Journal of Critical Reviews

ISSN- 2394-5125 Vol 7, Issue 4, 2020

Review Article

VIEWS AND CHALLENGES IN TEACHING MATHEMATICS OF ELEMENTARY TEACHERS IN RURAL AND URBAN SCHOOL DISTRICTS

Jehana M. Darkis

Doctor of Education Associate Professor V, Sulu State College, Jolo, Sulu Email Address: docjehanamuallam@gmail.com

Received: 19.12.2019 ***Revised: 21.01.2020*** ***Accepted: 23.02.2020***

Abstract

This research investigates teachers' views and challenges in mathematics teaching, the purpose of the research was two folds: 1) To investigate elementary teachers in Rural and Urban School Districts views of teaching mathematics when categorize according to the following: a) Basic Skills Practice, b) Discovery (Active) View, c) Teacher Designed Curriculum, d) Text Driven Curriculum, e) Many Methods Encouraged, f) Cooperative Learning View; and 2) To examine the challenges encountered by the elementary teachers in Rural and Urban School districts in teaching mathematics. Descriptive – survey research were used in gathering the necessary data. A total of one hundred fifty (150) mathematics teachers were chosen from various elementary schools in both urban and rural school districts through purposive sampling. Data were generated from closed ended survey questionnaire rating sheet with a five point Likert scale. The weighted Mean for Views and identified sources of challenges or obstacles were then calculated and was given equivalent descriptions and explained descriptively. Findings revealed both urban and rural school districts favored the many methods view when it came to there dominate views of teaching mathematics with a computed Mean of M=4.47 for Rural school districts and M=4.83 for Urban school districts. Results also revealed that the process of integrating technology in mathematics classrooms posed various types of challenges for teachers in rural district in their daily teaching process for the mathematics subject

Key words: Teaching mathematics, Views, Challenges, Mathematics Reforms

DOI: http://dx.doi.org/10.31838/jcr.07.04.19

INTRODUCTION

In the urban and rural school system, there exist mostly children from lower and middle class families so teachers whether in urban and rural school district, elementary teachers face the same challenges and experiences. What is urban and rural teachers' expectations for urban and rural students' mathematics achievement? What knowledge and qualifications in mathematics do urban teachers possess?

According to Cobb & Hodge (2002) teachers are the most important resource for developing students' mathematical identities. They influence the ways in which student's think of themselves in the classroom (Walshaw, 2004). In establishing equitable arrangements, effective teachers pay attention to the different needs that result from different home environments, different languages, and different capabilities and perspectives. The positive attitude and gives them greater confidence in their capacity to learn and make sense of mathematics. Confident in their own understandings, students will be more willing to consider new ideas presented by the teacher, to consider other the face of mathematical challenge.

This study looks at teachers' views to see what they think about when they are teaching.

This study may also help teachers identify their conceptions of mathematics and possibly stimulate how these conceptions affect teaching and student learning.

John Dewey stated:

The teacher is not in the school to impose certain ideas or form certain habits in the child, but is there as a member of the community to select influences which shall affect the child and to assist him in properly responding to these influences. (Hendrick, 1997)

As such, these topics constitute largely uncharted areas of research on mathematics teaching. Nevertheless, a number of studies in mathematics education, such as Dougherty, 1990; Grant, 1984; Kesler, 1985; Kuhns, 1980; Lerman, 1983; Marks, 1987; McGalliard, 1983; Shroyer, 1978; Steinberg, Haymore, and Marks, 1985; and Thompson, 1984, Mcgriff (1999) have indicated that teachers' beliefs and views about mathematics and its teaching play a significant role in shaping the teachers' characteristic patterns of instructional behavior.

It has been generally assumed that teacher' views towards mathematics and mathematics teaching might affect their instructional practices, as well as their students' achievement in and views towards the subject. This apparently simple statement has resulted into a considerable number of research studies that have been far from producing conclusive findings. For the current undertakings, this examines elementary teachers' views and challenges of mathematics teaching in urban and rural school districts. It seeks to answer the following specific query:

What are the views of mathematics teaching of elementary teachers in Rural and Urban School districts when categorize according to the following:

a. Basic Skills Practice
b. Discovery (Active) View
c. Teacher Designed Curriculum
d. Text Driven Curriculum
e. Many Methods Encouraged
f. Cooperative Learning View

What are the challenges encountered by the elementary teachers in Rural and Urban School districts in teaching mathematics?

MATERIALS AND METHODS

Research Methodology

The descriptive – survey research were used in gathering the necessary data concerning Views and Challenges in Teaching Mathematics of elementary teachers in Rural and Urban School District

Data collection procedures was similar in both urban and rural school district, the researcher or her research assistant distributed the questionnaire to the elementary grade teachers at each selected districts.

Research Sampling

The respondents of this study were teachers who are teaching elementary and primary grade students in urban and rural school districts.

One Hundred fifty (150) teachers participated in the study. Purposive sampling was employed in choosing the participants.

Research Instruments

A mathematics opinion survey was used to solicit the responses of the teachers in this current research study.

The main instrument was used in gathering data is the questionnaire – rating sheet with five-point Likert scale. It is composed of two parts. Part I of the questionnaire dealt with the views of the teachers towards teaching mathematics and part II dealt with the challenges of teachers in teaching mathematics.

The response mode for part I of the questionnaire was coded as follow: 5 - Strongly Agree, 4 – Moderately Agree, 3 - Undecided, 2 - Disagree, and 1 - Strongly Disagree. And the response mode for part II of the questionnaire on the other hand was coded as follow: 5 - Very High Extent, 4 - High Extent, 3 - Moderate Extent, 2 - Low Extent, and 1 - Very Low Extent.

Data Analysis

Data was tabulated and computed using weighted Arithmetic Mean; each computed values was given equivalent descriptions and will explain descriptively.

RESULTS

On Views of mathematics teaching of elementary teachers in Rural and Urban School districts

To measure the views of mathematics teaching of elementary teachers data were obtained from part I of the checklist – questionnaire, there were sex category such as a) Basic Skills Practice—basic skills vs. calculator, other emphasis; b) Discovery (Active) View— need to be told vs. can/should discover; c) Teacher Designed Curriculum—children's needs, differences and preferences are accommodated; one text is not followed for all abilities, the mathematics curriculum is differentiated for individual needs and differences; c)Text Driven Curriculum--mathematics is taught by following the text or syllabus exactly; d) Many Methods Encouraged—teacher's unique method vs. many methods; or, e) Cooperative Learning View—isolated vs. cooperative learning. Each item in the views section of the questionnaire has given five Likert alternatives and has equivalent description. The most favored view gets a high score and low score for not in favor. The weighted mean was computed. Table I indicates the views of teachers in teaching mathematics

Table I: Survey Results on Views of Urban and Rural School Districts Respondents in teaching mathematics and the computed mean

Views of Teachers in Teaching Mathematics	Rural School Districts Weighted Mean	Urban School Districts Weighted Mean
Basic Skills Practice	4.45	4.09
Discovery (Active) View	3.02	3.42
Teachers Designed Curriculum	4.13	3.92
Text Driven Curriculum	3.10	4.24
Many Methods Encouraged	4.47	4.83
Cooperative Learning View	4.12	4.34

As can be gleaned from Table I teacher's respondents from both urban and rural school districts favored the many methods view when it came to there dominate views of teaching mathematics with a computed Mean of M=4.47 for Rural School Districts and M=4.83 for Urban School Districts. This implies that the many methods approach in teaching mathematics has been communicated effectively to most teachers.

On Challenges of mathematics teaching of elementary teachers in Rural and Urban School districts.

To measure the Challenges of mathematics teaching of elementary teachers data were obtained from part II of the checklist – questionnaire, Each item in the Challenges section of the questionnaire has given five Likert alternatives and has equivalent description. The highest extent of challenges gets a high Mean score and low Mean score for less extent of challenges. The weighted mean was computed and given each equivalent verbal description as to whether very low extent, low extent, moderate extent, high extent and very high extent. Table II indicates the Challenges of teachers in teaching mathematics.

However, continued work in convincing, persuading, and training all teachers is yet needed. Math teachers usually use many methods when teaching. Their job when instructing is to develop methods, or ways to teaching, that will benefit students and make them successful. Methods for quality math instruction include using visuals, making connections, using formative assessments, and teaching strategic thinkinG

Table II: Survey Results on Challenges of Urban and Rural School Districts Respondents in teaching mathematics and the computed mean

No	Items	RURAL SCHOOL DISTRICTS			URBAN SCHOOL DISTRICTS		
		Mean	Verbal Description	Rank	Mean	Verbal Description	Rank
1	To help students actively engaged in mathematics using technologies as productivity, communication, research and problem-solving and decision-making tools	4.12	High Extent	5	3.63	Moderate Extent	7
2	An overarching conception of what it means to teach a particular subject such as mathematics integrating technology in the learning	4.22	High Extent	3	3.80	Moderate Extent	6
3	Knowledge of instructional strategies and representations for teaching particular mathematical topics with technology.	4.06	High Extent	6	3.95	Moderate Extent	4
4	Knowledge of students' understandings, thinking, and learning with technology in a subject such as mathematics	4.21	High Extent	4	3.97	Moderate Extent	3
5	Knowledge of curriculum and curriculum materials that integrates technology with learning mathematics	4.35	High Extent	2	3.94	Moderate Extent	5
6	Understanding the pedagogical theories that underlie school mathematics reform	3.37	Moderate Extent	10	4.49	High Extent	2
7	Make the school mathematics curriculum more ambitious and enhance classroom instruction	3.49	Moderate Extent	9	3.45	Moderate Extent	8
8	Difficulty in learning mathematics and meeting pupil's ability needs and interest	4.38	High Extent	1	4.51	High Extent	1
9	Lacks knowledge to use sets and set operations, number line, attribute blocks, etc. in teaching mathematics	3.97	Moderate Extent	8	3.19	Moderate Extent	9
10	The absence of attention to high-level processes, such as problem solving and reasoning, in typical mathematics instruction	4.02	High Extent	7	3.14	Moderate Extent	10

Legend

Mean	Verbal Description
1.00 to 1.59	Very Low Extent
2.00 to 2.59	Low Extent
3.00 to 3.59	Moderate Extent
4.00 to 4.59	High Extent
5.00	Very High Extent

Reflected in Table II the Survey Results on Challenges of Urban and Rural School Districts Respondents in teaching mathematics and the computed mean, noticeably both respondents from Urban And Rural school district found statement "Difficulty in learning mathematics and meeting pupil's ability needs and interest" gets the highest computed Mean of M=4.38 and M=4.51 which has verbal meaning of High extent of challenges encountered by Rural and Urban school districts participants respectively. Difficulty in learning mathematics and meeting pupil's ability needs and interest towards mathematics seems to be a source of challenges for teachers in mathematics. When students perceiving mathematics as being too difficult and to learn, they will quickly loose their interests and motivation to learn mathematics. As a result, they cannot perform and major factor that contribute to the failure in mathematics.

Challenges facing mathematics teachers in rural school district gets the highest extent were the statement from ranked 2 to ranked 7 indicated in table 2 with a computed Mean ranging from 4.02 upto 4.35 with a given verbal meaning of High extent of challenges, these are statements "Knowledge of curriculum and curriculum materials that integrates technology with learning mathematics with a weighted Mean of 4.35; An overarching conception of what it means to teach a particular subject such as mathematics integrating technology in the learning with a weighted Mean of 4.22; Knowledge of students' understandings, thinking, and learning with technology in a subject such as mathematics with a weighted Mean of 4.21; To help students actively engaged in mathematics using technologies as productivity, communication, research and problem-solving and decision-making tools with a weighted Mean of 4.12; Knowledge of instructional strategies and representations for teaching particular mathematical topics with technology with a weighted Mean of 4.06 and The absence of attention to high-level processes, such as problem solving and reasoning, in typical mathematics instruction with a weighted Mean of 4.02. Noticeably participants from Rural district reported high extent of challenges were more on mathematics integrating technology in learning, may be because of a long-ago influence of the use of traditional way of teaching in the far flung area.

While for mathematics teachers in Urban school district as can be noted in Table II above reported high extent of Challenges they are facing on and Understanding the pedagogical theories that underlie school mathematics reform with a computed Mean of 4.49. This implies that one of the main challenges that the teacher in our vignette experienced during her inquiry on area was interpreting her students' thinking and responding appropriately, especially when students proposed new strategies

or formulas for computing area and explained how they got their results.

DISCUSSIONS

Both urban and rural school districts favored the many methods view when it came to there dominate views of teaching mathematics, findings is parallel with the study of Dessart, De Ridder, and Ellington (1999) many methods view, cooperative learning, use of calculators, teacher designed curriculum, and the discovery view go hand-in-hand with the problem solving approach. Teachers with a problem solving type classroom will at one time or another employ all of these views. For example, most teachers agree that after student's master computational skills, calculators aid in checking computation and facilitate problem solving. Burns (1998) says that calculators can help children think and reason numerically.

Basic Skills came second for mathematics teachers views in rural district with a slight difference of weighted Mean of M=4.45, building blocks of mathematics start early on when learning the basic skills as pointed out by teachers and the key to teaching basic math skills that students can apply and remember for future instruction is to use several teaching strategies. While for urban district teachers the Cooperative Learning View come second after many methods with a computed Mean of M=4.34. It implies learning and teaching style that contrasts greatly with traditional direct instruction. According to Martin (2016), fewer students can access the content using direct instruction and usually forget it quickly. Cooperative learning provides opportunities for productive struggle, in which students learn from their mistakes through explanations from their peers and teacher. The classroom environment must be such that students feel safe to make mistakes. Meanwhile, Battista (1999) observed in the past, school mathematics has been seen as a set of computational skills and mathematics learning has been seen as progressing through carefully scripted schedules of acquiring those skills. According to the traditional view, students acquire mathematical skills by mimicking demonstrations by the teacher and textbooks. They acquire mathematical concepts by absorbing teacher and textbook communications. All current major scientific theories describing students' mathematics learning agree that mathematical ideas must be personally construct*ed* by students as they try to make sense of situations (including, of course, communications from others and from textbooks.

Teachers Designed Curriculum, Cooperative Learning View and Text Driven Curriculum fell in the middle and they had least favorable views towards Discovery (Active) view as reported by teachers in rural district while results were contrast to that of view of mathematics teachers in urban district they feel in the middle were the Basic Skills Practice, Text Driven Curriculum and Teachers Designed Curriculum and had least favorable views towards discovery. Teacher designed curricula affords the teacher to meet the individual needs of the students, consequently the mathematics curriculum is modified for individual needs and differences (Ernest, 1996). With cooperative learning, the students start the problem and work it out together. The teacher then provides closure, after students have presented their ideas and shown how they have connected the ideas and added academic vocabulary fewer students can access the content using direct instruction and usually forget it quickly. Cooperative learning provides opportunities for productive struggle, in which students learn from their mistakes through explanations from their peers and teacher. The classroom environment must be such that students feel safe to make mistakes, Martin Joyce (2016).

Remillard, Janine and Kim, Ok-Kyeong (2017) cited the studies of Collopy, 2003 documented that teachers interpret and mediate the contents of curriculum resources when using them and how teacher knowledge supports proper use of those resources (e.g., Chick, 2007, 2009; Kim, 2007). Their research also considers teachers' use of curriculum resources from a knowledge perspective. Specifically, we propose that using mathematics curriculum resources to guide instruction places particular knowledge-use demands on teachers that need to be included in how knowledge for teaching is conceptualized, studied, and developed.

Thompson (1984) observed that the extent to which experienced teachers' conceptions are consistent with their practice depends in large measure on the teachers' tendency to reflect on their actions—to think about their actions vis-à-vis their beliefs, their students, the subject matter, and the specific context of instruction. He acknowledged that all tensions and conflicts between beliefs and practice will not be resolved through reflection, but it is by reflecting on their views and actions that teachers gain an awareness of their tacit assumptions, beliefs, and views, and how these relate to their practice. It is through reflection that teachers develop coherent rationales for their views, assumptions, and actions, and become aware of viable alternatives.

The Curriculum and Evaluation Standards for School Mathematics (1989) characterizes what it means to learn mathematics: Knowing mathematics means being able to use it in purposeful ways. To learn mathematics, students must be engaged in exploring, conjecturing, and thinking rather than only in rote learning of rules and procedures. Mathematics learning is not a spectator sport, when students construct personal knowledge derived from meaningful experiences, they are much more likely to retain and use what they have learned. This fact underlies teachers' new role in providing experiences that help students make sense of mathematics, to view and use it as a tool for reasoning and problem solving.

The process of integrating technology in mathematics classrooms posed various types of challenges for teachers. Sometimes there were problems with the technology, sometimes the curriculum did not afford much support for learning, and sometimes students or teachers themselves were challenged. This concern is likewise understandable because most Teachers are less equipped with technology. Although the integration of technology in mathematics teaching has been recommended for several years, in fact this process of integration is still not implemented on a large scale. The process of integrating technology has not penetrated every school. Mathematics Teachers in Rural School district facing Moderate extent of Challenges in Teaching mathematics were statement from ranked 7 to 10 the "Lacks knowledge to use sets and set operations, number line, attribute blocks, etc. in teaching mathematics" with has computed Mean of 3.97; "Make the school mathematics curriculum more ambitious and enhance classroom instruction with has computed Mean of 3.49; "Understanding the pedagogical theories that underlie school mathematics reform" with has computed Mean of 3.37.

According to Banzon, J. G. (2000) the manner in which the subject is taught, how the curriculum is presented and how the classroom activities are conducted, are results of the knowledge, world views belief system, life goals, life style, needs, skills and attitudes that their teacher brings to the classroom. She also revealed that only teachers attitudes had influenced highly and significantly students performance.

Nickson (1992) stresses that in a mathematics classroom, teachers act as agents of particular cultures, bringing with them specific beliefs and concepts about how an academic subject should be taught. This is known as their philosophy with regard

to the subject. Within the context of the classroom they make judgments and choices about aspects of that culture to which their pupils will be introduced--in this case, what mathematics will be taught, to whom, and how.

According to several research reform projects have noted that emotions, both positive and negative, inevitably accompany efforts to change one's teaching practices (Clarke, 1994; Ferrini-Mundy, 1997). A participant in one of our professional development projects aptly described her initial experiences in instructional innovation as an "emotional roller-coaster"; at times she felt elated by her students' success and the depth of their mathematical thinking, but she could also sink into dejection from an unsuccessful instructional experience she had spent hours putting together or from the opposition presented by a parent or administrator. Some teachers may suddenly feel inadequate after years of perceiving themselves as successful teachers and may even blame themselves for "doing it wrong." Then statement ranked 3 to 10 also reflected in table II reported moderate extents of challenges facing by mathematics teachers from Urban school district. These are "Knowledge of students' understandings, thinking, and learning with technology in a subject such as mathematics" with a computed Mean of 3.97 "Knowledge of instructional strategies and representations for teaching particular mathematical topics with technology" with a computed Mean of 3.95; "Knowledge of curriculum and curriculum materials that integrates technology with learning mathematics" with a computed Mean of 3.94; An overarching conception of what it means to teach a particular subject such as mathematics integrating technology in the learning" with a computed Mean of 3.80; To help students actively engaged in mathematics using technologies as productivity, communication, research and problem-solving and decision-making tools" with a computed Mean of 3.63; "Make the school mathematics curriculum more ambitious and enhance classroom instruction" with a computed Mean of 3.45; "Lacks knowledge to use sets and set operations, number line, attribute blocks, etc. in teaching mathematics" with a computed Mean of 3.19 and "The absence of attention to high-level processes, such as problem solving and reasoning, in typical mathematics instruction" with a computed Mean of 3.14.

CONCLUSION

From the results, it is clear that both urban and rural school districts favored the many methods view when it came to there dominate views of teaching mathematics; many methods approach in teaching mathematics has been communicated effectively to most teachers. It can be concluded in this study Both in Rural and Urban District School source of challenges for teachers in mathematics is the difficulty in learning mathematics and meeting pupil's ability needs and interest towards mathematics and the process of integrating technology in mathematics classrooms also posed various types of challenges for teachers in rural district in their daily teaching process for the mathematics subject. Current research also have concluded that knowledge often develops based on the teacher's pedagogical knowledge and through classroom interactions with the subject matter and the students in the classroom, reports.

From a learning difficulties perspective, it may be useful to consider the role played by inclusion and differentiation in the classroom, which is often significant and should influence pedagogy. It must be noted that the findings of the current undertakings were strongly influenced by cultural context and were affected by the previous experiences of the participating teachers. A similar study should be conducted in different settings to examine the scope of the current findings. It is recommended that further studies be done using the same survey instrument as used in this study with higher grade level teachers, middle school level teachers, senior high school teachers as well as with preservice education teachers. Survey results can help detect inconsistencies and areas that merit attention in mathematics education, but the development of additional measures, methods, and designs are needed in this line of research that studies views and challenges. Research on views and challenges of teachers and teacher candidates are yet scarce. By creating other measures, this type of research would flourish and offer more insight into the teacher, the teacher candidate and their teaching methodologies.

The contribution of our study is twofold. First, the same research tools presented in this article can be used to expand the research beyond scope of our study. We suggest that more studies investigating the role and the significance of mathematical challenge in teaching and learning mathematics should be undertaken. It must be noted that the findings of the present study were strongly influenced by cultural context and were affected by the previous experiences of the participating teachers. A similar experiment should be conducted in a different cultural context to examine the scope of the current findings. We believe that individual interviews with mathematics teachers can shed light on teachers' conceptions associated with mathematical challenge and its role in mathematics classroom. Second, we believe that the categorization of mathematically challenging tasks devised in this study can be used by teacher educators and instructional designers to advance teachers' awareness regarding mathematical challenge and promote integration of challenging mathematical activities into the curriculum. We suggest that special instructional materials and activities for mathematics teachers that will allow teachers to develop their appreciation of challenging mathematics should be integrated in professional development courses; furthermore, discussion of the role and the significance of mathematical challenge should become explicit. The contribution of our study is twofold. First, the same research tools presented in this article can be used to expand the research beyond scope of our study. We suggest that more studies investigating the role and the significance of mathematical challenge in teaching and learning mathematics should be undertaken. It must be noted that the findings of the present study were strongly influenced by cultural context and were affected by the previous experiences of the participating teachers. A similar experiment should be conducted in a different cultural
context to examine the scope of the current findings. We believe that individual interviews with mathematics teachers can shed light on teachers' conceptions associated with mathematical challenge and its role in mathematics classroom. Second, we believe that the categorization of mathematically challenging tasks devised in this study can be used by teacher educators and instructional designers to advance teachers' awareness regarding mathematical challenge and promote integration of challenging mathematical activities into the curriculum. We suggest that special instructional materials and activities for mathematics teachers that will allow teachersto develop their appreciation of challenging mathematics should be integrated in professional development courses; furthermore, discussion of the role and the significance of mathematical challenge should become explicit.

ACKNOWLEDGEMENT

Prof. Hamsali S. Jawali, Ed.D., Sulu State College President, for his encouragement. Prof. Hja. Sururia A. Alsad, Ed.D., Vice president for academic affairs, chairman of the oral examining committee,

her consultant, for advice and intelligent guidance that led to improvement of this study. Prof. Tamtailer P. Nandu, for helping in analyzing and interpreting the data and constructive comments in statistics, Prof. Jumdanan J. Sandangan, SSC Director of Planning, for his comments and suggestions.

Mr. and Mrs. Damalan Hji. Abubakar, Akip, Andan, Mholly, Jayvee and to her sister in law Juai, her immediate family, you understood how important this degree was and you stood the test of time; thanks for your love and understanding. Her Nephew and Nieces, Alexander, Alyanna, Almina, Alnawati and Alessandara Muallam and Nafiesa Isad, thanks for inspirations and prayers.

School Principals and Heads of Selected Elementary Schools in Zamboanga City and Sulu Province for helping her in facilitating the gahering of data needed in the study.

Selected elementary teacher's respondents of both urban and rural school, for their cooperation without which this study would not be completed.

Above all, to our dear almighty ALLAH, for giving her enough knowledge, strength and degree of concentration to do this things possible.

REFERENCES

1. Bates (2012), Basic Math Teaching Strategies, https://education.cu-portland.edu/blog/classroom-resources/ basic-math-teaching-strategies/
2. Battista, M. T., 1999. The Mathematical Miseducation of America's youth: Ignoring Research and Scientific Study in Education. Phi Delta Kappan,
3. Brown, S., Cooney, T., & Jones, D., 1990. Mathematics Teacher Education. In W. R. Houston (Ed.), Handbook of Research on Teacher Education). New York: Macmillan.
4. Ernest, P., July, 1988. The Impact of Beliefs on the Teaching of Mathematics. Paper Prepared for the 6th International Congress on Mathematics Education. Budapest, Hungary.
5. Fennema, E., & Franke, M., 1992. Teacher's Knowledge and its Impact. In D. A. Grouws (Ed.), Handbook of Research on Mathematics Teaching and Learning New York: Macmillan.
6. Greenwood, J., 1984. Sound off: My Anxieties about math Anxiety. Mathematics Teacher
7. Koehler, M. J., & Mishra, P. (2009). What is technological pedagogical content knowledge? Contemporary Issues in Technology and Teacher Education,
8. Martin Joyce (2016), Cooperative Learning Strategies, National Council of Teachers in Mathematics, https://www.nctm.org/Publications/ Mathematics-Teaching- in-Middle-School/Blog/Cooperative-Learning-Strategies/
9. Martinez, G. R., & Martinez, N. C., 1996. Math Without Fear: A Guide for Preventing Math Anxiety in Children. Needham Heights, MA: Allyn and Bacon.
10. Meyerson, L. N., 1978. Conception of Knowledge in Mathematics: Interaction with and Applications to a Teaching Methods Course. Dissertation Abstracts International, 38, 733A. State University of New York, Buffalo, www.google.com
11. Mikusa, M. G., & Lewellen, H., 1999. Now here is that authority on Mathematics Reform, Dr. Constructivist! NCTM The Mathematics Teacher.
12. Morrison, G. S., 1997. Teaching in America. Needham Heights. MA: Allyn & Bacon.
13. Pacis, Maria Fatima (2000). Philosophical Orientation of Mathematics Teaching of the Secondary Schools in Baguio City. Unpublished Doctoral Dissertation, Saint Louis University, Bonifacio Street, Baguio City
14. Pelayo, Avelina A., 1988 Grade one Teachers Perceived, Competencies, Attitudes and problems in mathematics instruction as prescribed in the NESC. Master's Thesis - WMSU – Zamboanga, City.
15. Perry, N., Phillips, L., & Dowler, J. (2004). Examining Features of Tasks and Their Potential to Promote Self-Regulated learning. Teachers College Record, 106, 1854-1878.
16. Refugio, Craig N., 1995. Mathematics Teacher's Evaluation Practices and Students Achievement and Attitude Towards Mathematics. Unpublished Doctoral Dissertation, WMSU – Zamboanga, City
17. Remillard, Janine and Kim, Ok-Kyeong (2017), Knowledge of curriculum embedded mathematics: exploring a critical domain of teaching, Educational Studies in Mathematics,https:// www.researchgate.net/ publication/ 315330033_Knowledge_of_curriculum_ embedded_mathematics_exploring_a_critical_domain_of_teaching
18. Secada, W., 1990. The Challenges of a Changing World for Mathematics Education. InT. J. Cooney Ed., Teaching and Learning Mathematics in the 1990s. Reston, VA: National Council of Teachers of Mathematics.
19. Seldon, A., & Sheldon, J., 1997. Preservice teachers' conceptions of mathematics and how to teach it [On-line]. Available: http://www.maa.org/ t_and_l/sampler/rs_3.htm
20. Shulman, L. S., 1985. On Teaching Problem Solving and Solving the Problems of Teaching. In E. A. Silver (Ed.), Teaching and Learning Mathematical problem: Multiple research perspectives. Hillsdale, NJ: Laurence Erlbaum.
21. Thompson, A. G., 1992. Teacher's Beliefs and Conceptions: A Synthesis of the Research. In D. A. Grouws (Ed.), Handbook of Research on Mathematics Teaching and Learning. New York: Macmillan.
22. Knowledge of Curriculum Embedded Mathematics:
23. Exploring a Critical Domain of Teaching