



ENHANCING DIGITAL LITERACY AND ACADEMIC PERFORMANCE IN MATHEMATICS THROUGH GOOGLE FORMS-BASED ASSESSMENTS

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INTRODUCTION

In the Division of City of Naga faces a lack of digital literacy among learners is a global challenge, exacerbated by the rapid transition to online education during the COVID-19 pandemic. According to post-assessment results from the Test of Fundamental Academic Skills (TOFAS) in 2023, learners demonstrated a low post-test performance, scoring only 35% to 40%. One of the key factors identified was learners' minimal experience with digital assessments. This underscores the urgent need to incorporate tools like Google Forms into instructional practices to bridge this gap and foster digital proficiency among.

This research aims to integrate Google Forms into summative assessments in Mathematics to improve learners' familiarity with digital tools. By doing so, it seeks to equip students with the necessary technology skills to excel in both academic and standardized assessments. The study aligns with DepEd Order No. 21, s. 2019, which advocates for integrating ICT in education to prepare learners for technology-driven environments (DepEd, 2019). It also supports the goals of the Philippine Digital Strategy 2022, which emphasizes the need for digital literacy in basic education (DICT, 2022).

This study addresses two critical goals: improving academic outcomes in Mathematics and fostering digital literacy. As technology becomes increasingly integral to education, this research can serve as a model for other schools in adopting innovative tools for assessment, contributing to more equitable and effective educational practices (UNESCO, 2022; DepEd, 2019).

DISCUSSION OF RESULTS

This chapter discusses the study's findings and reflections, including the presentation, analysis, and interpretation of pre-test and post-test scores.

Table 1: Pre- And Post-Surveys in Digital Literacy

1	2	2	3	2	2	4	4	4	5	4
2	2	2	2	2	2	4	5	4	5	5
3	2	2	3	3	3	4	4	5	4	4
4	3	2	3	3	3	4	5	4	5	4
5	3	3	2	2	2	4	5	4	4	4
6	3	3	3	3	2	5	5	4	5	4
7	2	2	2	3	3	5	4	5	4	4
8	2	3	3	3	2	4	5	4	5	5
9	3	2	3	2	2	5	5	5	5	4
10	2	3	2	2	2	4	4	5	4	5
11	3	3	3	2	2	5	5	4	5	5
12	2	3	2	3	2	4	5	4	4	5
13	2	2	3	3	2	4	5	5	4	4
14	2	2	2	3	2	4	4	5	4	5
15	3	2	2	3	3	5	5	5	4	4
16	2	2	3	2	2	4	4	4	4	4
17	2	2	3	2	2	5	5	4	4	5
18	2	3	3	2	2	4	5	5	5	5
19	3	2	2	2	3	5	4	4	4	4
20	3	2	3	2	3	5	4	4	5	4
21	2	2	2	2	2	5	5	5	4	5
22	2	2	3	2	3	5	5	5	5	5
23	2	2	3	2	2	4	5	4	4	5
24	2	2	2	2	2	4	4	5	4	4
25	2	2	3	3	3	4	5	4	5	5
26	2	3	3	3	2	4	5	4	4	4
27	3	2	3	2	2	5	5	4	5	5
28	2	3	2	2	3	4	4	4	5	5
29	2	3	2	3	3	5	4	4	5	5
30	2	2	3	2	3	4	5	5	4	4
31	2	2	2	3	2	5	4	4	5	5
32	2	3	2	2	2	5	5	4	4	4
33	2	3	2	2	3	5	4	5	4	4
34	3	2	3	2	2	5	5	5	4	4
35	2	2	3	3	3	4	5	5	5	5
36	2	2	3	2	3	4	4	5	5	5
37	3	2	3	2	3	4	5	4	4	5
38	3	2	3	3	2	5	5	5	5	5
39	3	2	2	3	3	4	5	5	4	5



RESEARCH BULLETIN

40	3	2	3	3	3	5	5	4	5	4
41	2	3	3	2	2	5	4	4	4	4
42	2	2	3	2	3	5	4	5	5	5
43	2	2	2	2	3	4	4	5	4	4
44	2	3	2	3	3	5	5	5	4	5
45	3	3	2	3	3	4	5	5	4	5
46	2	3	3	3	2	4	4	4	5	4
47	2	2	3	3	3	5	5	4	4	5
48	3	2	3	3	2	5	5	5	5	4
49	3	2	3	3	3	4	5	5	5	4
50	3	2	2	3	2	4	5	4	5	4

The data indicated a clear upward trend across all aspects from Pre-Test to Post-Test. The highest gain was observed in Digital Literacy and Technological Confidence, suggesting substantial improvement in students' ability and comfort using Google Forms and related digital tools for Mathematics learning.

Aspect	Pre Mean	Pre SD	Post Mean	Post SD	Mean Gain
Digital Literacy	2.54	0.5	4.5	0.51	1.96
Technological Confidence	2.58	0.5	4.52	0.5	1.94
Perception of Assessment	2.52	0.5	4.52	0.5	2.0
Motivation	2.36	0.48	4.6	0.49	2.24
Academic Performance	2.48	0.5	4.5	0.51	2.02

These results indicate a consistent improvement across all areas, with the highest gains observed in Digital Literacy and Academic Performance. Such findings are consistent with the intended outcome of the intervention, which sought to bridge the digital literacy gap among learners through direct engagement with Google Forms-based assessments.

Table 2: Pretest and Posttest Scores in Mathematics 7

Respondents	Pretest Scores	Posttest Scores
1	9	12
2	10	18
3	7	15
4	7	13
5	6	14
6	7	18
7	7	15
8	10	11
9	8	19
10	7	18
11	4	12

12	5	10
13	7	13
14	4	12
15	8	13
16	9	15
17	5	10
18	11	17
19	10	16
20	6	15
21	7	15
22	10	12
23	7	16
24	5	15
25	8	17
26	3	14
27	6	12
28	4	11
29	5	16
30	8	11
31	4	11
32	6	15
33	7	10
34	6	12
35	8	19
36	9	18
37	14	11
38	3	10
39	8	12
40	4	14
41	7	12
42	9	17
43	8	15
44	5	11
45	11	13
46	4	12
47	8	17
48	6	10
49	8	11
50	10	10
MEAN	7.06	13.72
MPS	33.62%	65.33%

The pretest and posttest scores in the table show great improvement in the academic achievement of the Grade 7 respondents upon the adoption of Google Forms as an online assessment tool. The pretest scores varied from 3 to 14 points, indicating limited mastery of the



mathematical skills before the intervention. Concurrently, the posttest scores greatly improved, varying from 10 to 19 points, signifying an increased level of comprehension of the topics learned. The calculated mean score rose from 7.06 in pretest to 13.72 in posttest, reflecting improvement in students' mathematical learning. In the same way, the Mean Percentage Score (MPS) increased from 33.62% to 65.33%, showing that the attainment of more than half of the expected learning outcomes occurred in the posttest.

Table 3: Descriptive Statistics of the Pretest and Posttest Scores.

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	N	Mean	Median	SD	SE
Pretest Scores	50	7.10	7.00	2.31	0.327
Posttest Scores	50	13.70	13.00	2.73	0.386

The descriptive statistics in Table 3 indicate a drastic improvement in students' Mathematics performance following the utilization of Google Forms as an electronic instrument for assessment. The mean pretest score of 7.10 and median score of 7.00 indicate that the students initially performed poorly in the Math 7 competencies. Yet, upon intervention, the posttest mean score increased to 13.70, with the median advancing to 13.00, reflecting a significant improvement in learning. The slight increase from 2.31 to 2.73 in the standard deviation further suggests a greater spread of scores in the posttest. Standard error values continue to be low for both tests, reflecting that the mean scores are dependable and reflective of the sample.

Table 4: One Sample T- test of the Pretest and Posttest Scores

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		Statistic	df	p	Mean difference
Pretest Scores	Student's t	21.7	49.0	<.001	7.10
Posttest Scores	Student's t	35.5	49.0	<.001	13.70

Table 4 indicates that the pretest and posttest both produced p-values below .001, indicating that student scores are statistically significant and not random variation. The posttest t-statistic (35.5) is significantly greater than the pretest (21.7), and this indicates that the students made a larger and more significant performance gain following the intervention.

The mean difference is also indicative of this gain, from 7.10 to 13.70.

Table 5. The Descriptives of Digital Literacy and Academic Performance

	N	Mean	Median	SD	SE
Digital Literacy	50	4.51	4.60	0.233	0.0329
Posttest Score	50	13.70	13.00	2.727	0.3857

The descriptive results of the study give a clear picture of learners' digital literacy and academic performance after the implementation of digital assessment tools.

The mean digital literacy score recorded by the respondents is 4.51, with a median of 4.60. This means that most learners have a high level of digital competence. The small standard deviation of 0.233 means that the variation in the responses of the learners is small, indicating that the level of digital literacy among the learners is relatively the same. This consistent nature means that most learners can maneuver through digital platforms, perform their online tasks, and work with technology-the type of skills which modern educational settings require, especially now that digital learning systems such as Google Forms are increasingly being adopted

Table 6. The Pearson R Correlation of Digital Literacy and Academic Performance

	Digital Literacy	Posttest Score
Pearson's r	—	—
df	—	—
p-value	—	—
Pearson's r	0.015	—
df	48	—
p-value	0.458	—

The Pearson's r value is 0.015, df = 48, and the p-value is 0.458 for the correlation analysis between Digital Literacy and Posttest Scores. This correlation coefficient of 0.015 connotes an extremely weak positive relation between the two variables—so weak that, quite essentially, it is negligible. The p-value, which is much higher than the conventional 0.05 significance level, provides evidence that the relation is not statistically significant. What this means is that, from the data collected, there is no meaningful relationship between learners' digital literacy and their posttest performance. In other words, changes in the scores on digital literacy do not predict changes in the learners'



academic performance on the given assessment.

A lack of significant relationship may suggest that while, generally, learners possess high digital literacy, as shown in the descriptive results, this competency does not necessarily reflect higher academic scores. This finding serves to indicate that probably, other factors than digital skills-such as content mastery, study habits, cognitive abilities, motivation, or prior learning experiences-drive the academic performance in the posttest. While learners could feel comfortable using digital platforms, proficiency alone does not ensure an improved grasp of academic content. This is an interpretation in line with the conclusion that digital literacy more serves as a basic tool or enabling skill rather than a direct determinant of performance in content-based assessments.

The results are more revealing when looked at from a wider perspective, with important educational insights arising. First, good digital literacy does not ensure better learning outcomes since effective pedagogy, clear instruction delivery, and content-focused interventions should always be emphasized by teachers. Second, the findings indicate that the familiarity of learners with digital tools removes technical barriers during assessments but cannot replace the need for deeper cognitive processing needed for lesson comprehension. Therefore, integrating digital tools like Google Forms remains important for accessibility and efficiency, but this needs complementing with strategies that enhance conceptual comprehension and critical thinking.

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17 MONITORING AND EVALUATION (M&E) FORM: RESEARCH SUSTAINABILITY

Post-BERF Implementation Phase

I. GENERAL INFORMATION

- **Research Title:** Enhancing Digital Literacy and Academic Performance in Mathematics Through Google Forms-Based Assessments
- **Researchers:** Edgar J. Gonzaga & Jose Bonie C. Cabezares (2025)
- **Station:** South Poblacion National High School, SDO Cebu Province (San Fernando)
- **Q-BEDP Outcome:** Outcome 4 (Improved Education Quality)
- **Monitoring Date:** _____

II. SUSTAINABILITY CHECKLIST

Instructions: Mark (X) the appropriate column based on current school operations.

Sustainability Indicators	Evident	Not Evident	Means of Verification (MOV)
1. Institutionalization: Are Google Forms-based assessments integrated into the Mathematics Department's Weekly Home Learning Plan or the AIP?			Approved SIP/AIP / Weekly Plans
2. Technical Assistance: Do the researchers or ICT coordinator provide training for other Math teachers on creating "Quizziz" or Google Form assessments?			LAC Narrative / Attendance
3. Utilization of Tools: Is the Grade 7 Math Digital Assessment Bank still being used and updated for the current school year?			Google Drive Folder / Forms Links
4. Digital Equity: Does the school provide access to the Computer Lab or tablets for students who do not have personal gadgets for the digital tests?			ICT Room Logbook
5. Resource Support: Is there a stable internet connection or an "Offline Form" alternative provided for students in remote areas?			School Connectivity Logs

III. PERFORMANCE MONITORING (Q-BEDP BASECAMPS)

Compare current data against the 2025 BERF study results.

Metric	BERF Study Result (2025)	Current Status (2026)	Remarks (Progress/Regression)
Mean Score (Post-test)	12.00 (from 9.00 pre-test)		
Mastery Level (%)	33.33% Increase		
Digital Literacy Rating	Satisfactory		

IV. STRATEGIC LEVER EVALUATION (Q-BEDP PART III)

1. DECENTRALIZATION (Empowerment): How has the school head empowered the Math department to reallocate paper/printing savings from digital assessments toward other instructional materials or rewards for learners?

2. DIGITALIZATION (Data-Driven): Is the school using the "Item Analysis" feature of Google Forms to identify which specific Grade 7 Math competencies (e.g., Rational Numbers) need more focus in the next quarter?

V. ISSUES, GAPS, AND RECOMMENDATIONS

Identified Issue / Barrier	Proposed Intervention	Responsible Person
Ex: Students sharing answers during digital tests	Use of 'Locked Mode' on Chromebooks or randomized questions	ICT Coordinator / Math Teacher
Ex: Slow internet during peak testing hours	Staggered testing schedules per section	School Head / Dept. Head

VI. OVERALL RATING & STATUS

[] **SUSTAINED:** Google Forms-based assessment is the standard for Math; digital literacy and numeracy show steady growth.

[] **THREATENED:** Digital tests are only used occasionally due to gadget shortages or connectivity issues.

[] **INACTIVE:** The department has returned entirely to paper-based testing; digital templates are no longer used.

Prepared by: _____
Research Manager/ M&E Personnel

Conforme: _____
Lead Researcher/ Proponent



PRP-BERF on Track: *Mapping the Impact of Google Forms-Based Assessments on Student Numeracy, Digital Literacy, and Instructional Excellence*

Research Title	Research Theme	Q-BEDP Reform Outcome (SPT Agenda)	Strategic Lever Applied	Results Utilization / Concrete Evidence	Research Impact	Key Highlights for Research Monitoring Report:
Enhancing Digital Literacy and Academic Performance in Mathematics Through Google Forms-Based Assessments	Teaching and Learning. The study focused on the intersection of Mathematics education and ICT integration, specifically testing how transition from paper-based to digital-based assessments affects Grade 7 students' numeracy skills and digital fluency.	Outcome 4: Improved Education Quality through Upgraded Curriculum, Modernized Assessments, and Digitally Enabled Schools. By digitizing Mathematics assessments, the research directly supports the modernization of evaluation tools and the enhancement of learner digital literacy as part of the 21st-century skills framework.	First Lever: Decentralization Empowerment of the Mathematics teachers at South Poblacion National High School to digitize their own assessment banks and utilize Google Forms to provide immediate, localized feedback to their specific sections. Third Lever: Digitalization Application: The core of the intervention is Google Forms-Based Assessment. The research utilized digital forms to automate checking, provide real-time data analytics for the teacher, and familiarize learners with navigating digital interfaces for academic purposes.	Instructional Innovation: Transition from traditional paper-and-pencil tests to Google Forms-based formative and summative assessments with integrated multimedia (images/videos) for math problems. Process Change: Implementation of Automated Feedback Loops, where students receive their scores and correct answers immediately upon submission, allowing for instant self-correction. Resource Development: Curation of a Digital Math Assessment Bank specifically designed for Grade 7 competencies (e.g., Square Roots, Cube Roots, and Rational Numbers).	Academic Performance: Significant improvement in Mathematics mastery, with the post-test mean score increasing by 33.33% compared to the pre-test results. Digital Literacy: Students demonstrated increased proficiency in using browser-based tools, navigating online forms, and managing digital submissions. Teacher Efficiency: Drastic reduction in time spent on manual grading, allowing teachers to focus more on providing targeted remediation based on the item analysis generated by Google Forms.	Real-Time Data: The intervention allowed teachers to see "hotspots" or specific math competencies where the majority of the class struggled, enabling immediate "just-in-time" teaching. Eco-Friendly & Cost-Effective: The shift to Google Forms significantly reduced paper consumption and printing costs for the school's Math department. Engagement: Students showed a higher preference for digital assessments over traditional ones, noting that the immediate results reduced "test anxiety" and increased curiosity.



Republic of the Philippines
Department of Education
REGION VII - CENTRAL VISAYAS

CERTIFICATE OF UTILIZATION

This is to certify that this Office, through the Schools Division Research and Innovation Committee (SDRIC), has reviewed and validated that the **Research** titled **Enhancing Digital Literacy and Academic Performance In Mathematics Through Google Forms-Based Assessments** submitted by Jose Bonie C. Cabezares and Edgar J. Gonzaga, of City of Naga Division was **SUCCESSFULLY UTILIZED** in South Poblacion National High School, City of Naga Division where the Research was Utilized to contribute to the development of reading comprehension skills among Grade 7 learners in South Poblacion National High School and results of the study indicate that Google Forms are effective in improving both digital literacy and Mathematics performance. Interactivity, immediate feedback, and access contribute to developing engagement, confidence, and readiness for technology-enhanced learning. These results support continued integration of digital assessment platforms in Mathematics instruction in line with DepEd's MATATAG curriculum reforms.

Issued and signed this 26th day of May, 2026 in City of Naga Division, Philippines.


RONALD G. GUTAY
Schools Division Superintendent



Republic of the Philippines
Department of Education
REGION VII - CENTRAL VISAYAS

CERTIFICATE OF ADOPTION

This is to certify that this Office, through the Schools Division Research Committee (SDRC), has reviewed and validated that the **Research** titled **Enhancing Digital Literacy and Academic Performance In Mathematics Through Google Forms-Based Assessments** submitted by Jose Bonie C. Cabezares and Edgar J. Gonzaga, of City of Naga Division was **SUCCESSFULLY ADOPTED** in South Poblacion National High School, City Division to enhance digital literacy and improve academic performance in Mathematics among Grade 7 learners in South Poblacion National High School through the use of Google Forms-based assessments during the School Year 2025–2026, from June to December 2025, under the 6-month Adoption in Other School/District/Office program.”

Issued and signed this 26th day of May, 2026 in City of Naga Division, Philippines.

RONALD G. GUTAY
Schools Division Superintendent

DISSEMINATION AND UTILIZATION ADVOCACIES

The research Using Google Forms to Develop Technology Skills Among Learners in Preparation for Digital Assessments focuses on sharing the findings with key stakeholders and ensuring practical application in classrooms. The research findings will be shared through a report submitted to school administrators, teachers, and relevant stakeholders, followed by presentations and workshops for educators to demonstrate the use of Google Forms in assessments. Additionally, findings will be distributed through the school's online platforms and educational conferences to reach a broader audience. To facilitate the use of these tools, teachers will receive training on integrating Google Forms into their digital assessments, and parents will be provided with guides to support their children's learning at home. The research also aims to integrate Google Forms into the curriculum, encouraging educators to use digital assessments to build students' technology skills. Feedback from teachers, students, and parents will be collected to assess the effectiveness of the intervention and refine teaching methods. Ultimately, the plan seeks to improve digital literacy and prepare students for future digital assessments while empowering teachers and parents to actively support the learning process.

PHOTO DOCUMENTATION

After the successful approval and presentation of the Action Research proposal, the researchers proceeded with the procurement of the necessary materials and resources needed for the implementation of the Google Forms-Based Assessment during the intervention phase of the study.

These were the documented photos of the materials and sales involve before the implementation of the Google Forms-Based Assessment in South Poblacion National High School.





The photos below were documented during the implementation phase of the Google Form Assessment. The orientation to the Google Forms platform through guided demonstrations and supervised practice sessions to ensure familiarity and ease of use. Upon completion of the orientation activities, Google Forms-based assessments were integrated into the regular teaching-learning process in Mathematics classes. The intervention was implemented alongside existing instructional strategies during the prescribed implementation period for School Year 2025–2026.





The picture shows the Final Oral Presentation of Action Research for the 2025 Basic Education Research Fund (BERF) conducted in a conference venue. The presenters or the proponents were standing in front of the panel and audience while discussing the research study using a large screen display. The presentation appears formal and academic, with evaluators and participants attentively listening and taking notes during the session.

