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The Mediating Effect of Tutorial Videos in Mathematics on the Relationship between Teaching Strategies and Academic Motivation of Students

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Abstract: *The study determined the mediating effect of tutorial videos in mathematics on the relationship between teaching strategies and academic motivation of students. The study utilized descriptive correlational design and employed a survey method to attain the objective. Five hundred seventy-eight (578) students from Private and Public Senior High School in Davao City were the selected respondents of the study through random sampling technique. The researcher made use of pilot-tested and enhanced adapted questionnaires to describe the tutorial videos in mathematics, teaching strategies and academic motivation of students, utilizing mean, standard deviation, Pearson's Moment-Product Correlation, and path analysis to analyze the data. Results indicated that tutorial videos in mathematics, teaching strategies obtained different mean scores but both belong to a high descriptive level, while academic motivation belongs to a moderately high descriptive level. Furthermore, it was found that there is a significant relationship between and among teaching strategies, academic motivation, and tutorial videos in mathematics. A significant partial mediation of tutorial videos in mathematics on the relationship between teaching strategies and academic motivation.*

Keywords: *academic motivation, education, mathematics, mediation, teaching strategies, Philippines, tutorial videos*

1. INTRODUCTION

1.1. Rationale

It is an admitted fact that Mathematics education played an essential role in the historical development of our society (Reyes & Castillo, 2015). Academic motivation of students strengthens the direction of goal and learner's interest, most especially in mathematics. However, educational problems of the students include complaints that math subject is complex, lack of motivation and study habits, strict teachers, and below performance in significant examinations (Laguador, 2013). Besides, unpreparedness in learning math subjects is poorly observed even in the essential operation (Patena & Dingalasan, 2013). Absenteeism in Nation's Public school resulted in low achievement and motivation to perform primarily in mathematics (Balfanz & Byrnes, 2012). In 2010, only 6 percent of United States students were motivated and belong to the advanced level in mathematics that is lower than the performance of the 30 other countries (Hanushek, Peterson, & Woessmann, 2012).

Moreover, Rimando (2016) affirmed that three Department of Education Region has low academic motivations and high students' dropouts in Mindanao. Hence, it was a challenge on the part of the school and the teacher, particularly on how to address the existing problem. The significance of academic motivation urges learners to be more active and directs behavior as a determinant for academic success (Robbins et al., 2004; Hattie, 2009; Plante et al., 2013; Wigfield et al., 2016). The passion for learning math greatly influences the determination and academic motivation to solve math problems, and higher grades are accomplished (Laguador,2013b). In addition, students with high academic motivation are dedicated to solving problems until they can solve them and become absorbed in their mathematical problem-solving activities. Therefore, there is the need to devise ways and methods where students become motivated to choose mathematics.

The "cognitive theory of multimedia learning" Clark and Mayer (2016) and Media Richness Theory (MRT) that Daft and Lengel presented (1986) prove that the effectiveness in communication and

learning varies on the more prosperous media utilized. Moreover, that video contributes to education since its context will support and comprehend the developments involved. This is in line with the development of learning technology in the late 20th-century education system, which has changed rapidly, although many teachers are not yet maximizing this opportunity (Albirini, 2006). Educators, therefore, must institute a system or strategy where the learning process is viewed with simplicity, create an environment where students enjoy solving math problems, and draw interest among them the necessity and importance of hard work and perseverance, not only for their personal development and of obtaining wealth but likewise in contributing for the society's development. One of the practical teaching strategies in the learning process inside the classroom is the use of tutorial videos in the field of mathematics. Thus, effective teaching strategies like tutorial videos enhance students' motivation to engage in complex mathematical activities.

Likewise, Procopio (2011) and Liimatta (2015) state that tutorial videos address students with various opportunities to improve their skills and achievements. These limited studies have shown that the gap in video tutorials mediates teaching strategies, and students' academic motivation has not yet been fully addressed. Hence, this study may contribute to the teaching-learning process and support learner's difficulty in mathematics, considering that technology-based learning is widely used at this time of the 21st century.

2. RESEARCH OBJECTIVE

The study determined the mediating effect of tutorial videos on the relationship between teaching strategies and students' academic motivation in learning mathematics among the private and public senior high school students in Davao City. More specifically, the study sought to ascertain the following objectives:

1. To know the level of teaching strategies provided by the mathematics teachers as perceived by the students in terms of:
    1.1 behavioral Domain;
    1.2 cognitive Domain; and
    1.3 affective Domain.
2. To know the level of academic motivation of the students in learning mathematics in terms of:
    2.1 striving for excellence; and
    2.2 personal Incentives.
3. To know the level of efficacy towards the use of tutorial videos in mathematics.
4. To determine the significant relationship between the following variables:
    4.1 teaching strategies and academic motivation of students;
    4.2 teaching strategies and tutorial videos in mathematics; and
    4.3 tutorial videos in mathematics and academic motivation of students.
5. To determine the mediating effect of tutorial videos on the relationship between teaching strategies and academic motivation of students in learning mathematics.

3. HYPOTHESES

The following null hypotheses were tested at 0.05 level of significance:

1. There is no significant relationship between:
    1.1 teaching strategies and academic motivation of students;
    1.2 teaching strategies and tutorial videos in mathematics; and
    1.3 tutorial videos in mathematics and academic motivation of students.
2. There is no mediating effect of the tutorial videos in mathematics on the relationship between teaching strategy and the academic motivation of students.

4. THEORETICAL FRAMEWORK

This study adapted the "cognitive theory of multimedia learning" (Clark and Mayer, 2016) and Media Richness Theory (Daft & Lengel, 1986). Base on this theory it emphasizes that video contributes to education since its context will support and comprehend the developments involved and provides effective communications. Further, it developed the techniques and approaches in which video design merged visual, verbal, and text-based content presentation to complete a practical education course. The study is also supported by Teng (2015), about social cognitive theory and his view on observational learning (Bandura, 1986). The theory acknowledges that a large portion of an individual's knowledge is acquired through directly observing others through a model of task performance.

Similarly, Rosen et al., (2010) introduced Demonstration-Based Training (DBT) to support Teng's (2015) theory for people to perceive and abstract the pertinent knowledge for learning. So, the Demonstration-Based Training (DBT) was developed to improve specific knowledge, skills, and attitude through the systematic design and use of complementary instructional features. There are four (4) processes identified, with each function having its corresponding instructional features, such as the following: Attention process, retention process, reproduction process, and motivational process.

Attentional Process. It is considered the first step in observational learning. As defined by Bandura, attention refers to the process of observers selectively attending to specific observable actions according to their accessibility, relevance, complexity, and functional value. Attention is very significant since, without it, retention, motivation to be creative may not be possible. In the study, there were five (5) instructional features identified for this process to ensure sustained attention: Narration, Highlighting, User Control, Video Pacing, and Video Length.

Narration will visualize the text by the employment of the human voice. It will have to be done simultaneously with the animation. Since dual-coding theory states that people have separate channels for processing visual and auditory information, they can be converted mutually; there must be synchronization. There are two necessary components in procedural discourse, i.e., goals and actions and reactions (Van der Merj, 2013). Goal refers to your objective, while actions and reactions focus on task execution. Narration must ensure that these two components will be achieved. As proven, narrations are an effective method to invite learners' attention. (Bandura, 1986). The learners will most likely watch a video tutorial with narration than a pure video textual (Swarts, 2012).

As Teng cited, Highlighting or Signaling is a kind of instructional feature that guides learners' cognitive processing toward relevant information through verbal or visual symbols. In his study, Teng (2015) chooses color-coding by using red arrows and circle and zooming. Zooming facilitates recognition of objects and clarity of the text on the screen; thus, it will draw learners' attention, especially to the emphasized topic or subject, thus signaling improved learning.

The user control will enable learners to have the option of influencing the played video. In his study, Teng (2015) let the learners start, pause, stop, restart and go forward and backward the video. The result showed that it enabled the learners to adjust their views to their attentional process.

Video pacing pertains to the speed of the video. According to the study, the pacing of the video can affect learners' attention. If the pace is too fast, it may affect the cognitive faculty, while a prolonged pace video may have bored or diverted learners' attention. Video length refers to the duration of the video. In Teng's study, the average length for the experimental condition is 3.17 minutes, while in the control condition is 1.93 minutes. It was found that video under 3 minutes has a more positive impact than confirmed in the study.

Retention Process. Teng's study defines retention as a means to convert concrete observation to cognitive symbols. It is stated that meaningful learning is an effective method to support retention. In the study, Teng employed the following instructional features: Narration, Segmentation, Pause & Natural Brakes, and Simple-to-Complex Sequencing.

Narration is the text expressed in voice with the accompanying animation. It will help the learners understand the demonstration since it is explained to them the procedure and the rationale for the learners to appreciate the demonstrated performance.

Segmentation is the one where the video tutorial is divided into segments. In Teng's study, the same was manifested by creating a table of content that was split into three smaller videos. It is shown that segmentation helped the learners gradually gaining knowledge and skill without causing cognitive overload.

Pause and natural breaks refer to the temporary stop or rest in the demonstration. In the study, the visual image was kept during the gap without the corresponding narration. It enables the learners to reflect on the previous information and to prepare them for the next.

Simple-to-Complex Sequencing shows that learners benefit by employing the first simple video before exposing or presenting the complex one. This is within the context of a proven fact on human's cognitive hierarchy of knowledge development, i.e., the simple knowledge serves as the foundation to equip or prepare the learner in acquiring complex knowledge. Observing the simple-to-complex principle the study employed three chapters where the first was easy, the second is more complicated, and the last is the most difficult. As indicated, the simple-to-complex sequencing approach prevents cognitive overload and ensures that each task is manageable to the learner's capacity.

Reproduction Process. Reproduction refers to performing the observed behavior in seemingly appropriate contexts through activating the stored cognitive symbol. The practice is the only instructional feature employed in Teng's study to facilitate the reproduction process. It is expressed by cognitively rehearsing the modeled behavior. This is to provide the learners the opportunity to rehearse the task procedure cognitively. The students during the practice were encouraged to refer to the video tutorial as a guide for the system. The methodology or approach was in recognition of Van der Merj (2013) design guideline that advocates are strengthening demonstration by practice. It is shown that practice improved learners' retention knowledge and skills.

Motivational Process. Motivation generally refers to an internal state that initiates and maintains goal-directed behavior. Motivational processes are considered the most critical part of the observational learning processes (Bandura, 1986). Ensuring a high level of motivation is a necessary environment that can draw attention during and after the observation and achieve more reproduction of demonstrated performance afterward. In the study, the instructional feature employed to enhance learners' motivation includes simple-to-complex sequencing, using control and using spoken human voice and narration in a conversational style.

It was shown in the study that the learners were not only able to gain knowledge and skills in simple-to-complex sequencing gradually but has also enhanced the learner's self-efficacy and motivation. The video tutorial in the study arranged the instructional feature from simple to complex. When the learners experience success initially, it will motivate them to continue watching the next videos.

User control not only enables the learners the liberty to adjust their attention but also enhances motivation. Since video tutorial's one disadvantage is, it is a passive process; the user control overcomes this limitation. The learners will start, pause, stop, restart, and backward the video according to their needs using the control button.

The use of spoken human voice and narration in a conversational style in the narration where human instead of a computer-generated voice is being utilized creates an atmosphere where the narrator directly interacts with the learners like having a conversation between them. The study shows that learners learned more effectively when the narration is spoken in a human voice instead of a machine voice. This is called the voice principle. Video produced with a more personal feel would be more engaging. The personalization principle claims that learners will likely follow the narration if presented in a conversation style.

5. CONCEPTUAL FRAMEWORK

In Figure 1, the conceptual framework of the study is presented. The variables in this study are Teaching strategies, Academic motivation of students, and Tutorial Videos in Mathematics.

Teaching strategies in mathematics, the independent variable, comprise the following indicators: behavioral strategies, cognitive strategies, and affective strategies. On the students' academic motivation, the dependent variable comprises the following indicators: striving for excellence and personal incentives. Lastly, tutorial videos in mathematics comprise the following indicators: usefulness of videos, characteristics of videos, and confidence.

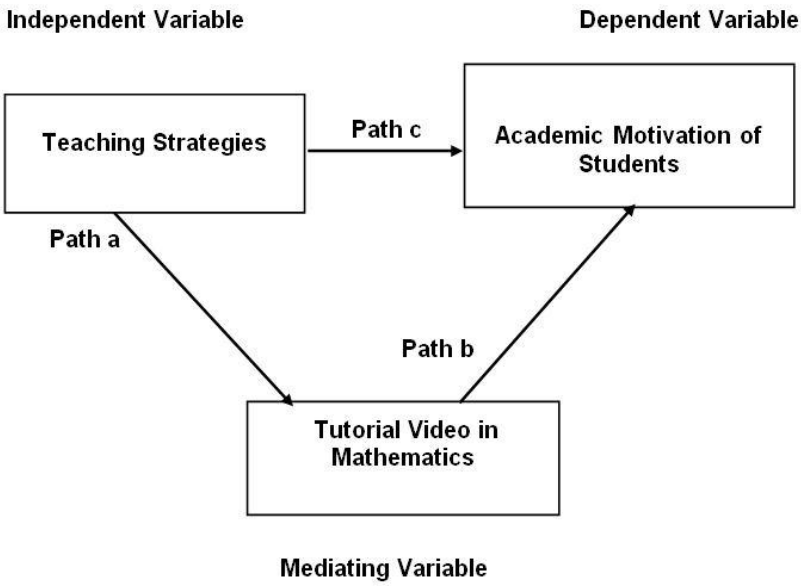

Figure1. *Conceptual Framework Showing the Variables of the Study*

The framework of the study serves as a guide to determine the relationship between the independent variable (teaching strategies -Path a) and dependent variable (academic motivation of students- Path b), the relationship between the independent variable (teaching strategies-Path a), and mediating variable (tutorial video in Mathematics- Path c) and dependent variable (academic motivation of students- Path b). Likewise, it serves as a map if the mediating variable (tutorial video in Mathematics) has a mediating effect on both the independent variable (teaching strategies) and dependent variable (academic motivation of students).

6. SIGNIFICANCE OF THE STUDY

From the global perspective, this study may address the existing problem about the deprived academic motivation of students in learning Mathematics in private and public schools. As such, the study results justify that tutorial videos can be used for remediation and enrichment that increases students' academic motivation (Khan & Slavitt, 2013). Moreover, YouTube tutorial videos were known as common educational alternatives that clearly explain the complex topic and promote helpful and reliable activities for teachers and learners (Carlsson, 2019).

In the case of Educators, the result of this study can give them an idea of how significant tutorial videos in mathematics are teaching strategies for students' academic motivation. This is the possible answer to the educational challenges to make the curriculum exciting and child-centered (Republic Act 10533). To make sure that education is fully achieved the teaching skills of teachers shall be developed and mastered to ignite students' motivational preferences and assumed to be experts as soon as they are in the field. With this issue, the Teacher Learning Institute (TEI) of higher education link efforts with DepEd to incorporate skills and competencies in the twenty-first century, including critical thinking in the curriculum for teachers' preparedness in the teaching and learning process (Choy and Oo, 2012).

For teachers, this study can serve as a lens on the importance of applying their discovery learning towards the video tutorial and motivational aspects of the learners' dreams towards excellence. Most schools used technology in teaching since we are in the 21st century, which helps our teachers to facilitate the introduced lesson easily. Students nowadays are dependent on their gadgets. With the help of tutorial videos as a teaching strategy, it is easy for the students to access their lesson since it is accessible to download. Like the khan academy video and other most recommended tutorial videos on YouTube for better learning, Parents can also guide their children to study, read more and ignite their interest to become serious in their motivational preferences academically. Moreover, it provides insights to our educators to promote encouragement, enthusiasm, and confidence in learning mathematics. This may contribute to the upliftment of the standard of the academe, particularly in utilizing tutorial videos as a math teaching strategy to increase students' academic motivation.

Definition of Terms

The following terms are defined operationally:

Tutorial Video. It refers to the lesson material in mathematics for senior high school students that teacher utilized in the teaching-learning process. In addition, it focuses on the use of videos, characteristics of videos, and the confidence of students in watching video tutorials.

Teaching strategies. The procedures or activities teachers and students perform in the teaching-learning situation to achieve the assigned teaching and learning objectives. Such teaching strategies are based on the behavioral, cognitive, and affective method. Also, it includes the teaching style and type of instruction delivered by the teacher.

Academic motivation. It refers to how students strive for excellence and personal incentives.

7. METHOD

7.1. Research Design

The researcher employed a quantitative non-experimental design utilizing the correlational technique of research to gather data ideas, facts, and information related to the study. Quantitative research, as described by Bhandari (2021), focuses on quantifying the collection and analysis of data. Accordingly, quantifying is formed from a deductive approach where the emphasis is placed on the testing of theory, shaped by empiricist and positivist philosophies, while non-experimental research is research that lacks the manipulation of an independent variable. Rather than manipulating an independent variable, researchers conducting non-experimental research measure variables as they naturally occur in the real world.

Meanwhile, according to Myers and Well (2013), descriptive-correlational research examines how the independent variable influences the dependent variable and establishes cause and effect relationships between variables. In this study, the researcher looked into the relationship between variables– teaching strategies, academic motivation of students, and tutorial videos in mathematics. Moreover, the study focused on the relationships among variables to determine significance on the relationship on paths a, b and c. In this study, the use of descriptive-correlational was appropriate because the researcher only focused on the behavioral aspect of the respondents, and the researcher was unable to experiment with a controlled set-up.

Lastly, mediation (path analysis) is a test that assesses whether a mediation effect is significant. It examines the relationship between the independent variable and the dependent variable, including the mediation factor. In statistics, Imai, Keele, Tingley, and Yamamoto (2014) pointed out that a mediation model seeks to explain the methods that support the relationship between the independent and a dependent variable via a third hypothetical mediator variable. In this study, the researcher examined the mediating effect of tutorial videos in mathematics on the relationship between teaching strategies and students' academic motivation.

7.2. Research Locale

The arrow in Figure 2 presented the map of Davao City pointing to a specific coordinate in the Philippine map where the study was conducted. Particularly, the current study was conducted purposely in selected Secondary Schools in Toril District, Talomo District and Poblacion District Davao City Division, Davao City.

The researchers' foremost consideration in deciding which schools are to be considered participating entities is those with an existing Senior High School Program. The institution's reputation or track record was also in the mind of the researcher as a factor. However, due to limitations brought about by the COVID-19 Pandemic, for practical reasons, those schools where the researcher has available contacts who are willing to accommodate and cooperate with the research came into the picture.

Daniels (2016) added that failing marks and dropped outs exist in the Public and Private Schools in Davao City. That is why the academic motivation of students to pursue studying being affected. Those prevailing scenarios made the researcher provide evidence that will help address the possibilities as to how students improve their encouragements towards learning.

Figure2. *The Map of Research Locale*

7.3. Population and Sample

The respondents of this research study were the Senior High School students in Public and Private Schools, Division of Davao City, Philippines. Using Krejcie and Morgan's (1970) distribution of samples sampling method, 578 respondents were required in the study. Krejcie and Morgan's (1970) distribution of the sample is a "Small Sample Technique" of the National Education Association in which no calculation is needed. It automatically provides the selection of respondents given the population in every School. The researcher also considered the participant withdrawing whether the participant wishes to provide continued follow-up and further data collection after their withdrawal from the intentional portion of the study.

8. RESEARCH INSTRUMENT

Three sets of survey questionnaires were used to obtain data from the respondents adapted from previous studies. The questionnaires were subjected for content validity and reliability analysis. The survey instruments were validated from external validators with expertise in the field of research and statistics. Minor revisions were recommended in some contents and statements of the instruments. Five experts validated it; four from the University of Mindanao, Professional Schools, and one from the outside with also expertise in validating the survey questionnaires. The overall mean from the expert validators is 4.66, with the description of excellent.

The first set was teaching strategies adapted from Hamzeh (2014) with indicators: First Domain: behavioral strategies, Second Domain: cognitive strategies, and Third domain: affective strategies. The questionnaire is a 5-point Likert Scale from 1 (Strongly Disagree) to 5 (Strongly Agree). With a reliability test of 20 items, the overall summary result has a value of Cronbach's Alpha at 1.05, indicating that the data used in this study is valid and the instrument has excellent reliability.

The second set is the academic motivation of students by Njiru (2003) with indicators: Striving for excellence and personal incentives. The questionnaire is a 5-point Likert Scale from 1 (Strongly

Disagree) to 5 (Strongly Agree). With a reliability test of 20 items, the overall summary result has a value of Cronbach's Alpha at .90, indicating that the data used in this study is valid and the instrument has high reliability.

The last set was adapted from Kahrmann (2016) for the tutorial videos in mathematics with indicators: usefulness of the videos, characteristics of videos, and confidence, and will be used to evaluate the tutorial videos in mathematics. The questionnaire is a 5-point Likert Scale from 1 (Strongly Disagree) to 5 (Strongly Agree). With a reliability test of 19 items, the overall summary result has a value of Cronbach's Alpha at .955, indicating that the data used in this study is valid and the instrument has high reliability.

In evaluating the teaching strategies of mathematics, the following scales were employed:

Range of Means	Descriptive level	Interpretation
4.20 - 5.00	Very High	This measure of teaching strategies is always observed.
3.40 - 4.19	High	This measure of teaching strategies is often observed.
2.60 - 3.39	Moderate	This measure of teaching strategies is sometimes observed.
1.80 - 2.59	Low	This measure of teaching strategies is seldom observed.
1.00 - 1.79	Very Low	This measure of teaching strategies is never observed.

In determining the academic motivation of students, the following scales were utilized:

Range of Means	Descriptive level	Interpretation
4.20 - 5.00	Very High	The measure of academic motivation is always manifested.
3.40 - 4.19	High	The measure of academic motivation is often manifested.
2.60 - 3.39	Moderate	The measure of academic motivation is sometimes manifested.
1.80 - 2.59	Low	The measure of academic motivation is seldom manifested.
1.00 - 1.79	Very Low	The measure of academic motivation is never manifested.

In assessing the level of students with regards to the achievement level of students with regard to the tutorial video in mathematics: the following scales were used:

Range of Means	Descriptive level	Interpretation
4.20 - 5.00	Very High	The measure of tutorial videos in mathematics is always evident.
3.40 - 4.19	High	The measure of tutorial videos in mathematics is often evident.
2.60 - 3.39	Moderate	The measure of tutorial videos in mathematics is sometimes evident.
1.80 - 2.59	Low	The measure of tutorial videos in mathematics is seldom evident.
1.00 - 1.79	Very Low	The measure of tutorial videos in mathematics is never evident.

Before conducting the actual survey, the researcher conducted a preliminary online survey through google form with 30 respondents for reliability testing. The preliminary data were subjected to internal consistency using Cronbach’s Alpha. With a reliability test of 59 items, the overall summary result has a value of Cronbach’s Alpha at .973, which indicates that the data used in this study is valid and the instrument has excellent reliability (Hinton et al., 2004).

9. DATA COLLECTION

During the data collection, the researcher did the following eight steps: First, the researcher presented her concepts, then did a series of revisions before drafting the survey instruments. Second, validated the survey tools through experts' opinions from notable research enthusiasts from different Universities. Third, after the validation of survey instruments was completed, the researcher decided to test them last March 2020. A total of 30 respondents have participated in the simulation of survey instruments. Fourth, the accomplished survey instruments were submitted to the statistician in the University of Mindanao for reliability testing. For reliability statistics, results revealed an average Cronbach's alpha of .96. This implies that the survey instruments are reliable. Fifth, after completing the validity and reliability testing for the survey instruments, the researcher submitted her manuscript to Ethics Review Committee for review (ERC). After the approval from ERC, written permission and endorsement was obtained from the department.

It was on the sixth, and its succeeding steps contributed to most of the scope of work in terms of the data collection process. The researcher experienced a slight problem with seeking permission from the Division office and private schools due to the COVID-19 pandemic. They are strict in entertaining the person and very busy preparing new normal set-up. On the sixth step, a letter was attached to the endorsements and then submitted to the School's division superintendent for public and School president for private.

As soon as the individual School permission was granted, a schedule was made for the data gathering using google form and the agreed date when the survey was done. Due to some limitations and strict protocols of the chosen School, the researcher adjusts on the School's available time and the Students. Seventh, the researcher coordinated with the school research coordinator for the google form link that must be forwarded to the subject teacher for the respondents to answer. She was very thankful for the assistance and positive attitude shown by the assigned teachers for their willingness to give the researcher a helping hand and give her enough time to finish the online survey administration. The data-gathering period for private schools was September 14-28, 2020, while in public School was October 5-9,2020. Eight, the researcher successfully retrieved the results since they can easily download them from google form. The data gathered were downloaded via the Microsoft excel program for evaluation and interpretation. After retrieval, the data were forwarded to the statistician for the computations of results. Appropriate statistical tools were utilized to manipulate the gathered data.

Statistical Tools

This section contains the statistical tools that were utilized to attain the objectives of the study.

Mean. This was used to characterize the teaching strategies (IV), academic motivation of students (DV), and tutorial videos in mathematics (MV).

Pearson r. This was used to determine the significance of the relationship between the teaching strategies (IV), academic motivation of students (DV), and tutorial videos in mathematics (MV).

Path Analysis. This was used to determine the mediating effect of tutorial videos in mathematics on the relationship between students' teaching strategies and academic motivation.

10. ETHICAL CONSIDERATION

In cooperation with the standards set forth by the University of Mindanao Ethics Review Committee, the researcher took specific steps to guarantee that respect, justice, and humanity were observed. Accomplishing these steps includes voluntary participation, privacy and confidentiality, informed consent process, risks identification and mitigation, and identification of potential benefits were implemented during the data collection and writing the study. Other ethical issues were also observed, such as plagiarism, fabrication, falsification, conflict of interest, deceit, permission from an organization or location, and authorship during the study.

Voluntary Participation. Secure the exercise of ethical procedures. This research secures the respondent's willingness as part of this study. The more willing the participants, the more meaningful inputs and information they may contribute.

Privacy and Confidentiality. Members of participants guarantee that all information collected in the study is managed with strict privacy and confidentiality, and only combined information will be used and part of the statistical analysis. However, upon request, the results will be made available to the participants anytime.

Informed Consent Process. The researcher will obtain proper consent to inform participants of their rights during the conduct of the study.

Recruitment. For this research, the identified participants are randomly selected in chosen private and public senior high schools within Davao City, especially those schools wherein the mediating effect of tutorial videos in mathematics on the relationship between teaching strategy and academic motivation will be applied. The Inclusion Criteria identified in this study have identified the population consistently, reliable, and objective. This study will accommodate and survey Senior high schools in the chosen Private and Public Schools within Davao City. Moreover, the exclusion criteria include factors or characteristics that make the recruited population ineligible for the study, which is not qualified as the survey respondents.

Risk. The researcher assumed a minimal risk to be undertaken by the respondents due to some unexpected circumstances or any physical discomfort during the conduct of the survey. However, for this research, it is possible that the researcher will be had a higher risk of getting harmed in terms of physical and psychological harm due to long travel throughout the study's conduct and duration. To mitigate such identified risks, the researcher evaluated the said risks and set some precautions such as deciding on the mode of travel, awareness of the environment status, and cognizance of research locations' school and safety policies.

Benefits. This study also guarantees the researcher's obligation was to maximize the benefits while minimizing the risks of damage to the participant. On the other hand, this study may provide respondents a deeper understanding and awareness about the tutorial videos in mathematics on the relationship between students' teaching strategy and academic motivation. The results and findings of this study can provide evidenced-based details that may serve as a reference of the academic recognizing agencies such as TESDA, CHED, DEPED, and other professional organizations in the formulation of policies supporting teachers' professional development and students' learning programs.

Plagiarism. To ensure authenticity and genuineness of various literature cited, Turnitin software or Plagiarism checker was used. Further, the researcher ensured that all authors and proponents of sources used were given due credits to avoid plagiarism.

Fabrications. The researcher also ensured no trace of misrepresentation of data, inaccurate results, or any alteration of results.

Falsification. All information and data collected must be original, adequately transcribed, verified by the participants, and there is no making up of data or alteration of results.

Conflict of Interest (COI). No conflict of interest is hidden and conduct without any vested interest like academic recognition and seeking popularity. The researcher guarantees fair and objective research.

Deceit. This research did not use deception about the author's identity, the nature of the study, and its true purpose. Misinforming or misleading the participants about the true meaning of the research can lead to deception. But, since the study did not involve experimentation, where personal knowledge of purpose might change people's behavior, then authenticity is achieved.

Permission from the organization. The researcher secured written permission from the organization in which the data was collected. The researcher also assured that the person must have the proper authority to seek consent in getting the written permission. The researcher will obtain permission from the DepEd Superintendent, School Heads, and Executive president in mentioned schools.

Authorship. The credit was based on the substantial contribution from design conception to data acquisition, analysis, and interpretation of data, drafting the manuscript, revising it to cover, and including essential contents to the final approval for the paper for publication. The primary author of this research, whose name appeared on the manuscript's title page, has been an authorship credit. The Co-Author of this study is my adviser, who was responsible for accomplishing this study.

11. RESULTS

11.1. Level of Teaching Strategies in Learning Mathematics

Presented in table 1 is the level of teaching strategies provided by mathematics teachers as perceived by the students in selected public and private senior high schools. The result shows that it accumulated an overall mean score of 4.12 with a verbal interpretation of high. It indicates that the level of teaching strategies provided by the teachers as perceived by the students in learning mathematics is often observed—the standard deviation records as 0.67, which suggests homogeneity among the senior high school students' responses.

All indicators of teaching strategies are labeled as High; however, affective strategy obtained the highest mean score of 4.18 with a standard deviation of 0.74. It implies that the affective strategy of mathematics teachers in private and public senior high schools is often observed.

Table1. *Level of Teaching Strategies in learning Mathematics*

Indicators	SD	Mean	Descriptive Level
BEHAVIORAL	0.72	4.06	High
COGNITIVE	0.70	4.14	High
AFFECTIVE	0.74	4.18	High
Overall	**0.67**	**4.12**	**High**

11.2. Level of Academic Motivation of the Students in learning Mathematics

Reflected in table 2 the level of academic motivation of the students in learning mathematics. The result has shown an overall mean score of 3.27 with a descriptive interpretation of moderately high, indicating that level of academic motivation of the students is sometimes manifested—the standard deviation records as 0.50, which suggests homogeneity among the senior high school responses.

All indicators of academic motivation of the students are labeled as Moderately High. Meanwhile, the striving for excellence has a greater mean score of 3.36 compared to the personal incentives. It indicates that striving for excellence is sometimes manifested.

Table2. *Level of Academic Motivation of the students in learning Mathematics*

Indicators	SD	Mean	Descriptive Level
Striving for Excellence	0.49	3.36	Moderately High
Personal Incentives	0.57	3.18	Moderately High
Overall	**0.50**	**3.27**	**Moderately High**

11.3. Level of Efficacy towards the use of Tutorial Videos in learning Mathematics

Table 3 presents the level of efficacy towards using tutorial Videos in learning mathematics as perceived by the students. Results show an overall mean score of 3.92 with the verbal interpretation of High. It indicates that tutorial Videos used in learning mathematics are often evident.

Specifically, statements emphasized with labeled Very High are the following: As Student, I find the videos that solved math problems (step-by-step) helpful" with a mean value of 4.28; "As Student, I use the videos to help me with homework" with a mean value of 4.23; "As Student, I watch the videos to help me learn" with a mean score of 4.23, "As Student, I watch the videos for the enrichment and to learn more" with a mean score of 4.20; and "As Student, I believe that videos help me learn with a mean score of 4. All of the five statements above indicate that tutorial videos in mathematics are evident at all times.

Table3. *Level of Efficacy towards the use of Tutorial Videos in learning Mathematics*

Items	SD	Mean	Descriptive Level
As student, I			
watch the videos daily.	0.97	3.63	High
watch the videos to help me learn.	0.92	4.23	Very High
watch the videos for enrichment and to learn more.	0.90	4.20	Very High
watch the videos because I missed the lesson in class.	1.01	3.7	High
watch the videos before the teacher taught the lesson.	1.10	3.57	High

watch the videos after the teacher taught the lesson.	0.9	3.77	High
use the videos to help me with homework.	0.96	4.23	Very High
use the videos to help me prepare for a test.	0.97	4.11	High
As student, I			
am able to learn more from the video since I was able view at my own pace and to rewind and review portions, I did not understand the first time.	0.97	3.9	High
find the videos that were more like lectures helpful.	0.88	4.08	High
find the videos that solved math problems (step-by-step) helpful.	0.95	4.28	Very High
like seeing my teacher in the videos.	0.95	3.89	High
like just seeing the blackboard and writing in the videos.	1.01	3.82	High
miss being able to ask questions during the videos.	1.04	3.56	High
find it hard to watch the videos because Internet access is a problem.	1.07	3.81	High
As student, I			
believe that videos help me learn.	0.90	4.20	Very High
have more confidence in my math ability now that I have the videos.	0.98	3.67	High
understand the math concepts better by watching the videos	0.98	3.74	High
like having the videos as math resource when I need it.	0.95	3.93	High
Overall	**0.66**	**3.92**	**High**

11.4. Relationship between Teaching Strategies and Academic Motivation of Students in Learning Mathematics

Table 4 shows the relationship between the teachers' teaching strategies and the students' academic motivation in learning mathematics. By doing in-depth analysis, it gleaned an overall r-value of 0.688 with a p-value <0.05 level. It indicates that the null hypothesis of no significant relationship between the students' teaching strategies and academic motivation is rejected. It implies that the more often the teachers' teaching strategies, the more they are academically motivated to learn mathematics.

More specifically, among all the indicators of teaching and academic motivation, results revealed the highest r-value of .651 with a p-value <0.05 for the relationship between behavioral strategy and striving for excellence. The more the teachers integrate the application in their teaching, the more students will be encouraged to aspire to do better.

Table4. *Significance on the Relationship between Teaching Strategies and Academic Motivation of Students in learning Mathematics*

Academic Motivation of Students	**Teaching strategies**			
	Behavioral	Cognitive	Affective	**Overall**
Striving for Excellence	.651* (.000)	.638* (.000)	.634* (.000)	**.686* (.000)**
Personal Incentives	.598* (.000)	.570** (.006)	.554* (.801)	**.614* (.000)**
Overall	**.662* (.001)**	**.640* (.000)**	**.628* (.000)**	**.688* (.000)**
***Significant @ 0.05**				

11.5. Relationship between Teaching Strategies and Tutorial Videos in Mathematics

Presented in table 5 is the relationship between teaching strategies and tutorial videos in mathematics. The results revealed an overall r-value of 0.752 with a p-value <.05, rejecting the null hypothesis. It indicates the significant relationship between teaching strategies and tutorial videos in mathematics. This further implies that the more often observed the teaching strategies provided by the teacher, the more effective it is because of the integration of tutorial videos.

Table5. *Significance on the Relationship between Teaching Strategies and Tutorial Videos in Mathematics*

	Teaching strategies			
	Behavioral	Cognitive	Affective	**Overall**
Tutorial Videos in Mathematics	.742* (.000)	.700* (.000)	.670* (.000)	**.752*** **(.000)**
***Significant @ 0.05**				

11.6. Relationship between the use of Tutorial Videos and Academic Motivation of Students in Learning Mathematics

Table 6 shows the relationship between tutorial videos' use and academic motivation in learning mathematics. The result reveals an overall r-value of .675 with p<.05, hence rejecting the null hypothesis. Thus, there is a significant relationship between tutorial videos' use and academic motivation in learning mathematics. It implies that the higher practice of tutorial videos in mathematics, the higher the students' willingness to be inspired in learning mathematics.

Table6. *Significance on the Relationship between the use of Tutorial Videos and Academic Motivation in learning Mathematics*

Academic Motivation of Students	**Tutorial Videos in Mathematics**
Striving for Excellence	.676* (.000)
Personal Incentives	.600* (.000)
Overall	**.675*** **(.000)**
***Significant @ 0.05**	

11.7. On the Mediating effect of Tutorial Videos in Mathematics

Presented in Figure 3 is the Path Analysis reveals the following: the result on teaching strategies (x) to tutorial videos (m); tutorial videos in mathematics (m) to academic motivation (y); and teaching strategies (x) to the academic motivation of students (y) are significant with sign unchanged; hence, tutorial videos in mathematics partially mediates the relationship between teaching strategies and academic motivation of the students in learning mathematics.

The triangular diagram above shows that there is a corresponding 0.74-unit increase in m (tutorial videos) for every unit increase in teaching strategies. Also, for every unit increase in tutorial videos, there is a 0.27 corresponding increase in students' academic motivation. Moreover, for every unit increase in teaching strategies there is a corresponding 0.31-unit increase in students' academic motivation. In summary, following path teaching strategies-tutorial videos in the mathematics-academic motivation of students, for every unit increase in teaching strategies, there is a 0.31-unit increase in students' academic motivation. This implies that students' academic motivation can be enhanced by teaching strategies but should pass through tutorial videos in mathematics. Hence, tutorial videos partially mediate teaching techniques to strengthen students' academic motivation in learning mathematics.

Partial Mediation (with Sign Unchanged)

			Estimate	S.E.	C.R.	P	Label
TV	<---	TS	.741	.027	27.536	***	
AM	<---	TS	.306	.032	9.619	***	
AM	<---	TV	.272	.032	8.402	***	

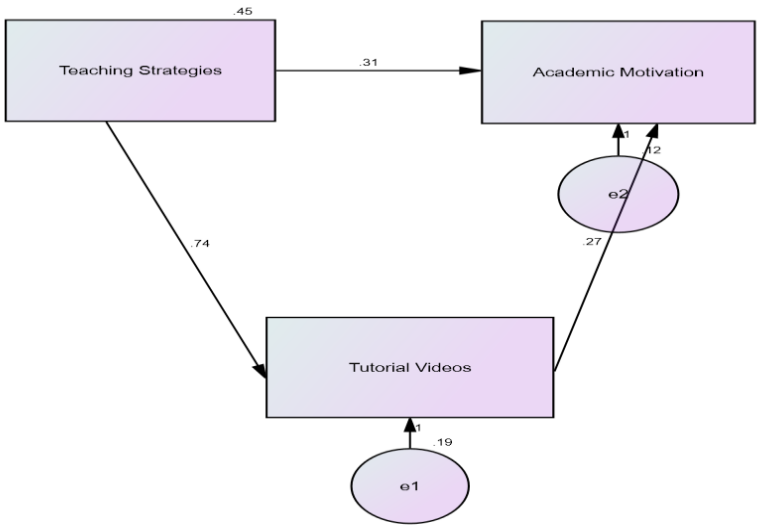

Figure3. *Results of the Mediation computation*

x= TEACHING STRATEGIES, y= ACADEMIC MOTIVATION, m= TUTORIAL VIDEOS

12. DISCUSSION

12.1. Teaching Strategies in Mathematics

The level of teaching strategies provided by the teachers in mathematics, the students perceived it as highly observed. It implies that the teaching strategies of mathematics teachers in private and public senior high schools are often observed.

This result of the teaching strategies in mathematics is higher than the findings of Pei-Shei (2012), as revealed in their conclusions that the Jordanian Mathematics teachers have moderate findings regarding the teaching strategies introduced. Moreover, Galindo (2020) emphasized that student engagement in cognitive strategy is a significant element because it widens the students' mastery and knowledge acquisition in learning the subject matter.

Moreover, Ayeni (2011) conforms with the results of this study as revealed in their findings that teaching methods must be appropriate and aligned with the subject matter. The student's responses vary whether the teaching strategy is effective or not. Hence, teachers must be resourceful and flexible enough to handle students, especially in mathematics (Mitchell, 2015). These strategies include a positive learning environment that improves mental ability, critical thinking, and correct information that directly connects to the acquired knowledge of the learner's diversity.

Moreover, Silver (2018) suggested that teachers should be advanced in knowledge with basic technological skills and understand individual differences of learners to accommodate strengths and interests. A positive learning environment is conducive to wide-ranging information. The achievement of effective strategy depends on the teachers on how to introduce a meaningful and memorable learning development. This includes progressive relaxation, deep breathing exercises, monitoring emotion, and making positive self-talk (Pophan, 2011).

12.2. Academic Motivation of Students in Learning Mathematics

The level of academic motivation of students in learning mathematics is described as moderately high. The indicators: striving for excellence and personal incentives have portrayed moderately high ratings. This means that senior high school students' academic motivation to learn mathematics from private and public is sometimes manifested.

This result is aligned with Njiru (2003) that students' academic motivation varies on teachers' approach to make lessons exciting and provide praises and feedback with regards to the outputs of the learners. In addition, Knapper (2017) supported that the integration of technology and manipulatives' use increases students' motivation academically.

Moreover, Sanchez, Marcos, Gonzales, Guanlin (2012) emphasize that teachers' attitudes and methods vary and are necessary for the learners' interests academically. As an example, their responses show that teachers' encouragement was observed, and students show interest in the topic. One feature that can improve student motivation academically is based on the teacher's teaching strategies (Gbollie&Keamu, 2017). Hence, by being satisfied, like using tutorial videos in mathematics, they were academically motivated to strive for excellence and have personal incentives. Several authors also emphasize that academic motivation urges learners to be more active and directs behavior as a determinant for academic success (Robbins et al., 2004; Hattie, 2009; Plante et al., 2013; Wigfield et al., 2016).

12.3. Tutorial Videos in Mathematics

The level of efficacy in tutorial video use is described as highly observed by the students in learning mathematics. The indicators: use of videos, characteristics of videos, and confidence have represented high ratings. It indicates that tutorial Videos in mathematics are often evident. Moreover, this parallels Kahrmann's (2016) study that tutorial videos have high use rate whether for teaching scheme, enhancement, or missed instruction and remediation. For instance, responses showed that tutorial videos help them learn and have confidence in answering problems in mathematics.

In support, Mendoza, Caranto, and David (2015) revealed in their study entitled "Effectiveness of Video Presentation to Students' Learning" that video instruction to students learning is highly effective, enhances students' learning, and positively affects performance. As mentioned by the American Public Broadcasting System (PBS) annual survey, the percentage of teachers utilizing video has increased since 2007. Result for 2010 shows that 68 percent believe that video instruction stimulates discussion, 66 percent believe that video increases students' academic motivation, 61 percent preferred by students to use video content, and 42 percent believe video automatically increases student's achievement (Liimatta, 2015). Dreon, Kerper, and Landis's (2011) study state that YouTube video tutorials are a very effective method in developing learning skills and the utilization of computers.

12.4. Relationship between Teaching Strategies and Academic Motivation of Students

The test of the relationship between teaching strategies and students' academic motivation revealed a significant relationship between teaching strategies and students' academic motivation. This implies that teaching strategies are correlated with the academic motivation of students. In other words, the increase in teaching strategies would also likely increase their academic motivation. Moreover, the more the teachers integrate the application in their teaching, the more students will be encouraged to aspire to do better.

The present finding conforms to the anchored proposition by (Sanchez, Marcos, Gonzales, Guanlin, 2012), emphasizing that teacher's attitudes and techniques vary and necessary for the learners' interests academically. Even though teachers cannot control aspects of motivation, they can incorporate instruction that learners became motivated and create a conducive atmosphere inside the classroom and a positive attitude towards the lesson objective. Differentiated instructions and activities set the goal that learners could quickly achieve. Diversity of learners inside the classroom promotes positive rapport with learners by showing respect, care, fairness, and understanding, and aiming for success and a feeling of achievement. The motivation and eagerness of learners towards learning depend on how the institution directly provides appropriate learning resources. Rwanda's best example is that the Ministry of education adapted the computer-generated classroom because they have a teacher shortage, crowded classrooms, and a lack of educational materials like textbooks (Ruhinda, 2013). It helps in curriculum development, making meaningful learning experiences, and helps to enable learning according to educational approaches reinforced by e-learning (Albano &Dello, 2019).

12.5. Relationship between Teaching Strategies and Tutorial Videos in Mathematics

The relationship between teaching strategies and tutorial videos in mathematics revealed a positive and significant relationship between the indicators of tutorial videos in mathematics. This implies that the increase in teaching strategies would also likely increase the tutorial videos in mathematics. The researcher led to say that the more advanced teaching strategies in mathematics, the more effective it is because of the integration of tutorial videos.

The finding agrees with the proposition of Clark and Mayer (2016) concluded that tutorial videos in mathematics contribute to education since its context will support and comprehend the developments involved. Khalid (2014) added that it also showcases that most learners prefer video presentation as current means of learning. Besides, there is an accurate source of how effective this means as a teaching method. Moreover, Silver (2018) suggested that teachers should be advanced in knowledge with basic technological skills and have an idea of the prior experiences of individual learners to accommodate learners' strengths and interests. A positive learning environment helps to learn in general.

12.6. Relationship between Tutorial Videos in Mathematics and Academic Motivation of Students

The test of the relationship between tutorial videos in mathematics and students' academic motivation shows that there are benefits and significant relationships between tutorial videos in mathematics and students' academic motivation. This implies that the higher practice of tutorial videos in mathematics the higher the willingness of the students to be inspired in learning.

This result is congruent to the view of Mendoza, Caranto, and David (2015) entitled study "Effectiveness of Video Presentation to Students' Learning" that video instruction to students learning is highly effective, enhances students learning, and affects performance positively. As mentioned by the American Public Broadcasting System (PBS) annual survey, the percentage of teachers utilizing video integration has increased since 2007. The result for 2010 shows that 68 percent believe that video instruction stimulates discussion, 66 percent believe that video increases students' academic motivation, 61 percent preferred by students to use video content, and 42 percent believe video automatically increases student's achievement (Liimatta, 2015).

"Cognitive theory of multimedia learning" of Clark and Mayer (2016) and the Media Richness Theory (MRT) that was presented by Daft and Lengel (1986) emphasizes that video contributes to education since its context will support and comprehend the developments involved and provides effective communications. This theory also developed the techniques and approaches in which video design merged visual, verbal, and text-based content presentation to complete a practical education course. With the support of Rosen et al. (2010), introduced Demonstration-Based Training (DBT) to perceive and abstract the pertinent knowledge for learning considering the instructional features for the tutorial videos such as the following: attention process, retention process, reproduction process, and motivational process. For the inattentive learners, the videos can be used for remediation and enrichment.

12.7. On the Mediating effect of Tutorial Videos in Mathematics

The mediation analysis reveals that tutorial videos in mathematics partially mediate the relationship between students' teaching strategies and academic motivation. Tamim (2013) added that if we check the performance quality, a tutorial video is used as an educational tool, and it is easier for the learners to relate and select between knowledge proficiency delivered. It aroused their resourcefulness and deepened their understanding resulting in their happiness and more interaction with their teachers using their learned information (Rice, Snelson, Wyzard, 2012). Fundamentally, Borthick and Lederberg's (2011) appealed that using video tutorial in mathematics lowers the drop rates and higher examination scores that increase the passing rates.

The mediation analysis involved the path between teaching strategies and tutorial videos in mathematics and the way between tutorial videos in mathematics and students' academic motivation. The findings confirmed the significant relationship between teaching strategies and tutorial videos in mathematics lending support to one of the framework accounts of this study that of Takeda, Takeuchi,

Haruna, (2007); Salina, Ruffinengo, Garrino, Massariello, Charrier, Martin, Favale, Dimonte, (2012). More studies established that video utilization as a teaching practice significantly encouraged the learners' curiosity to study on their own thus, relieve some of the teachers' chore. This is because teaching strategies, as mentioned by Greenberg et. al;(2007) that it also showcases that most learners prefer video presentation as current means of learning, and aside from that, there is an accurate source of how effective this means as a teaching method and increases teachers' feeling of ownership about their work so that they would feel proud to their work and undertake tasks willingly (Kanani&Shafiei, 2016).

Furthermore, the current study made clear that teaching strategies through tutorial videos in mathematics influence students' academic motivation. Tutorial videos in mathematics reinforce the relationship of teaching strategies and the academic motivation of students.

13. CONCLUSION

Based on the study's findings, the researcher gleaned the following conclusions drawn in this section. The findings of this study confirm the assumptions about the mediating effect of tutorial videos in mathematics on the relationship between teaching strategies and academic motivation of students. The level of teaching strategies provided by mathematics teachers as perceived by the students is high for behavioral, cognitive and affective teaching strategy. This denotes that the level of teaching strategies provided by the teachers as perceived by the students in learning mathematics is often observed.

Meanwhile, the students' level of academic motivation in learning mathematics has a descriptive interpretation of moderately high considering the striving for excellence and personal incentives. This means that the academic motivation of the students is sometimes manifested. Moreover, the level of efficacy towards using tutorial Videos in learning mathematics as perceived by the students is high. It indicates that tutorial Videos used in learning mathematics is often evident.

Meanwhile, it was found out that there is a significant relationship between teaching strategy and academic motivation of students; teaching strategy and tutorial videos in mathematics; academic motivation and tutorial videos in mathematics. Therefore, it could be concluded in this study that all three variables have significant relationship and towards each other.

In addition, the result on teaching strategies (x) to tutorial videos (m); tutorial videos in mathematics (m) to academic motivation (y); and teaching strategies (x) to academic motivation of students (y) are significant with sign unchanged. Hence, tutorial videos in mathematics partially mediates the relationship between teaching strategies and students' academic motivation in learning mathematics. Although the tutorial videos in mathematics only have partial mediation, it means that not all can be explained by the mediator on the teaching strategies for students' academic motivation. Moreover, the findings provide evidence that the Senior High School students from public and private institutions believed that effective teaching strategies are necessary for students' academic motivation.

14. RECOMMENDATION

Based on the foregoing findings and conclusions, several recommendations are offered. Since there is high of teaching strategies, moderately high academic motivation of students and high for tutorial videos in mathematics. It is suggested that teaching strategies in mathematics shall maintain or even improve for students' academic motivation. Furthermore, to improve the level of teaching strategies, academic motivation of students, and level of efficacy towards tutorial videos, the Department of Education may conduct seminars and trainings and closely monitor its implementation to amplify our educators' proficiency to be equipped in creating video tutorials. In fact, McMullen (2011) emphasizes that math tutorial videos in mathematics implications and its usefulness in arousing learners' knowledge. In addition, the government must allocate enough budget to improve internet access and provide equipment to different schools. The mediation analysis suggests that teachers must strengthen their tutorial videos in mathematics as a teaching strategy to achieve efficiency for our students.

On the other hand, future researchers should read the research findings to be equipped with knowledge about how tutorial videos mediate teaching strategies and students' academic motivation. They should also consider the application of research findings in their respective station to test students' academic motivation in learning mathematics.

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STATISTICAL TABLES

Table1.1. *Level of teaching strategies used by mathematics teacher as perceived by the respondents in terms of behavioral domain*

Indicators	Standard Deviation	Mean	Descriptive level
1. The teacher provides the student with information regarding his/her answer' accuracy all the time.	0.93	3.93	High
2. The teacher helps his/her students imitate desired models.	0.86	4.01	High
3. The teacher uses direct presentation to provide students with information.	0.89	4.13	High
4. The teacher dissembles the teaching-learning material into specific tasks that need specific responses.	0.85	3.92	High
5. The teacher trains students on learning simple behaviors till they reach to the complicated behavior.	0.86	4.19	High
6. The teacher makes advantage of the contract procedures he/she does with his/her students for the purpose of achieving the teaching-learning tasks.	0.85	4.00	High
7. The teacher provides students with a chance to apply new knowledge in new real-life situation.	0.89	4.20	High
Overall	**0.72**	**4.06**	**High**

Table1.2. *Level of teaching strategies used by mathematics teacher as perceived by the respondents in terms of cognitive domain*

Indicators	Standard Deviation	Mean	Descriptive level
1. The teacher presents the main ideas of the topic at the beginning of the class.	0.85	4.19	High
2. The teacher encourages students to verify information and facts before giving judgements.	0.87	4.16	High
3. The teacher trains students to plan, observe, and evaluate their teaching activities.	0.85	4.21	Very High
4. The teacher guides students to references such as dictionaries, encyclopedias, internet sites. etc.	0.92	4.13	High
5. The teacher gives students a chance to generate new concepts.	0.87	4.13	High
6. The teacher uses cognitive teaching strategies to harmonize with students' learning strategies.	0.84	4.09	High
7. The teacher uses problem solving strategy in the teaching situation.	0.87	4.11	High
Overall	**0.70**	**4.14**	**High**

Table1.3. *Level of teaching strategies used by mathematics teacher as perceived by the respondents in terms of affective domain*

Indicators	Standard Deviation	Mean	Descriptive level
1. The teacher allows students to have more clarifications and explanation.	0.95	4.22	Very High
2. The teacher encourages students to interact positively among themselves.	0.90	4.23	Very High
3. The teacher teaches student the way to identify their points of strength and weakness.	0.87	4.17	High
4. The teacher strengthens leadership in his students.	0.93	4.14	High
5. The teacher distributes different teaching-learning tasks on students.	0.92	4.04	High
6. The teacher trains students to solve their problems in a comfortable way.	0.87	4.28	Very High
Overall	**0.74**	**4.18**	**High**

Table1.4. *Level of academic motivation of students to achieve academically in terms of Striving for Excellence*

Indicators	Standard Deviation	Mean	Descriptive level
1. I try different ways to solve academic (study) problems.	0.68	3.29	Moderately High
2. When I don't get what I expect in my studies, I work hard so that I may achieve my goals.	0.67	3.48	High
3. I check my work carefully so that I can get good marks.	0.65	3.46	High
4. I make strong effort to achieve as high marks as I can.	0.65	3.49	High
5. I receive encouragement on my studies from my teachers.	0.77	3.26	Moderately High
6. I get interested in solving problems that others have as well in a topic.	0.75	3.18	Moderately High
7. I show interest about topics being taught.	0.70	3.30	Moderately High
8. I ask questions on topics I do not	0.73	3.35	Moderately High

understand from others.			
9. I try to learn from others who are better in studies than me.	0.71	3.40	High
10. I seek help from experts (e.g. Teachers) in my studies.	0.75	3.27	Moderately High
11. I pay attention to my teachers to understand what is being taught.	0.69	3.43	High
12. I take my studies as a personal responsibility.	0.64	3.54	High
13. I struggle to gather information on topics so that I can master them.	0.71	3.26	Moderately High
Overall	**0.49**	**3.36**	**Moderately High**

Table1.5. *Level of academic motivation of students to achieve academically in terms of Personal Incentives*

Indicators	Standard Deviation	Mean	Descriptive level
1. I try to work hard because doing well in studies bring high status.	0.74	3.37	Moderately High
2. I try to work hard in studies because of the challenges it brings.	0.72	3.40	High
3. I like the intellectual challenge brought about by academic work.	0.75	3.24	Moderately High
4. I like to solve problems in studies.	0.80	3.02	Moderately High
5. I like the social relationship involved in studies.	0.74	3.13	Moderately High
6. I have fun with peers as we study.	0.74	3.14	Moderately High
7. I get honor and praise from teachers for passing in my studies/exams.	0.87	2.94	Moderately High
Overall	**0.57**	**3.18**	**Moderately High**

AUTHORS' BIOGRAPHY

Nancy N. Namuag, is a public secondary mathematics teacher atMagtuod National High School, Cluster 2, City Division of the Department of Education (DepEd), in Davao, Philippines. She has been teaching in that school for about three (3) years. She was a winning coach during the 2019 Division Mathematics Fair and Critical Thinkers Quest/Festival of Talents-Mathematics Olympics at Davao City National High School under Tower of Hanoi category for Grade- 12students. Currently, she is teaching Mathematics in Years8 and 9 and in the Senior High School. She has been a panel member during the Research Congress in her school. She presented study during the 2nd International Research Conferenceunder the "General Education Category" in March 2020. Her father Vicente Malaran Namuag and late mother Josefina Namoc Namuag are the source of her inspiration in publishing this study. This study is dedicated to all the teachers and students who are continuously searching for related knowledge

Luzviminda T. Orilla, is an associate professor and teaching math courses for 35 years at the University of Mindanao, Davao City, Philippines. She is the technical assistant of MS of Pure and Applied Math, as well as PhD math programs. In addition, she was also a research coordinator in the college of Arts and Sciences Education for 5 years. She published and presented studies, locally and internationally

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