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Simplified Workbook in Algebra for Grade 7 Learners

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Abstract

The study aimed to create a Simplified Workbook to improve the performance and retention of Grade 7 learners in Algebra at Solotsolot National High School. It addressed research questions about learner profiles, Algebra performance levels, relationships between profiles and performance, and competencies that were mastered or not. Using descriptive-correlational and descriptive-developmental designs, data was collected through the Test Result and Item Analysis Package (TRIAP) for the second quarter, with analysis using frequency count, percentage, mean, and correlational techniques. The findings showed varied learner profiles in terms of sex, parental education, socio-economic status, and study habits. The performance in Algebra was generally satisfactory, with a grand mean of 27.49, and only the occupation of the mother had a significant relationship with performance. Most Algebra competencies were not mastered, indicating the need for a simplified workbook. The study's conclusions highlighted the need for parental involvement, resource centers, and teacher training to enhance learning outcomes. Recommendations included cooperation between parents and schools to improve discipline and interest in school activities, the use of the Simplified Workbook in Algebra 7, and encouraging active participation in Mathematics-related activities. Additionally, it was suggested that Mathematics teachers attend training sessions to enhance their teaching strategies and consider setting up Mathematics Clubs. Future research could examine other factors affecting mastery of Algebra competencies, such as teaching methodologies, social media exposure, and teacher-related factors.

Keywords: Algebra, level of performance, Simplified workbook, study habits

Introduction

Mathematics education, often considered the mother of all learning and the language of the cosmos, plays a crucial role in every aspect of our world, from simple mechanisms to complex systems. Its impact has driven rapid advancements in information and communication technology, underscoring the importance of mathematics in identifying patterns, relationships, and structures that solve real-world problems. Despite this, several factors hamper students' ability to grasp and apply mathematical concepts, posing significant challenges. Leongson (2013) notes that Filipino students excel in acquiring basic knowledge but struggle with higher-order thinking skills, a concern reflected in the results of national and international assessments on mathematics and scientific competencies. Moreover, the National Research Council attributes a significant portion of math failure in schools to outdated teaching methods that do not align with how most students learn

(Guthrie, 2003). These insights suggest a need for a reevaluation of teaching practices and a focus on developing skills that promote critical thinking and problem-solving in mathematics education.

In order to address issues with teaching and learning mathematics, high-quality instruction and effective instructional design are required (Dursun, 2004). The Philippine Department of Education is constantly working to improve the quality of education in the nation to ensure that "No student is left behind," which is one of its goals, is achieved. The K–12 Curriculum presents teachers with significant challenges when it comes to developing new teaching-and-learning resources and integrating ways to enhance the curriculum.

As a result, the Philippines' poor mathematics education has greater ramifications as the government works to address a variety of globalization, educational reforms, and technological change. Guillermo M. Luz, co-chairman of the National Competitiveness Council, was quoted in Leon (2011) as saying that the Philippines' ranking in the 2010–2011 rankings for education and innovation among nine Southeast Asian countries was a dismal seventh. The Philippines came in at number 69 in terms of educational quality, and number 112 in mathematics. Additionally, the National Education Testing Research (NETRC) reports that 52.3% of secondary students scored "Low Mastery" in mathematics on the NAT in 2005. Additionally, the National Achievement Test (NAT) results from 2010 showed that nearly two-thirds of the nation's high schools performed badly. According to DepEd order No. 72, dated September 20, 2010, 5,600 secondary schools had NAT scores for second-year high school pupils that fell between 26 and 50 percent right, or in the "lower average" range (Llagas, 2012).

The performance of the Department of Education – Ilocos Sur in the Metrobank MTAP Math Challenge Elimination round alone for the School Year 2018-2019 was worrisome. Only 17, 24, 46, 20, 20, and 40 were the cumulative grades from the top 1 elementary schools for Grades 1 through Grade 6, respectively. The highest possible cumulative score for secondary students is 100, and there were 36, 28, 57, and 24 students from Grades 7 to 10, respectively (Candon City Metrobank MTAP Eliminations Result, 2019).

In this study, the researcher utilized the Simplified Workbook to tackle the challenges students face in Mathematics, particularly in Algebra. This innovative workbook incorporates interactive learning assessments and Computer Assisted Instruction (CAI) to facilitate a deeper understanding of concepts in each lesson. Analysis of the results obtained after the Second Quarter Examination of Grade 7 students at Solotsolot National High School for the academic year 2022 – 2023, combined with the outcomes of the TRIAP, revealed that certain learning competencies, particularly in Algebra, were not fully mastered. Consequently, the researcher opted to focus on Algebra 7 as the primary content of the Simplified Workbook.

Simplified Workbook covered all least mastered competencies in Second Quarter Grade 7 Mathematics - Algebra. The items in the Simplified Workbook is designed on the targeted competencies and skills in Mathematics 7 specified in the Most Essential Learning Competencies (MELCs). The results of the documentary analysis on TRIAP is the basis in the development of the Simplified Workbook. The development of the Simplified Workbook focuses on the least mastered competencies of the learners.

Literature Review

The review of literature is an essential aspect of investigation. This helps the researcher to gather up to date information about what has been done in the particular area on which he intends to study.

In the words of Best (1977) a brief summary of previous research and the writings of recognized exports provide evidence that the researcher is familiar with what is still unknown and untested. Since effective research must be based upon past knowledge this step helps to eliminate the duplication of what has been done and provides useful hypothesis and helpful suggestions for significant investigations.

Profile of the Learners

Sex

The sex had been one of the factors that researchers considered as significant on the performance of the learners. In the research of Dumalagan (2018), she mentioned that gender of learners affects their level of performance in Geometry.

Some investigations have suggested sex as one of the conditions that influence academic achievement, as evidence supports differences between men and women in essential science learning. The Organization for Economic CO-operation and Development (OECD) report concerning the achievement compared to women in the total test score (de la Fuente et al, 2018). In the case of Colombia, men had outstanding achievement in math, and women performed better in areas related to language (Mediavilla et al, 2017). However, Correa (2016) as cited by Fonnega (2016), highlights at the TIMSS 2007 tests (Trends in International Mathematics and Science Study) indicate that sex is not a determinant factor on academic achievement.

Parent's Educational Attainment

Parents play a vital role in the life of the learners. They serve as the model of wisdom, patience and learning. Leganio (2017) states in her study that parent's educational attainment may impact their child's performance in several ways (1) Parental Example; children often emulate their parents. Children of parents who did well academically and/or went on college may do better because they are trying to be like their parents' footsteps. (2) Parental Attitude; parents who did poorly in school may have lower standards for their own children because they didn't value education; they may pass that attitude along their children. Conversely, parents who did well in school or got advanced degrees may have higher standards for their own children. If a parent did well or got a lot of education because they valued education, they may pass that positive attitude along their children. (3) Parental Assistance; parents who are well educated may be better equipped to assist their own children because they understand the concepts their children are studying better than poorly educated parents. (4) Parental Availability; better educated parents tend to be able to get better jobs which may mean more freedom to spend time with their children to help them with school. Parents who are working long hours, two jobs, etc. just to make ends meet have less time to spend with their children. (5) Teacher Expectations; teachers can (either consciously or unconsciously) project the parents' achievements onto their offspring- expecting children of academically deficient parents to do worse- which can influence what they expect from the children and influencing the children to live up to or down to the expectations. (6) Parental Affluence; parents who did well academically tend to get better paying jobs, which leads to more resources to help the children. (7) Indirect Peer Pressure; parents who did well academically tend to gravitate in social context to their parents who did well academically. This leads to children being exposed to other children who are subject to all the positive influences previously listed. Parents who want their children to do well will also seek to influence who their children hang-out with steering them towards other children who value education. On the flip side, parents who did poorly in school are less likely to provide these positive influences to their children because they are more likely to settle in areas where the rest of the people are

less academically accomplished, giving their children fewer nearby peers who may provide positive peer pressure to do well. Very poor people tend to get stuck in areas with their other poor people which means they are more likely to get stuck in areas with higher crime rates, drug problems, and other types of social dysfunction. People engaged in crime, doing drugs, etc. are much more likely to be poor so the rest of the poor get stuck dealing with them more on a day-to-day basis than more affluent people.

Parent's Occupation

Leganio (2017) stated that wage earners including parents, must (in most cases) be absent from the home during the day. When considering these modifications to the family dynamics, there is considerable basis for proof that the positive effects outweigh the negative effects experienced by offspring in families where both parents are employed. The working parents often command considerable respect from children because they demonstrate the worthy characteristics of industry, social compatibility, self – reliance, maturity, intelligence and responsibility. Because children identify with their parents, the feedback from each positive influence tends to be positive as well because many of these positive characteristics are imparted upon them.

Balsomo (2019), in his study has shown that the first-year students of ISPSC posed varied characteristics of age of parents, family monthly income, highest educational attainment of parents and occupation of parents.

Socio – economic Status (monthly income)

The socioeconomic background of learners is usually examined by the researchers in relation to academic performance (Liu et al, 2019), as socio-economic status is seen as a predictor of academic performance. Actually, the growing body of independent research has obviously shown that there are deficiencies for learners from lower income families and those deficiencies are related to academic performance (von Stumm, 2017). It is also possible to find out inconsistent results in relation between socio-economic status and academic performance. While some studies have found strong relation to those two variables (Adegoke & Osokoya, 2015; Tamul & Savasci, 2012; Zuzovsky, 2010), some others have not revealed any significant relation (Gobena, 2018; Koban Koc, 2016; Zhao et al., 2012). Those differences may occur from the context (location, socio-economic status types, culture, etc.) of the study conducted. Because of those differences, researchers have tended to use different methods such as meta-analysis or meta-synthesis to better understand the relation between socio-economic status and academic performance (Selvitopu and Kaya, 2021).

Families affect children's learning behavior and academic achievement in important ways, as they are primary and most significant environments that the children are exposed to. Coleman's report shows that families may play even more important roles in student's academic achievement that school and communities. Since then, the line of empirical research on family background and children's achievement has found that the family social economic statuses may affect children's academic achievements more than the impact of schools (Li and Qiu, 2018).

Study Habits

During learning, the goal is to generate knowledge or skills that are robustly integrated with related knowledge and easily accessible. Desirable difficulties promote cognitive processes that either aid forming robust, interconnected knowledge or skills or retrieving the knowledge or skill. Learners employing desirable difficulties may feel that they put in more effort and make more mistakes, but they are actually realizing larger gains toward long-term learning that learners using cognitive superficial tasks (Marsh and Butler, 2013).

Study habits can include a wide variety of behaviors, from the amount of time that students study, to the strategies that they use while studying, to the environment in which they study. The desirable difficulties framework (Bjork and Bjork, 2011), describes two main kinds of effective habits that apply to our study: 1) using effortful study strategies or techniques that prompt students to generate something or test themselves during studying and 2) distributing study time into multiple sessions to avoid "cramming" near the exam. In the following two paragraphs, we expand upon these study habits of interest.

Students' independent study behaviors are an important part of their learning in college courses. When holding preparation, class absences, and total study time equal, we found that students who spent more time on effortful, active study strategies and used a greater number of active strategies had higher scores for exams. Yet neither student who started studying earlier nor those who studied over more sessions scored differently than students who started later or studied over fewer sessions. Additionally, students who were more distracted while studying tended to perform worse than students who were less distracted. In other words, both the degree to which students employed desirably difficult strategies while studying and their level of focus when doing so were important for performance (Walck-Shannon et al, 2021).

Level of Mathematics Performance

Valdez (2017) in his study results to the competence level of Grade 11 learners in General Mathematics is not that remarkable. Though the learners can satisfactorily deal with problems ranging from easy to average difficulty, the learners encounter difficulty when prompted with complex problems. This shows that the learners have not yet fully mastered and attained the necessary competencies in the said subject.

With the findings that the learners are satisfactorily equipped with the needed competencies in General Mathematics, then it can be concluded that these learners acquired insufficient competencies in Mathematics vital to make them prepared and ready for higher Mathematics courses.

The study of Balsomo (2019) resulted to the fair level Mathematics skills in solving word problems required the development of the enhancement program to help improve the learners hone their mathematics skills and the developed enhancement program is very timely and appropriate.

Simplified Mathematics Book

The primary purpose of instructional materials is to bring teaching concepts to life. Well-crafted materials can significantly enhance comprehension of the topics being covered.

Tidon, as cited by Mejia (2016), investigated the impact of developed modules on exponential functions on the performance of fourth-year high school students at La Union National High School (LUNHS). The study comprised two parts: initially identifying the difficulties of the students in Advanced Algebra at LUNHS through Math IV teachers, and then developing modules based on these identified difficulties. The preliminary part used a descriptive method, while the main part employed an experimental method. The results revealed a significant difference in performance between students taught using traditional methods and those using the developed modules. This finding suggests that the two developed modules could effectively replace Mathematics teachers in instructing exponential and logarithmic functions in high school Advanced Algebra.

In her 2011 study, Caasi developed instructional materials in the form of activity sheets for teaching high school Algebra. The study involved 80 sophomore students from Dagupan City National High School who participated in the experimental research. The findings included: (1) the mean score on the

diagnostic test was 17.44 for the experimental group and 15.49 for the control group, with only 19 students scoring 50% or higher; (2) the mean score on the Summative Test was 34.27 for the experimental group and 29.54 for the control group, indicating a significant improvement in scores for the experimental group. This suggests that using activity sheets in teaching high school Algebra is effective. Although Caasi's worksheets serve a similar purpose to supplementary materials, they are not identical. Additionally, the year levels of students in Caasi's study differ from those considered in the present research.

Valdez (2017) and Dumalagan (2018) proposed instructional materials in their study in performance of their students in Geometry for Grade 8 and General Mathematics in Senior High School respectively. They have identified the strengths and weaknesses of their students and later proposed the said supplementary materials.

According to Cerveza (2013), citing Picar's findings, the Needs Analysis Survey reveals a clear necessity to develop instructional materials for Nursing Students in Inferential Statistics. Consequently, it is recommended that instructional materials, recognized as effective tools for teaching and learning, be utilized to offer remedial support for slow learners.

Level of Acceptability of the Simplified Mathematics Book

The number of research studies conducted in Mathematics education over the past three decades has increased dramatically. Research findings indicate that certain teaching strategies and methods are worth careful consideration as teachers to improve their Mathematics teaching practices.

Valdez (2017) mentioned that validation of any instructional material is usually accomplished by referring to the adopted book and other curricular guide and through the help of other people who are experts or specialized in the particular field or subject area. Validators may come from members of the grade level or department who are knowledgeable faculty members, curricular consultants and supervisors who are trained and experienced in special fields. They help in making decisions as regards as learning materials which are appropriate to the learners and which learning competencies should be given emphasis.

Moreover, Ornstein (1992), formulated the following guide questions that should be considered in the selection and evaluation of instructional materials: First, do the materials fit the objectives? Materials should fit the objectives of the course as well as unit plan and lesson plan. Second, are the materials well organized? Good instructional materials will relate facts to a few basic ideas or concepts in a logical manner. Third, do the materials prepare learners for the presentations? The material should include instructional objectives or advance organizers. Fourth, are the materials well designed? The materials should be attractive, the size should be appropriate for the intended to use, should be readable, legible and comfortable type size. Fifth, have the materials been presented in a technically appropriate manner? Visual presentation, side notes, appropriate headings, graphics and color should be incorporated to the material. Sixth, do the materials provide sufficient repetition through examples, illustrations, questions and summaries to enhance understanding of content? The materials should be paced properly and they should have sufficient time to digest and reflect on it. Seventh, are the materials suited to the reading level of the learners? Eight, does the difficulty of the materials match the abilities of the students?

This study focuses mainly on the proposal and acceptance of the Simplified Workbook which is somewhat similar to the other instructional materials developed from the other studies. The development of the Simplified Workbook will be based on the analysis of the data to be accumulated through survey.

The mentioned studies of each researcher gave direction to the researcher in the conceptualization of this study in designing the proposed Simplified Workbook.

Methods

This study used a descriptive–developmental research design focused on developing a Simplified Workbook in Mathematics 7 to address the least mastered competencies of Grade 7 learners, as reflected in their performance in the Second Quarter Examination. This approach also referred to the output of the study.

Descriptive method of research aimed at finding out "what is," so observational and survey methods are frequently used to gather and collect descriptive data. It is research methodology focuses with the present phenomenal conditions such as practices, beliefs, processes, relationships, or trends (Best and Kahn, 2007). According to Constantino (2019) as he cited that descriptive research describes what is. It concerns with the analysis of relationship between non-manipulated variables and the developmental of the generalization extending its conclusion beyond the sample size. The importance of this type of research is to determine averages, frequencies, and other statistical data of the population. With this information, researchers can determine trends and other information about the population.

Correlational research design used to explore the connection between two variables. In this type of research, you cannot interfere with the variables. Instead of manipulating or adjusting, it focuses more on observation. They show the strength of correlation that exists between the variables within a population. For this reason, these studies are also known an ecological study. Moreover, correlational research design is most useful for purposes of observation and prediction. Researcher's goal is to observe and measure variables to determine if any relationship exists (Eckel, 2022).

In this study, correlational research design was used to determine the relationship of profile and the level of performance of the learners.

Klaasen and Kortland (2019) define developmental research as a way of addressing the basic questions of why and how to teach what to whom. It involves a cyclical process of small-scale in-depth development and evaluation, at a content-specific level, of exemplary teaching-learning sequences. It aims to produce an empirically supported justification of the inner workings of such a sequence, which is claimed to be an important contribution to the expertise of teachers, curriculum developers and educational researchers. Moreover, Nelson (2020), developmental research as opposed to simple instructional development, has been defines as the systematic study of designing, developing, and evaluating instructional programs, processes and products that must meet the criteria of internal consistency and effectiveness.

This study is developmental in nature because it attempted to formulate a Simplified Workbook to address the weaknesses in Mathematics 7 for Grade 7 students. The strengths and weaknesses of students in Mathematics 7 will serve as basis in the development of the Simplified Workbook.

RESULTS AND DISCUSSIONS

The following are the findings of this study:

Profile of the Learners in Grade 7 Learners

Table 1 presents the profile of the learners as to sex, highest educational attainment of mother, occupation of the mother, highest educational attainment of the father, occupation of the father, and family monthly income.

As shown on the table, majority of the learners are male with 57.89 percent or thirty-three of the respondents while the remaining twenty-four respondents or 42.11 percent are female.

This implies that special efforts may be needed to encourage female learners to actively participate in class discussions, ask questions, and pursue advanced studies in Mathematics. Encouraging mentorship and providing female role models in the field can be beneficial.

This affirms the study of Mediavilla et al (2017) that, in the case of Colombia, men had outstanding achievement in math, and women
performed better in areas related to language.

Table 1. Profile of the Learners

PROFILE	**F**	**%**
A. Sex		
Male	33	57.89%
Female	24	42.11%
Total	**57**	**100.00%**
B. Highest Educational Attainment of Mother		
Doctorate Degree Holder	1	1.82%
with Doctorate Degree	0	0.00%
Master's Degree Holder	0	0.00%
with Masteral Units	0	0.00%
College Degree Holder	16	29.09%
Vocational Course	1	1.82%
College Level	9	16.36%
High School Graduate	18	32.73%
High School Level	7	12.73%
Elementary Graduate	1	1.82%
Elementary Level	2	3.64%
Total	**55**	**100%**
C. Occupation of Mother		
Professional Work	1	1.82%
Clerical Work	0	0.00%
Laborer/ Wage Earners	3	5.45%
Self - Employed	31	56.36%
Working Abroad/ OFW	20	36.36%
Total	**55**	**100%**
D. Highest Educational Attainment of Father		
Doctorate Degree Holder	1	1.82%
with Doctorate Degree	0	0.00%
Master's Degree Holder	0	0.00%
with Masteral Units	0	0.00%

College Degree Holder	10	18.18%
Vocational Course	0	0.00%
College Level	9	16.36%
High School Graduate	23	41.82%
High School Level	10	18.18%
Elementary Graduate	1	1.82%
Elementary Level	1	1.82%
Total	**55**	**100.00%**
E. Occupation of Father		
Professional Work	5	9.26%
Clerical Work	3	5.56%
Laborer/ Wage Earners	40	72.22%
Self - Employed	4	7.41%
Working Abroad/ OFW	3	5.56%
Total	**55**	**100.00%**
F. Family Income per Month		
below P10,000	41	71.93%
P10,001 - P20,000	10	17.54%
P20,001 - P30,000	2	3.51%
P30,001 - P40,000	2	3.51%
P40,001 - P50,000	1	1.75%
P50,001 - above	1	1.75%
Total	**55**	**100.00%**

Table also shows that out of 55 respondents, 50.91 percent or 28 of the respondents' mother have undergone basic education where 32.73 percent or 18 of the respondents' mother are high school graduate, 12.73 percent or 7 of them are high school level, 1.82% or 1 of them are elementary graduate, and 3.64 percent or 2 of them are elementary level. The remaining 49.09 percent or 27 of the respondents' mother have undergone college level, vocational course, college degree holder, and doctorate degree holder with 16.36, 1.82, 29.09, and 1.82 percentages.

Furthermore, on the highest educational attainment of the father, 41.82 percent are high school graduate, 18.18 percent are high school level, 18.18 percent are college degree holder, 16.36 percent are college level, and 5.46 percent are elementary graduate, elementary level, and doctorate degree holder.

This implies that parents with limited education have faced challenges in providing academic support to their children, especially that the educational system and requirements have changed since their own schooling. Moreover, the availability of resources and study materials at home depends on the educational attainment of the mother. Limited educational exposure affects the availability of educational materials and tools.

This is parallel to the study of Leganio (2017) that parents' educational attainment may impact their child's performance in several ways as to parental example, parental attitude, parental, assistance, parental availability, teacher expectations, parental affluence, and indirect peer pressure.

On the occupation of the mother, it can be seen on the table that majority of them are self-employed with 56.36 percent or 31 of the respondents' mother, while 36.36 percent, 5.45 percent, and 1.82 percent are

working abroad/OFW, laborer/wage earners, and professional work, respectively. On the occupation of father, 72.22 percent are laborer/wage earners, 9.26 percent have professional work, 7.41 percent are self-employed, 5.56 percent have a clerical work, and 5.56 percent are working abroad/OFW.

This implies that parents are not often at the side of their children to assist them in their educational needs since most of the time they are a far from their respective homes. If they are at home, most of them are tired after a long day of hard work earning for their day-to-day expenses and to support the financial needs of their children.

This corroborates with the study of Leganio (2017) that wage earners including parents, must (in most cases) be absent from the home during the day. Moreover, according to the study of Graetz as cited by Balsomo (2019) that parental occupation status is highly correlated with learners' educational choices and attainment. It further explained that low parental occupation status has negative influence or effect on learners' school achievement; and, learners having low parental occupation status has face lots of barriers in passing one stage of education to the next.

On the family income per month, it can be seen on the table that most of the respondents' family have an income below P10,000 pesos in which it comprises 71.93 percent or 41 of them. While, 17.54 percent, 3.51 percent, 3.51 percent, 1.75 percent, and 1.75 percent have a family monthly income of P10,001 to P20,000, P20,001 to P30,000, P30,001 to P40,000, P40,001 to P50,000, and P50,001 and above, respectively.

This implies that majority of the family cannot afford to buy textbooks and other related learning resources and materials that could be in help improve the academic performance of the learners.

This affirms the study of Li and Qui (2018), that families affect children's learning behavior and academic achievement in important ways, as they are primary and most significant environments that the children are exposed to. Coleman's report shows that families may play even more important roles in student's academic achievement that school and communities. Since then, the line of empirical research on family background and children's achievement has found that the family social economic statuses may affect children's academic achievements more than the impact of schools.

Study Habits of the Respondents

Table 2 shows the study habits of the respondents.

Table 2. Study habits of the respondents

Statements	Mean	DER
1. Do you have a regular time to study?	2.60	Always
2. Do you have a regular place to study?	2.42	Always
3. Do you try to study when you are alert/ rested?	2.14	Sometimes
4. Do you begin the study of a topic by quickly glancing over the topic to see what it is about?	2.37	Always
5. Do you think through or process information instead of just reading it?	2.26	Sometimes
6. Do you concentrate fully when you are studying?	2.56	Always
7. Do you solve in your own ways what the teacher is discussing?	2.65	Always
8. Do you review material/ information of the lesson that you have studied from previous days?	2.26	Sometimes

9. Do you take meaningful/ useful notes over what the teacher says in class?	2.70	Always
10. Do you put notes in an outline form as soon as possible after taking them?	1.74	Sometimes
11. When reviewing your notes do you have enough details to remember what the topic was about?	2.23	Sometimes
12. During lectures, do you look and listen to the teacher?	2.86	Always
13. Do you think about what the teacher is saying as well as listen to what he/ she is saying?	2.39	Always
14. Do you think about ways the subject you are studying may be helpful to you later in life?	2.68	Always
15. When you are solving a problem do you keep in mind the overall idea, topic, or process?	2.49	Always
16. Do you believe that in addition to learning the details of a subject it is important to know the overall idea as well?	2.42	Always
17. Do you deliberately prepare yourself for participation in class discussions?	2.33	Sometimes
18. Do you deliberately prepare yourself for open – note quizzes or tests?	1.72	Sometimes
19. Do you think through the meanings of test questions before you answer them?	2.58	Always
20. Do you write all homework, tests and projects in your planner to remind yourself of due dates?	1.98	Sometimes
Grand Mean	**2.37**	**Always**

The data reveal that respondents consistently engage in certain study habits, as indicated by their responses to questions such as "during lectures, do you look and listen to the teachers?", "do you take meaningful/useful notes over what the teacher says in class?", "do you think about ways the subject you are studying may be helpful to you later in life?", "do you solve in your own ways what the teacher is discussing?", and "do you have a regular time to study?" The corresponding mean scores for these habits are 2.86, 2.70, 2.68, 2.65, and 2.60, respectively.

Furthermore, certain study habits, such as "do you deliberately prepare yourself for open-note quizzes or tests?", "do you put notes in an outline form as soon as possible after taking them?", and "do you write all homework, tests, and projects in your planner to remind yourself of due dates?" are observed occasionally among the respondents, with mean scores of 1.72, 1.74, and 1.98, respectively.

These findings suggest a positive motivation among the respondents to actively engage in their studies, showcasing commendable study habits that can potentially contribute to their academic success. It is important to recognize that various factors influence the study habits of learners, including individual differences, effective time management, note-taking skills, participation in study habits training, the role of teachers and family, creation of a conducive study environment, completion of assignments, utilization of library resources, and the integration of reading, listening, and writing practices. Notably, interest and willpower emerge as crucial factors that significantly impact the cultivation of effective

study habits. Understanding and addressing these factors can contribute to the enhancement of overall academic performance among students.

Mapa (2014) as cited by Balsomo (2019) state that study habits can be a factor of the learners' academic performance in Mathematics. Likewise, he stated that good study habits and academic achievement walk hand in hand. He added that is you want to achieve success in any academic level you need to learn how to study more effectively. The majority of learners get mediocre to okay grades only because they get bored and do not do the right things at school. School can be fun and more effective to anyone that follows good study habits to get better grades.

Moreover, study habits can include a wide variety of behaviors, from the amount of time that students study, to the strategies that they use while studying, to the environment in which they study. The desirable difficulties framework (Bjork and Bjork, 2011), describes two main kinds of effective habits that apply to our study: 1) using effortful study strategies or techniques that prompt students to generate something or test themselves during studying and 2) distributing study time into multiple sessions to avoid "cramming" near the exam. In the following two paragraphs, we expand upon these study habits of interest.

Furthermore, students' independent study behaviors are an important part of their learning in college courses. When holding preparation, class absences, and total study time equal, we found that students who spent more time on effortful, active study strategies and used a greater number of active strategies had higher scores for exams. Yet neither student who started studying earlier nor those who studied over more sessions scored differently than students who started later or studied over fewer sessions. Additionally, students who were more distracted while studying tended to perform worse than students who were less distracted. In other words, both the degree to which students employed desirably difficult strategies while studying and their level of focus when doing so were important for performance (Walck-Shannon et al, 2021).

Level of Performance in Algebra

Table 3 displays the level of performance of the respondents in Algebra.

Table 3. Level of Performance in Algebra

Topics	Number of Items	Mean	Weight	DER
Algebraic Expressions	12	27.83	48.58%	S
Polynomials	7	35.33	61.99%	VS
Special Products	6	25.83	45.49%	S
Linear Equations and Inequalities in One Variable	13	20.95	36.90%	FS
Total	38	Grand Mean: 27.49	48.24%	S

As shown, the respondents have very satisfactory level of performance in polynomials with a mean of 35.33. Moreover, the respondents have satisfactory performance in algebraic expressions and special products with a mean of 27.83 and 25.83 and fairly satisfactory in linear equations and inequalities in one variable with means of 20.95. Over-all, the respondents have a satisfactory level of performance in algebra with a mean of 27.49.

This implies that the current curriculum and teaching methods are effective in conveying mathematical concepts to the learners. This could be an indicator that the curriculum is appropriately structured and that the teaching strategies are engaging and accessible to learners. Moreover, this indicates that teachers are skilled in explaining complex concepts, adapting to the needs of their learners, and fostering learning environment. Furthermore, the performance of the respondents in algebra can provide insights into the cognitive development and ability to grasp abstract mathematical concepts.

This is aligned with the study of Valdez (2017) in his study results to the competence level of Grade 11 learners in General Mathematics is not that remarkable. Though the learners can satisfactorily deal with problems ranging from easy to average difficulty, the learners encounter difficulty when prompted with complex problems. This shows that the learners have not yet fully mastered and attained the necessary competencies in the said subject.

With the findings that the learners are equipped with the needed competencies in General Mathematics, then it can be concluded that these learners acquired insufficient competencies in Mathematics vital to make them prepared and ready for higher Mathematics courses.

Moreover, the study of Balsomo (2019) resulted to the fair level Mathematics skills in solving word problems required the development of the enhancement program to help improve the learners hone their mathematics skills and the developed enhancement program is very timely and appropriate.

Relationship between the Profile of the Respondents and the Level of Performance in Algebra

Table 4 shows the relationship between the profile of the respondents and the level of performance in Algebra

Table 4. Relationship between the profile of the respondents and the level of performance in Algebra

Profiles	r - value	Interpretation	Decision
Sex	0.101*	S	Reject Ho
Highest Educational Attainment of Father	-0.128*	S	Reject Ho
Highest Educational Attainment of Mother	0.147*	S	Reject Ho
Occupation of Father	0.072*	S	Reject Ho
Occupation of Mother	0.384*	S	Reject Ho
Family Monthly Income	-0.077*	S	Reject Ho
Study Habits	0.000	NS	Accept Ho

*Legend: *-.05 level of significance*

The table shows that the profile of learners based on sex, with a computed r-value of 0.101, was interpreted as significant. This indicates that the null hypothesis was rejected, and the alternative hypothesis was accepted, signifying a significant relationship between the sex of learners and their performance in Algebra. Furthermore, this implies that both the sex of the learners and the highest educational attainment of their parents affect their performance in Algebra. This finding aligns with Dumalagan's (2018) study, which found a significant relationship between gender and student performance of Grade 8 learners in Dona Francisa Lacsaman De Ortega Memorial National High School.

The table also reveals a relationship between the highest educational attainment of learners' parents and the learners' performance level in Algebra. The computed r-values are -0.128 for fathers and 0.147 for mothers, both interpreted as significant. This means that the null hypothesis was rejected, indicating a significant relationship between the parents' highest educational attainment and the learners' performance in Algebra. This finding aligns with Dumalagan's (2012) study, which found a significant relationship between the mother's highest educational attainment and Grade 8 students' performance in Geometry during their third quarter examination in DFLDOMNHS. However, it contradicts Galay's (2015) study, which found no significant relationship between the mother's highest educational attainment and students' problem-solving ability in Mathematics.

Furthermore, the table shows the relationship between the occupation of learners' parents and the learners' performance in Algebra, with computed r-values of 0.072 for fathers and 0.384 for mothers, both interpreted as significant. This implies that the null hypothesis was rejected, indicating a significant relationship between the parents' occupations and the learners' performance in Geometry. However, this result contradicts Dumalagan's (2018) study, which found no significant relationship between the parents' occupations and the performance of Grade 8 learners in Geometry at DFLDOMNHS.

The table reveals that the relationship between family monthly income and learners' performance, with a computed r-value of -0.077, is interpreted as significant. This means that the null hypothesis was rejected, indicating a significant, albeit negative, relationship between family monthly income and the learners' performance. In other words, as family monthly income increases, there is a slight decrease in learners' performance, or vice versa.

This finding can be corroborated with the study by Gabriel (2012), which found similar significant relationships in socioeconomic factors affecting student performance. However, it contrasts with other studies, such as Cerveza (2013), which may have found no significant relationship between family income and academic performance. This discrepancy suggests that the impact of family income on learners' performance can vary based on different contexts and populations.

The table indicates that the relationship between study habits and learners' performance, with a computed r-value of 0.000, is interpreted as not significant. This means that the null hypothesis was accepted, suggesting there is no significant relationship between study habits and the learners' performance. In other words, the study habits of learners do not have a measurable impact on their performance.

Least Mastered Competencies

Table 5 presents the least mastered competencies of the learners based on their level of performance in Algebra.

Table 5. Least Mastered Competencies of the respondents based on their level of performance in algebra.

Competencies	Number of Items	Mean	Percentage	DER
1. translates English phrases to mathematical phrases and English sentences to mathematics sentences, and vice versa.	6	27.83	48.58	No Mastery

2. adds and subtracts polynomials.	3	36.33	63.67	Nearly Mastered
3. derives the laws of exponent.	1	44.00	77.00	Mastered
4. multiplies and divides polynomials.	3	25.67	45.29	No Mastery
5. uses models and algebraic methods to find the: (a) product of two binomials; (b) product of the sum and difference of two terms; (c) square of a binomial; (d) cube of a binomial; (e) product of a binomial and a trinomial.	6	25.83	45.49	No Mastery
6. illustrates linear equation and inequality in one variable.	1	17.00	30.00	No Mastery
7. finds the solution of linear equation or inequality in one variable.	4	28.25	49.75	No Mastery
8. solves problems involving algebraic expressions.	3	22.67	39.67	No Mastery
9. differentiates algebraic expressions, equations and inequalities.	1	17.00	30.00	No Mastery
10. solves linear equation or inequality in one variable involving absolute value by: (a) graphing; and (b) algebraic methods.	3	26.00	45.67	No Mastery
11. solves problems involving equations and inequalities in one variable.	4	16.50	29.10	No Mastery
12. evaluates algebraic expressions for given values of the variables.	3	15.67	27.67	No Mastery

It can be gleaned on the table that, “derives the laws of exponent” competency was mastered by the learners having a mean of 44.00 and a
percentage of 77.00. Moreover, “adds and subtracts polynomials” competency was nearly mastered by the respondents with a mean of 36.63 and a percentage of 63.67. However, “translates English phrases

and English sentences to mathematics sentence, and vice versa", "multiplies and divides polynomials", "uses models and algebraic methods to find the polynomial", "illustrate linear equation and inequality in one variable," "finds the solution of linear equation or inequality in one variable," "solves problems involving algebraic expressions," "differentiates algebraic expressions, equations, and inequalities," "solves linear equation or inequality in one variable involving absolute value," "solves problems involving equations and inequalities in one variable," and "evaluates algebraic expressions for given values of the variables" were not mastered by the respondents with mean of 27.83 or 48.58 percent, 25.67 or 45.29 percent, 25.83 or 45.49 percent, 17.00 or 30.00 percent, 28.25 or 49.75 percent, 22.67 or 39.67 percent, 17.00 or 30.00 percent, 26.00 or 45.67 percent, 16.50 or 29.10 percent, and 15.67 or 27.67 percent, respectively.

This implies that the identified competencies that were mastered by the respondents could serve as a foundation for developing effective teaching strategies and curriculum design. Understanding why these specific areas were well-mastered could inform the creation of instructional materials that are similarly successful. However, the competencies that were not mastered by the respondents indicate areas of weakness in the current educational approach. Designing targeted interventions for these specific topics might help improve overall student performance. This could involve identifying common misconceptions, developing remedial materials, or implementing alternative teaching methods. This finding suggests a practical implication: developing a simplified workbook in Algebra could potentially enhance the mastery level of the respondents. By creating a resource that distills complex Algebra concepts into more accessible forms, educators could facilitate a smoother learning experience for students, potentially leading to better comprehension and mastery of the subject matter. This approach aligns with the notion of catering to diverse learning needs and promoting a supportive learning environment, which are crucial aspects of effective pedagogy.

This is parallel to the study of Valdez (2017) that he proposed instruction materials in his study in the performance of his learners in General mathematics in the Senior High School. He identified the strengths and weaknesses of his students and later proposed the said supplementary material.

In her study, Dumalagan (2018) suggested using extra teaching materials to help Grade 8 students do better in Geometry. She looked at what her students were good at and where they struggled, then suggested these extra materials to help them.

Level of Acceptability of the Simplified Workbook in Algebra for Grade 7

To determine the acceptability of the simplified workbook in Algebra for Grade 7, Table 6 discloses the data of interest.

Table 6. Acceptability of the Simplified Workbook in Algebra for Grade 7

Indicators	Mean	Description
1. The goals of the workbook are clearly defined.	5.00	Very Highly Acceptable
2. The strategies proposed in the simplified workbook are feasible and realistic.	4.83	Very Highly Acceptable
3. The simplified workbook takes into accounts the needs and resources of the target population.	4.67	Very Highly Acceptable

4. The simplified workbook is based on evidence-based practices and research.	4.83	Very Highly Acceptable
5. The simplified workbook is culturally appropriate and sensitive to the target population.	4.83	Very Highly Acceptable
6. The simplified workbook includes appropriate methods for measuring the effectiveness of the intervention.	5.00	Very Highly Acceptable
7. The simplified workbook has the potential to make a positive impact in the target population.	5.00	Very Highly Acceptable
8. The simplified workbook is well organized and easy to understand.	5.00	Very Highly Acceptable
9. The simplified workbook includes a clear timeliness and milestones for implementation.	4.67	Very Highly Acceptable
10. The simplified workbook is flexible enough to allow for adjustments based on feedback and evaluation.	5.00	Very Highly Acceptable
Mean	4.88	Very Highly Acceptable

The data from Table 6 corroborates the high acceptability of the proposed simplified workbook in Algebra for Grade 7. With a mean rating of 4.88, described as "Very Highly Acceptable," and with eight out of ten indicators scoring mean values between 4.67 and 5.00, also described as "Very Highly Acceptable," it's evident that the evaluators found the content of the workbook highly satisfactory. This finding underscores the effectiveness and suitability of the workbook for its intended audience, suggesting that it meets the expectations and needs of the evaluators in terms of its content and usability.

CONCLUSIONS AND RECOMMENDATIONS

Based on the findings, the following conclusions are drawn:

The Grade 7 learners exhibit a diverse range of characteristics, encompassing factors such as the age of parents, family monthly income, highest educational attainment of parents, and parental occupation. Moreover, these learners demonstrate commendable study habits.

The Grade 7 learners demonstrate a satisfactory level of performance in Algebra, indicating effective efforts by teachers to provide them with the necessary lessons for learning and comprehension.

There is a significant relationship between the profile of the respondents and the level of performance in Algebra along considered dimension.

The developed simplified workbook in Algebra aids students to master the targeted K to 12 competencies.

The Simplified Workbook in Algebra is relevant, appropriate, and timely.

Based on the findings and conclusion drawn, the following recommendations are proposed:

Considering the diverse characteristics observed among Grade 7 learners, it is recommended to implement tailored educational support programs. These programs should account for factors such as the age of parents, family monthly income, highest educational attainment of parents, and parental

occupation. By addressing the unique needs of each student, educators can enhance overall academic performance and foster a more inclusive learning environment.

Although Grade 7 learners currently display satisfactory proficiency in Algebra, there remains a need for ongoing refinement in teaching methodologies by educators. This entails the integration of innovative instructional approaches, targeted assistance for students facing challenges, and the cultivation of collaborative learning environments. Additionally, the utilization of the newly developed Simplified Workbook presents a valuable resource in this pursuit. By persistently pursuing enhancements in teaching practices, educators can guarantee that every student is afforded the opportunity to achieve excellence in Algebra.

Despite the lack of significant relationship between the profile of respondents and performance in Algebra, it is recommended to further explore other potential factors that may influence academic achievement. This could involve conducting additional research studies or implementing comprehensive data analysis techniques to identify hidden patterns or correlations. Understanding these factors can provide valuable insights for designing targeted interventions to improve student outcomes.

The development of a simplified workbook in Algebra is acknowledged as timely and appropriate. To ensure its effectiveness over time, it is recommended to establish a system for regular review and update of educational resources. This involves soliciting feedback from teachers and students, incorporating any necessary revisions based on evolving curriculum standards or pedagogical best practices, and ensuring accessibility to all learners.

Since the Simplified Workbook in Algebra is rated as Very Highly Acceptable, efforts should be made to promote its usage among educators and educational institutions. This could involve disseminating information about its benefits, conducting training workshops for teachers on its effective implementation, and advocating for its inclusion in school curriculum guidelines. By promoting the use of high-quality educational materials, educators can enhance the learning experience and academic outcomes of Grade 7 students in Algebra.

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