Capability Building Model for Secondary School Mathematics Teachers

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ABSTRACT

Classroom management is an integral part of teaching and technique of managing students both can and must be acquired by the teacher. The teachers’ personality, philosophy and teaching style direct affect the students’ managerial and disciplinary approaches. Other educators aver that classroom management are based on a mixture of psychology, classroom experience and even, common sense. These are also applicable to mathematics teachers who are expected to have good classroom management skills. In this study, the mathematics teachers’ management skills involve their capability to set learning objectives and provide learning activities which will contribute to students’ growth. They should have the capability to make the mathematics classroom a beehive of activity and should provide students a feeling of openness and freedom and yet can make students behave accordingly.

Keywords: Capability Building, Classroom Management, Management Skill

INTRODUCTION

Mathematics is a formal body of knowledge defined by axioms and derived theorems. School mathematics should reflect that structure and the ways in which mathematical topics intertwine. A mathematics curriculum should identify a progression of topics that build on the structure of mathematics, with topics in one year, depending on topics covered in the previous year. Although there may not be a single correct sequence of topics in mathematics are not interchangeable pieces that can be placed in arbitrary sequence. When the sequence, cumulative nature of mathematics, is not present the resulting sequence of topics becomes nothing more than a meaningless list of items. Consequently, students only memorize as fast as they forget what they memorized. Such arbitrariness makes learning mathematics even more difficult to disadvantaged and struggling students. It is therefore evident that a coherent curriculum for mathematics teaching is one factor that needs to be seriously addressed in improving the teaching and learning of discipline. Providing a common, coherent, and challenging mathematics-based curriculum means that necessary resources should be truly addressed.

However, such a curriculum may not guarantee the realization of the successful goals of mathematics teaching. Such a curriculum must be effectively implemented, thus arise the demands on the crucial role teachers play.

Teachers’ knowledge of subject matter combined with a challenging curriculum is what often distinguishes the level of student achievement. The argument, therefore, is simple. Teachers with a strong mathematics background cannot teach well in a context defined by a fragmented and incoherent curriculum. Teachers feel the constraints of state and district standards that define their world of education where the tests that hold them accountable with the textbooks that they use.

It is noteworthy to point out that there are two kinds of accountability: the suggestive and coercive, or, more plainly said as, “nice” and “mean”. Advocates of nice accountability presume that the key to school improvement is to provide educators with more resources, expertise, support and capacity.

Mean accountability, on the other hand, uses coercive measures-incentives and sanctions-to ensure that educators teach and students master specified content. Students must demonstrate their mastery of skills in mathematics, reading, writing and perhaps core disciplines at certain key points prior to completion of a particular level.

In the context of accountability, most of the current efforts in developed countries to improve the quality of teaching focused on the teacher. The profession should strive to recruit more qualified teachers, likewise the challenge
is to remedy deficiencies among in the current teachers. The focus on the teacher certainly has some merit. The focus should be for the improvement of teaching. The methods that teachers use in the classrooms should yield greater returns as Stigler (2004) emphasized.

In view of the premise presented above, this study has been conceptualized with the hope that appropriate program could be identified and implemented. This study hopefully is a response to the quest of identifying professional competence among mathematics teachers. It further hopes to identify their strengths and weaknesses so that prompt and preferential attention and concern can be done and supplied. This study is a timely endeavor to take a serious look at the loopholes and effectiveness of teacher training and capability building among teachers.

STATEMENT OF THE PROBLEM

This study aims to develop a capability model for the secondary mathematics teachers. Specifically, this seeks answers to the following research questions:

1. What is the registered strength of teachers’ mathematics preparation along.
2. What are the assessments of the administrators and mathematics teachers on the following.
3. How do the responses of the administrators and teachers compare?
4. Is there a significant relationship between teaching competencies and strength of teachers’ mathematics preparation?
5. Based on the data analysis, what theory may be developed from which to anchor a proposed enhancement program?
6. What enhancement program for mathematics teaching may be proposed and developed to attain capability building among the teachers?

LITERATURE REVIEW

Stigler (2004) pointed out that focus on teaching must avoid the temptation to consider only the superficial aspects of teaching: the organization, tools, curriculum content and textbooks. The cultural activity of teaching—the ways, in which the teacher and students interact about the subject, can be more powerful than the curriculum materials that the teachers use. The bottom line therefore, is to find a way to change teachers and the culture of teaching itself.

Changing teaching itself can be done by using the methods known to change culture. Primary among these methods is the analysis of practice, which brings cultural routines to awareness so that teachers can consciously evaluate and improve. Ball (2003) revealed that analysis of classroom practices is one of the three factors predicting teacher’s growth in content knowledge.

Professional development takes many forms, but true professional development, in the case of resulting in meaningful and long-lasting qualitative change in teachers’ thinking and approaches to educating, is an autonomous activity chosen by the teacher in search of better ways of knowing and teaching mathematics. Professional knowledge cannot be transferred. Rather, it is constructed by individual teacher bringing his or her life experiences as a learner. As a teacher in an educational setting one’s interacting with the environment in a way that relates with newly acquired knowledge to previously constructed knowledge is an attempt indeed to make the best sense of the new ones.

Professional knowledge actively constructed by the teachers allows them to function as autonomous decision makers. They then act in the best interest of students regardless of externally imposed reward system.

Clements and Ellerton (1997) point out that the process of making teachers competitive and high performing professionals in the stint of teaching career starts from the university level. Competency-based teacher education models in universities are implemented in various colleges and universities in the country and have gained popular acceptance. It is further said that competency based teacher education models answer the need for generic teaching competency statements that describe what all beginners, and experienced teachers should know and be able to do. The new model has gained support because of the belief that the teaching profession will always be low unless competency
based education models for teachers, which will enable guarantees that qualified teachers possess desirable skills, knowledge, and have the attitudes to grow and develop, is realized.

Asghar (1997) identified one of the bottlenecks in the process of developing rural professional teachers. One is the lack of opportunities for professional development of primary school teachers, particularly in the rural areas. Experience in education of Pakistan suggests that meaningful change in education in the country is only possible through the sustained professional interaction and support to the teachers. Promotion is one of the means available.

With almost similar context of ideas, Daniel (1997) of Ali Institute, shared that at the beginning, a teacher is full of hopes and zest in working in the classroom. However, teachers frequently encounter disillusionment not only because of the inapplicability of the espoused theories but because of the objective learning-teaching situations. These could cause teachers, in the process of being initiated into the profession, to lose all hopes of embarking on a meaningful and fruitful teaching career. This points out that teachers should have continuing training to further improve in the profession and gain professional growth as much as possible. The link between poor performance of teachers and the level of professional growth has been believed so much by education development experts.

Gruereb (1994) remarked that a competent teacher differs with others in terms of their liberalism or conservatism in teaching activities. He also mentioned that competent teachers are more alike with reference to their basic professional characteristics rather than different.

Ornstein (1994) stated that a competent teacher knows the range of his responsibilities and the tasks that need to be prioritized. He mentioned that the knowledgeable teacher could match the needs and purpose of the school with his own qualifications, his own interests, his potential competencies. He stated further that a competent teacher can succeed by the standard of others and by his own if he sets expectations that are realistic and clear to him.

Ornstein (1994) further cited that the teacher must incorporate instructional materials into the unit plan and modify them in a way that considers the developmental stages, needs and interests, aptitudes, reading levels, prior knowledge, work habits, learning style and motivation.

A competent teacher should possess knowledge of the subject matter for it influences classroom organization and management and serves as a basis for transforming subject matter into knowledge. As such, as Campbell (1997) pointed out a competent teacher plans instruction based on the knowledge of subject matter, students, the community, and curriculum goals.

Teaching therefore implies an expression of technical competence. Thus, Sergiovanni and Starratt (1998) opined that the most basic of the four competency type is the driving force behind most models of supervisions and evaluation in use today.

Sergiovanni (1996) pointed out Vitto Perone’s idea that teachers’ role is central to improving the quality of learning for students because “the quality of teachers’ understanding influences to a large degree what teachers do in classrooms. Good teachers development programs and efforts, he reasoned, should be based on the assumption that the best source for students to learn more about teaching and learning, child growth and development, materials and methods, is through an examination of one’s own practice.

Milbrey McLuaghlin (1992) pointed out that the key to teacher learning is for teachers to be empowered in many ways that enables and allows them to exercise more control over their classrooms. She believes that this control is needed for teachers to make the changes in their practice that are necessary for them to teach more effectively.

Lichtenstein, McLaughlin and Knudsen (1992) also believe that professional knowledge plays central role in empowering teachers. They point out that the “knowledge” that empowers teachers is not the stuff of weekend workshop or after-school in service session. The knowledge that empowers teachers is to pursue their craft with confidence, enthusiasm and authority in the broadest possible sense. They identified three overlapping sources of professional knowledge: 1) knowledge of professional community, 2) knowledge of educational policy, 3) knowledge of subject matter. Knowledge of educational policy and knowledge of subject matter are strengthened as teachers participate in professional organizations and other networks. Knowledge of professional community empowers teachers by helping them recognize their own expertise, and by expanding their notions of what is possible in their own practice and the profession as a whole.
Zucker (1995) emphasized that promoting academic achievement goes beyond the use of specific techniques. However, several authors point out that the central issue is teaching for deep understanding rather than for the rote memorization of mathematical procedure. This requires that teachers themselves have substantive knowledge of mathematics and its discourse in order to create challenging mathematical contexts that will engage students in active reasoning.

Aquino (1985) discussed that instructional improvement is a cyclical process, because instructional improvement is dependent on formal evaluation for vitality at each stage in the process. Within this process, recycling can occur following evaluation of program planning, evaluation of program implementation or evaluation of outcomes. The school administrators’ involvement is most extensive at the decision points since they have the ultimate responsibility for determining proper course of action at each appropriate stage.

Arends (1998) suggested that when teachers group students for instructional purposes, they can learn heavily on heterogeneous grouping and minimize ability grouping. The deleterious effects for tracking and the poor quality of instruction generally found in lower ability groups and classes were well documented. Teacher can also design learning activities that mesh with a variety of learning styles. Further, teachers can vary their lessons by making them more or less concrete or abstract, more or less formal or informal, and by emphasizing in-context as well as out-of-context learning.

Three types of challenges that schools face to use assessment results to improve instruction. Accordingly, Sharkey pointed out that in each of these areas—technology, knowledge, and opportunity, school leaders can take steps to build the capacity of their staff to make the best use of assessment data.

Technology challenges entail that teachers and administrators must have quick access to assessment data since time is the scarcest resource in most schools. They need access to user-friendly software that provides intuitive graphic summaries of assessment results for specific groups of students. Student mobility and the fluidity of school organization make providing such data difficult.

Challenges of knowledge are anchored on the provision of training for teachers and administrators in using data. Training tends to focus on how to use software. Although such training is necessary, experience showed that teachers and administrators need to learn more difficult sets of skills: how to ask instructionally relevant questions of data and how to answer such questions. Most educators have not learned these skills in the pre-service training to being a recent approach due to technology. This challenge has a “chicken and egg aspect”. Teachers find it difficult to determine what patterns of result to ask for failure to get a clear sense of what questions would fit the expected response. The teachers then find it difficult to formulate instructionally relevant questions without full knowledge of the types of information they wanted to obtain.

Opportunity challenges rest on the limited time school staffs have during the day to examine student assessment results. Teachers sometimes work individually. Unfortunately, when teachers work by themselves to make sense of students assessment result, what they learn is unlikely to contribute to the creation of a coherent instructional program.

CONCEPTUAL FRAMEWORK

Mathematics is considered the core of most development today. Inventions, scientific breakthrough, economics, industries, service institution and other human organizations depend on mathematics for the realization of their goals. Such is the functionality of mathematics that it is integrated into the curricula of learners from the primary to the tertiary level. Along this concern, educators provide learners assistance by which mathematics learning may be facilitated.

Mathematics teachers are expected to have the necessary competency which they should have developed in themselves. Their professional preparation, their length of service, professional developments and continued academic learning are all symbiotic elements which may determine the quality of their teaching. In this study, these concerns were considered as part of mathematics strength in structural preparation.

Instructional skills are competencies manifested by teachers which facilitate students’ learning. In this study, the instructional skills expected among mathematics teachers are their knowledge of learning competencies, proficiency in the delivery content of the discipline, and efficiency in the preparation of mathematics lessons. This requires that
teachers also have a number of approaches to use in classroom instruction. They should also manifest the skill to face questions of students as most students find mathematics an abstract and a confusing subject.

Mathematics teachers need instructional aids. As mathematics deals on abstractions and verbal symbols, instructional aids may provide the multi-sensory aid to enhance understanding. Teachers, however, should have the competency to determine the most appropriate aid to be used in the light of the learning needs of the students. This is to ensure that these aids do not distract the educational significance of the lesson. This requires then that teachers have the capability to determine most suitable instructional aids.

In this study, this takes the form of a capability building program which may, to some measure improve their mathematics instruction. These conceptual constructs find illustration in Figure 1.

The study made use of the IPO system model. The input box has the profile of instructional strength of mathematics which in this study included academic orientation, length of service, and professional development.

A directional arrow points to the process box where the study covered the competencies of teachers as based on four instructional competencies. As based on the analysis of the administrators and the mathematics teachers, the study inputted a proposed capability building program for mathematics teachers. This is illustrated by the directional arrow from the process box to the output box.

A feedback loop reverts to the input box indicating that should the capability building program be implemented, the teachers’ status may be affected depending on the quality of implementation.

**HYPOTHESES OF THE STUDY**

The following hypotheses were tested in this study.

1. There are no significant differences on the assessment of the administrators and mathematics teachers on the following:
   a. instructional skills;
   b. instructional materials development and enrichment;
   c. classroom management; and
   d. evaluative skills

2. There is no significant relationship between the strength of instructional preparation and teaching competencies.

**METHODOLOGY**

The descriptive survey–correlational research method was used in this study. The descriptive method focused on the present conditions obtaining around the research environment. It was deemed to be the best design to provide facts
on scientific judgments of the present situation based on the data on academic preparation or professional orientation, length of service in teaching mathematics, and professional development such seminars, trainings, conferences attended and other activities for professional growth.

The descriptive survey is a fact-finding study with adequate and accurate interpretation. It is used to collect data about people’s behavior, practices, intentions, beliefs, attitudes, opinions, and the like and then such data are analyzed, organized, and interpreted. In this study, professional competencies, and the level of instructional competence of the mathematics teachers were evaluated with the use of a questionnaire in semantic differential.

The study was also correlational in nature designed to determine whether variables are related to each other. Through correlational studies, one can ascertain the degree of relationship between and among the variables tested. In this study, the professional orientation or educational attainment and academic preparation of the secondary school mathematics teachers was tested with teaching competencies.

Data Gathering Instruments

The researcher developed two sets of questionnaires of similar content as the main data gathering instrument. It has two parts. Part I deals on strength of mathematics preparation, while Part II deals with the assessment of the strength of instructional skills in terms of instructional skills, instructional materials development skills, learning related skills and evaluation skills.

Construction of the instrument. Prior to the development of the questionnaire, the researcher read books on capability building. Teacher education books were referred to specifically those which featured instructional skills, instructional material development, learning-related skills and evaluation skills.

To further add credence to the instrument, several studies which worked on the same concerns on capability building were also reviewed. Their findings were studied from which inferences were derived to form significant item inputs.

Validation of the instrument. The researcher used the test-retest method to test the validity and reliability of the questionnaire. The questionnaire was also administered to 25 school administrators of the private schools in the province. Over a week’s interval, the same set of respondents was asked to answer the questionnaire. The results were tallied and interpreted.

Considering the wealth of information and interest that could be gained in the use of the differential semantics, the researcher decided to format the questionnaire items this way.

To compute the reliability of the questionnaire, Pearson’s Product Moment Correlation was used. When the r-values obtained were greater than the tabular value of 0.65 at five percent level, the questionnaire items were considered reliable and feasible for gathering the needed data.

Administration and scoring. The instruments were responded to by administrators and teachers themselves. The researcher herself distributed these to the respondent groups to facilitate retrieval. The scoring of responses follows the Likert scale valuing of 1 to 10 with 1 as lowest to 10 as highest.

Data Gathering Procedure. The researcher first sought the permission from the different Schools Division Superintendents and administrators to allow her to conduct the study in the division and to distribute questionnaires to the target respondents. In like manner, permission for access to the records was also sought. The researcher also got the assistance of the school administrators both public and private in the distribution of the questionnaire to the teachers. Also, the cooperation of the respondents was asked so that valid and reliable perceptual data can be drawn in the process.

Statistical Treatment of Data. Weighted mean, T-test, standard deviation, Pearson R. multiple linear regression analysis were used to analyze the data.
FINDINGS

1. Strength of Mathematics Preparation of Secondary Mathematics Teachers

   Academic orientation. Majority of the secondary school mathematics teachers were bachelor degree holders with 231 or 96.65 percent of them; six or 2.51 percent had completed their master’s academic requirements, one or 0.42 percent each was a master’s graduate in mathematics, while another one had completed the doctoral academic requirements.

   Length of teaching experience. There were 80 or 33.47 percent with 15 to 19 years of teaching experience, followed by 77 or 32.22 percent of them, and another group with 20 to 24 years of experience and 19 or 7.95 percent with 10 to 14 years of teaching service ranked first to third, respectively. Lowest number of teachers was a group of 10 or 4.18 percent which ranked eight in the rank order distribution.

   Professional development. There were 122 or 51.05 who cited that they attended seminars, 81 or 33.89 of them went to trainings, both of whom ranked first and second in the rank order distribution. Least number was six or 2.54 who understood action research, ranked sixth.

2. Assessment of Mathematics Teachers’ Skills

   Instructional skills. Evaluation mean of administrators was 8.23 with SD of 1.13 described as moderately strong; potential and activity values were 8.21 and 8.25 with similar SD of 1.12 described to show moderate competence and moderate activity, respectively.

   Teachers had similar evaluation on the instructional skills with mean values of 8.25 for the evaluative and potential aspects and 8.20 for activity. SDs were 1.00 and 0.96, respectively.

   Instructional materials development. Administrators’ evaluation showed that instructional material was moderately explored, with 8.21 mean and SD 0.93, potential was moderately feasible with mean of 8.23 and SD of 0.91, while activity was described as moderately functional, mean of 8.26 and SD of 0.93.

   Teachers gave similar verbal assessments but differed in values as 8.08 for the evaluation aspect; mean value of 8.08 mean for the potential aspect, and 8.12 for the activity aspect. SDs were 0.87, 0.93, and 0.88, respectively.

   Classroom management skills. Administrators assessment of the teachers’ classroom management skills was moderately organized with mean value of 8.28 and SD of 0.87. On the potential aspect, the mean value of 8.24 with SD of 0.90 indicating that there were moderately workable activities that were moderately group-oriented based on mean value of 8.18 and SD of 0.92.

   For the teachers, classroom management skills were likewise assessed as moderately organized based on obtained mean value of 8.58 and SD of 0.59, moderately workable, with 8.66 mean value with SD 0.37, also moderately group oriented with mean value of 8.56 and SD of 0.44.

   Evaluative skills. Administrators assessed that mathematics teachers’ evaluative skills were moderately attended to, with mean of 8.21 and SD of 0.89, moderate potential as indicated by mean of 8.20 with SD of 0.88 moderately functional and active with mean of 8.21 and SD of 0.89 described as moderately explored.

   Teachers assessed similarly that evaluative skills were also moderately attended to, moderately explored and moderately functional with means of 8.03, 8.06 and 8.03 and SDs of 1.01, 0.99 and 0.96, respectively.

3. Comparison between the Assessment of Administrators and Teachers on the Registered Strength of Mathematics Preparation

   Instructional skills. There were no significant differences in the assessment of administrators and teachers on instructional skills with t-values of 0.409 on the evaluative aspect, 0.334 on the potential aspect and 0.260 on the activity. These skills were said to be moderately strong among teachers, showed moderate competence and moderate activity.

   Instructional material development. The significant difference were noted on the assessments of administrators and teachers on instructional material development which carried values of 0.690, 0.752 and 0.730 which were lower than the probability value indicating that instructional material development was moderately explored, moderately feasible and moderately functional.
Classroom management skills. There were also noted similarity in the qualifications of administrators and teachers that the mathematics teachers’ classroom management skills were moderately organized, moderately workable and moderately group oriented which had t-values lower than the tabular values. Values were 0.145, 0.178 and 0.497.

Evaluation skills. Administrators’ evaluation of evaluative skills revealed similarity with the teachers’ assessment as indicated by the obtained t-values of 0.853, 0.779 and 0.694. It follows that evaluative skills were moderately attended to, moderately functional and moderately explored.

4. Relationship Mathematics Preparation with Each of the Four Teaching Competencies

Results revealed that no significant relationships were derived to show academic orientation, professional development, and length of service in teaching mathematics as predictors of teaching competence.

The Pearson r value of 0.134 showed no significant relationship between the academic orientation, professional development, and strength of instructional skills; while the Pearson r value of 0.077 likewise showed no significant relationship between the academic orientation, professional development, and instructional material development. Similarly, no significant relationship was revealed between the academic orientation/professional development, and length of service in teaching as evidenced by the obtained Pearson r value of 0.120, while the Pearson r value of 0.147 manifested no significant relationship between the academic orientation, professional development, and evaluation skills.

5. Theory Development for a Proposed Enhancement Program for Mathematics Teachers

The study posited the view that there are essential capabilities required of mathematics teachers to respond to quality mathematics teaching and learning.

Along this concern, capabilities were viewed in terms of teacher initiated actions as academic orientation, length of service, and professional development. Capability most specifically included teachers’ competencies in terms of instructional skills, instructional material development, classroom management skills and evaluation skills.

To be able to propose a theory, the study used indicators which were dichotomized into evaluative, potential and activity standards. Using a questionnaire with semantic differential, the competencies of teachers were quantified using the assessments of administrators and teachers themselves. The logical assumption was that with high performance capability assessment of teachers, there would also be high student performance.

Data analysis revealed that generally, mathematics teachers did not register high performance. Instructional skills were evaluated as moderately strong of moderate competence in the potential aspect, and moderate activation. There was also noted moderate use of instructional materials as evaluated, moderate potentiality or feasibility of instructional material development and activity value and moderately functional. Classroom management skills were moderately organized, potentially standardized classroom management skills were workable while activities were moderately group oriented. On the other hand, evaluation skills were said to be moderately attended to, moderately functional and moderately explored.

All these necessitate a capability building program secondary school mathematics teachers.

Considering the negative effects that may be brought about by weak capabilities of mathematics teachers, the researcher forward the theory: that teachers’ competencies may manifest in students’ performance in mathematics.

6. Proposed Enhancement Program for Mathematics Teachers

The proposed enhancement program for secondary school mathematics teachers may help develop teaching capabilities of mathematics by strengthening their academic and professional orientation and their competencies on instruction, instructional material development, classroom management and evaluation. (See Appendix 1)
CONCLUSIONS

Based on the findings, the following conclusions were drawn:

1. The preparation of secondary school mathematics teachers is along bachelor’s degree with considerable years of teaching experience and professional development.

2. The evaluative, potential and activity assessments of administrators and teachers manifest that high school teachers of mathematics have moderate competencies in instruction, instructional aid development, classroom management and evaluative skills.

3. The administrators and teachers manifest no significant differences in their assessments on the competencies of mathematics teachers.

4. No significant relationship existed between academic orientation/ professional development and length of service in teaching mathematics and teachers’ competencies.

5. The moderate competencies of mathematics teachers provide the anchor of a proposed capability building enhancement program for secondary mathematics teachers.

6. The enhancement program may provide support to the proposed capability building model for secondary school teachers of mathematics.

RECOMMENDATIONS

Based on the findings and conclusions, the researcher offers the following recommendations:

1. That the proposed enhancement program be studied and find application so as to enhance mathematics teachers’ teaching capabilities.

2. That the secondary school mathematics teachers be provided with administrative support so that they are given learning opportunities on instructional materials development and rubrics preparation.

3. That mathematics teachers find linkages among peers from other institutions and organizations so that they may avail of information on capability building strategies of mathematics teachers.

4. That a similar study be conducted on the following which were found weak strands among mathematics teachers: instructional material development; alternative schemes for assessment of students’ performance; and preparation of learning kits for students, among others.

REFERENCE


McLaughlin, Denis (1997). “Teacher Education: Key to Sustainable Development in Education in Developing Countries.” Australian Catholic University.


APPENDIX 1

**Proposed Enhancement Program for Mathematics Teachers**

<table>
<thead>
<tr>
<th>Areas of Concern</th>
<th>Strategies/Activities</th>
<th>Performance Indicators</th>
<th>Evaluative Measures</th>
</tr>
</thead>
</table>
| Academic Orientation | • Pursuance of graduate study  
• Enrollment in open/ distance university  
• Availment of scholarships for advanced study | • Teachers are encouraged to pursue graduate studies and work out ways so that they finish a masterate degree | • Self-evaluation of mother teachers on the effects to teaching performance |
| Professional Upgrading | • Peer learning through quarter session meetings  
• Attendance to mathematics trainings/seminars  
• Readings on current trends and practices in mathematics teaching  
• Attendance to demonstration lessons  
• Membership in mathematics organization | • A revitalized faculty aware of practices and strategies in mathematics teaching  
• A set of mathematics teachers open to innovations, membership and involvement in organizations | • An active mathematics program and activities initiated by teachers |
| Teacher Empowerment through Strengthening Professional Competencies | * Instruction | | |
| | • Use of computer technology in teaching mathematics  
• Invitation of resource teachers to share teaching strategies  
• Visitation of schools so as to share lessons on best practices in teaching mathematics  
• Observation of demonstration classes in mathematics  
• Peer conferencing on topics found difficult  
• Books exchange with schools for added content for instruction | • Teachers use multi-media, CAL slides to aid mathematics instruction  
• There is observed lively, open class interaction between students and mathematics teachers  
• Teachers manifest proficiency and skills in mathematics tasks, topics and processes | • Students show better performance in mathematics classes due to better instruction  
• Mathematics teachers manifest better instructional competence  
• Conventional teaching practices are retooled |
| | * Instructional material development | • There is more interactive learning among students with the use of modules and learning kits  
• Teachers gain know how on preparation of instructional materials  
• Students become busy with the provision of activities  
• Students also are trained to explore preparation of instructional materials which may be used in mathematics classes | • Teachers have their own instructional materials  
• There is observed better student participation in mathematics classes |
<table>
<thead>
<tr>
<th>Classroom management</th>
<th>Peer exchange on classroom management approaches</th>
<th>There is observed healthy safe and academic conducive setting for students in classrooms</th>
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<tbody>
<tr>
<td></td>
<td>Preparation of newsletters for publication of best classroom management practices</td>
<td>Teachers may assimilate and model the best practices observed from other schools</td>
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<td></td>
<td>Inter-school visitation for exposure on classroom management in mathematics classes from other schools</td>
<td>Students become participative in keeping their classroom systematic and orderly</td>
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<td></td>
<td>Preparation of house rules for conducive mathematics learning among students</td>
<td>Students are benefited of a well-crafted and creative spaces for mathematics information</td>
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<td></td>
<td>Preparation of bulletin boards and other creative works for mathematics trivia</td>
<td>Teachers observe legal, humane, and ethical classroom management</td>
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<td></td>
<td>Use of varied activities and space for mathematics learning</td>
<td>Classrooms are clean and students responsibly keep their duty of making their rooms a pleasant space for study.</td>
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<td>Time is spent well and optionally.</td>
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<td>Space is used creatively.</td>
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<td>Students work comfortably in the classroom.</td>
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<td>Students and teachers know their rights and limitations in the classroom and in the school.</td>
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<td>*</td>
<td>Preparation of primer on classroom behavior and disciplinary measures</td>
<td>* Conventional evaluative materials are retooled.</td>
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<td>* Evaluative skills</td>
<td>Reorientation on the different evaluative material</td>
<td>Teachers learn to make their own rubrics.</td>
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<td>Seminar on other evaluative instruments to measure students’ performance in mathematics</td>
<td>Students are helped either by peers or by mathematics to cope with mathematics lessons.</td>
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<td>Review test analysis and validation</td>
<td>Teachers use other assessment tools with which to assess students’ performance.</td>
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<td>Training on preparation of mathematics rubrics</td>
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<td>Preparation of a remedial program for slow learners in mathematics</td>
<td>Teachers use rubrics as guides to assess students.</td>
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<td>Students receive more objective assessment of their work.</td>
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<td>Activities are given objective measurements.</td>
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