TEACHING PRACTICES IN MATHEMATICS AND ITS IMPACT TOWARDS THE INTEREST OF THE STUDENTS: BASIS FOR CRAFTING A COHERENT MATHEMATICS INTERVENTION PROGRAM

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Abstract

This study identified the teaching practices in Mathematics and its impact towards the interest of the students in Landan National High School of school year 2019 – 2020. This study found out the existing correlation between the teaching practices and the interest of the students. A self-constructed questionnaire was used to facilitate the data collection of the study. Two sets of questionnaires were completed by sixty (60) Grade 8 students. The teaching practices in Mathematics and the interest of the students rating scale was a five (5) point scale which includes twenty (20) statements of teaching practices and ten (10) statements of interest of the students in Mathematics respectively.

Findings revealed that the four teaching practices that were considered in the study are used to adopt by the teachers especially the “communicating Mathematics ideas” which got the highest mean. In terms of the interest that developed to students in Mathematics, the result “often” implies that students have high interest in Mathematics. In the test of relationship of each of the four teaching practices towards the interest of students in Mathematics, the result revealed that there is significant relationship between the four teaching practices and the interests of the students in Mathematics. In general, it is concluded that teaching practices has good influence in the developing of the students’ interest in Mathematics.

CONTEXT AND RATIONALE

According to Department of Education (2003) as cited by Ganal and Guiab (2016), from the International Mathematics Olympiad, details showed that the Philippines ranked 79th out of 82 countries in 2003 and 80th out of 85 countries in 2004. Based on the possible maximum points of 225, China got the highest score of 220 points, Vietnam 126, Thailand 9, and the Philippines 16 points. It is alarming that Filipinos are found lacking in the ability of basic mathematics. Research studies being done regarding the basic mathematical knowledge of teachers show their deficiency.

The Education Alliance Teaching (2017) said that teaching practices are essential for the effective functioning of education system and for improving the quality learning processes and it plays an important role in constructing the personality of the students.

Studies have shown that teaching practices in Mathematics builds on learners' experiences. By a good teaching practice, students will be challenged in engaging meaningful applications. It also encourages students to solve problems in many ways. By the help of teaching practices, students will be more interested in Mathematics. They will appreciate and connect Mathematics problems in real-life situations. Using a variety of instructional approaches and assessment instruments and procedures, learners will enjoy Mathematics at the same time, they are learning. Unlocking new words and vocabularies, and using simple words in explaining make learners understand Mathematics easily.

Thus, this study describes the teaching practices in Mathematics and its impact towards the interest of the students.

ACTION RESEARCH QUESTIONS

This study aimed to:

1. Determine the perception of student on how often his/her teacher adopt the following teaching practices:
   1.1 Used of manipulative materials/skills
   1.2 Problem solving approach
   1.3 Communicating Mathematics ideas
   1.4 Assessment practices
2. Determine the level of interest of students in Mathematics.
3. Is teaching practices can help to develop interest of students.
4. What intervention program in Mathematics can be developed out of the result?

BRIEF LITERATURE REVIEW

Ahmed and Aziz (2009) as cited by Ampadu (2016), are saying that most students have a positive attitude toward their teachers' teaching practices and that their teachers' teaching practices have a direct impact on their learning experiences. They added that teaching practices provides mathematics teachers with new ideas in encouraging and stimulating students' active participation in the teaching-learning process in fulfilment of the trends in mathematics education. Teaching practices challenges the teachers to be proactive in promoting a classroom environment free from intimidation and fear to motivate more students to be actively involved in teaching-learning process.

Manipulative materials are one of the important factors in molding learners. As Anthony & Walshaw (2018) said, providing students access to multiple representations helps them to develop conceptual and computational flexibility. Using an appropriate model, learners can think through a problem, or test ideas. Tools are helpful in communicating ideas that are otherwise difficult to talk about or write about.

Problem solving and reasoning are central to the learning of mathematics. Students learn mathematics as a result of exploring problems that provide rich challenges, relevance, and engagement.

Students should know how to express what they had learned in problem solving. According to Anthony & Walshaw (2018), effective teachers encourage their students to communicate their ideas orally, in writing, and by using a variety of representations. Students need to be taught how to communicate mathematically, give sound mathematical explanations, and justify their solutions.

In order to measure the learning of the learners, a Mathematics teacher should have a good assessment practice. Martinez (2017) says that, when thinking about the role of assessment in teachers' judgments, it is important to distinguish between externally mandated tests and various kinds of classroom assessment practices under the direct control of the teacher.

Teachers must recognize the child's level of cognitive, linguistic, physical, and social-emotional development. The most effective learning takes place when these aspects of development are taken into consideration. Mata et al. (2016) says that when the students adapt a positive attitude towards learning mathematics it reflects a positive emotional disposition in relation to the subject and, in similar way, a negative attitude towards mathematics relates to a negative emotional disposition. These emotional dispositions have impact on an individual's behaviour, as one is likely to achieve better in the subject that one enjoys. For this reason, positive attitude towards mathematics is desirable since it may influence one's willingness to learn and also benefits one to derive from mathematics instruction.

Conceptual Framework

A conceptual framework showing the relationship between the independent variable which is teaching practices in Mathematics and dependent variable which is the interest of the students in Mathematics of Landan National High School, S.Y. 2019-2020. The teaching practices have four components, these are the use of manipulative materials/skills; problem solving approach; communicating Mathematics ideas; and assessment practices.

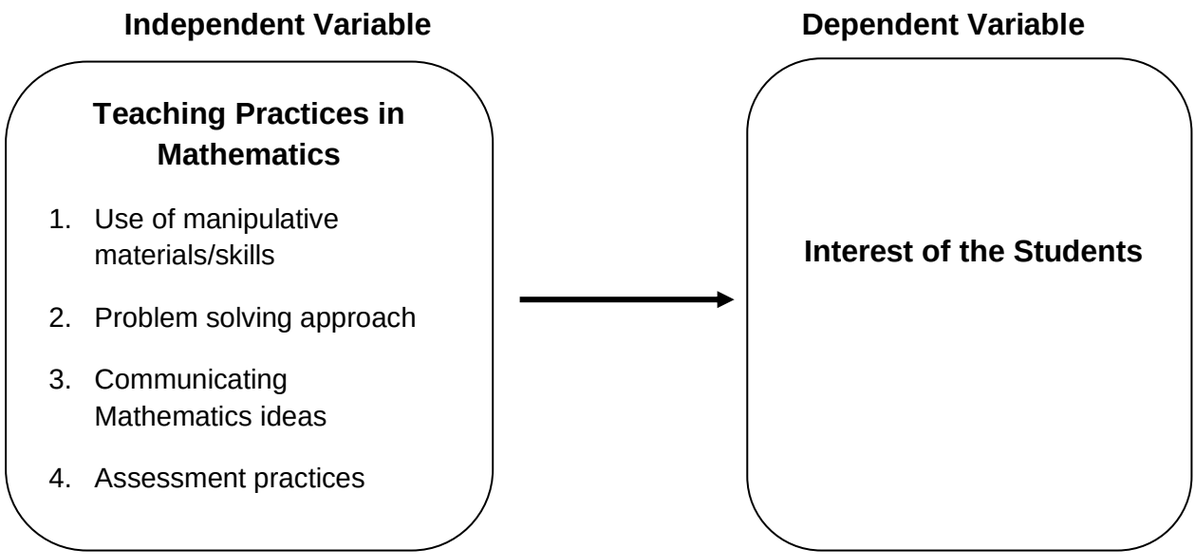

Figure 1. The Schematic Diagram of the Teaching Practices in Relation to the Interest of the Students in Mathematics.

RESEARCH METHOD

Research Designs

This study utilized a descriptive-correlation survey method. This is used in analyzing and interpreting the data, which was derived from the responses of the research instrument. Through a survey questionnaire, the respondents' perceptions in Teaching Practices in Mathematics and its impact towards the interest of the respondents were evaluated.

Research Locale

The study was conducted in Landan National High School. The local of the study was Brgy. Landan, Polomolok, South Cotabato.

Respondents of the Study

LNHS students were identified as respondents of this study. Sixty (60) students were randomly selected from the different sections of Grade 8 of Landan National High School, school year 2019 – 2020.

Research Instruments

A self-constructed questionnaire was used in the study which consists of list of items that measured the teaching practices used by the teachers in Mathematics. It also determined its impact towards the interest of the respondents.

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

This chapter presents the presentation, analysis and interpretation of the data from the results of data gathered in this research study. The various results are presented in the succeeding tables with corresponding discussions and explanations. It also answers specific problems stated in previous chapters.

Table 1. Teaching Practices of Mathematics Teacher

Teaching Practices	Mean	Descriptive Equivalent
A. Use of manipulative materials/skills.		
1. My teacher encourages us to use electronic technology such as calculators and any gadgets.	3.33	Sometimes
2. My teacher conducts actual measurements and let us explores the concept related to the subject.	3.93	Often
3. My teacher presents tables and graphs to provide visual element to assist students understanding.	3.93	Often
4. My teacher provides step by step procedures or algorithm for us to better understand the process of mathematical solutions.	4.47	Always
5. My teacher uses various instructional materials such as geo-board, meter stick, simulation devices, and many other devices that can be used to demonstrate concepts or idea in a certain math problem.	3.60	Often
Average Weighted Mean	**3.85**	**Often**
B. Problem solving approach		
1. My teacher introduces word problem with a variety of structures and solution paths, giving orderly starting from easy to difficult one.	3.78	Often
2. My teacher uses open-ended problems and extended problem solving projects.	3.58	Often
3. My teacher uses real life and practical life problems and applications.	3.57	Often
4. My teacher provides figures or drawing that illustrates the problem situation.	3.47	Often
5. My teacher encourages us to conduct the actual manipulation of the problem situation.	3.88	Often
Average Weighted Mean	**3.66**	**Often**
C. Communicating Mathematics ideas		
1. My teacher uses simple words in his instructions and explanations.	4.32	Always
2. My teacher encourages us to ask question when we want to be clarified with the lesson.	4.68	Always
3. My teacher ask why and how questions.	4.35	Always
4. My teacher encourages class discussion as peer tutoring to assist understanding.	3.90	Often
5. My teacher makes sure that vocabularies and other unfamiliar words that are new to us are well defined and explained.	4.07	Often
Average Weighted Mean	**4.26**	**Always**
D. Assessment practices		
1. My teacher uses written exam, such as periodical exam, summative test and quizzes.	4.55	Always
2. My teacher let us make assignment individually or by group.	4.68	Always
3. My teacher uses oral recitation to assess understanding.	4.13	Often
4. My teacher required us to conduct demonstrations or reporting.	3.78	Often
5. My teacher gives hands-on activities, puzzles and games as a practice.	3.43	Often
Average Weighted Mean	**3.68**	**Often**

Legend: 1.0 – 1.7 (Never) 1.8 – 2.5 (Rarely) 2.6 – 3.3 (Sometimes) 3.4 – 4.1 (Often) 4.2 – 5.0 (Always)

Table 1 shows the Teaching Practices of Mathematics Teachers as perceived by their students among the Grade 10 students of Saniel Cruz National High School. Four teaching practices were considered, and among these practices, the one that got the highest mean was the *"communicating Mathematics ideas"* with average weighted mean of 4.26 equivalent to *"always"*, then followed by the "*use of manipulative materials/skills*" with average weighted mean of 3.85, then the "*problem solving approach*" with average weighted mean of 3.66, then lastly the *"assessment Practices"* whose average weighted mean is 3.68. Only the item "Communicating Mathematics Ideas" falls with descriptive equivalent of "always" and the rest fall on "often". This implies that the teachers are used to adopt these teaching practices especially the *"communicating Mathematics ideas"*.

Table 2. Interest of Students in Mathematics

Items	Mean	Descriptive Equivalent
1. I found out that Mathematics is interesting.	3.95	Often
2. I always spent time to study Mathematics.	3.32	Sometimes
3. It's easier for me to understand math problems when my teacher uses tables and graphs.	3.53	Often
4. I can understand easily our lesson when my teacher uses various materials in teaching.	3.67	Often
5. In solving, I always use step by step process.	4.08	Often
6. I don't stick in one solution path when I solved problems.	3.42	Often
7. Solving real life problems makes me appreciate Mathematics more.	3.80	Often
8. I am more attentive in listening to my Mathematics teacher because she uses simple words in explaining.	3.82	Often
9. My confidence is developed every time we'll have our reporting in Mathematics.	3.45	Often
10. I enjoy Mathematics more when my teacher gives hands-on activities, puzzles and games as a practice.	3.80	Often
Average Weighted Mean	**3.68**	**Often**

Legend: 1.0 – 1.7 (Never) 3.4 – 4.1 (Often)
1.8 – 2.5 (Rarely) 4.2 – 5.0 (Always) 2.6 – 3.3 (Sometimes)

Table 2 shows the level of interest of students in Mathematics. In the measure of interest, ten (10) questionnaire items were considered whose average weighted mean was 3.68 and with descriptive equivalent of *"often"*. This implies that students have high interest in Mathematics.

Table 3. Relationship between Teaching Practices and Interest of Students in Mathematics

Variables Tested	R	R^2	Source	df	Sum of Squares	Mean Square	Computed F	Table F (@α=0.01)	Decision
			Regression	1	30.864	30.864			
x_1 vs y	0.2958	0.0875	Residual	58	2.9593	0.051	605.17	7.10	significant
			Total	59	33.823				
			Regression	1	28.911	28.911			
x_2 vs y	0.3810	0.1452	Residual	58	4.9114	0.0847	341.33	7.10	significant
			Total	59	33.823				
			Regression	1	25.508	25.508			
x_3 vs y	0.4958	0.2458	Residual	58	8.3145	0.1434	177.88	7.10	significant
			Total	59	33.823				
			Regression	1	27.532	27.532			
x_4 vs y	0.4313	0.1860	Residual	58	6.2909	0.1085	253.75	7.10	significant
			Total	59	33.823				

Independent Variable: Teaching Practices (X_1= Use of manipulative materials/skills, X_2= Problem solving approach, X_3= Communicating Mathematics ideas, X_4=Assessment practices)
Dependent Variable: Y= Interest of Students in Mathematics

In the test between the *"use of manipulative materials/skills"* and interest of students, R computed is equal to 0.2958 which shows positive weak linear correlation , R^2 is equal to 0.0875 which shows that "*use of manipulative materials/skills"* can predict academic performance by 8.75%, however at level of significance α=0.01, the computed F-value appeared to be greater than the tabular F-value which means that there is significant relationship between "*use of manipulative materials/skills"* and interest of students. In the test between the "*problem solving approach*" and interest of students, R computed is equal to 0.3810 which shows positive weak linear correlation, R^2 is equal to 0.1452 which shows that *"problem solving approach"* can predict academic performance by 14.52%, however at level of significance α=0.01, the computed F-value appeared to be greater than the tabular F-value which means that there is significant relationship between *"problem solving approach"* and the interest of students. In the test between the *"communicating Mathematics ideas"* and interest of the students, R computed is equal to 0.4958 which shows positive moderate linear correlation, R^2 is equal to 0.2458 which shows that *"communicating Mathematics ideas"* can predict academic performance by 24.58%, however at level of significance α=0.01, the computed F-value appeared to be greater than the tabular F-value which means that there is significant relationship between *"communicating Mathematics ideas"* and interest of students. In

the test between the *"assessment practices"* and interest of students, R computed is equal to 0.4313 which shows positive moderate linear correlation, R^2 is equal to 0.1860 which shows that *"assessment practices"* can predict academic performance by 18.6%, however at level of significance α=0.01, the computed F-value appeared to be greater than the tabular F-value which means that there is significant relationship between *"assessment practices"* and interest of students. The findings imply that all the teaching practices greatly influenced the development of students' interest in Mathematics.

FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Findings

The following were the results of the study.

1. Among the four teaching practices that were considered in the study, the one that got the highest mean was the *"communicating Mathematics ideas"*, then followed by the "*use of manipulative materials/skills*", then the "*problem solving approach*", and then lastly the *"assessment practices"*.
2. In terms of the interest that developed to student in Mathematics, the results imply high interest to Mathematics among students.
3. In the test of relationship of each of the four teaching practices towards the interest of students in Mathematics, there is significant relationship between the four teaching practices and the interests of the students in Mathematics.

CONCLUSIONS

Based on the results of the study, it is concluded that teaching practices has good influence in the developing of students' interest in Mathematics.

Recommendation

Based on the foregoing conclusions, the researcher recommends the following:

1. The use of manipulative materials/skills; problem solving approach; communicating Mathematics ideas; and assessment practices should always be part in the teaching practices of teachers.
2. The classroom experiences of the students should always be anchored with the teaching practices of the teachers for them to develop more interest in Mathematics.
3. A seminar-workshop anchored with the 21st century teaching practices and skills can be conducted. “Seminar-workshop in Teaching and Enhancing Mathematics Skills” Program or **“*STEM*”**.

WORKPLAN

Planning Area: Landan National High School Gymnasium

Key Result area: Teaching and Learning

Goal: Full implementation and materialization of STEM program in order to increase the interest of students in Mathematics subject in Landan National High School.

Objectives	Activities	Time Frame	Person/s in charge	Resources Needed	Budget	Expected output/ outcome	Monitoring scheme	Remarks
Introduce the importance of STEM program to enhance the knowledge of teachers in applying on some practices in teaching MAthematics	Seminar-workshop in Teaching and Enhancing Mathematics Skills Program or **“*STEM*”**	First week of May 2020	Principal *Master Teacher in Mathematics *Math Secondary Teachers	Gym Projector laptop	Snack certificates Source of fund: District Fund	Teachers should be able to apply different techniques and strategies in teaching Mathematics	Attendance sheet Proceedings of the training Different committee Output during the trainig	Observe all the necessary protocol

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Appendix

Questionnaire

The purpose of this questionnaire is to determine the teaching practices of Mathematics teachers and its impact towards the interest of the students.

SET A. TEACHING PRACTICES

Please check the frequency (never, rarely, sometimes, often, and always) on the teaching practices statements in Mathematics.

A. Use of manipulative materials/skills	**ALWAYS**	**OFTEN**	**SOMETIMES**	**RARELY**	**NEVER**
1. The teacher encourages us to use electronic technology such as calculators and any gadgets.					
2. The teacher conducts actual measurements and let us explores the concept related to the subject.					
3. The teacher presents tables and graphs to provide visual elements to assist students understanding.					
4. The teacher provides step by step procedures or algorithm for us to better understand the process of mathematical solutions.					
5. The teacher uses various instructional materials such as geo-board, meter stick, simulation devices, and many other devices that can be used to demonstrate concepts or idea in a certain math problem.					

B. Problem solving approach	**ALWAYS**	**OFTEN**	**SOMETIMES**	**RARELY**	**NEVER**
1. The teacher introduces word problem with a variety of structures and solution paths, giving orderly starting from easy to difficult one.					
2. The teacher uses open-ended problems and extended problem solving projects.					
3. The teacher uses real life and practical life problems and applications.					
4. The teacher provides figures or drawing that illustrates the problem situation.					
5. The teacher encourages us to conduct the actual manipulation of the problem situation.					

C. Communicating Mathematics ideas	**ALWAYS**	**OFTEN**	**SOMETIMES**	**RARELY**	**NEVER**
1. The teacher uses simple words in his instructions and explanations.					
2. The teacher encourages us to ask question when we want to be clarified with the lesson.					
3. The teacher asks why and how questions.					
4. The teacher encourages class discussion as peer tutoring to assist understanding.					
5. The teacher makes sure that vocabularies and other unfamiliar words that are new to us are well defined and explained.					

D. Assessment practices	**ALWAYS**	**OFTEN**	**SOMETIMES**	**RARELY**	**NEVER**
1. The teacher uses written exam, such as periodical exam, summative test and quizzes.					
2. The teacher let us make assignment individually or by group.					
3. The teacher uses oral or recitation to assess understanding.					

4. The teacher required us to conduct demonstrations or reporting.					
5. The teacher gives hands-on activities, puzzles and games as a practice.					

SET B. IMPACT OF TEACHING PRACTICES TOWARDS THE INTEREST OF THE STUDENTS

	ALWAYS	OFTEN	SOMETIMES	RARELY	NEVER
1. I found out that Mathematics is interesting.					
2. I always spent time to study Mathematics.					
3. It's easier for me to understand math problems when my teacher uses tables and graphs.					
4. I can understand easily our lesson when my teacher uses various materials in teaching.					
5. In solving, I always use step by step process.					
6. I don't stick in one solution path when I solved word problems.					
7. Solving real life problems makes me appreciate Mathematics more.					
8. I am more attentive in listening to my Mathematics teacher because she uses simple words in explaining.					
9. My confidence is develop every time we'll have our reporting in Mathematics.					
10. I enjoy Mathematics more when my teacher gives hands-on activities, puzzles and games a practice.					