RELATIONSHIP OF LEARNERS' ATTITUDE TOWARDS SCIENCE AND DISTANCE LEARNING TO ACADEMIC PERFORMANCE IN SCIENCE

JUDELYN CATALAN
SPAMAST, Institute of Professional and Graduate School

Corresponding Authors: judelyn.catalan@deped.gov.ph

ABSTRACT

Article History

Received: 15 February 2020
Revised: 12 June 2020
Accepted: 22 October 2020
Published: 30 January 2021

Keywords— Attitudes, Science, distance learning, academic performance, SPAMAST

The main objective of the study was to determine the relationship between learners' attitudes toward science and distance learning to academic performance in Science. The study was conducted using the descriptive-correlational research design. The respondents were Grade 4 pupils of 16 elementary schools in Malita, Davao Occidental. Data were tabulated using percentages, mean, T-test, ANOVA, and Spearman's Rank-Order Correlational Analysis. Adapted research questionnaires were utilized to gather learners' attitudes toward science and learners' attitudes toward distance learning. Results revealed that most of the respondents were male. Most of the learners were in the age range of 9-10 years old and did not belong to any ethnic groups. The learners had a very good attitude towards Science, with a total mean of 3.97, and their attitude towards distance learning was most of the time observed with a 3.84 total mean, which indicates a positive attitude towards distance learning modality. A significant difference was found in the learners' attitudes toward Science when grouped according to age, gender, and ethnicity. There was a significant relationship between learners' attitude towards Science and their academic performance in Science, and it was also found that there was a slight positive correlation between the attitude of the learners in distance learning and academic performance.

INTRODUCTION

In deep crises, real change often takes place, and this moment holds the possibility that when things return to normal, we will not return to the status quo (Schleicher, 2020). The COVID-19 pandemic is a great challenge to education. For long years, classes have been delivered face to face, but as long as COVID is in the air, it is impossible to have them the old way. To cope with the current situation, the Department of Education introduced three modalities of how learning shall be delivered in the "new normal". There is a lot to adjust and embrace. But one thing is for sure: one of those modalities can continually deliver quality education to our learners (Ceniza, 2020).

UNESCO (2011) quoted that the Philippine government aims to uphold and instill a high regard for education in Filipinos through the Department of Education and Commission on Higher Education. They are the principal government agencies responsible for educational and manpower development. Their thrust is to make quality education available to every Filipino child even during this time of the pandemic. However, Baclig (2020) noted that even before the pandemic, studies pointed out that Filipinos showed poor performance in Science. In the Trends in International Math and Science Study (TIMSS, 2019), Filipino Grade 4 students ranked third from last out of 58 countries, with a score of 249 in Science. The average international rating was 474, and the highest rating by any country was 578.

Figuring and nourishing students' attitudes toward Science has been a consistent goal in Science Education and a topic of significant research, as attitudes are an important aspect of students' persistence in school Science and interest in pursuing Science careers (Tyler et al., 2008). Understanding learners' attitudes is very important in supporting students' academic achievement and interest in a particular discipline. It is generally believed that learners' attitude toward a subject determines their success in that subject. Learners' attitudes towards Science subjects could be enhanced through effective teaching strategies. It has been confirmed that effective teaching strategies can create a positive attitude in students toward school subjects (Kabunga et al., 2016). It is therefore in the interests of society and the responsibility of educators to improve learners' attitudes toward Science and to prepare learners to live in a highly technological society (Ungar, 2010).

Distance learning is the most convenient mode of delivery until the vaccine arrives, and this change in teaching practices can be difficult, but students' needs are more important than realistic findings (Price & Kirkwood, 2013). In the Division of Davao Occidental, learners selected the modular print learning modality using the Self Learning Modules or SLMs. Most students (97%) indicated that the SLMs improved understanding and facilitated learning of basic science concepts. Thus, the attitude of the learners towards distance learning must

be studied. In the Malita District, few studies on the attitude of learners towards Science were conducted. Science, together with Mathematics and English, which includes Reading, were important subjects that were given utmost concern in evaluation at the district, national, and international levels.

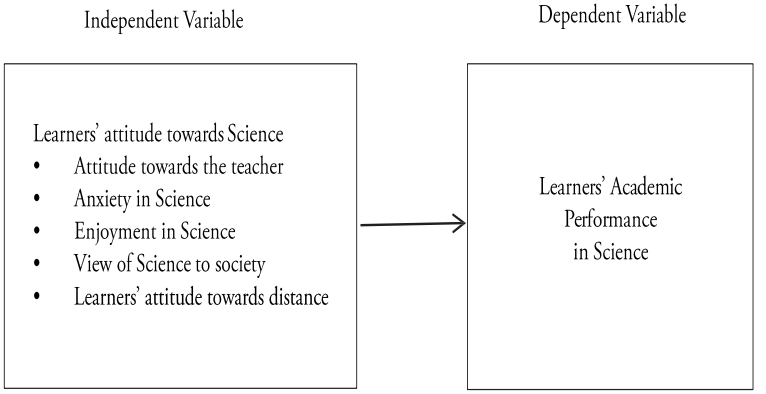
Objectives of the Study

The general objective of this study was to assess the attitude and its influence on the academic performance of elementary learners. Specifically, it sought to:

1. Determine the demographic profile of the learners in terms of:
   1.1 age;
   1.2 gender, and
   1.3 Ethnicity.
2. Determine the extent of the learners' attitude in terms of:
   2.1 Attitude towards the teacher;
   2.2 Anxiety in Science;
   2.3 Enjoyment in Science; and
   2.4view of Science to Society
3. Determine the attitude of learners towards distance learning.
4. Determine the academic performance of the learners in Science during the first and second grading periods.
5. Determine if there is a significant difference in learners' attitudes in Science, when grouped according to:
   5.1 age;
   5.2 gender, and
   5.3 Ethnicity.
6. Determine the relationship between the learners' attitude toward Science and their academic performances in Science.
7. Determine the relationship between the learners' attitude toward distance learning and their academic performances in Science.

Conceptual Framework of the Study

Figure 1
The diagram above shows that the academic performance of the learners in science (dependent variable) can be affected by students' attitudes towards Science and distance learning. Attitude can be affected by the learners' demographic profile, such as age, gender, and ethnicity.



MATERIALS AND METHODS

Research Locale

This study was conducted in a rural setting, particularly in the Malita District, Davao Occidental Division, Region XI, Philippines. The study covered 16 elementary schools in the Malita East District. These schools were accessible by motorcycle and other public utility vehicles.

Research Design

This study employed a descriptive-correlation method. The descriptive research design was used to describe the profile of the learners, the learners' attitude towards Science and distance learning, and their academic performances in Science. The correlation was also used to look into the possible relationship between learners' academic performances in Science and their attitude toward Science, as well as the possible relationship between the learners' attitude toward distance learning and their academic performances in Science.

Sampling Design and Technique

Schools were chosen using a purposive sampling technique. Four elementary schools from Malita East District, four elementary schools from Malita South District, four from Malita North District, and four from Malita West District. In selecting the respondents, the researcher used the random sampling technique.

From the population of the learners, the sample size was computed using the Slovin formula at a 5% margin of error to determine the sample size that allowed the researcher to sample the population with a desired degree of accuracy.

Table 1. *Distribution of respondents of the study*

District	Population	Sample Size
East	206	112
South	158	87
West	180	99
North	184	102
Total	728	400

Respondents of the Study

The target respondents of the study were the Grade 4 learners of 16 elementary schools in the municipality of Malita, Division of Davao Occidental, for the school year 2020-2021. From a total of 728 learners, 400 learners were chosen as the respondents.

Research Instrument

In this study, two instruments were used in collecting the data: Learners' Attitudes Towards Science and Learners' Attitudes Towards Distance Learning. The Learners' Attitude Towards Science was based on the instrument developed by Baldwin et al. (1999) as used and cited by Schruba (2006), but slightly modified to fit the confines of the current study. The ATSI was divided into two main parts: the demographic profile and the attitude towards Science, which had four main constructs, namely: attitude towards the teachers, enjoyment, anxiety, and view of Science to society. There were 34 questions on attitude towards Science. The modification was done to fit the context of this research.

The Learners' Attitude Towards Distance Learning questionnaire was based on the commonly asked questions about distance learning compiled by QuestionPro (2020). It was composed of 20 questions and contained the most frequently-referenced distance learning interest inventories identified that were deemed useful. The five-point scale was used. The draft of the research instrument was submitted to the research adviser for comments, suggestions,

and recommendations. The instrument was validated by three master teachers from Malita District.

Data Analysis

Data collected and gathered were decoded, recorded, tabulated, organized, analyzed, and interpreted. The questions on anxiety were negatively phrased; hence, the scores were transposed before proceeding to data analysis. Negative statements had equivalent points of 5 for "strongly disagree", 4 for "disagree",

3 for "undecided", 2 for "agree", and 1 for "strongly agree".

To analyze the extent of the attitude of the learners towards Science, the researcher used the scale below as a basis.

Mean of Scores	Extent of Attitude	Interpretation
4.51-5.00	Excellent attitude	This indicates that the learner has a positive attitude toward Science.
3.51-4.50	Very good attitude	This indicates that the learner has a positive attitude toward Science.
2.51-3.50	Good attitude	This indicates that the learner has a positive attitude toward Science
1.51-2.50	Poor attitude	This indicates that the learner has a poor attitude toward Science.
1.00-1.50	Needs Improvement	This indicates that the learner has a poor attitude toward Science.

The proficiency standards set by DepEd were used as a basis for determining the level of academic performance of the learners, as indicated in DepEd Order No. 31.

Proficiency level	Rating (%)	Description
Beginning (B)	74 & below	The student is struggling with their understanding due to a lack of essential knowledge and skills.
Developing (D)	75-79	The student possesses the minimum knowledge and skills but needs help throughout the performance of the authentic task.
Approaching Proficiency (AP)	80-84	The student develops fundamental knowledge and skills and a core understanding, with little guidance, and can transfer understanding through authentic performance tasks.
Proficient (P)	85-89	The student develops fundamental knowledge and skills and a core understanding, and can transfer them independently through authentic performance tasks.
Advanced (A)	90 & above	Student exceeds core requirements in terms of knowledge, skills, and core understanding; can transfer them automatically and flexibly through an authentic performance task.

The scale below was used in determining the learners' attitude towards distance learning.

Range	Scale Interval	Description	Interpretation
5	4.20-5.00	Always	This indicates that the item in the attitude scale test is always observed.
4	3.40-4.19	Most of the time	This indicates that the item in the attitude scale test is observed most of the time.
3	2.60-3.39	Sometimes	This indicates that the item in the attitude scale test is sometimes observed.
2	1.80-2.59	Rarely	This indicates that the item in the attitude scale test is rarely observed.
1	1.00-1.79	Never	This indicates that the item in the attitude scale test is never observed.

Data Gathering Procedure

The necessary data were gathered through the following procedures: First, the researcher secured an endorsement letter from the Dean of the Graduate School and asked permission from the Office of the Schools Division Superintendent, Davao Occidental, to survey the Grade 4 learners of the 16 schools of Malita District in the Division of Davao Occidental. Second, an orientation for parents on how their children would answer the questionnaires at home was conducted. Third, the questionnaires were distributed together with the distribution of modules in the second grading period. Fourth, one by one, the respondents were visited and guided in answering the questionnaires to ensure the accuracy and reliability of the data. The IATF suggested minimum health protocols, such as wearing face masks properly all the time, frequent hand washing or sanitizing, and observing social distancing at least 1-2 meters from each other, were observed by the researcher and the respondents. After completing the two questionnaires, the researcher retrieved the instruments. Data were encoded and tabulated for statistical analysis.

Ethical Considerations

The researcher ensured the anonymity of the respondents. Their personal information was kept confidential. Names of the respondents were not written on the questionnaire and were also not reflected in the results. All data gathered was handled with the utmost confidentiality.

Statistical Analysis

The following statistical tools were used in analyzing the data gathered.

The percentage was used in analyzing the profile of the respondents in terms of age, gender, and ethnicity. Frequency count determined the number of times the data occurred. A t-test determines if there was a significant relationship between the variable being studied. ANOVA was used to determine and assess the potential differences between the variables being studied. Spearman's Rank-Order Correlational Analysis was used to evaluate the strength of the relationship between two variables. This study was used to test the relationship between the learners' attitude toward Science and distance learning to their academic performances in Science.

To analyze the correlation coefficient (r), the researcher used the scale below.

r values	Description	Impact
0.00 to 0.20	Slight correlation; almost negligible relationship	The impact is slight or negligible.
0.21 to 0.40	Low correlation; Small relationship	The impact is low or small.
0.41 to 0.70	Moderate correlation; Substantial relationship	The impact is moderate or substantial.
0.71 to 0.90	High correlation; Marked relationship	The impact is high.
0.91 to 0.99	Very high correlation; Very dependable relationship	The impact is very high.
1	Perfect correlation; Perfect relationship	The impact is perfect.

RESULTS AND DISCUSSION

Students Related Factors

The socio-demographic profile of the respondents in terms of age, gender, and ethnicity was presented in Table 2. It showed that out of 400 respondents, 328 (82.00%) were 9-10 years old, 48 (12.00%) were 11-12 years old, 19 (4.80%) were 13-14 years old, and 5 (1.30%) were 15-16 years old. This means that the majority of the Grade 4 learners were in the age range of 9-10 years old. In terms of gender, results showed that out of 400 Grade 4 learners, 208 (52.00%) were males and 192 (48.00%) were females. This means that most respondents were male. In terms of ethnicity, 38 (9.50%) were Blaan, 88 (22.00%) were Tagakaulo, 59 (14.80%) were Tausog, and 215 (53.80%) were Cebuano. This implies that most of the respondents do not belong to any ethnic group.

The study of Jebson and Hena (2015) showed that there was a significant influence of gender on students' attitudes toward science subjects. The results indicated that boys have a more positive attitude toward Science subjects than girls. The result shows that age was the most important variable that relates to students' attitudes toward Science subjects. The t-test summary of the effect of

gender on students' attitudes toward Science subjects specified

that boys tend to have a more positive attitude towards Science subjects such as Chemistry, Physics, and Biology. Several studies have suggested that boys demonstrated a more positive attitude towards science subjects than girls. Moreover, Thiers (2011) mentioned that the interest of students in Science at age 10 is high and with little gender difference in either interest, for amazing energy and enthusiasm, increase anxiety, and tougher academic demands

make 4th grade a pivotal year. Albion et al. (2007) found that at the age of 9, in their fourth grade, students take Science skills further as they conduct experiments and use these experiments to further learning. On the contrary, Jebson and Hena (2015) found that age had no significant influence on students' attitudes toward Science.

Table 2. *Demographic Profile of the Grade 4 Learners*

Particulars	Frequency (f)	Percentage (%)
Age		
9 – 10	328	82.00
11 – 12	48	12.00
13 – 14	19	4.80
15 – 16	5	1.30
Gender		
Male	208	52.00
Female	192	48.00
Ethnicity		
B'laan	38	9.50
Tagakaulo	88	22.00
Tausug	59	14.80
Others: Cebuano	215	53.80

The extent of learners' attitude towards Science

The extent of learners' attitudes toward Science based on the general mean of each area obtained by the learners was shown in Table 3. The overall mean was 3.97, which indicated a very good attitude toward Science. It implies that the Grade 4 learners have a positive attitude toward Science. This supports the study of Dayag (2019), in which it was found that students had a very good attitude toward Science. Further, according to the study of Talisayon et al. (2014), the Philippines showed that more than 90% of students indicated a positive attitude toward science-related interests and experiences. Out of eleven studies,

the Philippines, on average, ranked second on 10 selected items in the ROSE questionnaire (Relevant of Science Education). In general, the student responses indicated a positive attitude towards future jobs, environmental protection, school Science, Science and Technology, and new technologies. Ndlovu (2017) explained in his study that if a student had a positive attitude toward Science, they would be interested in its teaching and learning. Most Science teachers did not make the teaching of Science practical and exciting, and this led to negative attitudes toward Science among students. He also stated that the elements of novelty, usefulness, and sheer intellectual curiosity were primary stimuli for awakening and maintaining the student's interest in Science.

Attitude towards the teachers

It was found that learners' attitude towards the teacher was excellent (4.52). Students showed a positive attitude to Science whenever teachers asked questions, presented materials in a manner easily understood by the students, gave individual help, and showed interest in their students. This study supported Namadha and Chamundeswari (2013), who found that students had a higher level of attitude toward learning Science. Teachers, in return, were challenged by Umameh (2011) in his study to have a genuine attitudinal change, to have sustained interest and continual challenge so that Science would no longer be seen as a boring and useless subject. Oloo et al. (2016) in a study of students' perceptions of Science in rural secondary schools in South Africa found that students thought that teachers who did not have competence in teaching Science were unlikely to be aware of the way to assist learners in solving problems in Science. Au (2007) also mentioned that some of the teachers did not understand all the chapters in Science textbooks, so it was difficult for them to assist students on those topics they did not understand.

Anxiety in Science

It was found that the learners showed less anxiety in Science with a 3.55 mean score rating, which indicated a very good attitude and positive attitude towards Science. The learners liked to hear the word Science, understood Science though tried hard, had a positive outlook on doing Science assignments, felt relaxed when talking about Science, did very well in Science, were not scared to take Science assignments right away, took Science because they liked it, liked to spend more time in school studying Science, and felt ease when working and thinking about Science.

According to the study of Siwel et al. (2012), there were differences in students' interests in Science subjects. Some of the students felt that Science was tough for them. Hence, King'Aru (2014) concluded that students' negative attitude toward Science affected their performance. They felt that those who took the Sciences were doomed to fail. But Craker (2006) observed that students who had positive attitudes toward Science had motivation for class engagement.

Attitude towards the enjoyment of Science

The learners showed enjoyment in Science (3.82), which indicated a positive attitude toward Science. Their enjoyment was manifested by talking to other people about Science and not getting upset when doing assignments. Learners manifested the likelihood of doing some extra or fun-assigned reading in Science and loved to watch Science programs on television. Results showed that students were at ease in a Science class, and reading ahead in Science books became a habit. They enjoyed Science very much and considered it one of their favorite subjects. They liked the challenges in Science assignments because they felt a real desire to learn Science, and truly, they were having a good feeling towards Science. The findings of Guido (2013) suggested that most of the respondents felt good when they were successful in the Science subject. They felt that they had fully succeeded in the subject when these endeavors became fruitful.

One of the factors that contributed to students' feelings towards Science was the teachers' detailed explanation. Additionally, Khetsiwe et al. (2020) found that 61% of the students strongly agreed with the statement "school Science is interesting". Students felt that their school Science education had been better than other subjects. Likewise, the recent Programme for International Student Assessment studies of 8th-grade students, OECD (2007), presented a similarly positive picture of United States students, with 45% indicating that they would like to study Science after high school.

View of Science in Society

The learners showed an excellent view of Science in society with a mean of 4.56, which indicates a very good attitude towards Science and implies a positive attitude. This implies that learners perceived that Science is useful in solving everyday life problems and important to a country's development. The knowledge gained in Science helped in getting a good job and helped in getting along perfectly well in everyday life. The findings of Ndlovu (2017) stated that students exhibited a positive increase in overall attitude towards Science if instructions were clear. Clear instructions even increased students' confidence or self-efficacy.

Table 3. *The extent of learners' attitude towards Science*

Particulars	Mean	Implication
Attitude towards the teacher, Science teacher	4.522	Excellent Attitude
Show interest in the students	4.632	Excellent Attitude
Present materials in a way I understand	4.555	Excellent Attitude
Willing to give individual help	4.4	Very Good Attitude
For students to ask questions	4.5	Very Good Attitude
Anxiety in Science	3.552	Very Good Attitude
Can understand Science, though I try hard	3.595	Very Good Attitude

Feeling relaxed when talking about Science	3.9	Very Good Attitude
Often think, "I can do this," when a Science assignment seems hard."	2.68	Good Attitude
At ease when working with Science	3.9	Very Good Attitude
Feeling relaxed, even thinking about doing Science	3.77	Very Good Attitude
Not scared to have to take a Science class	3.733	Very Good Attitude
Can see how to do a Science assignment right away	3.212	Good Attitude
Does very well in Science	2.978	Good Attitude
Feeling of likelihood when hearing the word "Science"	3.81	Very Good Attitude
I like to spend more time in school studying Science	3.643	Very Good Attitude
Like a job that does not use any Science	3.428	Good Attitude
The only reason I take Science is because I like it.	3.98	Very Good Attitude
Enjoyment of Science	3.816	Very Good Attitude
Enjoy Science very much	3.868	Very Good Attitude
Feel at ease in Science class	3.955	Very Good Attitude
I like to do some extra or fun assigned reading in Science	3.775	Very Good Attitude
Sometimes, read ahead in the Science book	3.642	Very Good Attitude
Does not disturb or upset to do a Science assignment	3.867	Very Good Attitude
Enjoy talking to other people about Science	3.628	Very Good Attitude
Enjoy watching a Science program on television	4.08	Very Good Attitude
Like the challenge of Science assignments	3.64	Very Good Attitude
Have a good feeling toward Science	4.03	Very Good Attitude
Science is one of my favorite subjects	3.7	Very Good Attitude
Have a real desire to learn Science	3.788	Very Good Attitude
View of Science in Society	4.568	Excellent Attitude
Science is useful for solving the problems of everyday life	4.483	Very Good Attitude
There is a high need for Science in most of today's jobs.	4.442	Very Good Attitude
Most people should study some Science	4.64	Excellent Attitude
Science is of great importance to a country's development	4.53	Excellent Attitude

It is important to know Science to get a good job.	4.732	Excellent Attitude
You cannot get along perfectly well in everyday life without Science	4.5	Very Good Attitude
Most of the ideas in Science are very useful	4.647	Excellent Attitude
Overall Learners' Attitude	3.978	Very Good Attitude

Learners' attitude towards distance learning

Table 4 shows the results of learners' attitudes toward distance learning. It obtained an overall mean of 3.84, which was described as most of the time observed. This was an indication that the respondents had a positive attitude toward the distance learning modality. The statement with the highest mean was "distance learning is the safest modality in times of COVID-19," had a mean score of 4.99, which means that most of the time observed by the learners. This implies that learners consider distance learning as the safest modality in times of COVID-19 despite the hardship they faced. The statement "returning the modules without answers when they did not have enough time to answer" gained the lowest mean score of 2.28, which means it was rarely observed by the learners. Likewise, the statement about "feeling uneasy and upset when I can see a module" obtained a mean score of 2.35, which means that it was rarely observed by the learners. These results imply that the learners have positive attitudes toward distance learning. These findings supported the study of Rufii (2015), who found that 97% of the students using the SLMs improved their understanding of basic Science concepts. SLMs were reported to allow learners control, help in preparation for in-class discussion, and improve understanding and retention.

Table 4. *Learners' attitude towards distance learning*

Statements	Mean	Description
The learner... Feel that distance learning is important.	4.785	Always
Feel good overall about distance learning	4.4.30	Always
Like distance learning	4.265	Always
Request my parent/guardian to get my modules on schedule	4.265	Always
Answer my modules honestly	4.28	Always
Return my modules on time	4.615	Always
Spent 5-7 hours each day on average on distance learning, so that I can still have time to play and exercise	3.945	Most of the time
Modular learning has been effective for me	4.125	Most of the time

Have an uneasy, upset feeling when I can see a module	2.348	Rarely
perspire and can feel my heart beating fast, thinking that my modules will be available when my parent arrives from school	2.41	Rarely
get to feel panicky when I have seen many modules to be answered	3.415	Most of the time
find myself thinking of the consequences of failing while answering my modules	3.075	Sometimes
feel sad when I fail to answer all my modules on time	3.715	Most of the time
returned the modules without answers, when I do not have enough time to answer my modules	2.278	Rarely
always feel that I am not confident with my answers, after answering my module	2.728	Sometimes
manage time while learning at home, following my weekly home learning plan	3.843	Most of the time
ask for help from my family, friends, and relatives when needed in answering my modules	4.83	Always
ask for help from my teacher when needed through my parents/guardians	4.53	Always
Ask my school to offer the resources needed to learn from home, such as textbooks and related materials	4.538	Always
Distance learning is the safest modality in times of COVID-19	4.987	Always
Overall Mean	3.84	Most of the time

Academic performance of the learners in Science

Table 5 shows the academic performance of the learners in Science. It was shown that the learners obtained an approaching proficiency in Science with an overall performance mean of 83.62. Similarly, the learners were consistent in demonstrating an approaching proficiency from the first grading period to the second grading period. The results on academic performance indicated that the learners only developed fundamental knowledge and skills of Science with little guidance.

However, an increase in performance was observed. According to Llego (2020), Filipino students' poor achievement levels in Science have been documented for several years. In the Trends in International Math and Science Study (TIMSS), Filipino Grade 4 students ranked third from last out of 25 countries in Science, with an average rating of 377 in Science. The average international rating was 474, and the highest rating by any country was 578. The TIMSS also showed that among Grade 4 students, girls performed better than boys, but this advantage of girls was no longer found in Grade 8, as emphasized

by Baclig (2020). In Malawi, poor performance in Science was also recorded among the students due to the following factors: lack of science equipment, insufficient quality textbooks, students' perception that science subjects are hard, students' laziness, and too little time allocated to practical lessons (Dzana, 2012; King'Aru, 2014).

Table 5. *Academic performance of the learners in Science*

Performance	Mean	Description
First Grading	82.672	Approaching Proficiency (AP)
Second Grading	84.572	Approaching Proficiency (AP)
Overall performance	83.622	Approaching Proficiency (AP)

The difference in the learners' attitude in Science when grouped according to age, gender, and ethnicity. Table 6 shows the test of difference in learners' attitudes in Science when grouped according to age. It was found that there was a significant difference in learners' attitudes toward Science when grouped according to age. This means that the learners' attitude toward Science varies according to age. This result supported the study of Resaland et al. (2018) that the interest of students in Science at age 10 was high, and with little gender difference in either interest, for amazing energy and enthusiasm, increased anxiety, and tougher academic Demands make the fourth grade a pivotal year. The result also supported Albion et al. (2013), who found that grade 4 students who were 9 years old take Science skills further as they conduct experiments and use these experiments to further learning. On the contrary, Jebson and Hena (2015) found that age had no significant influence on students' attitudes toward Science subjects. With these conflicting results, further study was needed.

Table 6. *The difference in the learners' attitude towards Science when grouped according to age*

Learners' attitude to Science	df	p-value.	Interpretation
Between Groups	3	0.00	Significant
Within Groups	396		
Total	399		

To know which of the specific age groups differed, the researchers employed the Tukey post hoc test, which was presented in Table 7.

Table 7. *Post hoc test on the difference in the learners' attitude in Science, when grouped according to age*

Age (I)	Age (J)	Mean Difference (I-J)	Sig.	Interpretation
1.0 (9-10)	2.0 (11-12)	.28911*	0	Significant
	3.0 (13-14)	.33338*	0	Significant
	4.0 (15-16)	.37790*	0.002	Significant
2.0 (11-12)	1.0 (9-10)	-.28911*	0	Significant
	3.0 (13-14)	0.04427	0.896	Not Significant
	4.0 (15-16)	0.08879	0.849	Not Significant
3.0 (13-14)	1.0 (9-10)	-.33338*	0	Significant
	2.0 (11-12)	-0.04427	0.896	Not Significant
	4.0 (15-16)	0.04453	0.981	Not Significant
4.0 (15-16)	1.0 (9-10)	-.37790*	0.002	Significant
	2.0 (11-12)	-0.08879	0.849	Not Significant
	3.0 (13-14)	-0.04453	0.981	Not Significant

*The mean difference is significant at the 0.05 level.

Results showed a significant difference at the 0.05 level. The attitude of the students who were in the age group 9-10 was better than the other three groups. Moreover, the difference was statistically significant. However, there were no significant differences between the age groups 11-12, 13-14, and 15-16.

Gender

Table 8 shows the test of difference in learners' attitudes in Science when grouped according to gender. It was found that there was a significant difference in learners' attitudes toward Science when grouped according to gender. Comparatively, males acquired a mean of 4.0487 while females obtained 3.9027. The t-test results obtained a p-value of 0.00, which was less than the critical value of 0.05. This implies that the difference between the two groups was statistically significant. This means that the learners' attitude to Science varies according to gender. Boys were more likely than girls to participate in Science-related activities, such as watching TV programs about Science, visiting websites about Science topics, or reading Science articles in newspapers or magazines. Cohen and Manion (2011) stated that there were significant differences between female and male students in terms of other factors, "enjoyment of Science", "anxiety", and "enjoyment of Science experiments", respectively. But Denessen et al. (2015) concluded that both boys and girls enjoyed Science and Technology more at the beginning of the school year compared to the end of the school year, 36.67 $P < .001$. Comparing the attitudes of boys and girls, it was determined that boys evaluated Science and technology more than girls did.

Table 8. *The difference in the learners' attitudes toward Science when grouped according to gender*

Gender	Mean	p-value	Interpretation
Male	4.0487	0.000	Significant
Female	3.9027		

Ethnicity

Table 9 shows the test of difference in learners' attitudes in Science when grouped according to ethnicity. It was found that there was a significant difference in learners' attitudes toward Science when grouped according to ethnicity. Tagakaulo was better than the other groups, such as Blaan and Tausug. A research study by Zhu (2012) indicated that cultural factors play an important role in what diverse learners share, participate in, and/or how they construct knowledge. Frederiksen et al. (2013) pointed out that culture can be one of the major factors that shape students' perspectives of interactions, perceptions, communication, and attitudes in online learning environments.

Table 9. *The difference in the learners' attitudes toward Science when grouped according to ethnicity*

Learners' attitude to Science	df	p-value.	Interpretation
Between Groups	3	0.005	Significant
Within Groups	396		
Total	399		

To know which of the specific ethnic groups differed, the researchers employed the Tukey post hoc test, which is presented in Table 10.

Table 10. *Post hoc test on the difference in the learners' attitude in Science when grouped according to ethnicity*

Ethnicity (I)	Ethnicity (J)	Mean difference (I-J)	Sig.	Interpretation
Blaan	2.0 (Tagakaulo)	-0.08537	0.319	Not Significant
	3.0 (Tausog)	-0.03953	0.881	Not Significant
	4.0 (Others)	0.02774	0.928	Not Significant
Tagakaulo	1.0 (B'laan)	0.08537	0.319	Not Significant
	3.0 (Tausog)	0.04584	0.714	Not Significant
	4.0 (Others)	.11311*	0.003	Not Significant
Tausug	1.0 (B'laan)	0.03953	0.881	Not Significant
	2.0 (Tagakaulo)	-0.04584	0.714	Not Significant
	4.0 (Others)	0.06727	0.284	Not Significant
Others	1.0 (B'laan)	-0.02774	0.928	Not Significant
	2.0 (Tagakaulo)	-.11311*	0.003	Not Significant
	3.0 (Tausog)	-0.06727	0.284	Not Significant

*The mean difference is significant at the 0.05 level

The level of attitude of the Tagakaulo was better than the other tribal groups. The difference was statistically significant. However, there was no significant difference in terms of learners' attitudes toward Science between the ethnicity groups, Blaan, Tagakaulo, and Tausug.

Relationship between the learners' attitude towards Science and their academic performance in Science

As shown in Table 11, a Pearson's r value of 0.234 indicated a positive low correlation or small relationship between the attitude of the learners towards Science and academic performance. Nevertheless, the relationship was found to be significant.

According to the study by Kabunga et al. (2016), students' attitudes toward Science had a direct effect on students' achievement in the subject. The findings of the study revealed that attitude, age, and gender had a significant relationship with students' performance in Science subjects. Therefore, students' attitudes should be central to teachers because affective dispositions are powerful predictors of students' performance.

Since the p-value was less than the 0.05 level of significance, the Ho1 (null hypothesis 1) was rejected, and concluded that there was a significant relationship between the learners' attitude towards Science and their academic performance in Science. The studies of Namadha and Chamundeswari (2013) and Newell et al. (2015) showed that a positive correlation existed between attitudes toward

learning Science and academic achievement in Science among the students.

Table 11. *Relationship between the learners' attitude towards Science and their academic performance in Science*

Attitude toward Science construct	r-value	Description	p-value	Interpretation
Attitude towards the teacher	0.145	Slight correlation; Almost negligible relationship	0.004	Significant
Anxiety in Science	0.25	Low correlation; small relationship	0	Significant
Enjoyment in Science	0.257	Low correlation; small relationship	0	Significant
View of Science to Society	0.229	Low correlation; small relationship	0	Significant
Overall Learners' Attitude	0.234	Low correlation; small relationship	0	Significant

Positive values imply that if the values in the domain increase, the academic performance in Science of students also increases. Negative values imply that if the values in the domain increase, the academic performance in Science of students decreases. The researchers considered the transformed data in the domain "Anxiety in Science" by reversing the scoring of each item. It was done to align with the scoring direction of the other domains.

Relationship between the learners' attitude towards distance learning and their academic performance in Science

As shown in Table 12, a Pearson's r value of 0.176 indicated a positive, slight correlation or small relationship between the attitude of the learners in distance learning and academic performance. The relationship was significant. According to the study of Smidt et al. (2014), 10 out of 13 students distinguished that the lack of the presence of a teacher was a disadvantage in learning, compared to the three students who felt it was an advantage. Lee et al. (2011) found in their study that students valued and benefited from interaction with instructors and peers. These effects were related to interpersonal interaction that could be due to personality differences. The results indicated that the degree of efficiency in the use of distance learning approaches was differentially facilitated by the psychological attitudes of the distance learners. Psychological factors have a positive bearing on the student's preferences for structured distance learning.

Rufii (2015) mentioned that in the Division of Davao Occidental, learners selected the modular print learning modality using the Self Learning Modules or SLMs. Most students indicated that the SLMs improved their understanding and facilitated the learning of basic science concepts. SLMs were reported to allow learner control helps in preparation for in-class discussion and improves understanding and retention.

Table 12. *Relationship between the learners' attitude toward distance learning and their academic performance*

Particular	r-value	description	p-value	Interpretation
Learners' attitude towards distance learning	0.176	Slight correlation; Almost negligible relationship	0.000	Significant

Since the p-value was less than the 0.05 level of significance, the Ho2 was rejected, and concluded that there was a significant relationship between the learners' attitude towards Science and distance learning to their academic performance in Science. According to Rufii (2015), most students indicated that the SLMs improved their understanding and facilitated learning of basic Science concepts. SLMs were reported to allow learner control, help in preparation for in-class discussion, and improve understanding and retention.

SUMMARY, CONCLUSION, AND RECOMMENDATION

Summary

The study specifically determined the relationship between learners' attitudes towards Science and distance learning to the academic performance in Science of 400 grade 4 learners in 16 elementary schools of the Municipality of Malita, Davao Occidental. The descriptive-correlational design was employed. Modified survey questionnaires were used to gather the necessary data. In choosing the sample size of the study, the researcher applied a random

sampling technique concurrently with the Slovin formula with a 5% margin of error. Furthermore, the data gathered were carefully validated, evaluated, collated, and statistically treated for easy analysis and interpretation of the results using percentage distribution, mean, frequency count, t-test, Post Hoc test, ANOVA, and Spearman's rank-order correlation analysis to answer the hypotheses of the study.

Results showed that there were more male learners compared to female respondents. The overall mean for attitude towards Science revealed that learners

had a very good or positive attitude. Specifically, they showed excellent attitude in terms of learners' attitude towards the teacher (4.52), showed less anxiety in Science (3.55), showed a very good attitude or positive attitude towards the enjoyment of Science (3.81), and on their views of Science in society (4.56).

The learners had a positive attitude towards distance learning modality with an overall mean of 3.84. The respondents, most of the time, acknowledged that distance learning was the safest modality in times of COVID-19, and they felt that distance learning was important. In terms of academic performance, the

Learners obtained an approaching proficiency with an overall performance of 83.62. There was a significant difference in the learners' attitude toward Science when grouped according to age, gender, and ethnicity. This means that the learners' attitude toward Science varies according to age, gender, and ethnicity. There was a significant relationship between learners' attitude and their academic performance in Science. This means that attitude towards Science had a direct effect on students' achievement in the subject. Therefore, students' attitudes should be central to teachers because affective dispositions are powerful predictors of students' performance.

There was a slight positive correlation or small relationship between the attitude of the learners in distance learning and academic performance. The relationship is significant.

CONCLUSIONS

Based on the findings, the researcher drew the following conclusions:

1. There is a significant difference in the learners' attitude toward Science when grouped according to age, gender, and ethnicity. This means that the learners' attitude toward Science varies according to age, gender, and ethnicity. It is a challenge for the teacher to respond to the different learning needs of their learners and make a plan to develop a positive attitude towards the subject.
2. Overall, the learners have a very good attitude towards Science in terms of attitude towards the teacher, anxiety in Science, enjoyment in Science, and view of Science to society.
3. The learners only develop fundamental knowledge and skills and a core understanding of Science, and can transfer them independently through authentic performance tasks. This indicates that learners need to master their basic skills in Science to perform well in Science.
4. The academic performances of the learners are consistent in manifesting an approaching proficiency from the first grading period to the second grading period. Therefore, there is a need to learn how to transfer fundamental knowledge and skills, and core understanding independently through authentic performance tasks.
5. The grade 4 learners have a positive attitude towards Science and

distance learning. This result challenges teachers to plan lessons geared towards developing a positive attitude towards the subject and teaching modality.

6. There is a significant relationship between learners' attitudes toward Science and their academic performance in Science. This means that attitude towards Science has a direct effect on students' achievement in the subject. Therefore, students' attitudes should be central to teachers because affective dispositions are powerful predictors of students' performance.
7. There is a slight positive correlation or small relationship between the attitude of the learners in Science and distance learning and academic performance. Even though the relationship is significant, there is still a great chance to develop a better relationship through the collaborative efforts of the teacher, parents, and learners.

Recommendations

In light of the foregoing findings and conclusions of this study, the researchers formulated the following recommendations for consideration:

1. Attitude has a significant influence on the academic performance of learners, so it is suggested to investigate other possible factors affecting performance in Science.
2. A study needs to be conducted to determine factors that affect the attitude of learners toward distance learning.
3. Teachers and school administrators need to work hand-in-hand to make sure that learners continue to develop a positive attitude toward Science.
1. Teachers must conduct an attitude check quarterly to determine learners' attitudes towards Science and the distance learning modality.
4. A study may be conducted in other municipalities under the Division of Davao Occidental since the study is limited only to 16 public elementary schools in the municipality of Malita.

REFERENCES

Albion, M., Fernie, K.M. & Burton, L.J. (2007). Individual differences in age and self-efficacy in the unemployed. Australian Journal of Psychology, Vol. 57, Issue 1.

Au, W. (2007). High stakes testing and curricular control: A qualitative metasynthesis. Educational Researcher, 36(5), 258-267.

Baclig, C. E. (2020). TIMSS 2019 International Science Report: Findings from IEA's Trends in International Mathematics and Science Study, the eighth and fourth grades. Cited by Hill, C: MA. Boston College. Multidisciplinary Journals.com. Inquirer.net

Baldwin, J., Ebert-May, D., and Burns, D. (1999). The development of a college biology self-efficacy instrument for non-majors. Science Education, 83(4), pp.397-408.

Ceniza, M. J. L. (2020). How does the "new normal" look in the Philippine education System? Butuan Central Elementary School, Central Butuan District 1. NewsBeastPh. Distance Learning New Normal Education. https://m.facebook.com>permalink

Cohen, N. and Manion, O. (2011). Students' attitudes towards science and technology: an investigation of gender, grade level, and academic achievement. Procedia-Social and Behavioral Sciences, Vol 1, pp2804-2808.

Craker, D. (2006). Attitudes towards the science of students enrolled in introductory-level Science courses. UW-L Journal of Undergraduate Research, IX, 1-6.

Dayag, C. (2019). Learners' attitude and self-efficacy, and academic performance in Science. Master's Thesis.

Denessen, E., Vos, N., Hasselman, F., and Louws, M. (2015). The relationship between a primary school teacher and student attitudes towards Science and Technology. Education Research International 2015 (534690):7 DOI: 10.1155/2015/534690

Dzana, E.N. (2012). Poor performance in Science subjects in Malawi, University of Malawi.

Frederiksen, C.H., Shi, Y. and Muis, K.R. (2013). A cross-cultural study of self-regulated learning in a computer-supported collaborative learning environment. Learning and Instruction, 23, 52–59. http://dx.doi.org/10.1016/j.learninstruc.2012.05.007

Guido, R.M.D. (2013). Attitude and motivation towards learning Physics. International Journal of Engineering Research and Technology, Vol. 2, Issue 11, November 2013.

Jebson, S.R. and Hena, Z. (2015). Students' attitude towards science subjects in senior secondary schools in Adamawa State, Nigeria. International Journal of Research in Applied, Natural and Social Sciences (IMPACT: IJRANSS). Vol . 3, Issue 3, March 2015, 117-124.

Kabunga, A., Mohamed, H., and Mnjokava, C. (2016). Learners' attitudes and performance in Science subjects in A-level in secondary schools, in Mbarara, Uganda. The Journal of Educational Research 2(5):10-25

Khetsiwe, E., Talent, T., and Maphosa, C. (2020). Creating students' communities of inquiry (COI) in online learning using the Moodle Learning Management System. Journal of Education and Practice. Vol 11. Issue 30, 143-150

King'aru, J.M. (2014). Factors contributing to poor performance of Science subjects: A case of secondary schools in Kawe Division, Kinondoni Municipality. Master of Project Management. The Open University of Tanzania.

Lee, S. J., Srinivasan, S., Trail, T., Lewis, D., and Lopez, S. (2011). Examining the relationship among students' perception of support, course satisfaction, and learning outcomes in online learning. The Internet and Higher Education. doi:10.1016/j.iheduc.2011.04.001.

Llego, A. B. I. (2020). Teachers, the problem of learning, and reform in Math and Science education. Ateneo de Zamboanga Journal of Multidisciplinary Studies, 2(1), 1-20.

Namadha, U. and Chamundeswari, S. (2013). Attitude towards learning Science and academic achievement in Science. Journal of Sociological Research, Vol. 4, No. 2.

Newell, A.D., Thamp, B.Z., and Zientek, L.R. (2015). Students' attitude towards science as predictors of gains on student content knowledge: benefits of an after-school program.

Ndlovu, F. (2017). Factors that contribute to the poor performance of students in Science in rural schools in Tsholotsho District in Matabeleland Province in Zimbabwe. IJRDO- Journal of Educational Research. Vol 2. Issue No.1,13-24 Retrieved from https://www.ijrdo.org/index.php/er/article/view/34

Oloo, E. A, Mutsotso, S.N. and Masibo, E.N. (2016). Effects of peer teaching among students on their performance in Mathematics. International Journal of Scientific Research and Innovative Technology. Vol. 3. No. 12, 10-24.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (OECD). (2007). PISA 2006: Science competencies for tomorrow's world: Vol 1: Analysis, Paris, OECD. OECD iLibrary. https://doi.org/10.1787/19963777 300.

Price, L. and Kirkwood, A. (2013). Using technology for teaching and learning in higher education: A critical review of the role of evidence in informing practice. Higher Education Research and Development (in press). Vol 33. Issue No.3, 549-564 https://doi.org/10.1080/07294360.2013.841643

QuestionPro (2020). Top 10 distance learning survey questions for students with examples. Academic Research/Survey. Questionpro.com

Resaland, G. K., Moe, V. F., Bartholomew, J. B., Andersen, L. B., McKay, H. A., Anderssen, S. A., & Aadland, E. (2018). Gender-specific effects of physical activity on children's academic performance: the active smarter kids cluster randomized controlled trial. Preventive medicine, 106, 171-176.

Rufii, R. (2015). Developing a module on constructivist learning strategies to promote students' independence and performance. International Journal of Education 7(1),18,2015.

Schleicher, C. (2020). How do learners in different cultures relate to science and technology? Results and perspective from the project ROSE. Asia Pacific Forum on Science Learning and Teaching, 6 (2), 1-6.

Schruba, A.E. (2006). Evaluation of students' attitude towards science and self-efficacy in a non-major Biology class. The graduate facility of the College of Education, Texas Christian University.

Siwel, Y., Nyamba and Kizito, K.M. (2012). Students' preferences for science subjects: Does this affect their performance? A case of Udzungwa Secondary School, Kilola, Iringa. Tanzania.

Smidt, E., Bunk, J., McGrory, B., Li, R., and Gatenby, T. (2014). Students' attitudes about distance education: Focusing on Context and Effective Practices. The IAFOR Journal of Education, 2(1), 40-64. DOI: 10.22492/ije.2.1.02

Talisayon, V.M., de Guzman, F.F., and Balbin, R. (2014). Science-related attitudes and interests of students. ROSE paper Malaysia Conference.

Thiers, N. (2011). The early and elementary years. The leap into 4th grade. Educational Leadership. The Transition Years, 68(7), 32-36

TIMSS (2003). User guide for the international database. Chestnut Hill, MA: Boston College.

Tyler, R., J.F. Osborne, G. Williams, K.Tyler, J.C. Clarck, and Tomei, A. (2008). Opening up pathways: Engagement in STEM across the primary-secondary school transition. A review of the literature concerning support and barriers to Science, Technology, Engineering, and Mathematics engagement at primary-secondary transition. Commissioned by the Australian Department of Education, Employment and Workplace Relations. Melbourne: Deakin University.

Umameh, M. (2011). Survey of factors responsible for students' poor performance in Mathematics in Senior Secondary School Certificate Examination (SSCE) in Idah Local Government Area of Kogi State, Nigeria. Researchgate. Thesis for BSE(ED) DOI:10.13140/RG.2.1.1965.7766

UNESCO.2011. National Commission of the Philippines.The development and state of the Philippines, Manila.

Ungar, T. (2010). Role of society in improving science and technology. New Jersey. The College of New Jersey. Volume 1: Analysis, Paris OECD.

Zhu, C. (2012). Student satisfaction, performance, and knowledge construction in online collaborative learning. Journal of Educational Technology & Society, 15(1), 127-136. Retrieved February 20, 2018, from http://www.jstor.org/stable/jeductechsoci.15.1.127