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EFFECTIVENESS OF A DEVELOPED WORKTEXT IN ENHANCING THE MATHEMATICS PERFORMANCE OF GRADE 3 LEARNERS

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Abstract :

This study investigated the effectiveness of a worktext to the academic achievement of Grade 3 learners in Mathematics. This was conducted in Tarlac South A District, Taralc City Schools Division during the school year 2025-2026. The Quasi-experimental method of research was used. There were 30 learners who were taught lessons in Mathematics 3 using a worktext for the experimental group and another 30 learners were taught using a traditional method for the controlled group. The study investigated the comparison of the achievement of learners in Mathematics 3 among those learners who were taught using a worktext and taught using a lecture method. It also compared the achievement of learners in Mathematics 3 who are taught using the two teaching approaches and when grouped according to their mathematical ability levels. It further examined the interaction effect on the achievement of learners when they were exposed using the two approaches and when grouped according to their mathematical ability levels. There was a significant difference in the achievement of learners in Mathematics 3 when taught using worktext and without using work text as teaching approaches. There was a significant difference in the achievement of learners in Grade 3 Mathematics when taught using the two teaching approaches and when grouped according to their Mathematical level. There was a significant interaction effect in the achievement of the learners when they are exposed using two teaching approaches and when grouped according to their mathematical level. It could be asserted that Worktext method is an effective teaching approach and enhances learners' capabilities in the understanding lesson in Grade 3 Mathematics.

Keywords: effectiveness, worktext, Grade 3 learners, Mathematics

INTRODUCTION

In the 21st century context, learners can learn Mathematics in many ways but they enjoy learning it through technology. The world now is in digital age and the inhabitants are called digital natives. Learners now a days learn best when they are comfortable and can relate with what they often do. Technology became a comfort zone for today's generation. Thus, technology is everywhere; therefore it should be utilized in the teaching and learning process particularly for complex subjects like Mathematics.

Mathematics is considered as the mother of all learning in both arts and sciences. It is a necessity for people of all ages to be successful in life. Despite the usefulness and importance of mathematics, students' ability to understand and apply mathematical concepts has been adversely affected by several factors. Few of these could be the student ideas relevant to their interests, their perceptions of the usefulness of mathematics, or their intrinsic interests in logic or challenge of mathematics.

Learning basic concept in mathematics is very important. The study of Alfeld (2009) Opined that a person understood Mathematics when they could explain basic mathematical properties in other simpler form of concept; could connect logically among facts, and could recognize the relation between a new concept with previous concepts. In other words, the purpose of teaching and learning is to promote understanding (Sabri, 2008). The use of different strategies in teaching mathematics is one of the promising innovations to improve teaching and to create a meaningful learning experience for students.

The objective of democratic education is the optimum development of the individual. To meet this end, it is imperative that greater attention should be given to the needs of individual learners – thus the demand for individual instruction. Individual instruction is backed by the philosophy that every child is unique. People develop at different rates. Development is relatively orderly, and development takes place gradually. (Woolfolk, 2013) One technique to individualize instruction is to use modularized instruction, where individual differences of students in their capacities to learn are taken into account. Individualized instruction

develops critical thinking. Students are encouraged to question, criticize and argue their point of view. It also develops one's self-concept by recognizing the desirability of individual differences. The basis for this approach is the fact that every student is unique with his potentials, abilities, interests, and needs. Thus, no two students can learn the same concepts at the same rate in the same manner.

Azar (2013) that MWT approach as a method of teaching mathematics is the starting point and foundation for the development of all critical thinking skills. MWT provides information about problem solving accompanied by numerous and varied practice opportunities ranging from simple to complex manipulation of formula. The instructional material is a modular worktext since exercises were presented with a varying level of difficulty after the discussion of mathematical concepts. It isn't just basic mathematics focused but is integrated into higher mathematics to enhance the students' concepts on selected topics in Grade Eight Mathematics so that learning is not confined to only one discipline.

Lloyd and Keller (2010) noted that when an instruction is broken down into small units from complex tasks, the learning becomes more accessible because teachers will tailor lessons to the individual need of the student. Also, the learning becomes accessible because the teacher was able to interpret errors, give correction feedback, select examples to illustrate concepts, and explain new ideas in several ways. Therefore students can achieve more at mathematical problem solving. It would be presumptuous to say that at-risk students are not successful at problem-solving because students lack conceptual knowledge. In many cases, students are familiar with the mathematical vocabulary but may need assistance with the mathematical process. Likewise, students may not know mathematical strategies and reading techniques that can be used in solving mathematical word problems. Under these circumstances, students have a difficult time with the problem-solving process because of the inability to relate and transfer relevant knowledge (Smith, 2012).

According to Kelly (2014), the most prevalent factors that facilitate heighten classroom interaction is the material availability and adequacy of educational materials, which would be effective, suitable and adaptable to the nature or the kind of students the teacher handles without prejudice. Mixed ability classes hamper when these materials are inadequate and scarce, impediments to classroom interaction among students result and learning process. The literature is related to the present study for it uses customized worktext suited for different levels of high school students in Grade Eight Mathematics. Providing the students adequate educational material is also the ultimate goal of this study. Castaniares (2014) in her study "Development, Validation and Acceptability of Worktext in Advanced Algebra" aimed to evaluate the effectiveness of modular instruction given to the experimental and controlled group. The experimental method of research was utilized using randomized pretest and posttest design. According to Bautista (2015), a pretest is a criterion reference test for knowledge and is given before the lesson. She used the group pretest-posttest experimental design. The first two groups were given before the utilization of the module, and afterwards the posttest, while the control group was taught in a traditional method of teaching without a module.

Knowing that students have difficulties with problem solving due to learning barriers, educators will need to take several steps to address their needs. One of those steps could be helping students use reading strategies in a mathematical classroom using worktext or workbook. Educators cannot help students to transfer knowledge just lecturing alone. At risk, students must take an active role in their learning. To accomplish this, educators in the field of mathematics need to use lessons that incorporate word problems, in which students would have the opportunity to explore, question, discuss and discover (Chamot&O"Malley, 2015). Mathematics and reading teachers will need to look at teaching strategies that mat assist at-risk students in their learning process.

Aggabao (2014) made a study aimed at developing individualized self-instructional modules on selected topics in Basic mathematics for instructional use at the Teachers College at Isabela State University. After making use of the experimental method, concluded that instructional materials used at the college for Basic Mathematics are inadequate and are not designed for self-instruction; that instruction through self-*Effectiveness of Modular Instruction in Word Problem Solving of BEED Students* DOI: 10.9790/5728-1205075965 www.iosrjournals.org 62 | Page instructional materials is as effective as the prevailing teaching method of instruction; and students, as well as, teachers generally have a positive attitude toward the use of individualized, self-instructional materials as a mode of instruction in Basic Mathematics.

The study of Madriaga (2004), "Effects of Modular Instruction in Teaching Physics" revealed that the use of modules gives the teacher more time to deal with the students on a one-on-one basis. She found out that the performance was better on the experimental group exposed to modular instruction. Lacdao (2014) in his thesis "A Comparative Study of the Effects of Modular Instruction and Lecture Discussion Method on the Achievement of Grade VI Pupils in Mathematics" mentioned that the experimental group in his study who were taught using the instructional modules, performed better than the control group who were taught using the traditional method of teaching. The study of Cavero – Delgado (2016), "Effects of the Use of Computers, Integrated to an Instructional Module on Functions of the Attitudes towards Mathematics and the Achievement in Functions at Precalculus of College Students" proves that the averages of the students in the end of the study increased significantly in the experimental group. The traditional treatment of the education of precalculus to university students compared with that one where the technology is used, as an instructional module on functions integrated into the computer, showed in the statistical analysis, significant results that allow us to conclude that this one is an effective tool. Cappetta (2007) in his dissertation, "Reflective Abstraction and the Concept of Limit: A Quasi-Experimental Study to Improve Student Performance in College Calculus by Promoting Reflective Abstraction through Individual, Peer, Instructor and Curriculum Initiates", the pretest-posttest scores showed that the students in the experimental group scored significantly higher than the students in the traditional section on a posttest of limits. The study of Rizaldo, et al. (2007) "Comparative Effects of Modular and Traditional Methods in Teaching Analytic Geometry," concluded that students performed better and mastered the subject matter using the modular method of teaching.

In the study of mathematics, students often struggle to comprehend and solve mathematical word problems. According to the State of Mathematics Achievement: NAEP's 2003 Assessment of the Nation and Trial Assessment of the States (NRC), about half of the student populations were graduating from high school with little of the mathematics understanding required by today high-tech occupations (2003). Graduating twelfth graders appeared to have an understanding of mathematics that does not extend much beyond simple problem solving with whole numbers. In recent years, there has been a substantial amount of attention directed to improving the academic achievement in mathematics at-risk students. Addressing this problem has become an important educational issue.

To battle against a student's inability to solve mathematical word problems, educators have studied at-risk students declining math test scores. Although there are external variables that at risk, students face, internal variables such as poor instructional approaches, no prior schooling, language barriers, and reading and math difficulties, play important roles in the students mathematical learning process while solving word problems (Bernardo, 2014). In hopes of finding a solution to help students mathematical abilities increase, most research educators examine the classroom strategies that can be used to help the problem. Since 2003, there has been an overall gain across mathematics achievement levels. NAEP's findings showed that the percentages of eight graders performing at or above basic, and or above proficiency level were both higher in 2003 than in all previous assessment years. Embedded within a theoretical framework of mathematical problem solving, topics were looked into from a review of the literature: teaching at-risk students, factors that influence students ability to comprehend and solve mathematical word problems, reading strategies and math strategies and the need of second language learners and at-risk students.

By Philippine national policy, mathematics is taught in English. However, many children from poor families have little knowledge of English, and it is recommended that instruction begin "with an assumption of zero knowledge" (Gonzales, 2014, p. 147). It is within this background that investigations on student performance in the domain of word problems that form an integral part of the Philippine mathematics curriculum (Department of Education Bureau of Elementary Education, 2003). Word problems primarily serve as a means to apply computational skills. The curriculum documents are quite explicit about how children should solve word problems. Children should be able to state what is asked and what is given, identify word clues, and specify the correct operation to be used. For two-step problems, children are also asked for the hidden question.

Filipino children find word problems difficult (Brawner et al., 2005), and the language factor is identified as one of the "what-else-is-new" reasons for student failure (Philippine Executive Report on the TIMSS, cited by Carteciano, 2015). Multiple studies have shown that Filipino children find word problems in English more difficult than those in Filipino (Bautista, Mitchelmore, & Mulligan, 2009; Bautista & Mulligan, 2010). It is also well-known that word problems in English are more difficult for children who are still in the process of learning English than for native English speakers (Martiniello, 2011). The disadvantages of written tests as a means of diagnosing children's difficulties is well established (Ellerton& Olson, 2012), especially when the language of the test is not the child's first language (Abedi, 2012). When children produce an error for short-answer questions, one can only hypothesize about the reasons for the error. Similarly, it is possible for students who do not have a firm grasp of the mathematical concepts involved in the problem to give correct answers. Thus, individual interviews are becoming increasingly utilized for mathematical assessments (Goldin, 2013).

Marzano, Pickering, and Pollock (2011) noted that various aspects of instructions might play a large role in student achievement in conjunction with teaching methods. In congruence, the study of House (2010) on the relationship between instructional activities and mathematics achievement of adolescents in Japan found out that students tended to show higher mathematics achievement when their teachers more frequently explained rules and definitions. Similarly, students performed higher mathematics test scores when their teachers more frequently solved an example related to the new topic.

The goal of teaching mathematics to be effective was that the students were able to solve their problems as asserted by Pimta et al., (2011) As a matter of fact, the experience in solving the problems of the subject is very important to develop students' thinking skills and help them gain more skills in solving the problem in daily life. Problem-solving is considered as the heart of mathematics learning because the skill is not only for learning the subject but it emphasizes on developing thinking skill method as well. Students can apply their knowledge and problem solving skills to be useful in daily life since the processes of solving the mathematics problem are similar to the general problem-solving.

For students to acquire learning gains in mathematics, educators need to study the different aspects that impede students from understanding and solving mathematical word problems. Mathematical problem-solving is an important attribute of a student's mathematical development (Bernardo, 2014). In the context of mathematics curriculum, a word problem requires that mathematical skills, concepts or processes be used to arrive at the intended goal. Disappointingly, most students do not master problem-solving skills. Research shows that students face numerous factors while problem-solving. Various studies have documented how difficulties associated with comprehending the problem text are linked with corresponding difficulties in problem solution. The factors are as follows: influence of general structure features of the problem, semantic structure of the problem, and problem solving process. The influences in general structure features include the average word length, number of arithmetic operations, and number of sentences in the problem, average number of words in each sentence and the frequency of nouns, verbs, and conjunctions (Jerman & Raes, 2015). A general structure feature is referred to how a word problem is formed.

The problem-solving process occurs in four stages: problem translation and problem integration (student's representation of the problem), solution planning, and solution execution (specific strategies used in the problem). The manner in which students interpret word problems depends on how well the word problems presented. Research shows the other order and manner in which the information is presented can make the problem more and less difficult to comprehend. First it was shown subjects are most likely to miscomprehend a problem and therefore commit a reversal error when the problem is presented in an inconsistent language form. The essential problem solving requires students to first acquire the meaning of the problem and the implication of the text. Next, the student develops an appropriate representation of the problem. Finally, the student links this representation to the best strategy for solving the problem.

In mathematics, reading demands are high. The amount of required for students in mathematical word problems can be overwhelming for low achieving, at-risk students (Borasai, Seigi et al. 2004). While solving mathematical word problems, students are required to view the written text as the set of small units that become meaningful in combination with one another. The inability to perform such task implies that students not only lack problem-solving skills but reading skills as well. There has been an increasing consensus about reading success and failure. Reviews by Hurford, Darroe, et al. (2004) have reported that the presence or absence of phonemic awareness predicts reading proficiency, and separates proficient readers from non-proficient readers.

Gumanoy (2011) who purported that most of the students comprehend the lessons especially the basic concepts thoroughly discussed by the teacher.In the same vein, Carabbacan (2011 in Ayap,2010) asserted that the teacher in the classroom is the central figure who provides the structure within which the children can learn. In fact, the way the teacher presents an activity or concept, strongly influences the way the learners react to it. An effective teacher utilizes a variety of techniques and strategies to develop productive discipline and to motivate learners.

Other researchers have pointed out; the teachers are the primary cause of students' failure in mathematics. Poor performance in mathematics can be traced back to teachers' failure to impart the necessary knowledge, skills, attitudes, and values to students. According to Sin Son (2003 in Mateo,2011), the teacher is the most critical factor in attaining quality education and the single most potent element in the complete structure of an effective mathematical program.

Mateo (2011) in his study concluded that teaching strategies are not correlated with mathematics achievement but further stated that good teaching strategies resulted in more positive attitude and lesser anxiety towards math. In the study of Ganal and Guiab (2014), Maurillo (2009) undertook a study on the assessment of grade five pupils' mastery of the basic mathematics skills in the Division of Tacloban city. He revealed that the extent of mastery of the pupils in the different mathematics skills was determined by the strategies, techniques, approaches, evaluative measures, follow-up activities, and utilization of instructional materials employed by teachers.

Barb and Quinn (2007) in the study of Limjap (2015) advocate the use of multiple methods of problem solving including such intuitively based methods as the guess-and-check method approximation. Problem solvers can use arithmetic computation with figures and charts and logical reasoning, and not necessarily algebraic equations in finding solutions. They believe that this strategy is more meaningful to a learner who is beginning to use some form of reflective abstraction, than rote application of algorithms usually found in textbooks. Teachers who usually look for algebraic solutions should be convinced of the value of developing the students' problem-solving skills and refining their strategies using intuition and logic. It should be noted that the ultimate goal of this instructional method is to help learners build a good knowledge base in solving word problems so they can achieve reflective abstraction in the process.

One of the latest innovations in educational arena is Modular Instruction. This innovation contains series of activities started with teaching instructions for the learners, explanation, exercises, and generalizations.

A module is defined as a self-contained, independent unit of a planned series of learning activities designed to help the student accomplished certain well-defined objectives. The learner can proceed at this own rate and recycle if necessary. It emphasized analysis and application of concepts and techniques and gave the concrete style of concepts. It also provides active participation of students in responding and a wait to meet areas of individual interest and helps the teacher more individualized instruction in school and at home (Guido,2014).

The use of self-instructional materials were particularly beneficial as a strategy in introducing basic information to an entire class, freeing the lecture discussion hours for more "discussions" and less "lecture", an enrichment activity for talented students; a strategy to make-up for a student who had been absent and a strategy for a student in need of remedial lectures (Macarandang, 2009).

Moreover, Imperial (2006) presented that the teaching materials were just as important as teaching techniques. This statement implied that teaching materials and techniques went hand in hand in giving meaningful learning to the students. Teachers were in the best position to make their instructional materials because teacher-made learning materials came from professional judgments just like books and other instructional materials. When the teacher was fully familiar with the target learners, he could designed and select an appropriate learning experience that was realistic to the learners.

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strongly influences the way the learners react to it. An effective teacher utilizes a variety of techniques and strategies to develop productive discipline and to motivate learners.

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Based on the study of Galanida (2005), instructional materials such as work text are useful in teaching college basic Mathematics; furthermore, instructional materials with manipulative activities were helpful in developing basic concepts of Mathematics.

Parallel to the study of Espinar and *Ballad (2016)* teaching tertiary mathematics entails the use of instructional materials which lead to independent learning. The study evaluated the content validity and level of acceptability of a developed worktext in Basic Mathematics 2. It also found the significant difference between the respondents' evaluation. Likewise, the study found the significant difference in the pretest and posttest performance between experimental and the control group and the difference between the posttest of the experimental and control groups. The study utilized the descriptive comparative method in determining the validity and acceptability of the developed worktext and the difference between the evaluation of experts/teachers and the student respondents. A Quasi-experimental design was also used to find out if the work text was effective in teaching the course employing t-test for correlated samples and t-test for independent samples. The result showed that the content validity and acceptability was very much valid and very much acceptable. The difference in the post-test between the experimental and the control groups was significant. It is concluded that the work text was effective to be used in teaching the course.

Teachers believe that utilization of instructional worktext could be one effective means of addressing the difficulty since it enhances knowledge, thinking skills, problem-solving abilities of all students, as well as incorporate recent advances in disciplinary content (Nicoll, 2008). Another study conducted by May-as (2007) emphasized that the developed instructional materials for interactive learning are useful and beneficial for the improvement of the students' critical thinking skills. Bruce (2007) concluded that the use of workbooks/worktexts is beneficial, resulting in not only higher scores but also an increase in power of self-direction which helps in retention, skill in fundamental processes, reasoning ability and solving problems. As to the performance rating, a teacher should endeavor to lift up his performance as well as the students' mathematical achievement. As cited by Patan (2010), teaching activities that include the different use strategies and active learning materials are associated with mathematical achievement.

However, the issue of lower than expected mathematics achievement is a persistent worry to education leaders and policy makers. The researcher found out that the students are experiencing difficulty in mathematics subjects, particularly in Mathematics seven as usually reflected in their scores. With this problem, the researcher sought to find out if the use of worktext in teaching mathematics enhances the academic performance of the students in grade seven mathematics.

The result of the study served a significant role in the field of teaching especially in mathematics seven. This can be a basis for uplifting the mathematics teacher's performance in teaching mathematics and to improve the students' academic performance in their mathematics courses.

Statement of the Problem

This study aimed to determine the effectiveness in using a Worktext to the academic achievement of Grade 3 learners in Mathematics in Tarlac South A District, Tarlac City Schools Division during the school year 2025-2026.

Specifically, it sought to answer the following sub-problems:

1. What is the pretest and posttest mean score of the Grade 3 learners?
2. Is there a significant difference on the learners' achievement in Mathematics 3 when taugh orktext and without using worktext as teaching approaches?
3. Is there a significant difference on the learners' achievement in Mathematics 3 when taught using the two teaching approaches and when grouped according to their Mathematical Level?
4. Is there a significant interaction effect on the learners' achievement when they were exposed using the two teaching approaches and when grouped according to their Mathematical level?

METHODOLOGY

This chapter discussed the research design, sources of data, instrumentation and data collection and the tools for data analysis.

Research Design

This study used the pre-test and post-test noncomparative quasi-experimental design to determine the implications of the strategies in teaching mathematics to students' academic performance in their mathematics subject. This design is the same as the Classic Controlled Experimental Design except that the respondents cannot be randomly assigned to either experimental or control group, or the researcher cannot control which group will get the treatment. In other words, participants do not all have the same chance of being in the control or the experimental group, or of receiving or not receiving the treatment.

Below is the design which involves one treatment group modeled.

Groups	Pre-test	Treatment	Post-test
Using a Worktext	O_1	T_1	O_2
Lecture Method	O_1		O_2

Sources of Data

The respondents of this study were the Grade 3 learners of Tarac South A District, Tarlac City Schools Division. Below is the distribution of respondents according to mental ability and methods of instruction.

Table 1. Distribution of the Subjects

Mental Ability	Methods of Teaching		Total no. of Students
	Using a Work text	Lecture method	
Above Average	8	8	16
Average	10	10	20
Below Average	12	12	24
Total	30	30	60

Instrumentation and Data Collection

The researcher conducted the study with the learners coming from 2 sections as the respondents of the study because these two sections were assigned to the researcher, hence, giving her the authority to conduct experiment applying the identified two teaching strategies in the teaching of mathematics seven.

A fishbowl technique was used to determine which sections are to be assigned for lecture and using worktext.

For Mathematical ability, the researcher used the Mathematics final grades of the learners in their grade 3 report card that is reflected on their school report card. To determine the mental ability of the students, the researcher categorized it as follows (pattern from the study of Patan, 2010)

Mental Ability	High School Math Final Grade
Above Average	90-95%
Average	81-89%
Below Average	75-80%

The validated worktext was used in this study. The worktext contained the objectives, input: discussion on the different topics covered from the period of the current study, examples, and exercises with the solution.

A letter requesting permission was presented to the school head allowing the researcher to use the Grade 3 learners as the research respondents. Upon grant of approval, the letter was forwarded to the mathematics Coordinator of the said school. Arrangements were then made by the researcher as to when the pretest, posttest would be conducted.

The grade 3 section 1 learners were assigned to using the work text and while Grade 3 section 2 learners were subjected to lecture method.

The researcher provided each of the subjects a copy of the worktext to the group who utilized the worktext. The subjects of this group were given a pre-test for 40 minutes, a work text was studied for the whole grading period after the topics discussed posttest were given.

Whereas for the group that was assigned to a lecture method, the same pre-test was given for 40 minutes. After the pretest, discussion of the lesson followed. Seat work and exercises were given after the discussion. These processes were done for the whole grading period. Then a post-test was administered after the lesson was tackled.

Tools for Data Analysis

After the data gathered, these were analyzed and interpreted accordingly.

To answer problem no. 1, the mean, standard deviation and one-way analysis of covariance (ANCOVA) was used on the achievement of students when taught using Work text and without using work text as Teaching Approach.

To answer problem no. 2, the mean, standard deviation and one-way analysis of covariance (ANCOVA) was used on the achievement of students when taught using the two Teaching approaches and when grouped according to their Mathematical Level.

And to answer problem no. 3, a two-way analysis of covariance was used by the researcher for the interaction effect in the achievement of the students when they are exposed using two teaching approaches and when grouped according to their mathematical level.

RESULTS AND DISCUSSION

This chapter presents analysis and interprets data gathered in the study. The sequence of the discussion was based on how problems are stated in chapter 1.

Significant Difference in the Learners' Achievement in Grade 3 Mathematics when taught using Worktext and without using Worktext as Teaching Approaches

Achievement of students in the pre-test and post-test are presented in Table 1.

Table 1

Mean Scores and Standard Deviation Values of the Pre-test and Post-test

Type of Group	N	Pretest Mean	SD	N	Posttest Mean	SD
Experimental Group	**30**	23.467	2.913	30	28.730	3.213
Control Group	**30**	24.190	2.739	**30**	24.970	4.839
Overall	**60**	**24.1075**	**2.826**	**60**	**30.966**	**4.026**

The table shows that the control group obtained slightly higher mean than that of the experiment group in the pretest. This result indicates that both groups have acquired the knowledge in pre-requisite skills of the lesson before the conduct of the study.

Furthermore, table 2 showed that the experimental group gained high scores in the posttest with a mean value of 28.73 compared to the control group having a mean value of only 24.97.

During the conduct of the study, it was observed that students who were taught using the worktext showed inclination upon receiving the worktext since they were used the instructional material such as worktext as their primary tool in the learning

process. Moreover, the students in experimental group could study the lessons in the worktext repeatedly and made them obtain a significant increase in their mean score.

On the other hand, the students in the control group had a direct input from the teacher in the discussion of the lesson in Grade 3 Mathematics. The in-depth discussion given by the researcher led the group to obtain a significant increase of their mean score. Thus, learners understand the lessons given by the researcher.

The higher value of the standard deviation of the control group shows that the scores of these students were scattered and not close to the mean compared with the scores of those learners in the experimental group. This implies that students who were taught using a worktext really understand the concepts well. This resulted in their higher mean score in the posttest.

The control group has a high standard deviation. It explains that the test scores of the students in this group are not closed compared to the experimental group. It further deduced that most of the students did not understand the selected lesson in Grade 3 Mathematics which was discussed by the teacher-researcher thoroughly.

To test if there is a significant difference in teaching approach used by the teacher between the experimental and the control group, the One-Way Analysis of Covariance (ANCOVA) was employed.

Table 2 presents the summary of the results.

Table 2
Summary of One –Way ANCOVA on the Achievement of Learners in Grade 3 Mathematics when taught using Worktext and Taught Using without Worktext

Source of Variation	Type III Sum of Squares	Df	Mean Square	F-Value	p-value
Covariate	21.13	1	21.13	3.310	0.037
Main Effect	93.17	1	93.17	14.598	0.000
Explained	49.31	2	24.655	3.863	0.000
Residual	344.67	54	6.382		

It can be gleaned on from table 2 that the computed *F*-value is 14.598 at $p = 0.000$, which is less than the set level of significance at $\alpha = 0.05$. Thus, the null hypothesis is rejected. This implies that there is a significant difference in the achievement of students in Grade 3 Mathematics when taught using the two teaching strategies. It further derived that the worktext helps the respondents in solving problems using the principle of the mathematical concept.

The finding of this study is related to the study of Luarez (2017) that there was a significant difference in the pre-post-test between the experimental and the control group. The said study concluded that the worktext helped the students in learning Pre-Calculus.

This result was supported by Aureada (2017) that a developed work text is a valid instructional material providing student performance improvement in Logic. However, this study negates the study of Salavaria (2014) that the respondents were very satisfied with Statistics Work text. The students are more satisfied with the Statistics Work text than the teachers and teachers were most satisfied with the usability of the work text.

Significant Difference in the Learners' Achievement in Grade 3 Mathematics when Taught using the two Teaching Approaches and when Grouped according to their Mathematical Levels

Table 3 presents the comparison of the achievement of learners with different Mathematical ability levels. It is shown that the above average, average and below average achieving learners in the experimental group has a higher score in the posttest than the above average, average and below average achieving learners in the control group. This result can be attributed to the other factors that disturb the focus of the learners like the time they spent in studying the lessons since they also have other subjects to study.

Furthermore, average achieving students in the experimental group have little increase in their test scores in the posttest which can be accounted for other factors that affect while learning the lesson. The low achieving learners both on the experimental and control group showed a little increase in their scores than the rest of the groups. This indicates that low achieving learners have difficulty in grasping the lesson in both teaching strategies.

Table 3
Mean and Standard Deviation of Learners' Achievement in Grade 3 Mathematics when Grouped According to their Mathematical Ability

Group	N	Pret-test		Post-test	
		Mean	s.d.	Mean	s.d.
Experimental					
Above Average	8	31.15	3.24	35.11	3.93
Average	10	24.34	1.88	27.86	3.93
Low	12	14.91	2.68	23.22	2.77
Control					
Above Average	8	30.11	1.92	30.72	1.82
Average	10	26.39	2.55	27.33	3.56
Low	12	16.07	3.24	16..86	1.92

It can be gleaned from the table that the computed *F-value* was 6.122 and a *p*-value of 0.028 which is significant at p-value of 0.05. Thus, the null hypothesis is rejected. This implies that the learners in the experimental group with different ability levels and those learners in the control group have the significant difference in their achievement when taught using the two teaching approaches.

Table 4
Summary Table of Two-Way ANCOVA on the Achievement of Learners in Grade 3 Mathematics when Taught Using Work Text and Taught Without Worktext

Source of Variation	Type III Sum of Squares	df	Mean Square	F-Value	p-value
Covariate	19.216	1	19.216	1.129	0.012
Factor A (Mathematical Ability)	104.120	1	104.120	6.122	0.028
AxB	3.117	1	3.117	0.183	0.000
Explained	139.112	4	34.778	2.045	0.000
Residual	**780.002**	**52**	**17.006**		

Summary

This study investigated the effectiveness of a worktext to the academic achievement of Grade 3 learners in Mathematics. This was conducted in Tarlac South A District, Taralc City Schools Division during the school year 2025-2026.

The Quasi-experimental method of research was used. 30 learners were taught lessons in Mathematics 3 using a worktext for the experimental group and another 30 learners were taught using a traditional method for the controlled group.

The study investigated the comparison of the achievement of learners in Mathematics 3 among those students who were taught using a worktext and taught using a lecture method. It also compared the achievement of learners in Math 3 who are taught using the two teaching approaches and when grouped according to their mathematical ability levels. It further examined the interaction effect on the achievement of learners when they were exposed using the two approaches and when grouped according to their mathematical ability levels.

The posttest results analyzed the students' achievement the select topic in Mathematics 3. The two and One Way Analysis of Covariance (ANCOVA), means and standard deviation were the statistical tools used to analyze the data.

Findings

From the analysis of data, the following was revealed:

There was a significant difference in the achievement of learners in Mathematics 3 when taught using worktext and without using work text as teaching approaches.

There was a significant difference in the achievement of learners in Grade 3 Mathematics when taught using the two teaching approaches and when grouped according to their Mathematical Level.

There was a significant interaction effect in the achievement of the learners when they are exposed using two teaching approaches and when grouped according to their mathematical level.

Conclusions

Based on the following findings, it could be asserted that:

1. Worktext method is an effective teaching approach and enhances learners' capabilities in the understanding lesson in Grade 3 Mathematics.
2. Lecture method and the use of work text as a teaching approach are effective for the different mathematical level of ability.
3. The above and average learners of both experimental and control groups perform better in Grade 3 Mathematics than those low achieving learners in both experimental and control group.

Recommendations

In the light of the findings and conclusions, this study recommended the following:

1. Using of work text in Grade 3 Mathematics subject is encouraged.
2. Studies on the use of a worktext may be conducted as an approach in teaching other subject areas to see if the learners perform similarly.
3. More sections are encouraged to be included in the choice of respondents for the future researcher to have another experimental study on using a work text.

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