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Feedback, Assessment and Bridging Learning Gaps in Mathematics Education

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Abstract

Lack of adequate and immediate feedback during the assessment is the biggest hurdle in mathematics education. Students are likely to develop learning gap because of very weak concepts in understanding, procedural errors, and poor problem-solving abilities. Some students learn a bit slowly; hence, learning gaps will persist if the teacher does not recognize them from the beginning or if there is delay in intervention. The purpose of the paper is to discuss the role of feedback and evaluation in identifying learning gaps, allowing students to move on in the realm of mathematical concepts. Objectives include understanding the nature of learning gaps, trying to correct student errors through feedback, using assessment data to calculate instructional decisions, and applying direct strategies to get a better score in mathematics. It was a qualitative study based on classroom observations, students' work and formative assessment interviews, and reflections of the teacher. The outcomes of the study point to the fact that students who were given with the kinds of feedback before tasks excelled in accuracy retention and support compared to others who just got general feedback.

Keywords: Feedback, assessment, learning gaps, mathematics education, remediation

Introduction

Mathematics education plays a key role in the development of logical thinking and reasoning and decision-making. Mathematics is a good subject that connects with almost all parts of our life, including being able to handle money, measure distance, compare quantities, and plan other works. Enormous as it is, many students still carry some form of dislike and fear in their hearts at the very mention of Maths. According to the students, they are faced with difficulties into place value, fractions, arithmetic operations, geometrical, and word operations. Many students face the problem of not understanding the basic ideas of Mathematics and therefore create a lot of errors very easily in this matter, thereby widening the gap of such learning.

Most teachers ignore the students' misconceptions. They go straight by the syllabus one event that feeds onto the feedback, assessment, and hence allows for really changing the gap of learning. Feedback helps in making sure that the children understand whereas assessment provides levels of achievement that help teachers in evaluating the progress of the child doing things alone to effect a solution.

The national education policy talks about outcome-based learning most of the time. There are far-reaching implications for Mathematics. It is about clear concepts and the development of problem-solving skills for those receiving it. Feedback and assessment are the most critical components of all. Teaching without feedback or assessment becomes mechanistic while learning remains fragile.

Educators see behaviours from students many times that indict learning gap(s). This could be in presenting patterns that sort to lead to success in answering while maintaining that they have no idea of the phenomenon, saying "umh!" without even thinking, guessing answers to questions without an attempt to solve, ignoring Word Problems, etc. On the other hand, does not structured feedback plus systematic assessment lead to building up on bridging learning gap at mathematics classrooms?

Objectives of the Study

The study proposes to:

- Identify some common learning gaps in school-level mathematics.
- Review the importance of feedback for correcting errors in mathematics.
- Study the part played by assessment in appraisal of the pupils' progress.
- Enhance suggestions for such strategies that can be commenced to roll up learning gaps.
- To promote disaggregated teaching of mathematics based on evidence.

Methodology

The research design took a qualitative avenue, keeping the lens on Grades 4-8 students, where the study is conducted over an eight-week period. It seeks to focus more on the day to day acts of teaching as opposed to some major standardized testing. The simple and effective tools will only be applied here.

Classroom Observation

Observe students solving problems individually as well as in groups. You note patterns of hesitation, delay, and errors. Some common mistakes that you record are regrouping errors in subtraction, misplaced digits in multiplication, fractions misunderstanding and confusion in word problems.

Student Work

Check notebooks, worksheets and assignments. Identify repeated errors. If many students make the same mistakes, there is a certain conceptual gap. For example, confusion between area and perimeter; or wrong division of fractions indicate weak understanding.

Formative Assessment

Conduct short quizzes with five to ten questions. One concept at a time. They will use exit tickets to provide quick feedback appropriate. These quizzes will help in planning the next class as per the actual need of learning.

Student Interview

At some point, you talk one-to-one with each student. You ask them to explain their thinking and request them an example to prove their reasoning. This can indicate whether the

memorization is taken place or they are in fact learning. Many students struggle with the language difficulties in word problems.

Teacher Reflection Notes

Write down the regular events in class as they unfold in a day. Through this, come up with ways of changing and working on educational outcomes for improvement.

Important Findings and Discussion

The research shows similarity in learning gap across grades. Mistakes are often made due to weak foundations, lack of feedback, and delayed assessment.

Types of Learning Gaps

Foundational gaps are not understanding place value. For example, reading 305 as three hundred fifty or incorrect placement of digits during addition.

Procedural gaps occur when one doesn't know how to borrow or carry.

Conceptual gaps when children cannot explain that something works because it uses methods, for example adding fractions without understanding what the common denominator is.

Application gaps occur in real-world contexts, for example, students cannot correctly tell what operation is needed to solve a word problem.

Retention gaps manifest when prerequisites have not been established.

The Role of Feedback

Feedback is effective when immediate and specific. According to the research, accuracy improves by nearly 30 percent in the next two weeks against constant feedback. Students respond well to short verbal feedback with visual explanation.

Examples

When children confuse area and perimeter, you demonstrate using classroom objects. Visual feedback clarifies the difference.

When students make carrying errors, you circle the exact step and guide correction.

For students, when they find it difficult to comprehend fractions, they are advised to utilize fraction strips and diagrams as learning tools.

The Different Kinds of Feedback Using

Corrective feedback is identifying the mistake. Directive feedback is showing the appropriate method. This is reflective feedback which encourages one to explain. Supportive feedback increases one's confidence. Specific feedback typically has a higher degree of effectiveness than generic comments-not against contrary to what people believe. Students correct their mistakes faster when they know the exact nature of the error.

Role of Assessment in Education

Assessment gives evidence for decisions about teaching. Short quizzes shed quick light on gaps. This example shows that 40 percent of the cohort needed remediating after the fraction

comparison quiz in this study. Scores reflecting improvement after targeted sessions were pretty impressive.

In effect, assessment shows how much progress the student has made over time. For example, students who attended the remedial sessions scored 30 percent improvement in attempts at accurate multiplication. Formative assessment works to offer flexible grouping with differentiated instruction.

Bridging Learning Gaps

Targeted Learning Sessions

Put the students into groups according to the mistake that was made. Very short, targeted sessions are designed to address specific gaps, e.g., place value or subtraction with borrowing.

Manipulatives

Blocks, counters, and fraction strips are examples of these concrete materials that help students visualize their concept for a better comprehension.

Worked Examples

Solutions given stepwise support reasoning. Asking students to explain steps makes them clearer.

Teacher Behavior and Classroom Environment

Clear instructions and encouragements given in a safe learning environment lower anxiety. Students are free to ask questions and participate actively.

Effect on Learner's Confidence

Learners thus grow more confident by tracking their progress. Feedback then normalizes mistakes as part of learning. Improved quiz scores motivate students. The conversion of students into self learners adds to the motivational spirits instilled in them by perseverance.

Challenges

There are subjections for teachers to face large class sizes, limited time, and untrained teaching. It should be noted that even the simplest of feedback practices or assessment options can be extremely helpful in changing outcomes.

Classroom Examples

Example one

Three Digit Multiplication And then pointing them at possible corrective feedbacks into alignment increasing accuracy.

Example two

For example, students misunderstood equivalent fractions. This created confusion but, with the help of visual aids and repeated feedback, it was managed.

Example three

Hesitation was seen in students while answering a word problem. Accustomed to structured and targeted feedback, they were able to show improved comprehension and strategy choice.

The Importance of Teacher Continuous Learning

Teacher training must cover aspects of feedback strategies and assessment design. NEP 2020 along with NIPUN Bharat endorses that. To improve the quality of instruction, it is pertinent that learning outcomes be understood.

Data Driven Teaching

The lessons planned have based on the assessment data. The teachers revisit their instructions according to the errors made by common responses and enriching them with those advanced learners.

Long Term Outcome

Feedback and assessments that drive reflective learning will find students active and immersed in the self-production of one-time comparisons. From the longer-term projection, the main focus will be on elevating achievement while also stimulating interest in STEM subjects.

Conclusion

Thus feedback and assessment form the oxygen of good mathematics education. They help to pave the way for a student to correct mistakes and fine-tune understanding levels. Progress Measure in Learning-it defines what assessment serves to inform instruction. Together, it bridges learning gaps and strengthens foundations broad spectrum observers. Such consistent application of this tool by teachers has observed a better degree of accuracy, confidence, and engagement. Better at understanding and independent learning of math are students. Sustainable improvements in learning outcomes are caused by such practices.

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