

Development of Training Design and Materials to Enhance Grade 7 Mathematics Teachers' Competencies

Dolly Rose F. Temelo, Editha Y. Sillorequez

Abstract

This is a quantitative research that utilized a quasi-experimental research, specifically, the one group pre-test-post-test design. It sought to determine the effectiveness of the training design and materials developed to enhance the mathematics teachers' competencies on the Enhanced K-12 Basic Education Curriculum. Eighteen Grade 7 mathematics teachers in the Division of Passi City who attended the Department of Education Regional Mass Training on the Enhanced K-12 Basic Education Curriculum served as respondents of the study. The post-test result based on the competency rating sheet (Adapted from F3-M&E Form 5 of DepEd TEC) and End of Program Assessment of the Department of Education Regional Mass Training on the Enhanced K-12 Basic Education Curriculum was used as basis in determining the least mastered skills and concept of the teachers. The identified least mastered skills of the teachers were used as basis to develop a training design and materials to enhance the teachers' competencies on the Enhanced K-12 Basic Education Curriculum. It was found out that the least mastered skills of the teachers include concepts on sets, basic construction, data analyses and interpretation, solving special products using models, and solving problems involving measurements and real numbers. The result showed that there was a significant difference in the competency of the teachers before and after the conduct of the retraining. Hence, the training design and materials developed was effective in enhancing the teachers' competencies on the new curriculum.

Keywords: developed training design, K-12 Basic Education Curriculum, least mastered skills, teachers' competencies

Education is conceived as a powerful agency which is instrumental in bringing about the desired changes in the social and cultural life of a nation. The whole process of education is shaped and molded by a human personality called “teacher”, who plays a pivotal role in any system of education.

Recently, the Department of Education embraced another innovation, the implementation of the Enhanced K-12 Basic Education Curriculum, which once again tested the ability and competency of the Filipino teachers to provide every student entrusted to their care with quality education. There is a need to implement the Enhanced K-12 Basic Education Curriculum because the country has to come up with a basic education program in a manner that is least disruptive to the current curriculum, most affordable to the government and families, and aligned with international practice (Department of Education, 2010). Many students who finish basic education do not possess sufficient mastery of basic competencies. One reason is that students do not get adequate instructional time or time on task. The current basic education is designed to teach a 12-year curriculum, yet it is delivered in just 10 years (Fullarton & Lamb, 2000).

In the implementation of the K-12 Basic Education Curriculum, the teachers play a very vital role. Teaching is a challenging profession and only teachers who are adequately prepared and have sound professional attitude can shoulder the heavy responsibilities of nation building. This adequacy of preparation implies the development of adequate skills, dedication to teaching, and determination for continuous growth and learning. Teachers are expected to use the best practices and strategies to meet the challenging demands of their career. If the teachers are well-trained and highly motivated, learning will be enhanced. The teaching profession demands clear set goals, love for the profession, and obviously the more favorable attitude towards the profession (Hussain, 2004). Teaching then, as Day (1994) stated, is a moral process where teachers strive to shape, challenge, and change students’ understandings for the betterment of students. The Philippines needs well-trained and professionally sound teachers and the responsibility of coming up with this kind of teachers falls on teacher-training institutions.

In order to equip the teachers with the necessary skills they need in order to bring out reform in education, they were provided with a four-day regional training prior to the opening of the school year. However, the results of the end of program assessment of the regional mass training however, revealed that the training was not enough to prepare the teachers to implement the subjects included in the K-12 curriculum most. Hence, there is a need to retrain the Grade 7 mathematics teachers and develop training design and

materials to enhance the Grade 7 teachers' competencies.

The main purpose for conducting this research study was to determine the effectiveness of the training design and materials developed to enhance the Grade 7 Mathematics teachers' competencies.

Specifically, it sought answers to the following questions:

1. What are the least mastered concepts/skills/competencies of the Grade 7 mathematics teachers after the conduct of the Department of Education regional mass training on the Enhanced K-12 Basic Education Curriculum that need retraining?
2. What is the level of the Grade 7 mathematics teachers' competencies on the Enhanced K-12 Basic Education Curriculum before and after the conduct of the retraining?
3. Is there a significant improvement in the Grade 7 mathematics teachers' competencies on the Enhanced K-12 Basic Education Curriculum after the conduct of the retraining?

Methodology

This study focused on determining the effectiveness of the developed training design and materials to enhance the Grade 7 Mathematics teachers' competencies

Participants

The participants in the study were the 18 Grade 7 mathematics teachers of the Division of Passi City who have attended the Department of Education regional mass training on the Enhanced K-12 Basic Education Program. They were determined using the total enumeration. The result of the competency rating sheet (Adapted from F3-M&E Form 5 of DepEd TEC) and End of Program Assessment made by the Grade 7 mathematics teachers coming from five different provinces of Region VI, namely: Aklan, Antique, Capiz, Iloilo, and Guimaras who attended the Department of Education regional mass training on the Enhanced K-12 Basic Education Curriculum held last May 14 – 18, 2012 at West Visayas State University was utilized to determine the least mastered skills and concepts of the teachers which were made as basis in developing the training design and materials.

Research Design

Quantitative research that employed statistical analysis to determine numerically the effectiveness of the developed training design and materials to enhance the Grade 7 mathematics teachers' competency was used in the study. This is a quasi-experimental research that made use of the one group pre-test – post-test design. It did not employ randomization of the selection of participants (Fraenkel & Wallen, 2006).

Instruments

The results of competency rating sheet (Adapted from F3-M&E Form 5 of DepEd TEC) and the End of the Program Assessment filled out by the participants during the evaluation phase of the Department of Education Regional Mass Training was used in order to identify the least mastered skills of the teachers. This was used as a basis to develop a training design and materials to enhance the teachers' competency.

The questionnaire was made up of two parts. Part One was the Rapid Competency Assessment (Adapted from F3 – M&E Form 5 of DepEd TEC). The participants were asked to assess their competency on the items which were identified by the regional mass training participants as their least mastered skills. They were asked to check the appropriate box for each item on the basis of their perceived competency on the areas included in the retraining. The perceived competency scale used was: 5 – if the teacher has 91 to 100% mastery and very confident to apply the new curriculum; 4 – if the teacher has 71 to 90% mastery and confident to apply the new curriculum; 3 – if the teacher has 41 to 60% mastery and somewhat confident to apply the new curriculum; 2 – if the teacher has 21 to 40% mastery but is not confident to apply the new curriculum; and 1 – if the teacher has below 21% competency and is not confident to apply the new curriculum.

Part Two consisted of open-ended questions on selected topics in mathematics that were used. It assessed the teachers' knowledge in answering questions that pertain to measure their competency on the least mastered skills. A rubric that was adapted from Gladys C. Nivera, a faculty member of the Philippine Normal University, based on the California Assessment Program was used in scoring the participants' answers to the items in the second part of the questionnaire.

Procedure and Data Analysis

Necessary permissions and communications relevant to the study were done. The research instruments were administered to the target participants of the study. Descriptive analysis was done with the use of frequencies, mean, standard deviation, and ranking. The hypothesis was tested through Wilcoxon Signed Rank test for related samples at 0.05 level of significance.

Results and Discussion

Least Mastered Skills/Topics of the Grade 7 Teachers

As indicated in the responses made by the participants during the regional mass training on K-12, there were twelve competencies that were considered for retraining. These were the competencies that obtained a descriptive rating below “average” or a mean score of 3.40 and below. These were: (1) solving problems involving sets; (2) using Venn Diagrams to represent sets, subsets, and set operations; (3) using a compass and straightedge to construct line segments and angles and construct perpendiculars and parallels; (4) analyzing, interpreting accurately, and drawing conclusions from graphic and tabular presentations of statistical data; (5) finding inductively using models and algebraically the product of two binomials, product of a sum and difference of two terms, and square of a binomial; (6) solving problems involving measurements such as perimeter, area, weight, time, speed, temperature, volume/capacity, and utilities usage (meter reading); (7) describing and illustrating well-defined sets, subsets, universal set, and null set; (8) solving problems involving real numbers; (9) defining and describing the union and intersection of sets and complement of a set; (10) collecting or gathering statistical data and organizing the data in a frequency table according to some systematic considerations; (11) illustrating, naming, identifying, and classifying triangles according to their sides and angles and derived relationships among the sides and angles of a triangle using measurement and inductive reasoning; and (12) explaining the basic concepts, uses, and importance of statistics. These topics that were considered in the conduct of the retraining.

Grade 7 Mathematics Teachers’ Competency Before and After the Retraining

The competencies with the highest mean increase are on “collecting or gathering statistical data and organizing the data in a frequency table according to some systematic considerations,” and “analyzing, interpreting

accurately and drawing conclusions from graphic and tabular presentations of statistical data.” Prior to the retraining, the teachers did not have sufficient idea about statistics. According to them, their memory of college statistics was no longer that sharp. Although, these were discussed during the regional mass training, four hours was not enough to thoroughly discuss the lessons on statistics which they need in order to gain confidence in taking these up with their students. The retraining somehow helped them gain new concepts and techniques on collecting or gathering statistical data and organizing the data in a frequency table according to some systematic considerations, and analyzing, interpreting accurately and drawing conclusions from graphic and tabular presentations of statistical data, such as making use of ICT and other instructional materials which could help them in discussing these topics.

Wilcoxon Signed Rank test results show that the difference in the individual competencies considered in the pre-test and post-test of the Grade 7 teachers is significant. This implies that the training design and materials used during retraining was an effective tool in helping the Grade 7 teachers overcome their difficulties in their least mastered skills.

Craig (1998) stated that from the time teachers begin any initial preparation or teaching, provision needs to be made for ongoing development of their subject matter knowledge; concrete skills to teach, observe, assess, and reflect; incentives; and career growth. Teacher development is a process, not an event. It involves change over time and is achieved in stages. Teacher development is a process and, therefore, different training and support are needed at different stages of this continuum. The education that teachers receive has the potential to make a difference in children’s learning and therefore warrants careful attention.

Table 1

Results of the Grade 7 Mathematics Teachers' Competency Before and After the Retraining

Competency	Pre-test	Post-test	Z	p
1. Describes and illustrates well-defined sets, subsets, universal set, and null set.	3.50	4.83	3.61*	0.000
2. Defines and describes the union and intersection of sets and complement of a set.	3.50	4.83	3.61*	0.000
3. Uses Venn Diagrams to represent sets, subsets, and set operations.	3.28	4.72	3.46*	0.001
4. Solves problems involving sets.	2.89	4.33	3.60*	0.000
5. Solves problems involving real numbers.	3.06	4.56	3.60*	0.000
6. Solves problems involving measurements such as perimeter, area, weight, time, speed, temperature, volume/capacity, and utilities usage (meter reading).	3.00	4.61	3.45*	0.001
7. Finds inductively using models and algebraically the product of two binomials, product of a sum and difference of two terms, and square of a binomial.	3.06	4.61	3.46*	0.001
8. Uses a compass and straightedge to construct segments, angles, and perpendiculars and parallels lines.	3.22	4.67	3.35*	0.001
9. Illustrates, names, identifies, and classifies triangles according to their sides and angles and derives relationships among the sides and angles of a triangle using measurement and inductive reasoning.	3.06	4.61	3.60*	0.000
10. Explains the basic concepts, uses and importance of Statistics.	2.94	4.50	3.46*	0.001
11. Collects or gathers statistical data and organizes the data in a frequency table according to some systematic considerations.	2.72	4.50	3.70*	0.000
12. Analyzes, interprets accurately, and draws conclusions from graphic and tabular presentations of statistical data.	2.72	4.50	3.82*	0.000
Over-all	3.11	4.59	3.024*	0.000

Note: * $p < 0.01$

Conclusions

The result of the study showed that there was a significant difference in the competency of the Grade 7 mathematics teachers before and after the conduct of the retraining. The result of the study implies that trainings are very important in order to help the teachers become more competent in the implementation of innovations. Helping the teachers become more competent would not only mean improving their performance but their students' performance as well. The retraining has helped the teachers clarify their misconceptions on their least mastered skills. Since most of the topics included in the retraining are the third and fourth quarter lessons, the retraining has helped the teachers become prepared to handle their classes and discuss with confidence the topics with their students.

The quality of education depends on the ability, hard work and dedication of the teacher. If a teacher fails to keep himself in touch with the rapid scientific and educational developments then he would become inefficient and ineffective. The teacher is considered the most crucial factor in implementing all instructional reforms at the basic levels. The academic qualifications, knowledge of the subject matter, competence and skills of teaching and the commitment of the teacher have effective impact on the teaching learning process. Teachers are a nation's great assets. It is the quality of teachers on which the population of a country mainly depends for excellence.

Training and development can be thought of as processes designed to enhance the professional knowledge, skills, and attitudes of educators so that they might, in turn, improve the learning of students. Training is an important part of teacher preparation programs, especially for those aspects of teaching that are more skill-like in their conception. However, but there are many other important aspects of teaching that can only be nurtured through reflective strategies and experiences (Rahman, et. al., 2011).

The findings of the study is consistent with Edward Lee Thorndike's Law of Readiness which states that a learner's satisfaction is determined by the extent of his preparatory set; that is, his readiness for action. That when someone is ready to perform some act, to do so is satisfying; when someone is ready to perform some act, not to do so is annoying; and when someone is not ready to perform some act and is forced to do so, it is annoying (Grossman, 1995). The retraining has somewhat made the teachers become ready to discuss the topics to their students. This preparedness will usher fulfillment not only to the teachers, but all the more, to the learners.

It also affirms the cognitivist theory which stresses the need for continuous and repeated learning. The result of the study showed that the conduct of the four-day regional mass training for the K-12 Curriculum were not enough to prepare the teachers to apply the new curriculum. There is still a need to reinforce some of the topics discussed during the training, most especially the least mastered ones. The retraining conducted, in a way, has helped the teachers surmount their difficulties and misconceptions on the least mastered skills.

Recommendations

The success of the implementation of the Enhanced K-12 Basic Education Curriculum and the role of the Department of Education does not end with having provided the teachers with training. Although, the mass training has helped in preparing the teachers to implement the new curriculum, the fact that it was conducted at a very short time and very close to the implementation/opening of the school year is not enough.

The result of the study showed that there are some topics which the Grade VII teachers find difficult to implement in their respective classrooms. This problem was addressed-a retraining was conceptualized and was conducted among the Grade VII mathematics teachers of the Division of Passi City. The findings revealed that the competence of the teachers has significantly improved after the retraining was conducted, but this does not guarantee the success of the implementation of the new curriculum. The Department of Education should closely monitor the implementation and consistently assist the teachers in the process of implementation. It should provide more trainings and enhancement for teachers on the use of the new curriculum.

The result further showed that there was an increase in the teachers' competence before and after the training was conducted; hence, the same training should be conducted in other Divisions during summer. This training will help them in the second year of implementation of the K-12 Curriculum.

Likewise, in order to prepare the teachers in the implementation of the K-12 in Grade VIII, the training should be done long before the start of the opening of classes and not just a week before the start of the classes so that the teachers would have enough time to prepare and implement the new curriculum. If possible, the training should be conducted for a longer time period, so that the teachers would develop deeper understanding of the different concepts included in the training. Preparation of instructional materials needed in the conduct of the lessons and grade computation should also be considered.

Although the three-day retraining proved to be effective in improving the teachers' competence, it could have been more effective if it was conducted for a longer time period to give enough time on each topic. The DepEd or LGU should extend financial assistance to provide the training participants with a better venue and food during the conduct of the retraining.

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