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Mathematics Assessment Practices and the Students' Academic Achievement

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Abstract. Amidst the challenges posed by the COVID-19 pandemic in recent years, the Philippine educational system transformed, transitioning from traditional face-to-face learning to modular distance learning and returning to face-to-face learning. Consequently, teachers faced the task of determining the most effective assessment practices and their extent of utilization to enhance students' academic achievement in mathematics. The main objective of this study is to statistically examine the relationship between the teachers' extent of use of mathematics assessment practices in modular distance learning during the pandemic and face-to-face learning and the students' academic achievement. A standardized survey questionnaire adopted from Nyunt et al. (2019) and Yan et al. (2022) was used as a research instrument to gather the participants' viewpoints. The survey comprised 200 respondents selected from Grade 9 Mathematics students who had undergone mathematics classes through modular distance learning and face-to-face learning. The results showed that summative assessment was the primary assessment practice used in modular distance and face-to-face learning. There is a significant relationship between the students' academic achievement and the extent of use of mathematics assessment practices in both modular distance learning and face-to-face learning. Also, it showed a significant difference between the extent of use of mathematics assessment practices in modular distance learning and face-to-face learning. The implications of these findings emphasize the value of having an effective learning plan that includes appropriate assessment practices suitable for in-person and modular remote learning settings.

Keywords: Comprehensive learning plan; Face-to-face learning; Mathematics assessment practices; Modular distance learning; Summative assessment.

1.0 Introduction

In light of the COVID-19 pandemic, the Philippine educational system shifted from traditional to varied learning modalities, such as online, blended, and modular distance learning. After two years, traditional face-to-face instruction was finally restarted. The most significant innovation teachers make is the application of varied assessment practices that depart from conventional approaches. Thus, teachers must use diverse and appropriate assessment practices to increase students' academic performance. Also, this means the extent of use of mathematics assessment practices in face-to-face and modular remote learning is significant. This adaptation demonstrated the sector's resilience and educators' commitment to high-quality instruction despite the challenges faced during these times.

Assessment, as defined in DepEd Order No. 8, s. 2025 is a process that is used to keep track of the learners' progress regarding learning standards and the development of twenty-first-century skills, promote self-

reflection and personal accountability among students about their learning, and provide the basis for profiling student performances on the learning competencies and curriculum standards. According to Mijares III (2022), proficient assessment and evaluation skills are crucial in bolstering students' learning in mathematics during modular distance learning. Building on this, Saga et al. (2021) emphasized the significance of assessing student work as a catalyst for sustained learning and improvement. Gonzales (2023), however, stressed that to ensure accurate and valid student assessments that provide holistic development, teachers must learn new teaching and assessment practices.

In contrast to face-to-face learning, Moralishvili and Chkhobadze (2021) emphasize that assessments should be fair, objective, purposeful, effective, and beneficial, ensuring that students receive feedback on their performances. Chueachot et al. (2013) suggested using an assessment approach to improve students' self-efficacy, self-regulation, and learning achievement. Furthermore, Sarmiento et al. (2020) disclosed that Filipino educators should employ a balanced mix of traditional and authentic assessment tools, integrating technology inclusively. This approach aims to enhance students' academic achievement, particularly in mathematics.

Hence, teachers must employ suitable and authentic assessment practices and strategies, enabling students to achieve higher academic outcomes. To address this imperative need, the primary goal must be the statistical examination and comparison of the utilization of mathematics assessment practices between modular distance learning during the pandemic and traditional face-to-face learning. This will allow teachers to determine how frequently they will apply assessment practices in both modular distance and face–to–face learning to increase the academic performance of the students.

2.0 Methodology

2.1 Research Design

This type of study used a survey and descriptive-correlational research design. The study used a survey research design to collect individual information and insights from each respondent. Also, it used a descriptive–correlational research design to describe the variables in the study, such as the extent of use of assessment practices and academic performance, and determine the relationship between these variables.

2.2 Research Participants

This study focused on grade 9 mathematics students who underwent Mathematics 8 through modular distance learning and students who pursued Mathematics 9 during the face-to-face learning approach. With a population of four hundred sixteen (416) Mathematics 9 students from 9 different sections of Junob National High School, it was narrowed down to a sample size of 200. The sample size 200 was calculated using Cochran's formula with a 5% margin of error. Respondents were selected using stratified sampling with sex – male and female – as the stratum. The researcher obtained consent from the parents of these respondents and consent from the Division of Dumaguete City before the survey was conducted.

2.3 Research Instrument

The primary tool that was used in this study was a standardized survey questionnaire adopted from Nyunt et al. (2019) in their research entitled Teachers' Perception on Classroom Assessment and Their Practices, which administered pilot testing to 30 teachers and had an internal consistency (Cronbach alpha) of 0.814 which meant that the instrument had high reliability to measure teachers' perceptions and their practices on classroom assessment. Furthermore, this study drew inspiration from Yan et al.'s (2022) research, which assessed teachers' strategies in formative assessment using the Teacher Formative Assessment Scale. The content of the survey questionnaire was based on sub-questions of the study's objectives. The questionnaire consisted of the respondents' demographic details – age and sex – and assessment practices used by the teacher during modular distance learning and face-to-face learning. In addition, it was divided into three parts: (a) Respondents' demographic data, which included sex and age, were gathered, (b) Assessment practices used by the teacher during the modular distance learning were obtained, and (c) Assessment practices used by the teacher in face-to-face learning were evaluated. The students' final grades in mathematics during the modular distance and face-to-face learning, which were handled confidentially and gathered from the teachers with the teachers' full cooperation and respondents' consent, were analyzed using the corresponding descriptors suggested by the Department of Education in their DepEd Order No. 8, s.2015.

2.4 Data Gathering Procedure

The survey questionnaires were distributed to 200 randomly selected Mathematics 9 students from the population of 416 Mathematics 9 students. The teacher's extent of use of mathematics assessment practices was based on the respondents' evaluation. Teachers' grading sheets were obtained with consent from the students to determine their academic achievement. The data collected was statistically analyzed, interpreted, and summarized using frequency count, means, weighted means, standard deviation, and percentages. The chi-square test was used to test whether the socio-demographic profile – sex and age – correlates significantly with the students' academic achievement. Also, Pearson's correlation was used to determine the relationship between the extent of use of assessment practices in modular distance learning and face-to-face learning and the students' academic achievement.

2.5 Ethical Considerations

The researchers provided printed consent forms to be signed by the respondents before conducting the research. The educational institution (DepEd) authorized study to be conducted in the classroom if it involved respondents under 18 and was done with the school's permission. Also, parents were given consent to submit the research before conducting it. All the study subjects, which include data derived from the systematic reviews of documents that may be deemed sensitive owing to racial, ethnic, religious, political, health, or sexual orientation, were kept confidential by the researcher. The data collected is meant for the study alone, and no unnecessary personal information was collected. Also, respondents were not forced to participate since the survey was voluntary. The researchers prevented information fraud and plagiarism by citing all possible sources used in the study.

3.0 Results and Discussion

3.1 Students' Demographic Data

The sample size comprised two hundred respondents. Figure 1 shows the frequency and percentage of the respondents—females and males—who responded to the survey. Among the participants, there is an equal percentage of 50% for both females and males. Ajai et al. (2015) contradict this result since they had a higher number of males than females; however, Anjum (2015), in his study, had a higher number of females than males. Table 1 reveals that the participants are within the age range of 14-18. Furthermore, 29.50% of the respondents are 14 years old, 60% are 15, 8.5% are 16, 0.50% are 17, and 1.5% are 18. Notably, the age with the highest percentage is 15, indicating that most respondents are 15. In their study, Thoren et al. (2016) had a larger sample of elementary-grade students than high school students. This result stands in stark contrast to the findings of this study, where most participants were 15 years old.

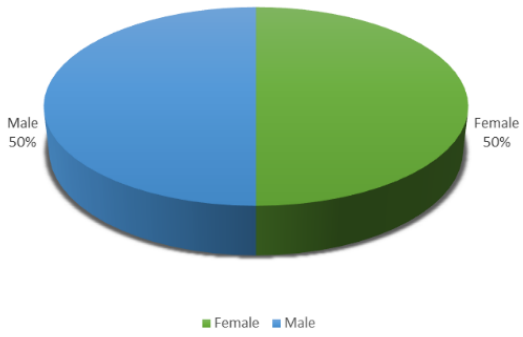

Figure 1. *Students' Sex*

Table 1. *Students' Age*

Age	Frequency	Percentage
14	59	29.50
15	120	60.00
16	17	8.50
17	1	0.50
18	3	1.50

3.2 Teacher's Extent of Use of Mathematics Assessment Practices

In Modular Distance Learning

As shown in Table 2, assessment for learning (formative assessment) obtained a group mean of 3.65 with a verbal description of "often." This means teachers learning modular distance practice formative evaluation often in their mathematics classes. Among the formative assessment practices, the most common practice used by the teachers is to give assignments to check the students' learning progress with a mean of 3.95 and a verbal description of "often." Teachers often give assignments during modular distance learning to check whether they learned something. However, the assessment practice that gained the lowest mean was providing feedback to point out students' strengths and weaknesses, with a mean of 3.21 and a verbal description of "sometimes." This implies that teachers sometimes provide feedback to the students to highlight their strengths and weaknesses; however, since giving feedback is a vital assessment practice, teachers must apply it to a greater extent. The findings of Nyunt et al. (2022) align with the outcomes of this study, where enhancing the learning process and class performance was prioritized among suggested assessment practices. In this study, learning processes were improved through assignments and feedback; a recommendation also echoed by Yan et al. (2022) in their assessment for learning practice.

Table 2. *Assessment for Learning (Formative Assessment)*

	Indicators	Mean	Interpretation
1	The teacher gives assignments that check students' learning progress.	3.95	Often
2	The teacher uses various assessment activities like daily quizzes, and collaborative activities to check the students' mastery of content.	3.83	Often
3	The teacher provides suggestions to improve students' performance.	3.75	Often
4	The teacher shares the learning objectives before starting the class/work.	3.50	Often
5	The teacher gives feedback to point out students' strengths and weaknesses.	3.21	Sometimes
Group Mean		**3.65**	**Often**

Legend:	**Scale**	**Verbal Description**
	4.21–5.00	Always
	3.41–4.20	Often
	2.61–3.40	Sometimes
	1.81–2.60	Rarely
	1.00–1.80	Never

As shown in Table 3, assessment as learning (self-assessment or peer assessment) obtained a group mean of 3.37, verbally describing "sometimes." This means that teachers, during modular distance learning, sometimes practice self-assessment or peer assessment in their mathematics classes. Among the self-assessment or peer-assessment practices, the most common practice used during modular distance learning is the teachers asking the students to identify strategies that will improve their work with a mean of 3.56 and a verbal description of "often." Teachers often ask their students for methods to improve their work during modular distance learning. However, the assessment practice that gained the lowest mean is the teachers asking the students to evaluate their peers' work, with a mean of 3.20 and a verbal description of "sometimes." Teachers sometimes ask their students to assess their peers' work. However, this assessment practice is also essential to let students check and evaluate their peers' work. The assertion that prioritizing assessment as a teaching tool is necessary to improve students' learning outcomes was bolstered by Nyunt et al.'s 2022 study. Their results highlighted the relationship between successful assessment procedures and overall student success and revealed the most helpful tactics in raising academic performance. The importance of focused improvements in these areas is further supported by the study's emphasis on a pattern that shows assessment techniques that give low-weighted means are associated with those strategies that acquire low means.

Table 3. *Assessment as Learning (Self-Assessment or Peer Assessment)*

	Indicators	Mean	Interpretation
1	The teacher asks the students to identify strategies that will improve their own work.	3.56	Often
2	The teacher asks the students to identify the strengths and weaknesses of their own work.	3.51	Often
3	The teacher asks the students to provide feedback to their peers to improve.	3.35	Sometimes
4	The teacher asks the students to give personal feedback on their own work.	3.25	Sometimes
5	The teacher asks the students to evaluate their peers' work.	3.20	Sometimes
Group Mean		**3.37**	**Sometimes**

As shown in Table 4, assessment of learning (summative assessment) obtained a group mean of 3.75 with a verbal description of "often." It means that the teachers during modular distance learning often practice summative assessment in their mathematics classes. The most common practice used by the teachers during modular distance learning is providing performance indicators and scoring rubrics with a mean of 3.97 and a verbal description of "often." Teachers often provide performance indicators and scoring rubrics during modular distance learning. However, the assessment practice that gained the lowest mean is that teachers evaluate the students' competence level with a mean of 3.82 and a verbal description of "often." Although this mean is the lowest, the teachers often use this assessment to evaluate the student's competence level during modular learning. Also, this implies that teachers must often assess the students' competence level and provide performance indicators and scoring rubrics to ensure and improve mathematics learning. Nevertheless, Nyunt et al. (2022) reported a contrasting outcome in their study. The assessment practices focused on assessing students' competence levels, secured the top ranking, and achieved the highest mean. Consequently, it can be inferred that, in their associated research, evaluating students' competence levels emerged as the prevalent assessment practice adopted by educators.

Table 4. *Assessment of Learning (Summative Assessment)*

	Indicators	Mean	Interpretation
1	The teacher provides performance indicators and a scoring rubric.	3.97	Often
2	The teachers make the final decision about the level of learning for students.	3.81	Often
3	The teacher measures the extent of learning.	3.69	Often
4	The teacher determines the desired learning outcomes.	3.67	Often
5	The teacher evaluates the level of competence of students.	3.82	Often
	Group Mean	**3.75**	**Often**

As shown in Table 5, the purpose of assessment practice that gained the highest group mean is assessment of learning (summative assessment), followed by assessment for learning (formative assessment). The assessment as learning (self-assessment or peer assessment) got the lowest weighted mean. However, the table clearly shows that the teachers apply varied assessment practices for three purposes in their mathematics classes during modular distance learning. The average of the group means of the extent of use of mathematics assessment practices in modular distance learning is 3.59, with the verbal description of "often," which means that, generally, the teacher often applied mathematics assessment practices in their mathematics classes during modular distance learning.

Table 5. *Purposes of Assessment Summary (Modular Distance Learning)*

	Indicators	Mean	Interpretation
1	Formative assessment	3.65	Often
2	Self-assessment or peer assessment	3.37	Sometimes
3	Summative assessment	3.75	Often
	Average	**3.59**	**Often**

Rofi'ah et al. (2021) emphasized that assessment methods like formative assessments must be implemented to improve student achievement and be oriented toward performance goals. These assessments include the practice of providing feedback. Gonzales (2023), in his study, revealed that 72% of the teachers used both formative and summative evaluations amidst the COVID-19 pandemic, and they maintained reliable and valid student assessments by providing capacity development and sustainable infrastructure.

In Face-to-face Learning

As shown in Table 6, assessment for learning (formative assessment) obtained a group mean of 4.12 with a verbal description of "often." The teachers often practice formative evaluation in their mathematics classes during face-to-face learning. The most common practice used by the teachers in their mathematics classes during face-to-face learning is using various assessment activities like daily quizzes and collaborative activities to check the students' mastery of content, with a mean of 4.30 and a verbal description of "always." This means that teachers always give various activities to check the students' mastery of lessons and activities. However, two assessment practices, teachers giving assignments that check students' learning progress and giving feedback to point out students' strengths and weaknesses, gained the lowest mean of 3.96 and a verbal description of "often." Although these two gain the lowest mean, their verbal description "often" still implies that teachers often apply these assessment practices. Both teachers give assignments that check students' learning progress and provide feedback to point out students' strengths and weaknesses, respectively. Teachers must

also strengthen the extent of use of these two practices to ensure that misconceptions about the lessons will be addressed. In their 2022 study, Nyunt et al. endorsed the present study's findings, particularly emphasizing the significance of assessment practices that enhance the learning process and class performance. Notably, the study identified that such practices ranked first in their research and can be effectively implemented through diverse assessment activities, including daily quizzes and collaborative tasks, to gauge mastery.

Table 6. *Assessment for Learning (Formative Assessment)*

	Indicators	Mean	Interpretation
1	The teacher uses various assessment activities like daily quizzes and collaborative activities to check the students' mastery of content.	4.30	Always
2	The teacher shares the learning objectives before starting the class/work.	4.21	Always
3	The teacher provides suggestions to improve students' performance.	4.17	Always
4	The teacher gives assignments that check students' learning progress.	3.96	Often
5	The teacher gives feedback to point out students' strengths and weaknesses.	3.96	Often
	Group Mean	4.12	Often

As shown in Table 7, assessment as learning (self-assessment or peer assessment) obtained a group mean of 3.92 with a verbal description of "often." The teachers often practice self-assessment or peer assessment in their mathematics classes during face-to-face learning. The most common practice used by the teachers during face-to-face learning is to ask the students to identify the strengths and weaknesses of their work with a mean of 4.02 and a verbal description of "often." Teachers often let students identify their strengths and weaknesses to improve their work. However, two assessment practices, teachers asking the students to give personal feedback on their work and to evaluate their peers' work, gained the lowest mean of 3.85 and a verbal description of "often." Although these two got the lowest mean, their verbal description implies that teachers often use these assessment practices with their students to give feedback on their work and the work of their peers. Nyunt et al. (2022) backed this study by endorsing the top-ranking assessment practice of determining how students can learn. This practice, which aligned with students' identifying strengths and weaknesses to enhance learning, received primary support in their research. However, their study revealed that providing feedback on students' work was the second most common assessment practice to enhance student learning, contrasting with the findings of this study, where it ranked last.

Table 7. *Assessment as Learning (Self-Assessment or Peer Assessment)*

	Indicators	Mean	Interpretation
1	The teacher asks the students to identify the strengths and weaknesses of their own work.	4.02	Often
2	The teacher asks the students to identify strategies that will improve their own work.	3.99	Often
3	The teacher asks the students to provide feedback to their peers to improve.	3.91	Often
4	The teacher asks the students to give personal feedback on their own work.	3.85	Often
5	The teacher asks the students to evaluate their peers' work.	3.85	Often
	Group Mean	**3.92**	**Often**

As shown in Table 8, assessment of learning (summative assessment) obtained a group mean of 4.18 with a verbal description of "often." Teachers often used summative assessments in their mathematics classes during face-to-face learning. The most common assessment practice teachers use in their mathematics classes during face-to-face learning is providing performance indicators and scoring rubrics with a mean of 4.36 and a verbal description of "always." Mathematics teachers always provide performance indicators and scoring rubrics during face-to-face learning. However, evaluating the students' competence level, the assessment practice obtained the lowest mean of 4.18 and a verbal description of "often." This implies that, although it has the lowest mean, its verbal description means that teachers often evaluate the students' competence level. In their 2022 study, Nyunt et al. contradicted the outcomes of the present study, wherein the top-ranking assessment practice – evaluating the level of competence – occupied the last position in their investigation.

Table 8. *Assessment of Learning (Summative Assessment)*

	Indicators	Mean	Interpretation
1	The teacher provides performance indicators and scoring rubrics.	4.36	Always
2	The teacher makes the final decision about the level of learning for the students.	4.25	Always
3	The teacher measures the extent of learning.	4.12	Often
4	The teacher determines the desired learning outcomes.	4.10	Often
5	The teacher evaluates the level of competence of the students.	4.08	Often
	Group Mean	4.18	Often

As shown in Table 9, the purpose of assessment practice that gained the highest group mean is the assessment of learning (summative assessment), followed by the assessment for learning (formative assessment). The assessment as learning (self-assessment or peer assessment) got the lowest weighted mean. However, the table shows that teachers apply varied assessment practices in their mathematics classes during face-to-face learning for three purposes. The average of the group means of the extent of use of mathematics assessment practices in face-to-face learning is 4.08, with the verbal description of "often," which means that the teacher often applied mathematics assessment practices in face-to-face learning.

Table 9. *Purposes of Assessment Summary (Modular Distance Learning)*

	Indicators	Mean	Interpretation
1	Formative assessment	4.12	Often
2	Self-assessment or peer assessment	3.85	Often
3	Summative assessment	4.18	Often
	Average	**4.08**	**Often**

In his 2021 study, Karaman identified a positive impact of assessment practices, particularly formative assessment, on student learning in face-to-face educational settings. He recommended that enhancing assessment practices could further contribute to student learning. Similarly, Ngunjiri's 2022 study underscored the significance of educators employing mathematics assessment practices to improve their students' academic performance.

3.3 Students' Academic Performance based on Their Final Grade in Mathematics

The first column of the table indicates the range of the respondents' final grades during modular distance learning. Among the respondents, Table 10 shows that 35% of the respondents got a final grade in mathematics ranging from 75 to 79 with a verbal description "fairly satisfactory" and a mean of 76.90; 37% of the respondents got a final grade of 80–84 in mathematics with a verbal description "satisfactory" and mean of 81.05; 13% of the respondents got 85–89 with a verbal description "very satisfactory" and mean of 86.54; and 15% of the respondents got 90–100 with a verbal description of "outstanding" with a mean of 92.33.

Table 10. *Students' Academic Achievement in Modular Distance Learning*

Range of Final Grades	Verbal Description	Frequency	Percent	Mean	Grand Mean	Verbal Description	SD
75–79	Fairly satisfactory	70	35	76.90	82.01	Satisfactory	5.51
80–84	Satisfactory	74	37	81.05			
85–89	Very satisfactory	26	13	86.54			
90–100	Outstanding	30	15	92.33			
Total		**200**	**100**				

The grand mean of the students' final grades in mathematics during modular distance learning is 82.01, with a standard deviation of 5.51. This shows that the students have garnered final grades with "satisfactory" verbal equivalence in mathematics. Aksan (2021), in her study, revealed that modular distance learning positively affected students' performance. Students performed very satisfactorily in mathematics, which means they performed well. Salapuddin (2021) in his study added that modular distance learning significantly affected the students' academic achievement in mathematics.

The first column of the table indicates the range of the final grades of the respondents in mathematics during the face-to-face learning. Among the respondents, Table 11 shows that 27.5% of the respondents got a final grade of 75–79 in mathematics with a verbal description of "fairly satisfactory" and a mean of 77.38; 37.5% of the respondents got 80–84 with a verbal description "satisfactory" and a mean of 81.89; 27.5% of the respondents got 85–89 with a verbal description of "very satisfactory" and mean of 86.82; and 15% of the respondents got 90–99 with a verbal description of "outstanding" and a mean of 91.87.

The grand mean of the students' final grades in mathematics during face-to-face learning is 82.76, with a standard deviation of 4.58. Thus, it means that students in face-to-face learning have gained satisfactory levels in their mathematics grades. Cano's (2022) research disclosed that students' academic performance in face-to-face learning was generally deemed proficient. Similarly, Dakwar's (2022) study on high school students found that they also attained proficient academic performance in mathematics under the same learning modality.

Table 11. *Students' Academic Achievement in Face-To-Face Learning*

Range of Final Grades	Verbal Description	Frequency	Percent	Mean	Grand Mean	Verbal Description	SD
75–79	Fairly satisfactory	55	27.5	77.38			
80–84	Satisfactory	75	37.5	81.89			
85–89	Very satisfactory	55	27.5	86.82	82.76	Satisfactory	4.58
90–99	Outstanding	15	7.5	91.87			
Total		**200**	**100**				

3.4 Student Academic Achievement and Students' Demographic Profile

Table 12 shows the relationship between the students' academic achievement in mathematics and sex in modular distance learning and the students' demographic profiles based on sex. The value of X2 is 37.4 with a p-value of 0.01, prompting the decision to "reject H0" and denote significance. This indicates a significant relationship between students' academic performance in mathematics and their sex in modular distance learning. Moreover, it suggests that students' academic achievements in mathematics are influenced by their demographic profiles, specifically their sex. In addition, this study reveals that males show higher academic achievements in mathematics compared to females in modular distance learning. Armah et al. (2020) concurred with the present results, indicating significant differences in mathematics achievement between male and female distance learners, with males achieving higher grades than females. Conversely, Tsaousis et al. (2022) contradicted these observations, reporting that females outperformed males in their study.

Table 12. *Students' Academic Achievement and Sex in Modular Distance Learning: Chi-square Test*

Variables	X^2	p	n	Decision	Remark
Academic Achievement and Sex	37.4	.010	200	Reject H_0	Significant

Table 13 shows the relationship between the students' academic achievement in mathematics in modular distance learning and the students' demographic profiles based on age. The correlation between the student's academic achievements in mathematics is -0.16 and has a p-value of 0.02, which leads to the decision to "reject H0" and remark "significant". This further denotes a significant, negative weak relationship between the student's academic achievement in mathematics in modular distance learning and the student's age. Also, it implies that the educational achievement in mathematics of the students in the younger age bracket is slightly higher. Wang et al. (2023) support the present results, revealing in their study an association between students' age and mathematics achievement. This contrasts with Thoren et al.'s (2016) findings, which indicated that relatively older students outperform relatively younger students academically.

Table 13. *Students' Academic Achievement and Age in Modular Distance Learning Correlation*

Variable	r	p	n	Decision	Remark
Academic Achievement and Age	-.16	.020	200	Reject H_0	Significant

Level of significance = 0.05

The data found in Tables 12 and 13 clearly shows that the students' academic achievement in mathematics in modular distance learning and the students' demographic profile regarding sex and age have a significant relationship. It can affect their academic achievement in mathematics. Moliner et al. (2022) generally supported these findings in their study, which reported an overall negative effect size of -2.32 on academic achievement and students' demographic profiles. Hammerstein et al. (2021) claim that modular distance learning during school closures negatively affected pupils' academic performance, especially regarding their demographics. Even though both studies point out this negative impact, it implies that a student's demographic profile, including age and sex, influences their academic performance in mathematics.

Table 14 shows the relationship between the students' academic achievement in mathematics and sex in face-to-face learning and the students' demographic profile based on sex. The value of X2 is 31.1 with a p-value of 0.04, leading to the decision to "reject H0." This further denotes a significant relationship between students' academic achievement in mathematics and sex in face-to-face learning. Also, it implies that the student's academic achievement in mathematics in face-to-face learning depends on the student's demographic profile based on sex. In addition, results show that males have higher academic achievement in mathematics than females in face-to-face learning. Kaiser and Zhu (2022) supported the current findings after discovering that boys scored higher than girls in mathematics tests. However, in their study, Ajai et al. (2015) revealed that male and female students

did not significantly differ in achievement and retention scores and could compete and collaborate in mathematics.

Table 14. *Students' Academic Achievement and Sex in Face-To-Face Learning: Chi-square Test*

Variables	SD	X^2	p	n	Decision	Remark
Academic Achievement and Sex	4.58	31.1	.040	200	Reject H_0.	Significant

Table 15 shows the relationship between the students' academic achievement in mathematics in face-to-face learning and the students' demographic profile based on age. The correlation between the student's academic achievement in mathematics is -0.0004 and has a p-value of 0.96, which leads to the decision to "fail to reject H0" with the remark "not significant." This means that the null hypothesis is accepted. Further, there is no significant relationship between the student's academic achievement in mathematics and face-to-face learning, and the student's age. Also, it implies that age does not affect the student's academic achievement in mathematics in face-to-face learning. Thoren et al. (2016) opposed the current findings of this study, which revealed that relative age affects mathematics achievement, with older students performing better than younger ones. However, Peña (2017) reported that the difference in test scores only reflected maturity differences and that the younger students were less affected by the learning of the older students.

Table 15. *Students' Academic Achievement and Age on Face-To-Face Learning Correlation*

Variable	r	P-value	n	Decision	Remark
Academic Achievement and Age	-.00	.960	200	Fail to reject H_0.	Not significant

Level of significance = 0.05

The data found in Tables 14 and 15 clearly shows that the students' academic achievement in mathematics in face-to-face learning and their demographic profile based on sex have a significant relationship, affecting their academic achievement in mathematics. However, the student's academic achievement and demographic profile based on age have no significant relationship. Additionally, it implies that age does not affect the student's academic achievement during face-to-face instruction. El Refae et al. (2021) support the current study's results by revealing that demographic characteristics significantly impacted students' academic performance in face-to-face learning. Hanafi et al. (2016) further supported this by asserting a significant positive correlation between demographic factors like age and sex and the students' academic achievement.

3.5 Students' Academic Achievement and the Extent of Use of Mathematics Assessment Practices

Table 16 shows the relationship between the students' academic achievement in mathematics and the extent of use of mathematics assessment practices in modular distance learning. The correlation between the student's academic achievement in mathematics and the extent of use of mathematics assessment practices in modular distance learning is 0.35. It has a p-value of <0.001, which leads to the decision to "reject H0" and remark "significant." This further denotes a significant relationship between the student's academic achievement in mathematics and the extent of use of mathematics assessment practices in modular distance learning. Also, it implies a positive weak correlation between the extent of use of mathematics assessment practices in modular distance learning and the students' academic achievement. Although the extent of use of these assessment practices has increased, the students' academic achievement also tends to increase; however, this relationship is not very strong. This implies that there is only a weak positive impact of the extent of using assessment practices on the students' academic achievement in mathematics.

Table 16. *Correlation between Students' Academic Achievement and the Use of Mathematics Assessment Practices in Modular Distance Learning*

Variables	r	p	Decision	Remark
Students' academic achievement in mathematics Extent of use of mathematics assessment practices on modular distance learning	.35	< 0.001	Reject H_0.	Significant

Level of significance = 0.05

Kultur et al. (2021) supported these current findings after discovering that the effect of formative assessment practices on mathematics achievement was statistically significant. In addition, Jalava (2021) supported his study after he observed that students obtained lower summative scores than expected, leading to lower mathematics achievement. He added that the results showed considerable implications for the students' mathematics achievement.

Table 17 shows the relationship between the students' academic achievement in mathematics and the extent of use of mathematics assessment practices in face-to-face learning. The correlation between the student's academic achievement in mathematics and the extent of use of mathematics assessment methods in face-to-face learning is 0.21. It has a p-value of 0.003, which leads to the decision to "reject H0." This further denotes a significant relationship between the student's academic achievement in mathematics and the extent of the use of mathematics assessment practices in face-to-face learning. Also, it implies a positive weak correlation between the extent of use of mathematics assessment practices in face-to-face learning and the students' academic achievement. Although the extent of use of these assessment practices has increased, the students' academic achievement also tends to increase; however, this relationship is not very strong. This implies that there is only a weak positive impact of the extent of using assessment practices on the students' academic achievement in mathematics.

Table 17. *Correlation between Students' Academic Achievement and the Use of Mathematics Assessment Practices Face-To-Face Learning*

Variable	r	p	Decision	Remark
Students' academic achievement in mathematics The extent of use of mathematics assessment practices in face-to-face learning	.21	.003	Reject H_0	Significant

Level of significance = 0.05

Chemeli (2019) supported these findings in his study by revealing that assessment for learning in the form of formative assessments positively impacted learners' achievement and improved learners' acquisition of problem-solving skills. Also, Omar et al. (2018) revealed that assessment as learning in the form of self-assessment and peer assessment positively impacted the students' academic performance. Marinho et al. (2017) added in their study that assessment of learning using summative assessment supports learning and academic success. This means that assessment methods in three forms – assessment for learning, assessment as learning, and assessment of learning – positively impact the student's academic achievement in mathematics.

3.6 Comparison between Extent of Use of Mathematics Assessment Practices in Modular Distance Learning and Face-to-Face Learning

Table 18 shows the statistical difference between the extent of use of mathematics assessment practices in modular distance learning and the extent of use in face-to-face learning. The mean of the extent of use of mathematics assessment practices in modular distance learning is 3.58, with a standard deviation of 1.25. The mean of the extent of use of mathematics assessment practices in face-to-face learning is 4.11, with a standard deviation of 1.05. The t-statistic between the extent of use of mathematics practices in modular distance learning and the extent of use of mathematics assessment practices in face-to-face learning is 14.5 and has a p-value of <0.001, which leads to the decision to "reject H0." This further denotes a statistically significant difference between the extent of use of mathematics assessment practices in modular distance learning and the extent of use in face-to-face learning. Also, it implies that the extent of use of mathematics assessment practices in modular distance learning is reliably different from that of mathematics assessment practices in face-to-face learning.

Table 18. *Difference in the Use of Applying Mathematics Assessment Practices in Modular Distance Learning and Face-To-Face Learning*

Extent of Use of Mathematics Assessment Practices	Mean	SD	t	p	Decision	Remark
Modular distance learning	3.58	1.25	14.5	< .001	Reject H_0	Significant
Face-to-face learning	4.11	1.05				

Level of significance = 0.05

Nyunt et al. (2019) did not support the existence of variations in the assessment methods used, which runs counter to these findings. According to their research, most educators instead employed comparable evaluation methods, such as formative, summative, and peer or self-assessment. Additionally, Gonzales (2023) highlighted in his study that 99% of teachers changed their methods for evaluation. Seventy-two percent of them said they used both formative and summative assessments. However, Kemp et al. (2014) found no significant difference in the students' test performance in both modalities, which means that whatever modality is used in assessment can lead to similar levels of student performance.

4.0 Conclusion

The data analysis shows 50% males and 50% females in the 200-sample size. Most respondents, accounting for 60%, fall under 15. Furthermore, teachers consistently implemented mathematics assessment practices in modular distance and face-to-face learning settings. Also, students have garnered final grades with a "satisfactory" verbal equivalence in mathematics in both modular distance and face-to-face learning. In the context of modular distance learning, the findings indicate a significant relationship between academic achievement and sex, with males demonstrating higher achievement levels than females. Additionally, a significant negative relationship exists between educational attainment and age, suggesting that younger individuals tend to achieve higher results. Furthermore, the results reveal a weak positive correlation between the extent of use of assessment practices and academic achievement in mathematics.

The results show a strong correlation between sex and academic achievement in face-to-face learning, with males outperforming females. However, there is no discernible correlation between age and kids' academic performance in mathematics, indicating that age has no bearing on academic success. Additionally, the results reveal a weak positive correlation between the extent of use of assessment practices in mathematics. Lastly, there is a significant statistical difference between the extent of use of mathematics assessment practices in modular distance learning and face-to-face learning. Also, it implies that the extent of use of these assessment practices in modular distance learning is reliably different from face-to-face learning.

5.0 Contributions of Authors

The authors confirm their equal contribution to every part of this research. All authors reviewed and approved the final revision of the paper.

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7.0 Conflict of Interests

All authors declared that they have no conflicts of interest as far as this study is concerned.

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