Geometry and algebra present particular difficulties
4. Systemic Issues: Traditional assessment methods prove inadequate for addressing learning deficiencies

B. Recommendations

1. Integrated Approach: Combine the best elements of GCERT Form A and PARAKH HPC
2. Teacher Capacity Building: Implement practical training and workshops for HPC implementation
3. Technical Infrastructure: Develop digital HPC systems and provide necessary technological support
4. Stakeholder Awareness: Conduct awareness programs for parents about new assessment methodologies
5. Pilot Projects: Initiate state-level HPC pilot projects with continuous evaluation
6. Learning Outcome Focus: Special attention to low-performing learning outcomes identified in NAS

V. CONCLUSION

The NAS 2017 and 2021 data reveal a concerning decline in mathematics learning outcomes, emphasizing the urgent need for reformed assessment practices. PARAKH's Holistic Progress Card represents a significant step forward from GCERT's Form A, addressing many limitations of traditional assessment systems. The HPC framework offers a comprehensive, student-centered approach that can potentially revolutionize mathematics education by focusing on holistic development. However, successful implementation requires adequate teacher training, technological infrastructure, and fundamental mindset changes among all stakeholders. Special attention must be given to addressing the specific learning outcomes where students demonstrate the poorest performance, as identified by NAS data.

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