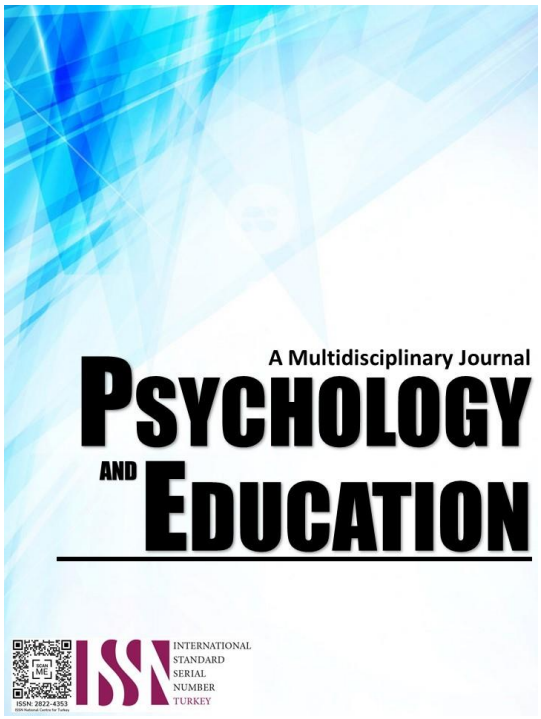
ASSESSMENT PRACTICES OF SENIOR HIGH SCHOOL MATHEMATICS TEACHERS IN RELATION TO STUDENTS' TEST PERFORMANCE



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Research Article

Assessment Practices of Senior High School Mathematics Teachers in Relation to Students' Test Performance

Paul Melcar C. Paglomutan*, Roxanne A. Cabarubias, Rowena T. Valdesimo, Richard L. Lachica
For affiliations and correspondence, see the last page.

Abstract

This study sought to determine the relationship between the demographic profile, extent of assessment practices of senior high school mathematics teachers, and students' test performance in mathematics. In this study, embedded mixed methods research design was employed to collect both quantitative and qualitative data, with the latter being used to supplement the former. The results of the study revealed that the extent of assessment practices of SHS mathematics teachers in all subscales and as a whole showed a generally clear, visible, and observable implying noticeable indications and demonstrations of effective assessment practices in the classroom, allowing for meaningful evaluation and support of student learning. However, on students' test performance in mathematics, findings revealed a poor test performance indicating an enhancement is needed and highlights deficiencies in understanding or application of mathematical concepts. This was verified by the key informants' responses during the interview. Additionally, results also revealed that no significant differences exist on the extent of assessment practices of SHS mathematics teachers as assessed by the participants when grouped according to their demographic profile. Furthermore, in terms of test performance in mathematics, findings revealed that no significant differences exist when the participants were grouped according to sex and junior high school of origin but with significant difference in terms of section as likewise confirmed by the key informants on their responses. Moreover, it was found out that no significant association exists between the extent of assessment practices of SHS mathematics teachers and students' test performance in mathematics in all subscales aside from responsive. This relationship was more robust in classrooms where students demonstrated lower average performance on the formative assessment data. The researchers concluded that there were findings that highlighted several important factors that contributed to the outcomes in mathematics assessment. Clear assessment objectives, adopting a continuous assessment approach, providing timely and constructive feedback, incorporating self-assessment and peer evaluation activities can enhance metacognitive skills, identifying students who require additional support and providing targeted interventions, encouraging reflective practices, ongoing professional development opportunities, creating a positive and supportive classroom climate, and further longitudinal research and data analysis were the recommendations that would lead to improve the test performance in mathematics.

Keywords: *assessment practices, mathematics teachers, test performance*

Introduction

Assessment practices are an essential aspect of the teaching and learning process in any educational setting, and this is particularly true in high school mathematics classrooms. Mathematics teachers play a critical role in designing and administering assessments that accurately measure student learning and understanding. The use of effective assessment practices can not only aid teachers in identifying areas where their students may need additional support but also help students evaluate their own learning progress and identify areas of strength and weakness. In the context of high-level math courses, it is crucial to examine the assessment practices of math teachers and their relation to students' test performance (Heritage, 2021).

According to Zhang (2021), there are several challenges associated with assessment practices in mathematics education, such as addressing the needs of diverse student populations, balancing formative and summative assessments, and ensuring that assessments are valid and reliable measures of student learning. Assessment plays a critical role in supporting student learning and improving teaching practices. Effective assessment practices are essential for ensuring that students receive the support they need to succeed in the higher-level mathematics courses.The difficulties and challenges those students face when learning mathematics at two universities in Pakistan range from insufficient background knowledge, inadequate study habits, and a lack of interest in the subject. The study highlights the need for instructors to employ effective teaching strategies and provide additional support to students who are struggling (Saleem, 2022).

Moreover, the Mathematics Performance of the Philippines in TIMSS 2019 is a large-scale international assessment of students' mathematics and science knowledge, skills, and attitudes that is conducted every four years. According to Dee et al. (2021), the performance of Filipino students in mathematics in TIMSS 2019 is compared to the global

and regional averages. The mathematics performance of Filipino students is below the global and regional averages, indicating a need for improvement in mathematics education in the Philippines. The curriculum coverage in mathematics in the Philippines is relatively low compared to other countries, which may have contributed to the low performance of Filipino students. The instructional practices in mathematics in the Philippines are also identified as factors that may have affected the students' achievement, such as the overemphasis on rote memorization and the lack of emphasis on problem-solving and critical thinking.

One of the researchers is a senior high school teacher in mathematics and presently teaching Basic Calculus which is specialized subject under the Science, Technology, Engineering and Mathematics (STEM). Based on the record of test scores in mathematics, it showed that the average test score was 44.12, interpreted as very poor, posing a problem in the performance of mathematics in the department. Two high school mathematics teachers who are currently researchers of the study asked a Calculus problem to random Senior High School (SHS) students, "What is the 2x3+x2+5x+1 ?", Only one out of five got the correct answer. Through this result, the researchers wanted to identify areas for improvement in assessment practices that may benefit both teachers and students. Ultimately, a better understanding of the relationship between assessment practices and students' test performance that will lead to more effective teaching and learning in SHS mathematics classrooms.

Research Questions:

This study aimed to determine the extent of assessment practices of SHS mathematics teachers in relation to students' test performance in mathematics. Specifically, it will answer the following questions:

1. What is the demographic profile of the SHS students when grouped according to:
   1.1 Sex;
   1.2 Section; and
   1.3 Junior high school of origin?
2. What is the extent of assessment practices of SHS mathematics teachers as assessed by the participants as a whole and in terms of:
   2.1 Responsive;
   2.2 Flexible;
   2.3 Integrated;
   2.4 Informative;
   2.5 Multiple Methods;
   2.6 Communicated;
   2.7 Technically Sound; and
   2.8 Systemic?
3. What is the test performance of the participants in mathematics?
4. Is there a significant difference on the extent of assessment practices of SHS mathematics teachers as assessed by the participants when grouped according to their demographic profile?
5. Is there a significant difference on the test performance of the participants in mathematics when grouped according to their demographic profile?
6. Is there a significant association between the extent of assessment practices of SHS mathematics teachers as assessed by the participants and their test performance in mathematics?
7. What are the experiences of the key informants in their mathematics class?

Methodology

In this study, the mixed method with embedded design was used. An embedded mixed methods research design, according to Onwuegbuzie et al. (2022), entails the collection and analysis of both quantitative and qualitative data, with one method serving as the primary approach and the other method serving as a secondary approach. The primary approach is typically quantitative, with the secondary approach providing additional insights, clarifying or explaining quantitative results, or even challenging them. The qualitative component is nested within the quantitative component in an embedded design, so the qualitative data is used to explain or expand on the quantitative data. The combination of both approaches allows for a more comprehensive understanding of the research problem and leads to a more comprehensive solution.

For the quantitative component of the study, there were 110 STEM respondents officially enrolled in Kabankalan Catholic College. The qualitative component had seven (7) participants from different sections. To determine the number of respondents, the researchers used Raosoft Sample Size Calculator which is a free online tool that can be used to calculate the minimum sample size required for a survey or experiment. The calculator takes into account the desired margin of error, confidence level, and population size. The sample size was proportionately distributed using stratified random sampling. According to Cohn (2023), stratified random sampling

is a probability sampling method in which the population is divided into homogeneous groups (strata) based on shared characteristics, and then a random sample is selected from each stratum. This ensures that the sample is representative of the population in terms of the shared characteristics.

This study was conducted at Kabankalan Catholic College, which is located on Guanzon Street in Brgy. 1, Kabankalan, Negros Occidental. The survey questionnaire in this study was divided into three (3) parts. The first part is the consent form and the demographic profile of the respondents. The second part is a research questionnaire adapted from Carless et al. (2018)'s Assessment for Learning in the Twenty-First Century: A Pedagogic Guide for Teachers. The RFIIMCTS framework is a tool for evaluating and improving assessment practices in educational settings. It provides a comprehensive approach to assessment for learning that emphasizes the importance of using assessment practices. The framework consists of eight components, each of which represents a key aspect of effective assessment practices:

a. Responsive: Assessment items and activities enable students to think critically.
b. Flexible: Assessment is adaptable to students' settings.
c. Integrated: Assessments conducted enable students to experience the realities in their future work setting.
d. Informative: Assessment items/tasks given enable students to demonstrate their learning.
e. Multiple Methods: Course-embedded assignments providing evidence of how well students transfer learning into new contexts are used in assessing students' performance.
f. Communicated: The results of assessments are communicated effectively to all stakeholders.
g. Technically Sound: Assessment items and procedures are reliable and valid.
h. Systemic: Assessment practices are embedded in a systemic framework that supports student learning.

The last part is the three (3) open-ended questions for students to share their experiences about their SHS mathematics teachers' assessment practices and their test performance in mathematics.The validity score was 4.5. This means that the research instrument was valid. To rate each item in the questionnaire, a five-point Likert scale based from the criteria presented by Carter V. Good and Douglas Scates was used. According to Middleton (2022), validity refers to how accurately a method measures what it is intended to measure. If research has high validity that means it produces results that correspond to real properties, characteristics, and variations in the physical or social world. The result of the reliability testing was 0.976 for thirty (30) participants, using the Cronbach Alpha Coefficient. The results of reliability testing were determined using the formula of Cronbach Alpha Coefficient $\alpha=Ncv+(N-1)c$ where N is equal to the number of items, c is the average inter-item covariance among the items, and v equals the average variance. Cronbach's alpha is a measure of the internal consistency or reliability between several items, measurements or ratings (Malays, 2018). The consistency with which a method measures something is referred to as reliability. If the same result can be consistently achieved by using the same methods under the same circumstances, the measurement is considered reliable (Middleton, 2022).

To gather the data, the procedures were followed: the researchers wrote to the Department Head the following letters: a permit to conduct the study, a reliability test, a survey, and gathering test scores from the teacher(s). Writing a letter of permission addressed to the school registrar in order to obtain the master list of STEM 11 students. A letter of request for validation was forwarded to three (3) education experts. Pilot testing was conducted on thirty (30) STEM 11 students who are not part of the study in order to test and refine the study's procedures.

Based on the specific objectives and hypotheses established earlier in this study, the data were analyzed using appropriate statistical tools. In the first problem, frequency counts and percentages were be used. According to Geert van den Berg (2022), frequency distribution tells how frequencies are distributed over values. The mean was used for problems 2 and 3. Mean, different from the geometric mean of a dataset is the sum of all values divided by the total number of values. It is also known as the average and is the most widely used measure of central tendency (Bhandari, 2022). Problems 4 and 5 were statistically analyzed using the t-test when grouped according to sex and JHS of origin. T-test is a statistical test that is used to compare the means of two groups. It is often used in hypothesis testing to determine whether a process or treatment actually has an effect on the population of interest, or whether two groups are different from one another (Bevans, 2020). When grouped according to section, One-Way ANOVA was used. Mackenzie (2021), stated that one-way ANOVA is a type of statistical test that compares the variance in the group means within a sample whilst considering only one independent variable or factor. It is a hypothesis-based test, which means it'll look at several mutually exclusive explanations about our data.

The researchers used a 5-point rating scale to respond to the following questions on Assessment Practices of SHS Mathematics Teachers in Relation to Students' Test Performance: 4.21-5.00, which means Highly Evident; 3.41-4.20, which means Evident; 2.61-3.40, which means Moderately Evident; 1.81-2.60, which means Slightly Evident; 1.00-1.80, which means Not Evident.

Furthermore, the researchers used the interpretation of test performance for the students' test performance: 96%-100% means Excellent, indicating that the test performance in mathematics is exceptionally high; 86%-95% means Above Average, suggesting that the test performance in mathematics is higher than the average level; 69%-85% means Average, represents a satisfactory level of test performance in mathematics; 50%-68% means Poor, a level of test performance in mathematics that is below what is expected or desired; 0%-49% means Very Poor, represents a significantly low level of test performance in mathematics.

Results and Discussion

Table 1. *Demographic profile of the SHS students when grouped according to profile*

Profile	*Frequency*	*Percentage*
Sex		
Male	50	45.5
Female	60	54.5
Section		
Section A	35	31.8
Section B	37	33.6
Section C	38	34.5
JHS of Origin		
Private	73	66.4
Public	37	33.6
Total	110	100.0

Table 1 shows that most of the participants are female composing of 60 or 54.5%. In terms of sections, the participants are almost equal in numbers in conformity to DepEd's order to make the number of students in each class manageable. Furthermore, most of the participants are coming from the private schools. This is due to the fact that more public schools each year offer SHS programs which become a more practical choice for students whose families cannot afford private education fees.

Table 2.1 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants in terms of Responsive*

Indicators	*Mean*	*Interpretation*
Assessment items and activities enable students to think critically.	3.84	Evident
Descriptive feedback is provided through positive comments and constructive criticisms. Students are informed of the progress towards the attainment of learning outcomes.	3.95	Evident
Self-reflection and peer assessment are used to enable students to identify and improve their weaknesses.	3.96	Evident
Students are given opportunities to revise and improve their performance.	3.94	Evident
Teachers monitor students' progress through formative assessment and activities and adjust instructions to cater to students' needs.	4.15	Evident
Overall	3.97	Evident

The extent of assessment practices was assessed by the participants. Table 2.1 reveals that, in terms of responsiveness, the teachers' efforts to maximize the utilization of assessment is evident. The main purpose of assessment which is to serve as a monitoring tool of students' progress is reflected in the result with 4.15 as the highest mean. Assessment results become bases for educational decisions to make sure students' needs are addressed. Educators look for computational tools allied to the learning platforms which enable the use of educational data analysis techniques to assist in the assessment of students' academic performance and to support in pedagogical decisions, promoting a more personalized learning experience and the construction of student knowledge through their learning experiences (Costa, et.al, 2020).

Table 2.2 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants in terms of Flexible*

Indicators	*Mean*	*Interpretation*
Assessment is adaptable to students' settings.	3.72	Evident
Students are given choices on what and how to be assessed.	3.89	Evident
Students are given choices on the weight of assessment.	3.74	Evident
Students are allowed to use a variety of format to meet the learning outcomes	3.89	Evident
Teachers make use of projects, assignments, performance observations and skills demonstration, oral questioning other than paper and pen test in assessing student performance.	3.88	Evident
Overall	3.82	Evident

In terms of flexibility, the results reveal that the teachers make use of assessment in different methods. Achievement of learning competencies cannot be only

assessed by paper and pencil tests. These variety of techniques allows students to not only be assessed by what they know, but also provides opportunity to lead, exhibit their skills and think outside the box. Furthermore, in assessment, there is no such thing as "one size fits all." Assessment for learning in education should provide students several models for demonstration of excellence and opportunities to apply concepts and skills learned (Mohan, 2023).

Table 2.3 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants in terms of Integrated*

Indicators	*Mean*	*Interpretation*
Assessments conducted enable students to experience the realities in their future work setting.	4.13	Evident
Assessment items/activities involve processes that combine and blend the learning outcomes from multiple topics into a series of streamlined, realistic, and employment focused activities.	3.97	Evident
Assessments are not mere add-ons at the end of the lesson but incorporated into day-to-day practices.	3.75	Evident
Assessment items/activities given/conducted give students opportunities to consider their choices and identify alternative strategies.	3.82	Evident
Assessment items/activities given/conducted provide students opportunities to transfer earlier learning to situations and represent knowledge through different means.	3.79	Evident
Overall	3.89	Evident

While education is considered to be a preparation for the future, assessment should do its role as an important part of the process. Table 2.3 reveals that assessment practices of teachers integrate practices vital in their future careers as reflected by the mean of 4.13 interpreted as evident. However, it also allows students to be creative in finding solutions to address the problems and is not only limited to one approach.

Table 2.4 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants in terms of Informative*

Indicators	*Mean*	*Interpretation*
Assessment items/tasks given enable students to demonstrate their learning.	3.97	Evident
Assessment tasks given enable students to use reflective activities to develop deep learning.	3.98	Evident
Assessment items/tasks enable students to analyze their own learning or thinking process (metacognition).	3.99	Evident
Demonstration of the 21st century skills are evident in the assessment items/tasks.	3.77	Evident
Assessment items/tasks enable students to show the steps they go through and display their thought processes for peer and teacher review.	3.89	Evident
Overall	3.92	Evident

In terms of being informative, SHS teachers practice includes indicators of assessment to be informative. It allows students to be informed of their personal learning and progress. Though also evident, it is essential that 21st century skills should be incorporated to provide opportunity to students to improve.

Table 2.5 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants in terms of Multiple Methods*

Indicators	*Mean*	*Interpretation*
Course-embedded assignments providing evidence of how well students transfer learning into new contexts are used in assessing students' performance.	3.90	Evident
Teachers require students to conduct mini research to determine how well they integrate and apply principles and concepts learned and abilities acquired into a culminating project.	3.92	Evident
Collaborative problem-solving activities are provided to show how well students practice or apply learning.	3.82	Evident
Students' projects or performances are internally (subject teacher) and externally (other teacher) reviewed to determine and provide evidence of students' problem-solving activities/performance.	3.82	Evident
Students are given challenging assessment task to provide evidence on how well they analyze, synthesize and solve problems.	3.67	Evident
Overall	3.83	Evident

Table 2.5 shows that the utilization of multiple methods is evident in the assessment practices of SHS teachers. The integration of research as a crucial component of the 21st century education becomes a practice. However, on the area of giving challenging assessment task to provide evidence on how well they analyze, synthesize and solve problems, though still evident, had the lowest means of all. This may be due to the fact that the same problems are given to all students to answer. The mathematical tasks that are included in these assessments have a rather low level of complexity (they are easy), so as to not let students fail (Sayac & Veldhuis, 2021). Allowing students to look for problems on their own and allowing creativity in addressing the problems and finding solutions might be better than providing it.

Table 2.6 *Extent of assessment practices of SHS mathematics teachers as assessed by the participantsin terms of Communicated*

Indicators	*Mean*	*Interpretation*
Students receive routine feedback on their learning progress.	3.95	Evident
Parents are informed of the students' learning progress.	3.47	Evident
Teachers return test/examination papers to students after the quiz/periodic examinations for transparency of assessment results.	4.00	Evident
Teachers inform students of their grades for a term at least a week or two after the periodic examinations.	3.82	Evident
The school recognizes students' academic achievements.	4.14	Evident
Overall	3.87	Evident

Table 2.6 reveals that teachers practice to communicate the results of the assessment made through feedbacking a returning of learning evidences. The school also practices quarterly recognition of students' achievement which make the mean of indicator 5 highly rated as 4.14. Though report cards are given to report students' progress to parents, it is important to inform parents of significant changes especially the negative ones to address them as soon as possible and provide intervention to avoid further decrease in students' performance.

Table 2.7 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants in terms of Technically Sound*

Indicators	*Mean*	*Interpretation*
Assessment items/tasks given enable students to demonstrate what they know.	4.32	Highly Evident
Assessment items/tasks given enable students to demonstrate how they can apply the knowledge they learned in appropriate and relevant ways.	4.08	Evident
Adjustments and accommodations are made in the assessment process to meet the students' needs and establish fairness.	3.99	Evident
Assessment items/tasks measure the learning outcomes/objectives.	3.96	Evident
Assessment items/tasks enable teachers to gather accurate information which will be made basis for decision making.	4.01	Evident
Overall	4.07	Evident

As assessment is treated to be a way of supporting learning, teachers should be trained in creating assessment that measures what it supposed to measure. Table 2.7 reveals that assessment given by SHS Mathematics teachers measures what students know as revealed by the mean of 4.32 interpreted as highly evident. Other important factors to consider by teachers is the alignment of assessment to the learning competencies provided, accurately quantify students' learning and meeting students' need and establishing fairness. Overall, the result implies that teachers are trained in designing assessment that measures what it ought to measure which results become accurate basis of students' learning.

Table 2.8 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants in terms of Systemic*

Indicators	*Mean*	*Interpretation*
Assessment items/tasks are aligned to the Most Essential Learning Competencies (MELC) set by DepEd.	3.83	Evident
Assessment items/tasks given assess students' higher order thinking skills where they are required to analyze, synthesize, and evaluate.	3.90	Evident
Assessment items/tasks measure students' ability to show a close connection existing between concepts.	3.84	Evident
Assessment items/tasks enables the students to discover new relationships among concepts.	3.88	Evident
Assessment items/tasks demonstrate a well-aligned assessment system that is balanced and inclusive of all stakeholders as they are designed to support improvement at all levels and domains of learning.	3.85	Evident
Overall	3.86	Evident

In table 2.8, it is revealed being systemic is evident in the assessment practices of the teachers. This implies that the teachers' effort to ensure that assessment aligns to the learning competencies set forth by the Department of Education and to accurately provide measures that represent students' achievement of the target is evident. Valenzuela (2022) emphasized that there isn't only one way to teach, but daily lessons must have flow and alignment.

Table 2.9 *Extent of assessment practices of SHS mathematics teachers as assessed by the participants as a whole*

Indicators	*Mean*	*Interpretation*
Responsive	3.97	Evident
Flexible	3.82	Evident
Integrated	3.89	Evident
Informative	3.92	Evident
Multiple Methods	3.83	Evident
Communicated	3.87	Evident
Technically Sound	4.07	Evident
Systemic	3.86	Evident
Overall	3.91	Evident

As revealed by Table 2.9, assessment practices of SHS Math teachers are perceived evident by the students in all areas. The area with the highest mean is technically sound and the lowest is flexibility, though still evident. This implies that they are implying good assessment practices recognizing that it is a crucial part of the learning process. Furthermore, Crocket (2021) Teachers are always looking for ways to check for

understanding, which we practice through applying mindful assessment. Mindful assessment tools come in many shapes and sizes. They can be quick and light or more in-depth. In the end, assessment can happen anytime in any classroom.

Table 3 *Test performance of the participants in mathematics*

Indicator	*Mean Percentage*	*Interpretation*
Test Performance	44.12	Very Poor

Table 3 reveals the mean score of 44.12 of SHS students which is interpreted as poor. This implies that the students have not completely mastered the lessons being assessed. In the study of Bernardo, et. al (2022), the results suggest that most Filipino high school students are not learning what they are supposed to in mathematics, the situation seems to be worse for the students in Philippine high schools. In a sense, the results are not surprising as the Philippines had been consistently performing poorly in mathematics in the global assessments.

Table 4 *Difference Analysis on the extent of assessment practices of SHS mathematics teachers as assessed by the participants when grouped according to their demographic profile*

Profile	*Test Cogfficient*	*p-value*	*Conclusion*
Sex	*t-value*		
Responsive	−1.110	0.269	Not Sig.
Flexible	−1.522	0.131	Not Sig.
Integrated	−0.284	0.777	Not Sig.
Informative	0.210	0.834	Not Sig.
Multiple Methods	−0.359	0.720	Not Sig.
Communicated	−0.340	0.734	Not Sig.
Technically Sound	−0.904	0.368	Not Sig.
Systemic	−0.325	0.746	Not Sig.
As a whole	−0.716	0.475	Not Sig.
Section	*F-value*		
Responsive	2.643	0.076	Not Sig.
Flexible	0.034	0.966	Not Sig.
Integrated	0.654	0.522	Not Sig.
Informative	0.425	0.655	Not Sig.
Multiple Methods	0.184	0.832	Not Sig.
Communicated	0.128	0.880	Not Sig.
Technically Sound	0.117	0.890	Not Sig.
Systemic	1.888	0.156	Not Sig.
As a whole	0.393	0.676	Not Sig.
JHS of Origin	*t-value*		
Responsive	−0.738	0.462	Not Sig.
Flexible	−0.409	0.684	Not Sig.
Integrated	−0.329	0.743	Not Sig.
Informative	−0.591	0.556	Not Sig.
Multiple Methods	−0.255	0.799	Not Sig.
Communicated	−0.444	0.658	Not Sig.
Technically Sound	0.615	0.540	Not Sig.
Systemic	0.578	0.565	Not Sig.
As a whole	−0.252	0.802	Not Sig.

Not Sig. if p-value is greater than 0.05; sig. and highly sig. if p-value is less than 0.05 and 0.01, respectively.

The table presents the difference analysis on the extent of assessment practices of SHS mathematics teachers as assessed by the participants when grouped according to their demographic profile. Based from the result, it shows that there are no significant differences in each demographic profile: sex: t=-0.716; p=0.475, section: F=0.393, p=0.676, and JHS of origin: t=-0.252, p=0.802, across all subscales of assessment practices of the teachers in SHS and taken as a whole. This implies that the assessment practices of SHS teachers are generally clear, visible, and observable. There are noticeable indications and demonstrations of effective assessment practices in the classroom, allowing for meaningful evaluation and support of student learning (x=3.91 as shown in table 2.9).

The consistency of result is supported by interviews conducted. According to informant 1, “I learned about different ways on how to solve problems and thinking outside the box, to strive harder because it is not something you can just memorize in a day. These experiences that I learned from the subject are fundamental trainings for us to be prepared in the future.” Informant 2 also added, “Though I struggled a lot in Basic Calculus, our teacher provided detailed explanation and different means on how to solve the problems. Hardship was another thing that I realized in this subject, it is not easy, however, I have countable meaningful experiences such as: not having a zero score in quiz or exam, got the right answer and had chance to show it to class. Being able to understand the lesson is the best experience for me for I can use these knowledge and skills in my college years. Furthermore, informant 3 said, “I learned to develop critical thinking skills, problem-solving abilities, and a deeper understanding of mathematical concepts that are widely applicable in various fields of study. There are things or situations in real life wherein I can apply the lessons we learned from the subject. As a student, patience is very important because you cannot solve a problem right away, it takes time.”

In the study of Clarke and Wilkie (2021), the findings imply that some teachers hold productive beliefs about teaching and assessment that support the use formative assessment actions more readily. Such productive beliefs provide a useful platform for enacting better assessments inside secondary classrooms, given that there is paucity of research that deals with how secondary teachers make use of formative assessments. The findings implicitly confirm that better use of formative assessment strategies tend to result in more interactive lessons regardless of heterogeneous sectioning.

In the Spring of 2020, online instruction was predominantly asynchronous. It is difficult to say much about what happened in the classrooms because of the methodology set. However, what was observed, via the participants' responses, includes the surprising ways that students who might have been overlooked in brick-and-mortar classrooms emerged in online settings. This happened in chat rooms, in one-on-one video calls, in break out rooms, and in the use of online whiteboards that democratized the power of the pen—all contributions were visually represented as equally present, and thus equally valued when shared in those ways (Ruef, 2021).

Table 5 *Difference Analysis on the test performance of the participants in mathematics when grouped according to their demographic profile*

Profile	*Test Coefficient*	*p-value*	*Conclusion*
Sex	*t-value*		
Test Performance	−0.277	0.782	Not Sig.
Section	*F-value*		
Test Performance	4.362	0.015	Sig.
JHS of Origin	*t-value*		
Test Performance	0.120	0.904	Not Sig.

Not Sig. if p-value is greater than 0.05; sig. and highly sig. if p-value is less than 0.05 and 0.01, respectively.

The table presents the difference analysis on the test performance of the participants in mathematics when grouped according to their demographic profile. Based from the result, it shows that there are no significant differences on the test performance when grouped according to sex (t=-0.277, p=0.782) and JHS of origin (t=0.120, p=0.904). This implies that the test performances of the participants are almost the same no matter what sex preference they belong and their junior high school academic background. It represents a significantly low level of test performance in mathematics. The individual or group performed well below expectations or standards, demonstrating a lack of understanding and proficiency in the subject. However, a significant result shows when the participants were grouped according to section (F=4.362, p=0.015), implying that test performance differ as sections in STEM were grouped heterogeneously. Furthermore, this is evident on the result of Post-hoc Analysis using Tukey where there is a significant difference between A (daily class) and C (once a week) with p=0.011. This implies that mathematics especially higher-level subjects like Basic Calculus should be taught daily for gradual enhancement of math skills and learning experience are not in rush.

The significant difference on the test performance in terms of section is supported by the testimonies of the selected participants. According to informant 3, "My struggle in this subject is that the lessons are discuss in one day in a week (during Friday) and I usually I am absent during the discussion of the lessons because of some circumstances happening. Informant 4 also added, "I strongly suggest that this subject becomes a daily lecture instead of just one day a week. I found Basic Calculus challenging due to complex equations and concepts that required meticulous attention to detail, often leading to frustration and confusion. Additionally, the extensive practice required to master the subject felt monotonous and overwhelming at times."

Furthermore, the experiences of both male and female, and their different JHS of origin showed similar responses. According to informant 5, My struggles in the subject Basic Calculus is due of pandemic-related modularity in the curriculum throughout my grade 9 and grade 10 years, I had difficulty mastering the teachings in the subject of basic calculus. Additionally, informant 1 said, "Basic Calculus taught me the agony of endless derivatives, the despair of complex integrals, and the torment of limit evaluations. But at the same time Basic Calculus taught me the power of breaking down complex problems into manageable parts and the elegance of finding patterns and relationships hidden within equations." Lastly informant 6 also said, "I have learned to strive harder because life has never been easy and it contributed to my personal development. It's also worth noting that amidst the challenges, life can offer opportunities for growth, learning, and resilience."

According to Pina et al. (2021), the test performance in mathematics did not show significant difference or size effect between genders for mean performance, variance in the distribution of performance, or percentiles. Reiterated by these findings, great care should be exercised when reporting on possible gender differences in mathematical performance, as these can contribute to low self-concept among female students.

Moreover, observation revealed that when students utilized problem posing, there were cognitive load implications. They justified that they choose situations to create problems where they could easily relate. Pattern appears to have the least involvement on their posed problems but has perceived the given problems based on given situations as "easy" problems as to their content knowledge. The students judged the structured type of problem-posing as "difficult" as to their posed problems, while they perceived "neutral"

with free and semi-structured style, which means they were undecided about its difficulty. However, students confessed they struggled most with their tasks because they lacked previous experiences, which is not present in their early education (Daz & Patac, 2021).

Table 6 *Correlation Analysis between the extent of assessment practices of SHS mathematics teachers as assessed by the participants and their test performance in mathematics*

Variables correlated to Test Performance in Mathematics	*r-value*	*P-value*	*Conclusion*
Responsive	0.188	0.049	Sig.
Flexible	0.122	0.202	Not Sig.
Integrated	0.180	0.060	Not Sig.
Informative	0.145	0.131	Not Sig.
Multiple Methods	0.175	0.068	Not Sig.
Communicated	0.116	0.226	Not Sig.
Technically Sound	0.083	0.386	Not Sig.
Systemic	0.124	0.199	Not Sig.
Assessment Practices as a whole	0.169	0.077	Not Sig.

Not Sig. if p-value is greater than 0.05; sig. and highly sig. if p-value is less than 0.05 and 0.01, respectively.

The table presents the correlation analysis between the extent of assessment practices of SHS mathematics teachers as assessed by the participants and their test performance in mathematics. Based from the result, it shows that majority of the subscales do not have a significant association to the test performance in mathematics other than the subscale "Responsive" (r=0.188; p=0.049) implying that there could be other factors affecting the test performance of the participants aside from the pre-determined factors test in the study. The result also implies that assessment items and activities enabled students to think critically, descriptive feedbacks were provided through positive comments and constructive criticisms, students were informed of the progress towards the attainment of learning outcomes, self-reflection and peer assessment were used to enable students to identify and improve their weaknesses, students were given opportunities to revise and improve their performance, and teachers monitor students' progress through formative assessment and activities and adjust instructions to cater to students' needs. The positive correlation indicates a positive negligible association between the two variables and that the more this subscale (Responsive) is observed, there can be a slight improvement on the test performance of the participants in mathematics.

According to informant 2, "Having to repeat a process because my answer is incorrect causes me anxiety, which leads to impatience and overthinking about bad scores and having low grades." Informant 7 also added, "As someone that is very slow in understanding numbers, I think my struggles are learning how those numbers work. I have many struggles but I cannot seem to point out where do I specifically struggle. Informant 5 also added, "Applying multiple rules in one problem takes time to write and sometimes I missed some information leading to wrong answers.

Having a non-significant result to the majority of the subscales is supported by the study of Parker at al. (2021), showing a positive relationship between formative assessment data related to the concepts of counting and decomposing numbers and summative data. This relationship was more robust in classrooms where students demonstrated lower average performance on the formative assessment data. The results suggest that formative assessment can be more beneficial to encourage low achieving students in mathematics classrooms. In addition, there is a low correlation between teachers' assessment practices and students' mathematics achievement. This means that there is a low relationship between the two variables. The study also found that the findings were not significant. It is also possible that the low correlation and lack of significance are due to the fact that there is no real relationship between teachers' assessment practices and students' mathematics achievement. This would mean that teachers' assessment practices do not have a significant impact on students' mathematics achievement.

According to Dee et al. (2021), the performance of Filipino students in mathematics in TIMSS 2019 is compared to the global and regional averages. The mathematics performance of Filipino students is below the global and regional averages, indicating a need for improvement in mathematics education in the Philippines. The curriculum coverage in mathematics in the Philippines is relatively low compared to other countries, which may have contributed to the low performance of Filipino students. The instructional practices in mathematics in the Philippines are also identified as factors that may have affected the students' achievement, such as the overemphasis on rote memorization and the lack of emphasis on problem-solving and critical thinking.

Conclusion

In conclusion, this study examined the assessment practices of Senior High School Mathematics teachers and their relation to students' test performance. The findings highlight several important factors that can contribute to improved outcomes in mathematics assessment.

The results of the study revealed that the extent of assessment practices of SHS mathematics teachers in all subscales and as a whole showed a generally clear, visible, and observable implying noticeable indications and demonstrations of effective assessment practices in the classroom, allowing for meaningful evaluation and support of student learning. However, on students' test performance in mathematics, findings revealed a poor test performance indicating an enhancement is needed and highlights deficiencies in understanding or application of mathematical concepts. This was verified by the key informants' responses during the interview. Additionally, results also revealed that no significant differences exist on the extent of assessment practices of SHS mathematics teachers as assessed by the participants when grouped according to their demographic profile. Furthermore, in terms of test performance in mathematics, findings revealed that no significant differences exist when the participants were grouped according to sex and junior high school of origin but with significant difference in terms of section as likewise confirmed by the key informants on their responses. Moreover, it was found out that no significant association exists between the extent of assessment practices of SHS mathematics teachers and students' test performance in mathematics in all subscales aside from responsive.

Clear assessment objectives and criteria are crucial for guiding both teachers and students throughout the learning process. By communicating these objectives effectively, teachers can help students focus their efforts and better understand what is expected of them.Adopting a continuous assessment approach, rather than relying solely on high-stakes tests, allows for a more accurate representation of students' understanding and progress in mathematics. Regularly assessing students throughout the academic year enables teachers to identify areas of weakness early and provide timely interventions to support struggling students.Providing timely and constructive feedback is essential for student growth. Effective feedback that is specific, highlights strengths, and provides actionable suggestions for improvement can motivate students to make necessary adjustments and enhance their performance.

Incorporating self-assessment and peer evaluation activities can enhance metacognitive skills and promote a deeper understanding of mathematical concepts. By involving students in assessing their own work and evaluating the work of their peers, they take ownership of their learning and engage in collaborative learning environments.Identifying students who require additional support and providing targeted interventions is crucial. Extra tutoring sessions, supplementary materials, and recommended external resources can assist struggling students in grasping mathematical concepts and improving their test performance.Encouraging reflective practices empowers students to become active participants in their own learning journey. Reflection activities, such as journaling, class discussions, or one-on-one conferences, help students identify strengths, weaknesses, set goals, and develop strategies for improvement.

Ongoing professional development opportunities for mathematics teachers are necessary to enhance assessment practices. Continuous learning through workshops, conferences, and collaborative communities ensures teachers stay updated with effective strategies and fosters a culture of improvement in mathematics education.Creating a positive and supportive classroom climate is essential for student motivation and performance. Establishing a safe space where students feel comfortable asking questions, seeking help, and making mistakes encourages active engagement in learning, leading to improved test performance.Further longitudinal research and data analysis are recommended to gain a deeper understanding of the long-term impact of different assessment practices on students' performance. This study can inform future assessment practices and policies, ultimately enhancing mathematics education. By implementing these recommendations, senior high school mathematics teachers can create an environment that supports student growth, engagement, and achievement in mathematics assessments, ultimately leading to improved test performance.

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Affiliations and Corresponding Information

Paul Melcar C. Paglomutan
Kabankalan Catholic College- Philippines

Roxanne A. Cabarubias
Kabankalan Catholic College - Philippines

Rowena T. Valdesimo
Department of Education - Philippines

Richard L. Lachica
San Ramon Catholic School - Philippines