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Original Article

An Evaluation of Mathematics Intervention Program for Struggling Students Using Provus Discrepancy Evaluation Model: Aligning Design, Implementation, and Student Achievement

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Abstract

In helping academically challenged learners, mathematics intervention is important in targeting specific learning gaps with customized instructional strategies. In response to the learning losses caused by the pandemic, DepEd in the Philippines officially launched the National Learning Recovery Program, under which focused intervention in Mathematics, among others, is mandated based on evidence. This study assessed the Mathematics Intervention Program for struggling students in a Central Mindanao school using Provus' Discrepancy Model of Evaluation. This was in line with the overall objectives of determining the expected student achievement level as defined by the program, analysis of actual student performance before and after intervention, the recognition of discrepancies worth mentioning, and recommendations for improvement of the program. According to the results, 95.2% of students before the intervention were below standard in relation to the DepEd's Most Essential Learning Competencies (MELCs) and DepEd Order No.8, s. 2015. In contrast to pre-test results, which indicated a considerable gap in student performance, the post-intervention performance showed a drastic increase in the number of students who achieved satisfactory to outstanding levels. The mean score increased from 21.32 (pre-test) to 45.31 (post-test), which means students showed increased understanding and fluency in mathematical concepts and procedures. This implies that the program has effectively dealt with the intervening factor standing between the performance of the students and the desirable level. Some recommendations put forth are institutionalizing the program, regular diagnostics, intensive training for teachers in differentiated instruction and formative assessment, improvement of learning resources, and parental involvement.

Keywords: Mathematics Intervention, Discrepancy Evaluation Model, Learning Recovery, Academic Achievement, Program Assessment.

1. Introduction

Mathematics interventions help struggling learners learn different instructional strategies right in the learning gaps so they perform even better than they have done. These remedial or supplemental instructional programs help students achieve grade-level standards and foundation skills that will carry through for future success. In the Philippines, the urgent need for recovery learning interventions is made known with the varied innovations of DepEd in that it has issued the National Learning Recovery Program (NLRP) or DepEd Order No. 13, s. 2023. This policy requires schools to undertake evidence-based methods, including such

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intervention in Mathematics, towards a more immediate concern about learning losses due to the pandemic (Baybayan, & Lacia, 2024).

Interventions should be thoughtfully designed and deployed, along with systematic evaluation, for relevance and quality that makes them impact beneficial (Yazon & Leonano, 2019). The Discrepancy Evaluation Model (DEM) created by Malcolm Provus can be used for the purpose mentioned above. It is based on a five-stage evaluation of educational programs: design, installation, process, product, and cost-benefit, and it does so by assessing what 'should be' (standards) regarding what 'is' (actual implementation and results) (Ozudogru, 2016; Provus, 1971). On the application of this model onto school-based math interventions, one can identify specific gaps and inconsistencies across the program lifecycle, which can be used to steer continuous improvement.

To continue confronting serious challenges in Mathematics performance, the Philippine education system faces another wave of tests this time imposed by world events such as the COVID-19 pandemic (Dagdag, 2019). Results from national and international assessments like the Programme for International Student Assessment (PISA) continue to reveal drops in the ranking of Filipino learners who are below the global average with regard to the proficiency for mathematics (Education GPS, 2025). Efforts were put in place by the DepEd in implementing learning support measures with the guidance of DepEd Order No. 13, s. 2018 to encourage subject-specific interventions for all learners at risk. On top of that, to address the disrupted learning brought about by the COVID-19 pandemic, there is the Basic Education Learning Continuity Plan (BE-LCP) which emphasized remediation and intervention programs to neutralize the effects of interrupted learning caused by the pandemic.

Consistent with these national policies, this study reviews a school-based Mathematics Intervention Program targeting academically struggling junior high school students within a school. Through the use of Provus' Discrepancy Evaluation Model, the research investigates the following components of the program: the design of intervention (goals, structure, content), implementation (instructional delivery, resources, teacher training), and student achievement (performance gains, mastery of skills) emerging from that activity. In this way, the study seeks to reveal the gaps between program goals and real practices and outcomes in the course of providing evidence-based recommendations to improve such.

This research also adds to an ongoing discourse about educational equity, learning recovery, and instructional effectiveness. It speaks not only to international evaluation frameworks but also to national education policies in providing caliber insights for school leadership, policymakers, and educators on Mathematics intervention programs. It aims not just to fill the gaps in terms of academics but also to uphold the commitments and duties of DepEd to quality, inclusive, and learner-centered education.

The study aims to evaluate the Mathematics Intervention Program for Struggling Students at a School in Central Mindanao, Philippines using Provus' Discrepancy Evaluation Model. It focuses on assessing the alignment between the program's intended outcomes and actual student performance in mathematics. Specifically, the study seeks to answer what the expected level of student achievement in mathematics is as defined by the program's objectives; what the actual student performance in mathematics observed before and after the implementation of the intervention is; whether there is a significant discrepancy between the expected performance and the actual performance of the students before and after the implementation of the intervention; and based on the findings, what recommendations can be made to enhance the effectiveness of the Mathematics Intervention Program.

2. Methods

2.1. Research Design

This study employed the descriptive evaluation research with a quantitative approach. The evaluation approach used is the Provus Discrepancy Evaluation Model by Malcom Provus.

2.2. Respondents

The respondents of this study were 186 Grade 8 Junior High School students of a University in Central Mindanao, Philippines who are enrolled in Academic Year 2024 –2025. Only grade 8 level was chosen as respondents of this study due to the difference in the curriculum which includes the topic and scope of the lessons from each grade level. The object being evaluated was the grade 8 mathematics intervention program for struggling students in the same university.

2.3. Instrument

An adapted questionnaire from Department of Education – Caraga Region validated by five mathematics experts was utilized to find out the content validity of the instrument. The five-point Likert scale used were 5 – Excellent, 4 –Very Good, 3 – Good, 2 – Fair, and 1 – Needs Improvement. Using the Aiken's Content Validity Index, the content validation resulted to a value of 0.99 which says that the instrument is very valid. Aiken's Validity Index as narrated in the study of Irawan & Wilujeng (2020) as cited in the study of Baybayan (2025) was calculated through the formula, wherein V = Validity of Aiken's Index, S = The score awarded by the rater minus the lowest possible rating a rater can award, C = The highest possible rating a rater can award, and N = The number of raters rating the test questionnaire (Baybayan, 2024). The Validity of Aiken's Index or V obtained in each item is then classified by Irawan and Wilujeng (2020) into different categories with respective decisions, namely 0 ≤V ≤0.4 as Invalid, 0.4 < V ≤0.8Medium Validity, and 0.8 < V ≤1 Very Valid.

2.4. Data Gathering Procedure

A formal letter addressed to the president of one University in Central Mindanao, Philippines was sent for approval in conducting the study. After the approval, the researcher gave the pre-test. After the whole quarter lesson is delivered to the respondents, the researcher gave the post test. After all responses were gathered, the researcher tallied, computed, and analyzed the gathered data.

2.5. Statistical Analysis

After gathering the responses from the respondents, the researcher computed for the frequency and percentage of the pre and post test result. Moreover, mean scores was utilized to find if there are discrepancies between the expected performance and the actual performance of the students before and after the implementation of the intervention.

2.6. Ethical Considerations

The study strictly adhered to the ethics, especially beneficence, justice, autonomy, and transparency while ongoing research. In view of all this, the study was conducted with utmost awareness about its impact on the education sector. Fairness, non-interference, and transparency were observed at each stage. The researcher guaranteed that all informants about the results of the study with the maximal degree of transparency and secured required clearance for publication. This study was conducted independently without any material incentive or external sponsorship and fully funded by the researcher. The rights and welfare of the participants and of the institution should is protected by appropriate ethical measures

such as guarantee of confidentiality and privacy. No personal information was revealed, and data confidentiality remained very strict. The methodology has given special attention to careful data collection procedures and in line with the ethical review and approval processes of the University. This research has followed a structured and documented process. All relevant permissions were obtained from the necessary school authorities before its implementation to ensure that all institutional and ethical requirements for conducting the study are satisfied.

3. Results and Discussion

3.1. Expected Level of Student Achievement in Mathematics as Defined by the Program's Objectives

Table 1. Student Achievement Levels in Mathematics

Descriptor	Grading Scale	Remarks
Outstanding	90 – 100	Passed
Very Satisfactory	85 – 89	Passed
Satisfactory	80 – 84	Passed
Fairly Satisfactory	75 – 79	Passed
Did not meet Expectations	Below 75	Failed

The table 1 above presents the expected level of student achievement in mathematics as defined by the program's objectives. The expected level of student achievement in mathematics has been defined by the Curriculum Standards and Most Essential Learning Competencies (MELCs) per grade level, according to the Department of Education (DepEd). In fact, these standards highlighted conceptual understanding, procedural fluency, and problem-analysis techniques. That is to say, students are expected to master foundational mathematical concepts suitable for their grade level, apply mathematics to real-world life, and show growth in critical thought and analytical ability.

Moreover, DepEd Order No. 8, s. 2015, entitled "Policy Guidelines on Classroom Assessment for the K to 12 Basic Education Program", states that "Passing grade for all learning areas is 75." The computation of grades is based on formative and summative assessments and is reflected in quarterly and final grades. A student who attains 75 and above is, therefore, considered to have achieved the minimum required level of achievement in that grade level.

3.2. Actual Student Performance in Mathematics Observed Before and After Implementation of the Intervention

Table 2. Student Performance in Mathematics Pre- and Post-Intervention

Score	DepEd Descriptor	DepEd Grading Scale	Remarks	Pre -Test		Post - Test	
				f	%	f	%
51 – 60	Outstanding	90 – 100	Passed	1	.5	67	36.0
46 – 50	Very Satisfactory	85 – 89	Passed	2	1.1	38	20.4
41 – 45	Satisfactory	80 – 84	Passed	2	1.1	31	16.7
36 – 40	Fairly Satisfactory	75 – 79	Passed	4	2.1	20	10.8
0 – 35	Did not meet Expectations	Below 75	Failed	177	95.2	30	16.1
Total				186	100.0	186	100.0

The table 2 above presents the students' actual academic performance in Mathematics before and after administration of the intervention. In reference to the pre-test results, the majority showed that out of 177 students or 95.2%, all fell within the range of "Did Not Meet Expectations" which clearly manifests a massive concern regarding wide spreading of difficulty in understanding basic concepts in learning. Only just a few students 4 or 2.1% fairly satisfactory, 2 or 1.1% satisfactory to very satisfactory, and 1 or 0.5% outstanding achieved passing marks. This is an indication that prior to this intervention, very few learners had reached the expected standard competency.

However, after the intervention, there is a clear shift in the distribution of performance. The number of unmet expectations was brought down remarkably, and in fact, only 30 or 16.1% of students failed to achieve the threshold score, while those who passed increased significantly across all performance levels 20 or 10.8% fairly satisfactory, 31 or 16.7% satisfactory, 38 or 20.4% very satisfactory, and 67 or 36.0% outstanding.

The remarkable achievement of this improves mathematics intervention program by not just reducing the number of failures but also pushing up many learners to the higher bracket of achievement levels.

3.3. Discrepancy Between the Expected Performance and the Actual Performance of the Students Before and After the Implementation of the Intervention

Table 4. Discrepancy Between Expected and Actual Student Performance Pre- and Post-Intervention

Factors	Mean Score	DepEd Grading Scale Interpretation	DepEd Descriptor	Remarks
Expected Performance	36 and above	75 and above	Outstanding, Very Satisfactory, Satisfactory, and Fairly Satisfactory	Passed
Pre – Test Score	21.32	Below 75	Did not Meet Expectations	Failed
Post-Test Score	45.31	80 - 84	Satisfactory	Passed

The table 4 above presents a large gap that exists between the students' performance before and after their exposure to the mathematics intervention program. The pre-test mean score of 21.32, considerably lower than the anticipated level of performance of 36, states that, as a whole, the students initially did not meet the expectation whereby a majority of respondents failed to demonstrate sufficient understanding of targeted mathematical concepts. This finding exemplifies the need for remedial support and underscores the necessity for the intervention.

After working in the intervention, however, the post-test mean score has increased to a score of 45.31, which is above the expectation. This brings it into the "Satisfactory" level of achievement, meaning that most students passed and showed improvement in their understanding and performance of mathematics. The extent of the observed change indicates that the intervention was effective in closing learning gaps and enhancing student achievement.

4. Conclusion

Concluding from the study, it was found that the Mathematics Intervention Program was able to contribute to the significant filling of the gap between expected and actual student performance in Mathematics. The Department of Education set a clear benchmark for academic achievement with the Most Essential Learning Competencies (MELCs) and with DepEd Order No. 8, s. 2015. Before the intervention, a huge majority of the students could not perform to these expectations, as shown by the results of the pre-tests where 95.2% of the students did not reach the standard. This pointed to a serious need for remedial support and direct instruction focused on helping learners who are struggling.

After the process was implemented, the research found that students' performance levels were significantly improved. A large number of students who previously failed had a significant decrease, and there was an appreciable rise in the number of students who met or exceeded the satisfactory level. The findings of the post-tests showed not only improvement in scores but also improved distribution into higher performance categories, which in turn indicates better cognition and understanding of the mathematical concepts. The increase from the mean of 21.32 to 45.31 signifies the effectiveness of the intervention in aiding students' conceptual understanding and procedural fluency and analytical thinking. Therefore, the Mathematics Intervention Program has proved to be an effective measure for raising student achievement and closing learning gaps in mathematics.

As a result of the significant gains in student performance associated with the implementation of the Mathematics Intervention Program, a number of recommendations are offered for further enhancement and sustainability. That said, the first recommendation is to institutionalize the program and embed it into the academic support provision of the school for those children identified with difficulties in Mathematics. To facilitate early assistance, it will also be considered standard practice to conduct regular diagnosis at the start of every grading period to find the learners needing support. Moreover, continuous capacity development among all teachers has to be prioritized mostly on effective differentiation, approaches in remediation, and effective uses of formative assessments. Another recommendation is to supplement the program with attractive learning resources, contextualized learning tasks, and solving problems in the real-world context. When it comes to parental involvement, it is necessary to provide regular notices of progress made by their children so that parents can also be guided on how to support learning at home. In addition, constant monitoring and evaluation systems will be set up to monitor the progress of students on their established targets and identify areas for improvement in the implementation of the program. Finally, the program is also recommended to have scaling or replication in other grade levels or even other schools with the same challenge in Mathematics achievement. The above would guarantee this Mathematics Intervention Program in achieving its aims and focusing on learners attaining the necessary standard levels of academic performance.

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