



World Journal of Advanced Research and Reviews

eISSN: 2581-9615 CODEN (USA): WJARAI

Cross Ref DOI: 10.30574/wjarr

Journal homepage: <https://wjarr.com/>



(RESEARCH ARTICLE)



MATHEMATICS TEACHING PRACTICES AND STUDENT PERFORMANCE: A STUDY OF MSU COMMUNITY HIGH SCHOOLS

Monirah Udal Macaumbang *

Mindanao State University, Marawi City.

* Corresponding Author

World Journal of Advanced Research and Reviews, 2026, 32(01), 812–821

Publication history: Received on 06 September 2026; revised on 12 October 2026; accepted on 14 October 2026

Article DOI: <https://doi.org/10.30574/wjarr.2026.32.1.2613>

Copyright © 2026 Author(s) retain the copyright of this article. This article is published under the terms of the Creative Commons Attribution License 4.0

ABSTRACT

This study examined the teaching styles, discursive styles, and questioning techniques of mathematics teachers and their relationship to students' mathematics performance in selected Mindanao State University (MSU) Community High Schools. The study employed a descriptive-correlational research design using both quantitative and qualitative approaches. Data were gathered through teacher demographic questionnaires, a 100-item questionnaire on teaching, discursive, and questioning practices, classroom observation checklists, interviews, student reflection questionnaires, journals, field notes, and audio-video documentation. The participants included 42 mathematics teachers from nine MSU Community High Schools, together with selected student respondents. Quantitative data were analyzed using the Statistical Package for the Social Sciences (SPSS), Chi-Square Test, and Pearson Product-Moment Correlation, while qualitative information was examined through classroom observations, interviews, and documented classroom activities. The findings showed a significant difference in mathematics performance between students from high-performing and low-performing MSU Community High Schools. Students in high-performing schools generally demonstrated higher mathematics performance, with a mean grade of 87.01 compared with 82.67 among students in low-performing schools. Classroom observations further indicated differences in instructional resources, teacher enthusiasm, student learning behaviors, and school-community support. High-performing schools were observed to have better access to instructional resources and more positive classroom practices, while limited resources and weaker student engagement were observed in low-performing schools. The study highlights the importance of effective mathematics teaching practices, classroom interaction, questioning, instructional resources, and supportive learning environments in improving students' mathematics learning outcomes.

Keywords: Discursive Teaching, Mathematics Education, Student Performance, Questioning Techniques, Teaching Styles

1 INTRODUCTION

Mathematics is the construction of knowledge that deals with quantitative and qualitative relationship of space and time. It is a human activity that deals with patterns, problem-solving, logical thinking and more in an attempt to understand the world and make sense of that understanding. Imparting knowledge on mathematics rests heavily on the shoulder of educator. Teaching mathematics is a task, which demands the best efforts of teacher. It requires more than a thorough knowledge of the subject matter, a broad perspective of the field of mathematics itself, an understanding of

the place and importance of mathematics to meet the need of the learner. It demands skill in the techniques and methods of teaching styles each particular topic or aspect of the subject.

Mathematics is considered the mother of all learning in both arts and sciences. It permeates life, and is essential in almost every field: measurement in fashion, angles in sports, technology and economics. This perspective on Mathematics has gained more attention with the phenomenal advances in information and communication technology. Mathematics is not just computation but a tool for understanding structures, relationships and patterns to produce solutions for complex real life problems, thus a necessity for people of all ages to be successful in life. Given the inestimable usefulness of mathematics in daily life, factors that adversely affect the students' ability to understand, learn, and apply mathematics concepts and principles.

Clearly, mathematics education in the Philippines needs to level up in the interest of national development and progress in a globalizing world. More serious attention must be given to the growing body of empirical data which outline a nosedive or progressive downward trend of learning outcome that, in turn, serve proof of the deterioration of the quality of math education.

Undeniably, learning in mathematics and mathematics education has been problematic for the last three decades as borne out by assessment results. The average fourth year students mastered just about half of the content of basic subjects like Science and Mathematics (David, 2002). As David (2002) sees it, the poor mean percentage score in the NAT reflects the teaching methods and practices employed by the teachers. In other words, the problem of depressed performance is linked with the way teachers teach the subject (Henay, 2010). There is a vitally important link between teacher preparation and the performance of teachers and their students' achievement. Every child must be taught by a quality teacher.

Teacher competence and performance, of all salient factors other than learner variables, have the most direct influence on the learning process and in all likelihood, on the learning outcome or student achievement (Nye & Hedges, 2004). This vital point is expressed in the form of an equation by Stronge (2010): **Effective Teachers = Student Achievement**. This is based on the findings of numerous research. Effective teaching involves the right thing at the right time, teaching the right amount and in the right way and teaching in an acceptable quality (Orille, 1979).

The search for the Holy Grail of effective teaching may well begin with teaching styles which consist of the personal attributes of a teacher, and vary from one teacher to another. Teachers in these times of change and growing complexity must be skilled in reflective practice and understand its crucial role in advancing student achievement. Salem (2001) defined teaching styles as "the procedures or processes adopted and employed by the teacher in order to achieve the day-to-day objective of the lesson". They are also the conglomerations of one's views, convictions, and approaches designed for the attainment of maximum results in the teaching-learning process. Consequently, the way teachers deliver instruction in the classroom is influential to the learning of the students. Teachers' variation of their styles would depend on the personality type, pattern of behavior, mode of performances, and their attitude towards the subject and students. Thus, teaching styles should match the learning styles of the students so they can be motivated to study and learn more especially in academic subjects like mathematics (Macarambon, 2011).

The teaching-learning process is basically a communication between the teacher as transmitter and facilitator of learning and the students, hence, the teacher's discursive style is of great importance. Discursive teaching style refers to interactive lecturing where the instructor or teacher permits and actively encourages participation throughout the lecture by asking questions, soliciting participation from the students, tackling any difficulties or misunderstandings on the spot, generally, encouraging a classroom culture in which students may feel more comfortable asking their questions, making interventions, and initiating discussion (Tutino, 2013). How the teacher uses language to advantage as a tool of communication to aid the process of concept formation (Vygotsky, 1994) through dynamic or active teacher-student interaction consisting of students' questions for clarification, teacher's explanations, citing examples or illustrations, and encouraging further participation, is crucial for future learning. A concept emerges and takes shape in the course of such interaction. Complex concepts in particular, which abound in mathematics, are elucidated and conveyed through language. Learning such concepts involves some type of external experience being transformed into internal processes through classroom discourse (teacher-student interaction).

In view of the acknowledged centrality of classroom discussion/discourse in the learning process, teachers' discursive styles in mathematics pedagogy have received considerable attention from exponents and advocates of various suasions. Forman and Ansell (2001) describe the teacher's role as one of helping students structure their talk, revoicing, organizing, turn-taking, asking students to reflect on and evaluate explanations provided, and orchestrating collective arguments. Likewise, O'Connor (2001) developed an approach which he describes as position-driven discussion involving a teacher who rivets students' attention on one main question that has a limited number of possible usually unknown answers; the aim of this kind of discussion is for each student to take his/her own position and defend such position with evidence. As can be imagined, this approach generates a multiplicity of contending positions and much

lively exchange. Sierpinska (2007) makes an impassioned proposal for a curriculum that is relevant from the historical and cultural perspective to initiate students into the historically developed ways of doing and talking in the course of getting them involved in mathematics. This involves use of the meta-discursive rules of the mathematical genre for them to become second nature to the students. Students learn as they are taught. Moreover, Sierpinska argues that discursive approach focuses on participation in an activity of sharing commonalities and constructively dealing with the meanings people see to have in common.

Another concern meriting explicit attention since this is related to teacher's discursive approach is the use of questioning as an instructional strategy. One of the major duties of a mathematics classroom teacher is to promote thought and inspire inquiry in students, and one effective way of doing this is through proper questioning in the classroom. Caram and Davis (2005) emphasized that teachers' questions when used correctly can enhance student learning by developing critical thinking skills, reinforce student understanding, correct student misunderstanding, provide feedback for students, and enliven classroom discussions. Teacher's questions are of significant value for many instructional purposes, eliciting student reflection, and challenging deeper student understanding and engagement in the classroom.

One major aspect of successful teaching and learning processes in the mathematics classroom is the interaction between the teacher and the learners. In order to have a good interaction in the classroom, teachers pose questions, which should play a major role in the type of learning in mathematics classroom, because of the abstract nature of mathematics to which the problem of poor performance is often attributed. There could be many reasons that could cause students to have learning difficulties in mathematics, but the pivotal role of the classroom teacher in making sure that the students develop adequate self-confidence and a good disposition to mathematics seems indisputable. It could very well be the underlying factor of poor performance in mathematics, which can be attained by teachers' effective use of classroom questions. Teachers' classroom questions should be an effective and important part of the lesson (Muijs & Reynolds, 2005). A good question is a powerful teaching tool and a good teacher should know how to use questions for maximum impact (McHill & Dunkin, 2002). It is important to be able to use classroom questions well in order to teach effectively (Brualdi, 1998).

Leongson (2003) describes Filipino students as excelling in knowledge acquisition but faring considerably poorly in lessons requiring higher order thinking skills. This weakness is evident in the performance of students in national and international surveys on mathematics and science competencies, for example, the National Achievement Test (NAT) here in the Philippines and the Third International Mathematics and Science Study (TIMSS) U.S.A. They have consistently obtained scores below the international average in Science and Mathematics. As the TIMSS report revealed, the Philippines ignominiously landed near the bottom of the list of participating nations, underscoring the need for a search for solution to improve science and mathematics education for countries that lag behind others (Schmidt et al., 2001; Ibe, 1997; cited in Guro, 2009). Added to these depressing exhibits of student performance is the performance of pre-service teachers and mathematics teachers in the Professional Board Examination, which reveals the same picture of poor competencies (Philippine Daily Inquirer, 1986; Ibe, 1995).

This study was conceptualized based on the cited reports on the poor performance of students in mathematics which attest to the deteriorating quality of math education, and studies on the crucial role of teacher quality – i.e. qualifications and competence as manifest in the teaching style, methods, strategies or techniques used in teaching mathematics. Just by the dismal results of these studies, there is the necessity and urgency of undertaking an inquiry on the teaching styles, discursive style, and questioning techniques of MSU Community High School mathematics teachers to find out how these affect learning outcome or student achievement. A rot in mathematics education has set in, particularly in schools in ARMM, which have set the depressing record of being the lowest performing schools (Esplanada, Philippine Daily Inquirer, September 17, 2007) and the cause of this decay must be brought to light.

2 RESEARCH METHODOLOGY

2.1 Research Design

This study is descriptive-correlational in approach utilizing quantitative and qualitative forms of data. Quantitative part of the study involved the use of rating scale type (Likert) survey questionnaire and respondents' profile questionnaire. Quantitative data was in the form of scores in rating scale, grades, and proportions in the respondents' profile questionnaire. The qualitative part of the study involved the used of checklist observation, field notes, audio-video recordings, interviews, and teachers' generated/constructed artifacts such as lesson plans and test questionnaire. Qualitative data was in the form of descriptive text/words and documentation of teachers' generated artifacts.

Correlation was employed to determine the kind or magnitude of relationship that is assumed to exist between the correlated variables.

The independent variables are the socio-demographic profile of the teacher respondents such as age, gender, highest educational attainment, number of years teaching mathematics, and number of seminars/training in mathematics attended. The dependent variables are the teaching styles/strategies, discursive styles, and questioning techniques of the teachers, and students' performance in mathematics.

2.2 Research Instruments

The following instruments were used in this study:

2.2.1 Teachers' Teaching Style, Discursive Style and Questioning Techniques Questionnaire

It is a 100-item questionnaire which was adopted to draw information about teachers teaching styles, their discursive styles and their questioning techniques on mathematics teaching. Of this 100-item, Fifty (50) items were intended for the mathematics teachers to answer and fifty (50) items for the students to get the exact information of the respondents. The instrument used for collecting the data was closed questionnaire with Likert-scale standard answers with 100 items. Twelve (12) items for teaching styles, ten (10) items for discursive styles, five (5) items for questioning techniques, seven (7) items for frequency of asking questions, eleven (11) items for types of question asked, and six (6) items for level of questions asked. This instrument was made by the TIMSS – R 1999 originally intended for mathematics teachers. The methodology administered in coming up with this instrument was thru an investigation which is of qualitative nature with correlational designed.

2.2.2 Traces of Influence on the Teachers

In this study, traces is refers to classroom observation checklist for the teachers' respondents, interview guide using reflection questionnaire to the students made by the researcher and diary/journal writing of the students as they observed to their mathematics teachers teaching styles, and lastly, the narrative of the observed teacher respondents' actual teaching activities in the classroom and field notes as guided by the researcher.

- **Classroom Observation Checklist.** The classroom observation checklist was designed to collect data on how the teachers handle mathematics classes based on their teaching styles/practices employed. The checklist consists of four categories to observe. a.) Formal mathematics teaching styles such as delegator/group style, expert/blended type, formal authority/lecture style, manager, personal model, and a facilitator/activity style. b.) Body language and voice such as speaker-audience distance and good movement and stance. c.) Facial expression by conservative look, dull/boring, energetic, joyful, lazy, limited words idea, smart, smiling, and strict, and d.) Other styles shown by the mathematics teachers like; interactive classroom, fun, personalized for young learner, guidance, encourager, transmitter (teacher), constructivist teaching method, provider, translator, emphasize the relationship between lesson, informer of the daily lessons, organizer, disciplinarian, approachable, demonstrator, and roaming around the class. All of these enumerated words/sentences were carefully checked by the researcher with the two co-teacher assistant and the results was duly analysed by the researcher.
- The purpose of the classroom observations checklist was to elicit an actual data of the teachers' teaching style, discursive style, questioning technique and the type of question they asked during mathematics lessons to cross-check all the data gathered (see Appendix B).
- **Interview Guide.** The researcher used semi-standardized reflection questionnaire. The questions were based on the content of the questionnaire to supplement and verify the data collected from the respondents. Reflection questionnaire of the students were then properly document using worksheet/notebook to ensure the reliability of the information gathered and at the same time the diary/journal of the students were also included.
- **Field Notes.** Field notes used in this study contained the researcher's detailed notes in the entire data-gathering activity. Notes were made on the experience with the teachers, students, and classroom co-observers assistant on the description of the teaching styles, discursive styles and questioning techniques of the mathematics teachers' respondents and the last documentation were the narrative of the observed teacher's respondents'. The field notes were then properly documented using audio- video recorder and notebook.

2.3 Data Gathering Procedures

Prior to the site visitation of the nine (9) schools, the researcher first secured a permission from the Assistant Vice Chancellor for Academic Affairs to conduct the study and a letter of introduction to the school administrator/principal of each community high school with whom the researcher was working in close coordination. For data gathering in the field, the researcher was equipped and guided with a prepared schedule/timetable and a simple frame consisting of the list of subject mathematics teachers in each school who should participating in the study.

After the sought permission was granted, the researcher, guided by her prepared timetable and sample frame, went to the community high schools where the selected subject respondent/participants are teaching. Administering the questionnaire was done by congressional district, which is the more systematic and cost-efficient way to go about it. Preparatory to the distribution of the questionnaires is the design to obtain the needed ordinal and cardinal types of data on the subject participants' profile and quantitative data on their teaching style, discursive style, and questioning techniques.

The teachers and their students chosen in each school both high and low performing MSU Community High Schools were the respondents of this study and the questionnaire were properly administered to them. All 42 mathematics teachers were observed using a checklist during class discussion and only six (6) students from each class were purposely chosen based on their learning styles. The students were divided into two (2) groups in each class. Three (3) students answered the reflection- questionnaires and three (3) students were asked to write a journal/diary regarding the teaching styles of their teacher. These are the school participated; MSU Balindong, MSU Baloi, MSU Binidyan, MSU Lopez Jaena, MSU Malabang, MSU Marantao, MSU Saguilaran, MSU Tugaya, and MSU Wao. Teachers and students selected in each school to form part of the sample was oriented or briefed regarding their role in the study or what is expected of them. The orientation/briefing is also an opportunity for the researcher to establish rapport with them as subject participants. They were presented with the approved request for permission which guarantees the inform consent, confidentiality and anonymity. These guarantees and the purpose of the study were carefully explained to them in the orientation/briefing to gain their trust and full cooperation.

Afterwards, the researcher administered the questionnaires herself and was present all throughout this stage of data gathering to entertain questions that might be raised. A researcher aide or co-teacher and video men gave their assistance. Retrieval of the questionnaire were done on the same day. When the quantitative and qualitative data were on hands, these were tabulated, analysed and interpreted.

2.4 Statistical Treatment of Data

To ensure the reliability of the outcome of the research data in this study, the researcher separately organized and analyzed the documentation data based on what was measured quantitatively and qualitatively. Analysis of the qualitative data (teachers' teaching styles, discursive styles and questioning techniques) were done through careful examination and interpretation of the data gathered from the video recording, note taking by the researcher and the students' questionnaires. To analyze the quantitative data, Statistical Packages for social Science (SPSS) software for MS Windows was utilized.

The Chi-Square Test (χ^2) was used to determine significant relationships between mathematics teachers' profile and their teaching styles, discursive style, and questioning technique and the type of questions raised during the classroom discussions and in the examination, as well as the mathematics performance of the student among the high and low performing MSU Community high schools.

Pearson Product-Moment Coefficient of Correlation was utilized to determine the significant relationship that may have existed between the three sets of variables. Namely: teachers teaching styles, discursive styles, and questioning techniques of the respondents.

3 RESULT AND DISCUSSION

3.1 Levels of Mathematics Performance of Student-Respondents in the Low and High Performing MSU Community High Schools

Student-respondents' mathematics performance were assessed based from their latest final grades in Mathematics of school year 2018-2019. Table 15 shows the student-respondents' mathematics performance level in both the low and high performing MSU Community Schools, the number (%) of students in each performance level, chi-square value and p-value.

As shown in Table 1, combining excellent and very good performance level, very few (1.6%) students in the LPS demonstrated excellent/very good performance while less than a quarter (16.5%) in the HPS. In the LPS, a quarter (25.1%) of the students demonstrated good performance, more than a quarter demonstrated satisfactory (34.2%) and at passing (38.8%) level while in the HPS, more than a quarter demonstrated good (40.0%) and satisfactory (30.4%) and very few (13.1%) at the passing level. Comparing the distribution of the number (%) of students in the performance levels between the LPS and HPS, there is significant difference ($\chi^2 = 151.98$, $p = .00 < .05$) in favour of the HPS. Apparently, more students in the HPS than the LPS demonstrated excellent/very good, good, satisfactory, and passing performance levels. Apparently, on the average, students in the HPS (mean grade = 87.01, SD = 55.27) demonstrated good performance than the LPS students (mean grade = 82.67; SD = 4.84; which is only satisfactory). In addition, the

significant t-test result of their mean grade between LPS and HPS, which Fisher's Exact Test is 162.799 and the p-value (.000).

Table 1: Student-Respondents' Level of Mathematics Performance in the Low and High Performing MSU Community High Schools

Transmuted Score Range	Performance Level	School Category*		Fisher's Exact Test	p-value
		LPS	HPS		
		Number (%)	Number (%)		
100-98	Excellent	0 (0.0%)	6 (0.8%)	162.799	.000(s)
97-93	Very Good	7 (1.6%)	111 (15.7%)		
92-87	Good	108 (25.1%)	283 (40.0%)		
86-81	Fair/Satisfactory	147 (34.2%)	215 (30.4%)		
80-75	Passing	167 (38.8%)	93 (13.1%)		
74 and below	Failed	1 (0.2%)	0 (0.0%)		

Note: Student-Respondents' Mathematics Performance were based from their Latest Final Grade

Generally, one of the weaknesses of students in the LPS community high school as observed by the researcher is that they don't want to read mathematics books, instead they rather play games in their cellphone. Students in the LPS has no limitations of using their cellphone. Most of them rely on the notes they copied from the lecture. While, students in the HPS community high school are opposite to the students in LPS. Using their phone has a limitation. They kept it well when the teacher enters the room and they are good listeners when the teacher presents their lesson.

Another observed by the researcher is the creativity on improvising of local materials is very strong positive significant relationship between instructional resources and academic performance. In this study, the researcher observed that LPS Community High School has no enough resources like; books, school facilities, modern technology such as computer, projectors, laptop, gadgets and etc. while as for the HPS, a school endowed with more resources performed as observed by the researcher. So, it's concluded that resources can help the school better than schools that are less endowed.

On the LPS community high school, the teacher has lack of enthusiasm. They don't think that teacher enthusiasm spark the curiosity of students and jumpstart their motivation to learn. While for the HPS Community High School, some of them did it. Teacher enthusiasm can lead to better teaching evaluations. Positive attitudes toward teachers, better student performance, and improved classroom behavior.

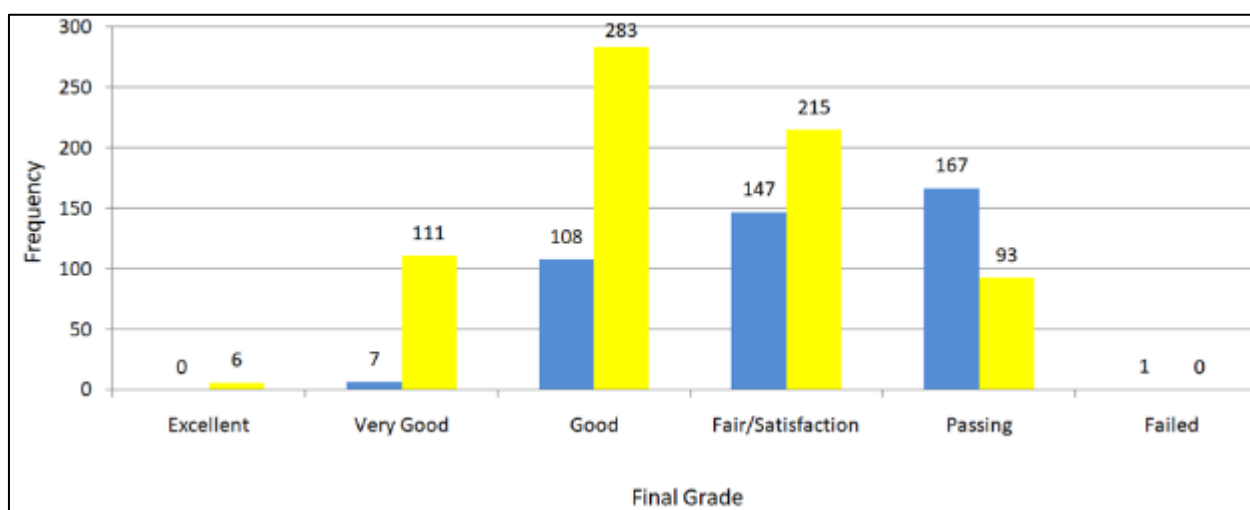


Figure 1: Correlation between Mathematics Teacher-Respondents' Profile and their Teaching Style, Discursive Style and Questioning Techniques in High and Low Performing MSU Community High Schools

Another factor observed by the researcher in these two comparing schools (LPS and HPS) is, when families, schools and communities work in collaboration in supporting the child's learning, the children gain better education outcomes. Sad to say, only few schools were observed to do this.

For visual purposes, data in Table 15 is presented in bar graph form as shown in Figure 3.

A bar chart (or bar graph) is a type of tabular presentation of data in the form of a chart with rectangular bars with lengths proportional to the values that they represent Students' Respondents' Level of Academic Performance in Mathematics Based on their Latest Final Grade of the LPS and HPS MSU Community High School. This figures given a scenario on the correlation between the final grade of the students and their level of schools in the nine (9) MSU Community High Schools.

This figure shows that the LPS demonstrated majority of their students got satisfactory level and at passing score level only while in the HPS, more than a quarter demonstrated good and satisfactory level and very few were at the passing level.

4 CONCLUSION

The study concludes that mathematics performance differed significantly between students in the high-performing and low-performing MSU Community High Schools. Students from the high-performing schools generally obtained higher mathematics grades and showed better performance levels than those from the low-performing schools. The findings also indicate that classroom practices, teacher enthusiasm, availability of instructional resources, student engagement, and cooperation among families, schools, and communities are important considerations in the mathematics teaching-learning process. The study emphasizes that effective teaching involves meaningful teacher-student interaction, appropriate questioning, active participation, and the use of suitable instructional resources. Strengthening these aspects may contribute to a more supportive mathematics learning environment and improved student performance.

STATEMENTS ON COMPLIANCE WITH ETHICAL STANDARDS

Funding Source

This study is descriptive-correlational in approach utilizing quantitative and qualitative forms of data. Quantitative part of the study involved the use of rating scale type (Likert) survey questionnaire and respondents' profile questionnaire.

REFERENCES

- [1] Alton-Lee, A. (2003). Quality teaching for diverse students in schooling: Best Evidence Synthesis. Wellington: Ministry of Education.
- [2] Appalachia Educational Laboratory. (1995). Questioning Understanding Improves Learning and Thinking (QUILT): A facilitator's guide.
- [3] Ball, D. L. (2003), Mathematical Proficiency for All Students. Towards a Strategic Researcher and Development Program in Mathematics Education. RAND Mathematics Study Panel. Santa Monica, CA; RAND.
- [4] Bandura, A. (1997). Self efficacy of control. New Yrk: W.H. Freeman
- [5] Brown, G. A., and R. Edmondson. 1989. Asking questions. In Classroom teaching skills, ed. E. C. Wragg, 97-120. New York: Nichols.
- [6] Bonne, L. & Pritchard, R. (2007). Teacher researchers questioning their practice. 133- 142. Mathematics: essential research, essential practice-Vol 1. Proceedings of the 30th annual conference of the Mathematics Education Research Group of Australasia,
- [7] C. A., & Davis, P. B. (2005). Inviting student engagement with questioning. Kappa Delta Pi Record, 19-23. Capel, S., Leask, M., & Turner, T. (1996). Learning to teach in the secondary school. London& New York: Routledge.
- [8] Caram, C.A. and Davis, p. b. (2005). Inviting Student Engagement with Questioning. New York: Macmillan Publishing company.
- [9] Cazden, C. B. (2001). Classroom discourse: The language of teaching and Learning. Portsmouth, NH: Heinemann.
- [10] Cobb, P., Wood, T., Yackel, E. and McNeal, B. (1992) Characteristics of Classroom Mathematics Traditions: An interaction analysis. American
- [11] Cohen, L., Manion, L., & Morrison, K. (1995). A guide to teaching practice (4th ed.). London & New York: Routledge.

- [12] Cotton, K. (1989). Classroom Questioning Close-Up No. 5. Portland, OR: Northwest Regional Educational Laboratory
- [13] Creswell, J.W. (2003). Research Design: Quantitative, Qualitative, and Mixed Methods Approaches. Thousands Oak(CA): Sage-Publications.
- [14] Danielson, C. (1996). Enhancing professional practice: A framework for teaching. Alexandria, VA: Association for Supervision and Curriculum Development.
- [15] Dantonio, M. A., & Beisenherz, P. C. (2003). A Hands-on approach for middle grades. Portsmouth, NH: Heinemann.
- [16] Fisher, R. (1995). Teaching children to think. Cheltenham: Starney Thornes. Galton, M.; Simon, B. & Croll, P. (1980). Inside the primary classroom. London & New York: Routledge.
- [17] Frank, T. H. (2005). The handbook for developing supportive learning environments. Larchmont, NY 10538: EYE ON EDUCATION.
- [18] Grant, L., Hindman, J. & Stronge, J. (2010). Planning, instruction and assessment: Effective teaching practices. Larchmont, NY 10538: EYE ON EDUCATION.
- [19] Grasha A.F. (1996) Teaching with style: A practical guide to enhance learning by understanding teaching and learning styles. Pittsburgh, PA: Alliance Publishers.
- [20] Grasha A.F. (1996) Teaching with style: The integration of teaching and learning style in the classroom. Pittsburgh, PA: Alliance Publishers.
- [21] Hindman, J., Grant, L. & Stronge, J. (2010). The supportive learning environment: Effective teaching practices. Larchmont, NY 10538: EYE ON EDUCATION.
- [22] Hamilton, R., & Brady, M. P. (1991). Individual and class wide patterns of teachers' questioning in mainstreamed social studies and science classes. Teaching and Teacher Education, 7(3), 253-262.
- [23] Hedge, T and Whitney, N. (1996). Power, pedagogy & practice. Oxford OX2 6DP: Oxford University Press.
- [24] Kawanaka, T., & Stigler, J. W. (1999). Teachers' use of questions by eight-grade mathematics classrooms in Germany, Japan, and the United States, Mathematical Thinking & Learning, 1(4), 255. Kerry, T. (2002). Explaining and questioning. Cheltenham, UK: Nelson
- [25] Leongsan, J.B. (2003). Assessing the Mathematics Achievement of College Freshman using Piaget's Logical Operation, Hawaii International Conference on Education, Waikiki, Hawaii, USA.
- [26] Marzano, R. J. (2003). What works in schools: Translating research into action. Alexandria, Virginia, USA: Association for Supervision and Curriculum Development.
- [27] McNamara, D. (1994). Classroom pedagogy and primary practice. London & New York: Routledge.
- [28] Mishra, R.C. 2007 . Teaching Styles. APH Publish Corporation
- [29] Ornstein, A. C., & Lasley, T. J. (2000). Strategies for effective teaching (3rd ed.). Boston, USA: McGrawHill Higher Education.
- [30] Petty, G. (1993). Teaching today (a practical guide). Cheltenham: Stanley Thornes (Publishers) Ltd.
- [31] Sadker, D., & Sadker, M. (1985). "Is the classroom OK?" Phi Delta Kappan, 55, 358-67. Tan, Z. (2007). Questions in Chinese University EL Classrooms: What lies beyond it?. RELC, 38 (1), 87-103.
- [32] Salandanan, G. (2006). Methods of teaching. Quezon City. Lorimar Publishing Co. Inc.
- [33] Sahin C. Bullock, K. and Stables, A. (2002) Teachers' beliefs and practice in Relation to their beliefs about questioning at key stage 2, Educational Studies. 28, 371-384.
- [34] Sahin, A. (2007). The effects of types, quantity and quality of questioning in improving students' understanding. Texas: Texas A and M
- [35] Santrock, J. W. (2004). Educational psychology. Second Edition. Boston: McGraw-Hill Higher Education.
- [36] Stronge, J. H. (2010). Effective teachers = student achievement: What the research says. Larchmont, NY 10538: Eye on Education.
- [37] Voight, J. (1992). Negotiation of mathematics meaning in classroom process: Social interaction and learning mathematics. In L. Steffe, P. Nesher, p. Cobb, G. Goldin, and B. Greer (Eds.), theories of mathematical learning (pp. 21-50) Mahwah, Nj: Erlbaum.

- [38] Vogler, K. E. (2005). Improve Your Verbal Questioning. *The Clean House*, November/December, 79(2), 98-103.
- [39] Wink, J. (2005). *Critical pedagogy: Notes from the real world*. 3rd Edition. Boston and New York: Pearson Education, Inc.
- [40] Yang, M. (2006). "A critical review of research on questioning in education: limitations of Its positivistic basis." *Asia Pacific Education Review*, 7 (2), 195-204.
- [41] Chin, C. (2006). Classroom interaction in science: teacher questioning and feedback to students" responses. *International Journal of Science Education*, 28 (11), 1315– 346.
- [42] Croom, B., & Stair, K. (2005). Getting from q to a: effective questioning for effective learning. *The Agricultural Education Magazine*, 78, 12-14.
- [43] Durham, M.E. (1997). Secondary science teachers" responses to student questions. *Journal of Science Teacher Education*, 8 (4), 257-267.
- [44] Dursan, S. & Dede, Y. (2004). "The Factors Affecting Students Success in Mathematics: Mathematics Teachers Perspective." *Journal of Gazi Education Faculty* 24(2).217-230.
- [45] Hill, J., and Flynn, K. (2008) Asking the right questions. *Journal of Staff Development*, 29, 46-52
- [46] Groenke, S.L. & Paulus, T. (2007). "The role of teacher questioning in promoting dialogic literary inquiry in computer-mediated communication." *JRTE (Journal of Research on Technology in Education)*, 40 (2), 141– 164.
- [47] Guan Eng Ho, D. (2005). "Why do teachers ask the questions they ask?" *RELC*, 36 (3), 297-310.
- [48] Hattie, J. (2002, October). What are the attributes of excellent teachers? Paper presented at the New Zealand Council For Educational Research Conference on Teachers make a difference: What is the research evidence? Wellington, New Zealand.
- [49] Mason, J. (2000). Asking mathematical questions mathematically. *International Journal of Mathematical Education in Science and Technology*, 31(1), 97-111.
- [50] McHill, D., & Dunkin, F. (2002). What is a good question?. *LITERACY Today*, December, 8-10.
- [51] Mkandawire, C. Teachers' questioning technique in mathematics grade II level. A Dissertation Paper. University of Zamba, Lusaka, 2013.
- [52] Muijs, D. & Reynolds, D. (2005). *Effective Teaching –Evidence and Practice*. London: Sage Publications.
- [53] Nunan, D., & Lamb, C. (1996). *The self-directed teacher: Managing the learning process*. Cambridge: Cambridge University Press.
- [54] Third International Mathematics and Science Study (TIMSS, 2000).
- [55] Vogler, K. (2004) Using political cartoons to improve your verbal questioning. *The Social Studies*. January/February. 11-15.
- [56] Walsh J.A., & Sattes, B.D. (2005). *Quality questioning: Research-based practice to engage every learner*. Thousand Oaks, California: Corwin Press.
- [57] Wilkerson, J. & Lang, W. (2007). *Assessing teacher competency: Five standards-based steps to valid measurement using the CAATS model*. Thousand Oaks, California 91320: Corwin Press.
- [58] Cardona, R.S. (2009). *Mathematics anxiety and Mathematics Achievement of Prospective Elementary Teachers*, Unpublished Master's Thesis. Philippine Normal University, Alicia, Isabela, Philippines
- [59] Cotton, K. (2004). Why is Questioning such Important Competent of Effective Teaching and Learning. Retrieved April 12, 2009 from <http://www.google.co.th/search?hl=th&q=classroom+questioning+by+cotton+2004&meta>
- [60] Dumrang, S. (2001) the Science teaching approaches and students performance at MSU-External studies high schools. Dissertation, Mindanao State University
- [61] Guro, O. and Guro, J. (2015). Factors Associated with Muslim High School Students' Mathematics Performance in Three Selected Regions in Mindanao: Basis for Intervention. Mindanao State University Marawi City, Philippines
- [62] Gumal, A. (2012) Factor affecting the teaching of public high school mathematics teachers in the province of Ianao del sur and Maguindanao. Dissertation, Mindanao State University, Marawi City
- [63] Macarambon A. @011). Teaching styles: Its effects on achievement and interest in science of first year student at Philippine integrated school foundation, Inc., Masteral Thesis, Mindanao State University, Marawi City

- [64] Sumang, L. (2012). Teaching strategies used by professional teachers of selected private and public schools in Marawi city division. Masteral Thesis, Mindanao State University
- [65] Brualdi, A.C. (1998). Classroom questions. Practical Assessment, Research and Evaluation, 6(6), Retrieved June 8, 2005, from <http://PAREonline.net/getvn.asp.7>.
- [66] National Council of Teaching of Mathematics (1991). Professional Standards for Teaching Mathematics. Reston, Virginia: The Council
- [67] TIMMS (1999-R) repeated
- [68] System of Admission and Scholarship Examination. "SASE Information Bulletin" Secondary High School Examination