

Attitude and performance of the Grade 9 students in Mathematics of in-flip classrooms

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ABSTRACT

This research assessed the attitude and performance of Grade 9 students in Mathematics through in-flip classrooms at the identified public high schools in Bogo City Division for the school year 2022-2023 as a basis for a proposed math performance enhancement plan using a descriptive correlational research design. The respondents selected through simple random sampling were 99. The data gathered were treated using frequency counts, percentages, weighted means, and Pearson's *r*. Results revealed that the majority of respondents were female, mostly 14 years old, and had parents who were elementary graduates with a combined monthly income of 10,000 or below. The students performed very satisfactorily in Mathematics. The respondents have a positive attitude toward mathematics in terms of their confidence in learning Mathematics and behavior toward success, but a negative attitude in terms of anxiety towards Mathematics. The test of the relationship between the three variables and the level of respondents' attitude toward mathematics in the in-flip classrooms showed that all three variables are significantly related to academic performance. The researchers further recommended that the teachers adopt the math performance enhancement plan to enhance the attitudes and performance of the respondents in math, and the effectiveness of the in-flip classroom must be considered.

Keywords: Teaching Mathematics, attitudes, academic performance, in-flip classrooms, descriptive-correlational, Bogo City, Cebu, Philippines.

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INTRODUCTION

For more than a year, the pandemic prevented students from attending face-to-face lessons and making new friends, so they now have the opportunity to reap the benefits of attending school. All regions with minimal risk of coronavirus began holding on-site classes after staying at home for almost 2 years. Despite the challenges posed by the pandemic, the

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Department of Education, together with other agencies and partners in implementing education, made modest progress in reinstating face-to-face classes.

A big challenge in teaching was in the teachers' hands. Almost all schools adopted modular distance learning to ensure continuity of learning. And this kind of approach lasted for almost two years. However, selected schools implemented face-to-face learning starting in the second week of November. All of them followed the safety protocols as required by the government. This pilot implementation provided all institutions with knowledge and experience in conducting face-to-face classes while adhering to safety protocols to prevent the spread of COVID-19.

The pandemic had also changed students' behavior due to limited face-to-face interaction. The teacher must work hard to maintain each student's interest, drive, and knowledge. To achieve this goal, numerous inclusive teaching strategies are available. Peer tutoring is a cooperative technique in which students work in pairs or small groups to provide explicit instructional support. Regarding technology use, modern educators can make the most of the Internet to implement blended learning, combining online and face-to-face instruction. Then, the "flipped classroom," a sort of blended learning, was established.

The so-called "in-class flip" has received little attention despite the fact that the flipped classroom has been extensively researched. The teachers "flip" the classroom in a modified version of the classic flipped classroom model. This version is appropriate for teachers who work in remote locations, particularly when they lack control over the reliability of their internet connection, the availability of their tools, and the level of digital literacy of each student at home. As a result of numerous engaging technology-based classroom activities, the flipped version may also increase students' motivation and interest in learning. Because they can observe students as they learn, teachers can also benefit from the in-class flip.

As educators, the researchers never cease to improve their teaching to ensure students' learning by trying out various approaches that may work for others and staying up to date with current trends in education, while keeping students' learning styles in mind. That is why the researcher conceptualized this study. This research study is conducted to assess the impact of the in-flip model on the mathematical performance and behavior of the Grade 9 students towards mathematics during the limited face-to-face classes in the City of Bogo Science and Arts Academy.

Statement of the problem

The research assessed the attitudes and performance of Grade 9 students in Mathematics in flipped classrooms at the identified public high schools in the Bogo City Division for the school year 2022-2023 as a basis for a math performance enhancement plan.

Specifically, this study sought to answer the following questions:

1. What are the characteristics of the respondents in terms of gender, age, parents having the highest level of education, and monthly income of the entire family?
2. What is the level of attitude toward Mathematics of the participants in the in-flip classrooms in terms of confidence in learning Mathematics, attitudes toward success in Mathematics, and anxiety towards Mathematics?
3. What is the math proficiency level of the Grade 9 students in the in-flip classrooms?
4. Is there a significant correlation between the attitudes of the respondents and their academic performance in-flip classrooms?
5. Based on the findings of the study, what math performance enhancement plan can be proposed?

METHODOLOGY

Research design

The study utilized a descriptive-correlational research design to examine the relationship between respondents' attitudes and performance in Mathematics, as well as the extent of that relationship. A correlational study sought to ascertain relationships between two or more variables. The findings of a correlational study enabled researchers to determine whether two variables were associated and the extent of that association.

Locale of the study

The researchers conducted the study in the City of Bogo Science and Arts Academy and Jovencio N. Masong National High School in the Division of the City of Bogo.

The City of Bogo Science and Arts Academy (CBSAA) is an integrated public school with an Elementary and Junior High School housed in the old municipal hall in St. Joseph Village, Cogon, Bogo City, and a Senior High School temporarily located at Bogo Central School 1. It was founded by the former mayor to provide a special school for the gifted in the Arts and the Sciences in the Bogo locale. JNMNHS is also a public secondary school in the two most densely populated barangays in the City of Bogo. It began its operation in the school year 2000 – 2001 with two teachers and one school caretaker handling the different subjects in two sections of the first year. The following year, there was 40% increase in student population.

Respondents of the study

This study selected Grade 9 students from the identified public high schools in Bogo City Division for the school year 2022-2023. They were fit with the study since they started junior high school during the pandemic, and their learning modality is blended learning. Both identified schools offer a science curriculum and are the chosen respondents for this study.

Selection and description of respondents

The study used a universal sampling technique to select 99 Grade 9 students, in which an in-flip classroom approach was used to teach Mathematics.

Data gathering instruments

The questionnaire was adapted from the Fennema-Sherman Attitude Scale (1976) and modified to assess attitudes toward mathematics in the flipped classroom. It consisted of a 30-item scale with three sub-scales, namely: confidence in learning Mathematics subscale, attitude toward success in Mathematics subscale, and Mathematics anxiety Subscale. The Mathematics anxiety subscale was intended to measure feelings of anxiety, dread, nervousness, and associated bodily symptoms related to doing mathematics. The behavior toward success in the Mathematics subscale aimed to measure students' beliefs about success in learning mathematics. The confidence in learning Mathematics subscale was intended to measure the confidence in one's ability to learn and to perform well on mathematical tasks.

Data gathering procedures

The researchers sent an approval sheet to the school principal and the respondents' parents. Informed consent was also obtained from the selected respondents prior to the orientation, during which the study's significance and the questionnaire's content were discussed. In addition, the steps involved in implementing the in-flip classroom were discussed.

After their approval, the adapted survey questionnaire was distributed to the respondents through their adviser, and every instrument was retrieved after the respondents had completed their responses.

Once the information was gathered, the researchers tabulated, presented, and interpreted it using appropriate statistical tools to inform the crafting of the findings, conclusion, and recommendations. A Mathematics performance enhancement plan was also developed as the study's output.

Data analysis procedure

After retrieving the questionnaires and gathering the results, the data were tabulated, compiled, analyzed, and interpreted using frequency counts, means, and standard deviations to compute the level of attitude towards Mathematics, including confidence in learning Mathematics, attitude towards success in Mathematics, and anxiety towards the Mathematics subject. In addition, the Pearson's r test was used to determine if a significant relationship existed on the level of attitudes of the Grade 9 towards Mathematics in the in – flip classroom, academic performance, and level of attitudes in terms of confidence in learning Mathematics, attitude toward success in Mathematics, and anxiety towards the Mathematics subject.

RESULTS AND DISCUSSION

Demographic profile of the respondents

The profile of the respondents, based on the gathered data, was the age group, gender, parents' highest level of education, and the highest monthly income for the entire family.

The results revealed that 54 of 99 respondents were female students, constituting 54.55 percent, and 45.45 percent were male students. In terms of age, 38.38 percent of the female students were 14 years old, followed by 13.13 percent who were 15 years old. Moreover, only 3.03 percent were 13 years old, and none were 16 years old or older. For males, 20.20 percent of respondents were aged 14, almost the same as those aged 15. This implies that most of them had entered school at the proper age requirement by DepEd, and they are fit with the competencies intended for their level. According to Douglas et al. (2020), age played a moderating role in the relationship between gender and deep learning, consistent with prior studies. Additionally, gender emerged as a significant predictor of achievement in both samples, with women exhibiting superior performance compared to men.

Regarding the highest educational attainment among the respondents' parents, the majority were elementary school graduates (23.23%), followed by college graduates (21.21%) and high school graduates (15.15%). Furthermore, parental educational attainment provides a foundation that supports children's academic success indirectly through the beliefs and expectations parents hold for their children, as well as the cognitive stimulation they provide in and out of the home environment, which considers the intergenerational contributions and dynamic transactions within families that are important considerations for informing potential avenues for intervention (Kean et al., 2020).

In terms of the family income of both parents of the respondents, the majority have a monthly income of 10,000 and below (67.68%), 15,001 – 20,000 (13.13%), and earnings above 30,000 (8.08%). The academic achievement of children from low-income families is significantly impacted. The struggle to educate their children is common in low-income families. Several factors, including wealth and income, can influence how well students do in school. When educational services require payment, or when there are significant transportation and other expenditures, affordability and accessibility are directly affected by income. Compared with high-income students, low-income students have generally outperformed them on most academic performance metrics (Studocu, 2018).

Level of respondent's attitude towards Mathematics in in- flip classrooms

More confident learners are more eager to challenge themselves, learn new things, and are more resilient during transitions such as switching schools. This is especially true for essential disciplines like English, Math, and Science, where learners' progress is positively impacted by confidence over the long term.

Confidence in learning

Self-confidence was one of the influential factors that was unrecognized regarding students' mathematics achievement. Some studies have shown that students' self-confidence in learning Mathematics influences academic achievement. Thus, self-confidence is believed to improve students' achievement in learning mathematics (Kunhertanti et al., 2018).

The results revealed that respondents manifested a more positive outlook toward Mathematics in the in-flip classrooms, with eight (8) positively worded items receiving positive responses; such as they felt secure about learning Mathematics, confident in learning Mathematics, learned Mathematics more using the in-flip class model, and through the in-flip classroom they could do advanced work in Mathematics because they handle my time in answering the exercises. However, two of the items were rated negatively by the respondents, such as the students' lack of confidence in doing well in Mathematics and their view that it is not their best subject. Children must have confidence in their ability to comprehend and learn math. The result is supported by Dance et al. (2018), who found that teachers need to encourage students to develop mathematical self-assurance. This growth-mindset trait includes the ability to persevere, accept criticism well, take calculated risks, and be self-reliant.

Behavior towards success

Achieving quality education depends on developing a proactive, positive behavior toward the subject, rather than just memorizing formulas and solving equations. Being a successful learner starts with having a positive behavior towards learning. Students with a favorable outlook on math exhibit a strong drive for mathematics and a propensity to engage in math-related activities (Hwang & Son, 2021).

The data indicate that the respondents strongly agreed that knowing Mathematics will help them earn a living, with a mean of 3.30. Students believed that Mathematics had been a part of their lives since they were young, that they would keep it with them for as long as they were alive, and that it was a positive factor in success in learning across all items in this indicator. The results revealed that students chose to study Mathematics because they recognized its importance in achieving their objectives and in their future success in reading.

The results conform to Prasanna (2021), which states that one of the most important subjects in our lives is mathematics, which enables students to make wiser decisions in daily life, and that knowledge of math makes life easier. Since mathematics is associated with the financial industry, even clients should be familiar with it. In addition, these behaviors are developed in and outside of school, and learning behaviors help with understanding and managing emotions, establishing and maintaining positive relationships, and making responsible decisions, which are essential life skills (Howard County Public School System, 2020).

Anxiety towards mathematics

Many students believe that mathematics is a difficult subject to learn and get proficient in in the classroom. The condition known as mathematics anxiety is one of the major causes of students' troubles learning mathematics. (Siaw et al., 2020). An unpleasant emotional response to mathematics known as "math anxiety" can be quite crippling. It is described as a state of stress and anxiety that prevents people from manipulating numbers and figuring out mathematical equations in real-world and academic contexts. (Brooks, 2020). Math anxiety can be caused by a fear of making mistakes, early bad experiences, or social pressure to be mathematically proficient.

The level of respondents' attitude toward Mathematics in the in-Flip classrooms in terms of anxiety towards Mathematics, revealed that most respondents responded negatively such as Mathematics is hard for them (2.83), students feel bad when they think of trying hard Mathematics problems (2.75) and students cannot focus, think and not clearly understood when working Mathematics problem (2.70).

The results implied that students do not really like answering the assessment in their Mathematics activity and feel uneasy and uncertain with the Mathematics subject. Thus, a student may perform poorly in mathematics because they are nervous about it, rather than because of math anxiety. Numerous aspects of learning, such as attention, memory, and processing speed, can be affected by worry, according to decades of research. The results of this study are similar to those of Gearty (2022), who found that Math anxiety can significantly impair memory, a crucial neurodevelopmental process required for math. This is due to the brain's increased focus on managing stress rather than on processing information, which reduces the amount of active working memory available for mathematical tasks.

Level of academic performance of the respondents in mathematics

Academic performance was important for students as a result of their experiences, representing knowledge, skills, and attitudes. Academic performance becomes one of the key factors in determining students' success in their future careers (Mappadang et al., 2022).

The level of the respondents' academic performance in the first quarter is measured by the knowledge and skills students gained from the teaching method and interventions provided by the teacher. The results revealed that the majority of the respondents were at the outstanding level in terms of academic performance (36.36%), excellent performance (29.29%), and very satisfactory level (12.12%). Despite the pandemic that brought a great impact on the students, they still maintained their good grades in Mathematics, and with the help of the in-flip classroom. The Department of Education gave recognition to those students who have attained an average of 90 to 94, belonged to With Honors, 95 to 97 belonged to With High Honors, and the students who can attain a grade of 98 to 100 are considered as With Highest Honors (DepEd Order No. 8, s. 2015).

Test of significant relationship between the attitudes and academic performance of the respondents

The test of the significant relationship between students' attitudes and academic performance is relevant to the academic institution. Academic success is correlated with attitudes toward education and learning. Students who perform poorly in school have a more negative attitude toward learning and think that education will not help them succeed in the future.

Using the Pearson product-moment correlation test to test the significant relationship between confidence in learning Math and academic performance, the result shows a p-value of 0.000, which is less than 0.05, suggesting a significant relationship between the two variables and thereby rejecting the null hypothesis. Therefore, there is a significant relationship between confidence in learning Math and academic performance. The finding was supported by the study by Akbari et al. (2020), which found that while the majority of students were quite confident, some had low self-confidence. Additionally, students' self-confidence affected their learning through participation, goal-setting, developing an interest in the material, reducing anxiety, feeling at ease around teachers and classmates, and sharing their thoughts in class. Based on the low and high levels of students' self-confidence, they found that self-confidence affected students' academic performance and revealed significant differences in the academic results of students with either low or high self-confidence (Lone, 2021).

Regarding the relationship between behavior towards success and academic performance, a p-value of 0.000 or less than 0.05 indicates rejection of the null hypothesis and therefore a significant relationship. As Bakana (2022) concluded in his study, a student's personality traits or behavior were significantly related to academic performance. Accordingly, students with bad behavior recorded the lowest marks, while students with good behavior recorded high performance.

Lastly, results revealed that there is a significant relationship between anxiety and academic performance, with a p-value of 0.000, which is less than 0.05. Similarly, the researcher rejects the null hypothesis and therefore concludes. Student success may be affected by the range of emotions students experience in response to classroom activities and achievement outcomes. Anxiety is a feeling that some students experience, and it can have a detrimental effect on persistence and performance (England et al., 2019).

CONCLUSION

Based on the study's findings, it can be concluded that the level of respondents' attitudes toward mathematics in the in-flip classrooms have a bearing on their academic performance in Mathematics. Thus, their attitudes in the in-flip classrooms are the reason for better performance in Mathematics. Even though they were in the adjustment period from modular to face-to-face learning, they maintained positive attitudes towards Mathematics through the in-flip classrooms. Accordingly, students with bad behavior recorded the lowest marks, while students with good behavior recorded high performance. Some of the respondents' profiles could also be considered factors that affect their academic performance in school.

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