

Utilization of Instructional Materials Developed by the Mathematics Teachers in the Province of Sorsogon, Philippines

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ABSTRACT---- *Development and utilization of teacher-made instructional materials in local public schools in the Philippines has taken an increase of demand especially during the implementation of the distance education- blended learning modalities in response to the Pandemic. However, in rural provinces, this remains a big challenge. This study investigates the utilization of instructional materials developed by mathematics teachers in public secondary schools in the province of Sorsogon, Philippines. About fifteen teacher-authors and IM developers from different districts and municipalities across the province are the respondents of this study. The researcher made use of mixed method in the analysis and treatment of data. Findings reveal that mathematics teachers developed and utilized instructional materials that are very limited for classroom consumptions in the Division of Sorsogon. It further concludes that teachers encountered difficulty in utilizing instructional materials.*

1. INTRODUCTION

Twenty-first century education demands teachers to be fully equipped with teaching skills and competence in order to meet the needs of the advanced and modern learners (Kim, Raza, Seidman, 2019). Students nowadays are exposed to varied instructional materials such as audio-visual that could support them in discovering new facts and mastering the competencies by their own. Thus, teachers are tasked to align their teaching approaches and methodologies in order to combat inefficiency and adequacy in the teaching and learning process.

Instructional materials (IMs) are essential resources that educators utilize in the teaching course. These materials are powerful tools for they make the lessons easy both on the part of the learners as well as the teachers (Tety, 2016). However, there are requirements that should be taken into consideration in developing and using these materials in order to be beneficial especially on the part of the learners.

The idea of Hizon (2018) centers on the importance of instructional materials in the effective academic performance of the learners. The positive attitude of teachers and the proper utilization of these resources are indeed necessary in the teaching and learning process. Thus, quality IMs would booster the knowledge, skills, and competence of the students in mastering a learning area.

The aforementioned study noted that instructional related factors contribute to the response of learners towards liking and disliking Mathematics. It is a fact that among the factors, instructional materials are of great importance that is why they should be planned, prepared and utilized effectively. The study of Bassey et.al, (2010) discovered that instructional materials have great impact on the students' learning mathematics. The utilization of improvised IMs promotes and enhances effective teaching-learning process thus, teachers should be encouraged to use them efficiently.

Filipino learners seem to conform with the abovementioned study regarding their acceptance of Mathematics in the affective domain. Cadelina (2006) believed that students hate mathematics because of teacher factors such as, some teachers teach them wrong, give instant quizzes and tests, use books that are ineffective, do not relate math to real-life situations, prepare homogenous activity for the entire class, and students felt they are unloved by their teachers.

Republic Act No. 10533, also known as “Enhanced Basic Education Act of 2013” reiterated the undertaking of creating a functional basic education system that will develop productive and responsible citizens. In order to achieve its goal, the K to 12 program of the Department of Education includes Mathematics in all grade level from kindergarten to senior high schools. Elementary Mathematics and other branches of Mathematics such as General Math, Geometry, Trigonometry, Statistics and Probability and Calculus comprise the subject.

However, results show that the Philippines is indeed required to study and make concrete actions pertaining to the decline of the learners' performance specifically in Mathematics. Paris (2019) reported that Philippines ranks among lowest in reading, math and science in 2018 study. The Philippines ranked in the low 70s in the 2018 Program for International

Student Assessment (PISA), a student assessment of 15-year-old learners across 79 countries done by the Organization for Economic Cooperation and Development (OECD). Filipino students ranked 79th in reading, with an average of 340 against the OECD average of 487. Also, mathematics and science ranked low, with 353 points and 357 points respectively against a 489 OECD average for both categories.

With the information presented, the educational system needs to undergo a closer look of its goal and the ways this can be attained successfully for the main purpose of education is to prepare the learners to be value-laden, competitive, independent, creative, productive, and ready to face the bigger arena of challenges. As a matter of fact, Yap (2012) pointed out that the role of an improved Philippine education in economic development is widely acknowledged as innovative capacity of an economy and facilitates the diffusion, adoption, and adaptation of new ideas. More specifically, education increases the amount of human capital available, thereby increasing productivity and ultimately output.

In consonance with the data above, the performance of junior high school students in Mean Percentage Scores in the *National Career Assessment Examination (NCAE) Result of 2016*, specifically that of mathematical ability, showed a very alarming outcome. Only a 32.13 MPS is achieved which is far from the 75% passing score.

One of the strategies to battle this problem is to examine the resources available and utilized by teachers in the field. This step is effective since it will determine the root cause and at the same time provide resolution to existing issue. The study of Afolabe & Joshua (2010) focused on the assessment of resources and instructional materials status in Southwestern Nigeria. The result shows that only 34.5% availability, 18.0% adequacy and 22.5 utilization rates of instructional materials. These numbers are quite low in terms of adequacy, efficiency and effectivity.

The situation presented above is analogous with what is happening in the Division of Sorsogon particularly in Mathematics department. It was found out that there are no compiled instructional materials available in the Division office since junior high school mathematics teachers fail to submit IMs for validation. This is the reason why teachers need to craft their own teaching resources in response to the need of utilizing teaching aids to enhance the teaching and learning progression.

The researcher addressed this problem among the many because of its impact on the success of the learners. Citing the need to identify the available instructional materials in Mathematics and the extent of their utilization is very timely and fittingly in order to remedy the problem on the low performance level of students along Mathematics. The task of finding out the challenges faced by teachers in designing and utilizing instructional materials is also obligatory in order to create concrete and tangible ways to align every effort to the learning needs of the clientele.

In addition, this study aims to create output based on the result. This endeavor would surely aid the teachers and support junior high school learners to attain mastery of the competencies. This action is undoubtedly vital since learners performed well when exposed to varied instructional materials that are within their capacity and interest.

2. STATEMENT OF THE PROBLEM

This study determined the utilization of the instructional materials developed by secondary Mathematics teachers in the Division of Sorsogon in the school-year 2019-2020. Specifically, it sought answers to the following problems:

1. What are the instructional materials developed by the Mathematics teachers along the following features:
 - a. Competency-Based
 - b. Contextualization
 - c. Independent Learning?
2. What are the perceived quality of the instructional materials along:
 - a. Content and Coverage
 - b. Theoretical Considerations
 - c. Appearance/ Visual Appeal?
3. What is the utilization of the existing instructional materials in secondary Mathematics?
4. What are the challenges encountered by the teachers in utilizing instructional materials in Mathematics?
5. What action plan maybe proposed based on the finding of the study?

3. METHODOLOGY

This study made use of mixed methods of research, qualitative and quantitative. It identified the instructional materials developed by secondary Mathematics teachers along competency-based, contextualization and independent learning. In addition, it also determined the perceived quality of the IMs along content and coverage, theoretical considerations and appearance or visual appeal. In the same manner, this study categorized the utilization of these existing materials and the challenges encountered by the junior high school mathematics teachers in utilizing IMs.

The respondents were 15 teachers from different municipalities of Sorsogon province with their respective developed instructional materials. The instrument used was a survey questionnaire and interview guide.

The researcher made use of content analysis, survey and interview to collect data from the two sets of respondents, specifically 15 secondary mathematics teachers and 7 jurors who are all master teachers of the subject mentioned.

The data collected in this study were treated comprehensively using frequency count, ranking and descriptive statistics.

4. RESULTS AND DISCUSSION

This part presents, analyzes and interprets the gathered data from the respondents. The presentation was done through comprehensive discussions for clearer and more logical results.

1. Instructional Materials Developed by the Mathematics Teachers in the Division of Sorsogon

There are different types of instructional materials crafted by mathematics teachers in the Division of Sorsogon but most were not reported or recognized by the division office. These materials have been utilized in delivering the lessons in order to achieve mastery of skills and competencies in the subject.

Some of the identified instructional materials were learning activity sheets, learning modules, strategic intervention materials, daily lesson plans, daily learning log and electronic materials.

IMs with Competency-Based Features Teachers are guided accordingly on the lessons that need to be taught and the competencies the students should master. The curriculum guide which displays these identified details also exhibits the performance standard the students should perform or produce at the end of each topic or lesson.

Table 2A: Instructional Materials Developed by the Mathematics Teachers along Competency- Based

Title of Instructional Materials	Type of Instructional Materials	Featured Competency-Based
Enhancing Mathematica (Basic Algebra Module)	Module	factors completely different types of polynomials (polynomials with common monomial factor, difference of two squares, sum and difference of two cubes, perfect square trinomials and general trinomials)
Math Unggoyan	Flash Card	performs operation on rational expressions
		simplifies radical expressions using the laws of radicals
		performs operations on radicals
Learning Activities for Math 10	Learning Activity Sheets	proves the Remainder Theorem, Factor Theorem and the Rational Root Theorem
Contextualized Home-Learning Activity Sheets in Statistics & Probability for TVL and Academic Track	Learning Activity Sheets	identifies regions under the normal curve corresponding to different standard normal values.
		converts a normal random variable to a standard normal variable and vice versa.
		computes probabilities and percentiles using the normal standard normal table.
Activity Sheets in Mathematics	Learning Activity Sheets	distinguishes between simple and compound propositions.
		performs the different types of operations on propositions
DLL in Math 7	Lesson Plan	multiply and divides polynomials
DLL in Math 9	Lesson Plan	illustrates situations that involve the following variations: (a) direct (b) inverse joint (d) combined
DLP in Math 9	Lesson Plan	applies the laws involving positive integral exponents
JAR Model accompanied with lesson Exemplar	Lesson Plan	describes principal roots and tells whether they are rational or irrational
DETAILED LESSON PLAN using LOCALIZED MANIPULATIVE TOOLS in Mathematics 7	Lesson Plan	performs operation on rational number
Lesson Exemplar on Quadratic Equations using Module and pattern blocks	Lesson Plan	solves equations by: (a) extracting the square root (b) factoring (c) completing the square (d) using the quadratic formula
Si Nobita at ang Magic Card	SIM	operations on function (addition and subtraction)
Effectiveness of Strategic Intervention Materials in Learning Rational Algebraic Expressions	SIM	simplifies rational algebraic expressions
Mang Ding and his Mission on Breaking through Polynomial Functions	SIM	solves problems involving polynomial functions
Circle Quest	SIM	solves problems on circles

The result shown in above implies that one of the considerations, a mathematics teacher employed in developing instructional materials, is that it should be competency-based. This is an effective means of inculcating concepts and skills to the students because the main goal of any endeavor a teacher does in the classroom is supporting learners in attaining mastery of competencies. That’s why, developing resources that are competency-based allow success both on the part of teachers and learners.

Furthermore, although all of the developed IMs are competency-based, it can be noted that the IMs listed and developed did not cover all the learning competencies in each of the year level. In this regard, the need for the development of IMs is indeed encouraged especially on least learned competencies in Mathematics.

The fact that all of these IMs are still utilized by secondary mathematics teachers, the need to produce more IMs which are competency-based should be prioritized. This undertaking would therefore support and enhance learners’ mathematical skills through various learning encounters and learning tasks.

Lagata (2016) supported this claim and presented the characteristics of good instructional materials. She stated that these resources are big help to teachers in order to facilitate the teaching and learning process. In addition, she pinpointed the idea of relativity wherein instructional materials must be related to the topic so that students will understand the subject better.

In addition to this, Valdez (2018) pinpointed those instructional materials should be within reach of students. What is being taught should be perceived by learners as relevant and useful. So, for resources to be good, they should be allied to the learning competencies for them to be really beneficial and valuable especially on the part of the learners.

IMs with Features of Contextualization. Instructional materials used by teachers have positive impact to the teaching and learning process if they are well-planned, appropriate and learner-friendly. Numerous studies proved that these learning resources do not only cater to the learners but also to the teachers in making lessons easier and enjoyable. In line with this, contextualized instructional materials developed and utilized by mathematics teachers have been identified in this present study.

Table 2B: Instructional Materials Developed by the Mathematics Teachers along Contextualization

Title of Instructional Materials	Type of Instructional Materials	Contextualization Features
Math Unggoyan	Flash Card	It was named locally, the way it was played the game with the same steps
Learning Activities for Math 10	Learning Activity Sheets	the Activities is suited and within the context of the locality
Contextualized Home-Learning Activity Sheets in Statistics & Probability+ for TVL and Academic Track	Learning Activity Sheets	the activities in these Instructional materials were made and based on locale
Activity Sheets in Mathematics	Learning Activity Sheets	The activities were drawn based from and within locals
DETAILED LESSON PLAN using LOCALIZED MANIPULATIVE TOOLS in Mathematics 7	Lesson Plan	the materials used in adding and subtracting rational numbers is from Locals

The IMs presented above have features of contextualization since they were named locally and the activities included were suited and familiar in the community. Also, they feature such since some of the materials used in a particular mathematical lesson came from the locality.

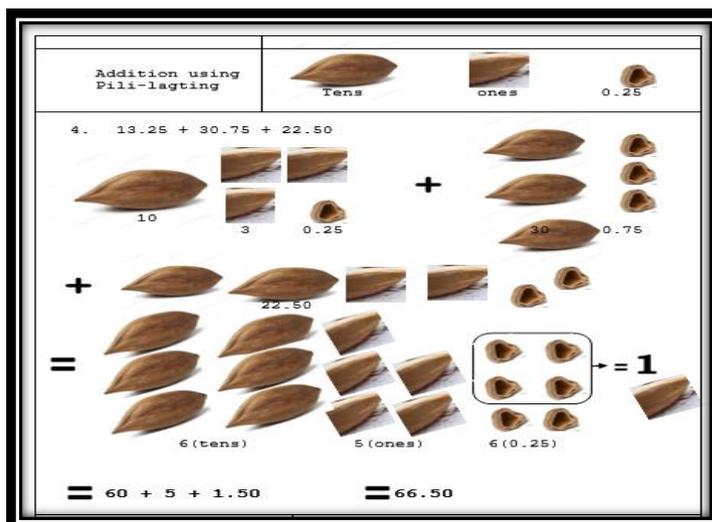


Figure 2.2 Sample photo of IM with Contextualization feature

The contextualized IMs above are very much helpful in motivating learners to answer learning tasks in Mathematics. For example, the use of module and manipulative tools engage students to a more meaningful and enjoyable encounter with addition on rational numbers in decimal form.

When these IMs were utilized by the teachers, positive feedback was noted such as what was revealed in these lines:

“These instructional materials are very effective in terms of letting students understand the concepts.”

(Ana Rose-Teacher)

“They are engaging and at the same time they make students enjoy while learning the lesson.”

(Diane-Teacher)

“These kinds of IMs are really helpful both for teachers and students”.

(Liza-Teacher)

The data presented establish the fact that teachers are very creative and resourceful in developing instructional materials that would be suited to the needs and interest of the learners. Contextualized activities are effective means of letting learners master the skills in a way that is enjoyable, and interesting. In this manner, teachers were able to catch the attention of the students, provide avenue for them to learn mathematics and enhance their higher order thinking skills.

Contextualization in instructional materials was discussed by Krause et.al (2016) stating that it can improve student motivation, learning, and persistence. In addition, it also activates learners' prior knowledge, promote more effective problem solving and reflect on their learning from abstract to concrete concepts. These benefits from contextualized materials enable learners to engage actively in the process.

Moreover, the study of Cubillas (2020) proved that contextualized learning materials were suited and appropriate for students to master the competency in grade 7 mathematics. She further suggested that teachers may also develop more contextualized learning materials for other topics in Mathematics and for other subject areas to address the students' least learned skills.

IMs with Features of Independent Learning. One of the objectives of the Department of Education is to develop holistic individuals and independent learners who are technologically advanced and goal oriented. With this purpose, teachers as advocates of learning align all their plans and output so as to achieve unified vision and positive outcomes.

Table 2C: Instructional Materials Developed by the Mathematics Teachers on Independent Learning

Title of Instructional Materials	Type of Instructional Materials	Independent Learning Features
Enhancing Mathematics (Basic Algebra Module)	Module	It is considered Home-based, self -directed and self-assessed, where students answers activities with less teacher's supervision
Si Nobita at ang Magic Card	SIM	Serves as Intervention Material that the students' can easily grasp the lesson, because of its detailed unique parts which will serve as the guide of the students on what to do with the activities
Effectiveness of Strategic Intervention Materials in Learning Rational Algebraic Expressions	SIM	
Mang Ding and his Mission on Breaking through Polynomial Functions	SIM	
Circle Quest	SIM	Serves as Intervention Material that the students' can easily grasp the lesson, because of its detailed unique parts which will be the guide of the students on what to do with the activities

The data above present that instructional materials can be utilized to motivate learners learn independently with the aid of the directions given and support from the teachers. Instructional materials that activate independent learning must be intensified and considered especially in today's new normal form of education. In this way, students do not only master their mathematical skills and knowledge but most importantly their attitude toward learning the concepts by themselves.

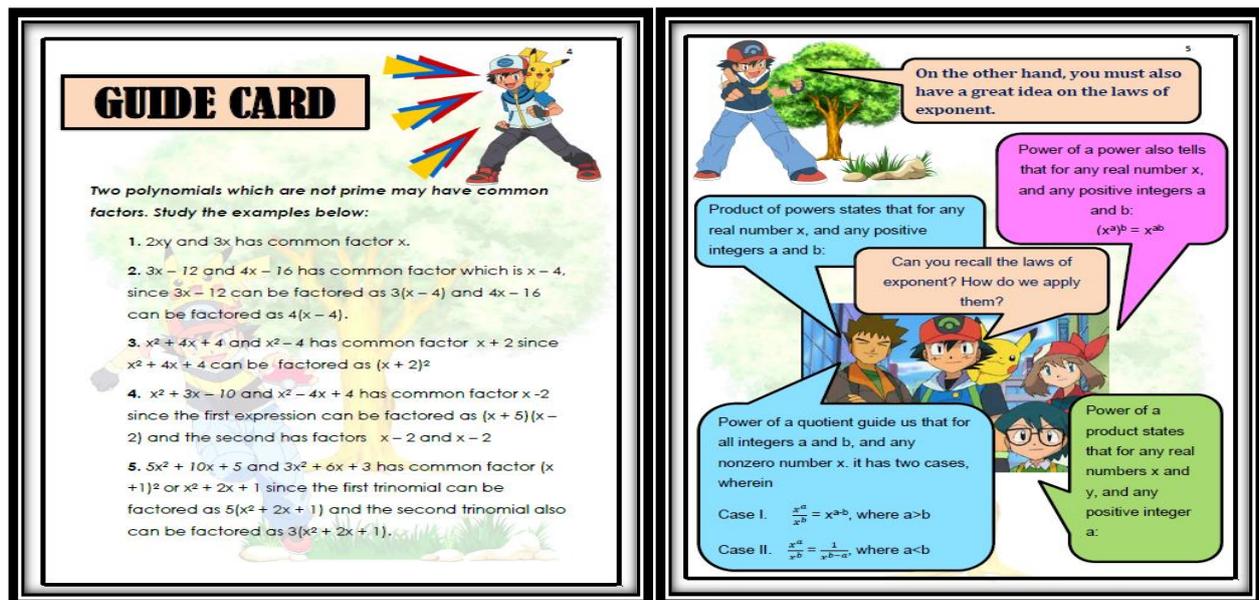


Figure 3.1 Sample photo of IM with Independent Learning feature

The images above show samples of instructional materials that cater to students' independent learning. These two (2) strategic interventions materials (SIM) presented activities that were interactive and enjoyable through dialogues, simple directions, anime characters, games and varied activities. The use of these instructional materials enabled learners to discover mathematical concepts independently by just following instructions.

The findings of the study conducted by Oden (2021) has shown that inadequate use or lack of use of instructional materials in the teaching/learning situation (lecture method) negates the objective of teaching. The role of instructional materials in the teaching/learning process cannot be overemphasized. They facilitate and encourage self-study or independent study in students. Teachers who do not make use of instructional materials hide in the cover of none supply of the teaching resources.

The above statement is parallel to the utterances of teachers who utilized these learning resources in their teaching of Mathematical concepts. One of the teachers pointed out that:

*“These materials are very powerful in letting students get the concepts by themselves.
(Aldrin-Teacher)*

*“The use of varied activities and familiar characters such as in anime caught the attention
of the learners and they found enjoyment answering the mathematical problems”.
(Edwin-Teacher)*

In the same manner, when students were asked on their reactions about the instructional materials, they simply narrated that;

“Gustong-gusto ko yong binagay sa amin ni Maam Ana na sagutan kasi naenjoy akong tingnan ang mga larawan kasi paborito kung anime characters ang naandun, parang nag uusap usap lang sila tungkol sa aralin naming”.

“I really love the activities given to us by Ma’am Ana because I really enjoy looking at the images there because they are my favorite anime characters. They were there as if they are talking and part of the lesson.”)

(Justin-Student)

“Napansin ko na ang mga activities doon ay kayang kaya kong sagutan kasi malinaw yung paliwanag pati na ang panuto, Kahit mag-isa lang akong sumasagot nakukuha ko din ng tama kasi malinaw at simple ang mga panuto.”

“I observed that I can easily answer the activities there because the discussion is clear together with the directions. Even if I am alone answering the activities, I got the answers correctly because of clear and simple instructions.”)

(Jostine-Student)

Interestingly, this result was supported by Urbandale (2021) on its policies in crafting instructional materials. Some criteria include that instructional staff should consider that resources must motivate learners to evaluate their own attitudes and behavior, to understand their own responsibilities, to utilize higher order thinking skills and to exercise the freedom to make independent judgements and decisions.

2. Perceived Quality of the Instructional Materials

Instructional materials aid teachers to deliver lessons efficiently and easily. That is why, it is of greater importance to assess these resources before presenting them to the class. There are certain characteristics that instructional materials should have in order to be aligned and consonance to learning objectives and goals. Prioritizing the quality of instructional materials is a must since they have big impact to the teaching and learning process.

Content and Coverage. Developing instructional materials is indeed a challenge for educators in the field. A lot of important thoughts should be noted since these learning resources influence the process. The effectiveness of certain IM is usually measured by the performance of students in a certain learning area.

Table 3A: Perceived Quality of the Instructional Materials On Content and Coverage

Instructional Materials	Weighted Mean	Description
Enhancing Mathematica (Basic Algebra Module)	4.83	Outstanding
Math Unggoyan	4.83	Outstanding
Learning Activities for Math 10	4.67	Outstanding
Contextualized Home-Learning Activity Sheets in Statistics & Probability for TVL and Academic Track	4.67	Outstanding
Activity Sheets in Mathematics	4.83	Outstanding
DLL in Math 7	4.33	Very Satisfactory
DLL in Math 9	5.00	Outstanding
DLP in Math 9	4.60	Outstanding
JAR Model accompanied with lesson Exemplar	4.33	Very Satisfactory
DETAILED LESSON PLAN using LOCALIZED MANIPULATIVE TOOLS in Mathematics 7	5.00	Outstanding
Lesson Exemplar on Quadratic Equations using Module and pattern blocks	4.67	Outstanding
Si Nobita at ang Magic Card	4.67	Outstanding
Effectiveness of Strategic Intervention Materials in Learning Rational Algebraic Expressions	4.67	Outstanding
Mang Ding and his Mission on Breaking through Polynomial Functions	4.67	Outstanding
Circle Quest	5.00	Outstanding

Analyzing the result, the data presented reflects the outcome in Table 1A that, almost all the developed IMs are competency based however, only limited learning competencies were included since IMs are also scarce. This further points toward the realization that there is a need to develop more IMs for secondary mathematics in order to have sufficient learning resources beneficial both for the learners and the teachers. This endeavor would enable learners master all the competencies that need to be covered throughout the school year. In the same manner, teachers would easily discuss concepts since various IMs are available and accessible.

This outcome also speaks of the teachers’ effectiveness in creating IMs that are in line with content and coverage. This is a great endeavor since the goal of developing and utilizing learning resources is to align all the objectives and learning tasks in meeting and mastering learning competencies. Since content and coverage should be considered in developing IMs, it is therefore necessary for teachers to manage and compile e-resources available such as curriculum guide to support them in the teaching and learning situations.

This idea is supported by the University of Wisconsin Madison stating that the best instructional materials are aligned with all the other elements including the learning objectives, assessments and activities. In addition, IMs should consider the breadth and depth of content so that student learning is optimized.

Theoretical Considerations. Teachers dream to affect the lives of their students in a very meaningful way. That’s why, they make it a point to plan, prepare and organize all teaching aids so learners will easily catch up the lesson. In this manner, teachers become a powerful motivator and at the same time, an efficient avenue of learning.

Table 3B
Perceived Quality of the Instructional Materials on
Theoretical Considerations

Instructional Materials	Weighted Mean	Description
Enhancing Mathematica (Basic Algebra Module)	5.00	Outstanding
Math Unggoyan	4.33	Very Satisfactory
Learning Activities for Math 10	5.00	Outstanding
Contextualized Home-Learning Activity Sheets in Statistics & Probability for TVL and Academic Track	5.00	Outstanding
Activity Sheets in Mathematics	5.00	Outstanding
DLL in Math 7	4.00	Very Satisfactory
DLL in Math 9	4.33	Very Satisfactory
DLP in Math 9	4.00	Very Satisfactory
JAR Model accompanied with lesson Exemplar	4.67	Very Satisfactory
DETAILED LESSON PLAN using LOCALIZED MANIPULATIVE TOOLS in Mathematics 7	4.67	Outstanding
Lesson Exemplar on Quadratic Equations using Module and pattern blocks	4.67	Outstanding
Si Nobita at ang Magic Card	4.33	Outstanding
Effectiveness of Strategic Intervention Materials in Learning Rational Algebraic Expressions	4.67	Outstanding
Mang Ding and his Mission on Breaking through Polynomial Functions	4.67	Outstanding
Circle Quest	5.00	Outstanding

Generally speaking, these numbers project that mathematics teachers consider the various theories in developing IMs that would suit the learning needs and their effectiveness to motivate learners in mastering the lesson. It was clearly stated from the table that there is no one specific learning resources that teachers can use inside the classroom, Any IMs like learning activity sheets, learning modules, strategic intervention materials, daily lesson plans, daily learning log and electronic materials could be effective learning tools that would aid learner understand an idea. In essence, the different theories considered by teachers in developing IMs enable them to create learner-centered classroom and learner-friendly activities.

Taking into account schemes that are appropriate and operative could be an avenue for learners to master concepts, skills and competencies. It can be deduced from the table that DepEd’s suggested approaches are definitely employed by secondary mathematics teachers in developing IMs. These include contextualization, localization, indigenization, differentiated instruction, discovery, inquiry-based and learner-centered curriculum.

This data analysis is synonymous to the investigations conducted by Marasigan (2016), revealing that the developed and validated self-instructional materials yield better learning output than the usual lecture instruction since the use of the material improved the performance of the students.

Generally speaking, learners are usually attracted to reading materials that are attractive at a first glance. This is true since the total packaging of a certain reading resource influence the mood of the learners to learn. The covers and the content would mean a lot to the students if they are crafted and written in the best possible way.

Table 3C: Perceived Quality of the Instructional Materials on Appearance/Visual Appeal

Instructional Materials	Weighted Mean	Description
Enhancing Mathematica (Basic Algebra Module)	5.00	Outstanding
Math Unggoyan	4.25	Very Satisfactory
Learning Activities for Math 10	4.25	Very Satisfactory
Contextualized Home-Learning Activity Sheets in Statistics & Probability for TVL and Academic Track	5.00	Outstanding
Activity Sheets in Mathematics	4.25	Very Satisfactory
DLL in Math 7	4.00	Very Satisfactory
DLL in Math 9	4.25	Very Satisfactory
DLP in Math 9	4.25	Very Satisfactory
JAR Model accompanied with lesson Exemplar	4.00	Very Satisfactory
DETAILED LESSON PLAN using LOCALIZED MANIPULATIVE TOOLS in Mathematics 7	4.25	Very Satisfactory
Lesson Exemplar on Quadratic Equations using Module and pattern blocks	4.00	Very Satisfactory
Si Nobita at ang Magic Card	4.25	Very Satisfactory
Effectiveness of Strategic Intervention Materials in Learning Rational Algebraic Expressions	4.25	Very Satisfactory
Mang Ding and his Mission on Breaking through Polynomial Functions	4.50	Outstanding
Circle Quest	5.00	Outstanding

As shown above, appearance/visual appeal has been considered by mathematics teachers in crafting IMs. Since this indicator is an important aspect of learning resources, taking them into consideration is indeed a must because this appeal awakens interest, calls attention and increases engagement and motivation. Alongside with this, appearance and visual appeal improves communication, support retention and nurture ingenuity. The table above also indicates that jurors agree on the point wherein all types of IMs developed by secondary mathematics teachers are visually appealing. This is undeniably true since the figures back up this observation. Crafting IMs that are presentable, properly lay-out and well-packaged encourages learners to browse, comprehend and accomplish learning tasks. These learning tools would also motivate learners to cooperate, collaborate and participate in discussion.

The sample IMs above are evidences on how teachers consider visual appeal as an important element of IMs to be introduced to the learners. Images and their colors attract learners to perform better and do the tasks assigned and given in each topic. As a matter of fact, below is the direct statement uttered by a student upon seeing the IMs;

“I really love the drawings and their colors.”

Zyra (Student)

“I was motivated to read the materials and answer the given activities.”

Samantha (Student)

“I enjoy answering all learning tasks and I’m not feel bored throughout the time I’m answering them.”

(Ken Alvin-Student)

To support this outcome, Bugler, Marple, Burr, Gaddini, and Finkelstein (2017) pointed out that accuracy, visual appeal, alignment to standards, depth of knowledge, ease of use, support, engagement and ability to meet student needs. These criteria determine the quality of instructional materials and they were observed in the resources created by the secondary mathematics teachers.

Generally speaking, this result indicates that teachers utilized the developed instructional materials since they were crafted considering their content and coverage, theoretical considerations and appearance/visual appeal. These indicators are present in the teacher-made IMs so they are confident enough that learners will profit from the learning resources.

Another idea that supports these findings was the guidelines for evaluation of instructional materials presented by the BCSC, Colorado Spring. These rules include, materials are based on scientifically accurate and grade-level appropriate learning goals, the rationale for selecting them, explain how the phenomena or problems are used to focus students on learning goals, situate learning goals within the progression of K-12 learning, designed with carefully sequenced learning goals and well-matched experiences, designed with carefully sequenced learning goals and well-

matched experiences, communicate the design principles and sequencing underpinning the storyline, promote teacher knowledge building related to the storyline.

3. Utilization of the Existing Instructional Materials in Secondary Mathematics

Instructional materials as a powerful tool serve as starter, exploration, absorption and reference of knowledge and skills as learners continue with the learning process (Calaluan, 2018). With these benefits, it is very essential that they are planned, selected, organized, refined and utilized so that they would fit to learners’ needs and interests.

Table 4: UTILIZATION OF THE EXISTING INSTRUCTIONAL MATERIALS IN SECONDARY MATHEMATICS

Title of Instructional Materials	Year-developed	Level of Utilization	Nature of Utilization
Enhancing Mathematica (Basic Algebra Module)	2018	School-based	Diagnostic/Summative
Math Unggoyan	2020	School-based	Motivation/Performance task part
Learning Activities for Math 10	2020	School-based	Diagnostic/Summative
Contextualized Home-Learning Activity Sheets in Statistics & Probability for TVL and Academic Track	2020	School-based	Diagnostic/Summative
Activity Sheets in Mathematics	2020	School-based	Diagnostic/Summative
DLL in Math 7	2018	School-based	Discussion, Diagnostic/Summative
Daily Lesson Plan in Math and Lesson Exemplar on Quadratic Equations Using Module and Pattern Blocks.	2017	School-based	Discussion, Diagnostic/Summative
DLP in Math 9	2019	School-based	Discussion, Diagnostic/Summative
JAR Model accompanied with lesson Exemplar	2016	School-based	Discussion, Diagnostic/Summative
DETAILED LESSON PLAN using LOCALIZED MANIPULATIVE TOOLS in Mathematics 7	2017	School-based	Discussion, Diagnostic/Summative
Lesson Exemplar on Quadratic Equations using Module and pattern blocks	2016	School-based	Discussion, Diagnostic/Summative
Si Nobita at ang Magic Card	2018	School-based	Intervention
Effectiveness of Strategic Intervention Materials in Learning Rational Algebraic Expressions	2017	School-based	Intervention
Mang Ding and his Mission on Breaking through Polynomial Functions	2020	School-based	Intervention
Circle Quest	2015	Division based	Seminar/Contest

The figure infers that teacher-made instructional materials serve various purposes in the teaching and learning situations. Nevertheless, the common thread lies on the fact that they were utilized in order to help learners master competencies and support teachers to bridge the gap of difficulty. These learning resources could be in different forms and styles; however, they remain powerful tools that can make learners motivated, interested and skillful in acquiring knowledge and skills they need in life.

Furthermore, it was noted that developing IMs should not be limited for discussion, assessment and intervention purposes since they can also be developed for publication, presentation in conferences and a lot more.

The result presented is in consonance with the study of Samuel (2019). He emphasized that classroom teachers must become conversant with the type of instructional materials, which can be used in any teaching-learning situations. Instructional materials constitute alternative channels of communication, which a teacher can use to convey more vividly to learners. They represent a range of materials which can be used to extend the range of vicarious experience of learners in the process.

4. Challenges Encountered by the Teachers in Utilizing Instructional Materials in Mathematics

Developing and utilizing instructional materials is one of the challenging tasks for teachers since these resources entail skills, efforts, money and time. However, because teachers are mandated to provide quality education to their

clientele, it is a must that they should have the will and determination to craft IMs that are meaningful and aligned to achieving of learning goals.

Table 5: Challenges Encountered by the Teachers in Utilizing Instructional Materials in Mathematics

Challenges	Frequency	Rank
Non-Availability of Secondary Mathematics IMs	15	1
Passivity of Teachers Towards Utilizing the IMs in Mathematics	9	5
Lack of Skills and Strategies in Utilizing IMs in Mathematics	3	8.5
Lack of Appropriate Materials in Textbook as References	7	6
Lack of Support from Immediate Supervisors Like Head Teacher and School Head	3	8.5
Non-Availability and Poor Internet Connection as Tool in Browsing E-References	14	2
Individual Differences of Secondary Mathematics Teachers	10	4
Limited Availability of References as Support to the Available IMs	6	7
Limited Time Allotment in the Actual Utilization of the Available IMs	12	3
TOTAL	80	

This result reveals that mathematics teachers are prone to meet challenges in utilizing IMs. Since teachers are delegated to give the best for the learners to master competencies, they cannot deny the fact that they must face certain difficulties to ensure that learning outcomes show students’ progress and success in learning. In this scenario, teachers are ready to take risks because they are trained and motivated to be the best for the learners.

These findings seem to correlate with the study of Stephen (2015) revealing the problems faced by Physics teachers during improvisation of instructional materials. These issues include financial constraints, lack of skills and strategies on improvisation, large class size, time constraint, unavailability of tools and lack of exposure on improvisation. Recommendations were made that seminars and workshop on improvisation be organized for Physics teachers by the authorities concerned.

The findings in the study conducted by Nyawira (2015) conforms with the result of this present study. In teaching mathematics in public secondary schools in Nairobi County, challenges included: large class sizes, heavy work load, inadequate instructional resources, inadequate teacher professional development, students’ negative attitude towards mathematics and inappropriateness of resources.

5. CONCLUSIONS

Based on the findings, the following conclusions were drawn:

1. Secondary mathematics teachers developed competency-based, contextualized and pro independent-learning instructional materials.
2. The jurors’ perceived quality of the IMs passed the criteria for content and coverage, theoretical considerations and appearance or visual appeal.
3. Mathematics teachers developed and utilized instructional materials that are very limited for classroom consumptions in the Division of Sorsogon.
4. Mathematics teachers encountered difficulty in utilizing instructional materials.

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