



B.7: Evidence of transfer of appropriate technology to the target clientele.

Extension Project Phase 1

➤ Work Plan

 University of Southern Mindanao EXTENSION SERVICES OFFICE Kabacan, North Cotabato 																	
Work Plan																	
PROJECT TITLE: Strengthening mother-tongue based education of elementary teachers in DepEd Cotabato through instructional materials development and validation.																	
STARTING DATE: (01-01-23)							COMPLETION DATE: (12-31-23)										
Activity No	Major/Sub-Activity	Anticipated Results	Responsible Person	Resources Required	J	F	M	A	M	J	J	A	S	O	N	D	Milestones
1	Obtain necessary permissions and approvals from relevant authorities	Obtained notice to proceed and approvals from barangay capitan .	Philip Lester Benjamin, Sandra Nanding, Rowel Madjo, Meriam Rubio	Bondpapers , printer, gasoline for travels													10%
2	Conduct profiling and needs assessment	Profile and needs of participants	Philip Lester Benjamin and Sandra Nanding	Bondpapers , internet													20%
3	Development and refining of existing IMs	Developed and refined IMs	Philip Lester Benjamin, Debbie Marie Verzosa, Leorence Tandog .	Bondpapers , printer, internet, gasoline for travels, etc.													25%
4	Validation of the instructional materials	Validated IMs	Sandra Nanding, Meriam Rubio	Bondpapers , printer, internet, gasoline for travels, etc.													25%
5	Report writing	Final report	Philip Lester Benjamin, Sandra Nanding	Bondpapers , printer, internet													20%

➤ Flow of the activities (program)

   UNIVERSITY OF SOUTHERN MINDANAO COLLEGE OF SCIENCE AND MATHEMATICS DEPARTMENT OF MATHEMATICS AND STATISTICS <h2 style="text-align: center;">EXTENSION PROJECT</h2> STRENGTHENING MOTHER-TONGUE BASED EDUCATION OF ELEMENTARY TEACHERS IN DEPED COTABATO THROUGH INSTRUCTIONAL MATERIALS DEVELOPMENT AND VALIDATION April 22, 2024 7:30 AM GS Hall, USM	<h3 style="text-align: center;">PROGRAM</h3> <ul style="list-style-type: none"> 7:30 AM – 8:00 AM <input type="checkbox"/> Registration 8:00 AM – 8:15 AM <input type="checkbox"/> Welcoming Remarks by Dr. Philip Lester Benjamin 8:15 AM – 8:45 AM <input type="checkbox"/> Presentation of Pre-test Result by Dr. Leorence Tandog 8:45 AM – 11:45 AM <input type="checkbox"/> IM Development Speaker: Dr. Debbie Marie Verzosa 11:45 AM – 12:00 PM <input type="checkbox"/> Evaluation 12:00 PM – 1:00 PM <input type="checkbox"/> Lunch 1:00 PM – 2:00 PM <input type="checkbox"/> Validation of IMs <p style="text-align: center;">Roel S. Valenton Emcee</p>
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

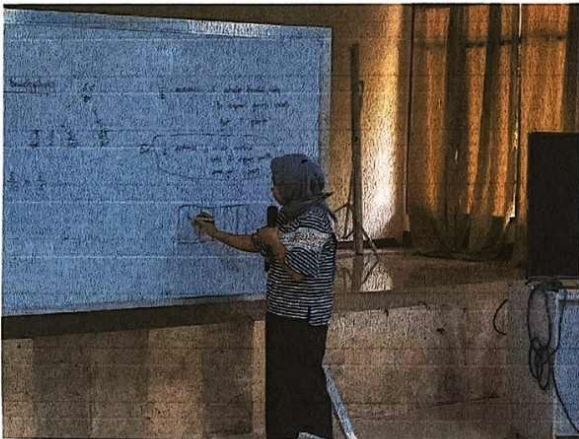
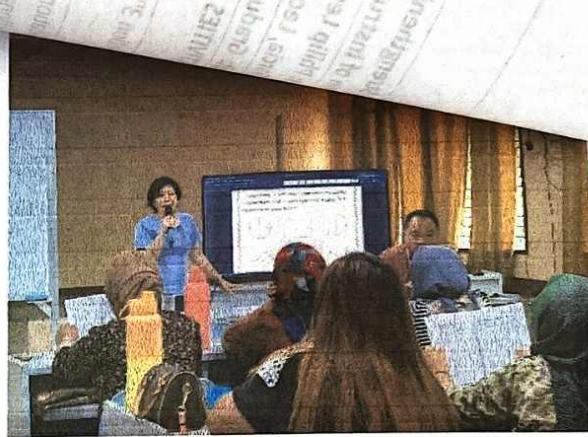
➤ Picture of Activities and Interaction from the recipients



LECTURE ON IM DEVELOPMENT BY DR. VERZOSA



Attachments




Training session on instructional material (IM) development and simplified fraction explanations led by Dr. Debbie Marie Verzosa, held at the GS Hall, USM. The session focused on equipping educators with effective strategies to create engaging IMs and teach fractions in a straightforward manner.

Additionally, the validation process for the IMs developed was overseen by Dr. Lorence Tandog and a team of experts, ensuring alignment with educational standards and effectiveness in facilitating learning.


➤ OUTPUT: Instructional Materials Developed and Validated

Name: _____
 Edad: _____
 Birthday: _____
 School: _____

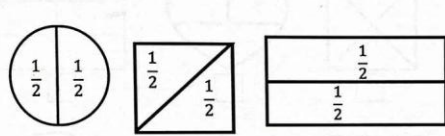
 Grade Level: _____



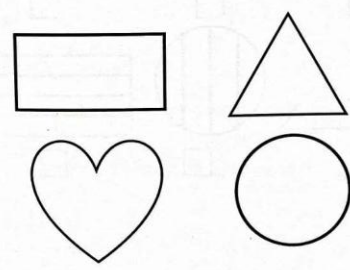
Gawin Natin 'to
 Hatiin sa dalawang pantay na bahagi itong papaya.



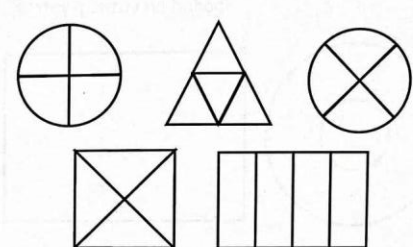
Isang Kalahati o One Half ($\frac{1}{2}$)
 Ang isang piraso ng isang buo na hinati sa dalawang magkapantay na bahagi ay tinatawag na $\frac{1}{2}$ (one half).



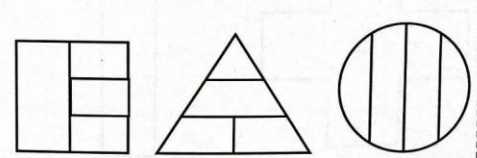
Gawin Natin 'to
 Gumuhit ng mga bahaging nagpapakita ng $\frac{1}{2}$.



Suriin Natin 'to
 Pantay na Pagkakahati sa Apat



Hindi Pantay na Pagkakahati sa Apat



➤ Pilot test



IM DEVELOPED AND REFINED: PILOT TEST



Extension Project Phase 2

➤ Work Plan

	UNIVERSITY OF SOUTHERN MINDANAO Kabacan, Cotabato Philippines EXTENSION SERVICES OFFICE	
WORK PLAN SCHEDULE		

PROJECT TITLE:	Strengthening Barangay High Schools: Validating and Implementing Representation Approach-Based Learning Materials for Independent Study of Mathematics in Remote Schools					
COLLEGE/ DEPARTMENT/UNIT:	CSM/Math & Stat Dept. in collaboration with GS/MST and PhD Ed Math Programs					
PROPONENT (S):	Leorence Tandog					
Total Duration (in months)	12 months	Planned Start	January 2025	Planned End	December 2025	
Activities	Expected Outputs	Responsible Person	Schedule of Activities			Milestone (%)
			1st Quarter	2nd Quarter	3rd Quarter	
1. Building Capacity of Teachers in Instructional Material Development (one day)	-30 teachers capacitated in IM development -design and sample lay-out of IM	L Paleta (RS), DB Verzosa (RS), L Tandog (RS), J Pilongo (F), R Valenton (F), S Nanding (F), PL Benjamin (M)				10%
2. Development of Representation Approach-Based Learning Materials for Independent Learning of Mathematics	-20 Learning Mathematics Activity Pages (LMAPS) produced thru lesson study	L Tandog (RS), DB Verzosa (RS), L Paleta, J Pilongo (F), R Madio (F), S Nanding (F), PL Benjamin (F), AJ Garcia (F), DM Mamon (F)				50%
3. Validation and Packaging of Representation Approach-Based Learning Materials for Independent Learning of Mathematics	-20 validated and packaged LMAPS	J Pilongo (RS), L Tandog (RS), DB Verzosa (RS), L Paleta (F), R Valenton (F), S Nanding (F), AJ Garcia (F), DM Mamon (F), L Yabes (F)				70%
Building Capacity of Teachers on Action Research (one day)	-10 partner teachers capacitated to implement action research using LMAPS	DB Verzosa (RS), L Tandog (RS), J Paleta (F), R Madio (F), R Valenton (M)				80%
Implementation of Representation Approach-Based Learning Materials for Improved Learning of General Mathematics		PL Benjamin (RS), L Tandog (F), DB Verzosa (F), J Pilongo (F), R Madio (F)				100%

➤ Program of Activities

Schedule of Activities

Time (Day/Time Duration)	Topic/Activity (Title of the Lecture/Discussion)	Speakers/Presentors/Personnel
May 30, 2025 (Friday)		
7:30 - 8:30 AM	Arrival/Settling In/Registration	Secretariat
8:30 - 9:00 AM	Opening Program Welcome Remarks Inspirational Message Overview of the Seminar Workshop	GS Students Dr. Philip Lester P. Benjamin Dr. Jonald L. Pimentel SUC President IV Dr. Leorence C. Tandog
	Lecture 1: Action Research	Speaker: Ms. Aurea Puyos Senior Instructor, Notre Dame of Kidapawan College Moderator: Prof. Roel S. Valenton Associate Professor, USM
10:15 - 10:45 AM	Break	
10:45 - 12:00 PM	Lecture 2: Writing Good Math Problems (Online Mode)	Speaker: Dr. Ian June L. Garces Associate Professor, Ateneo de Manila Moderator: Prof. Rowel P. Madio Associate Professor, USM
12:00 - 1:00 PM	Lunch Break	
1:00 - 2:15 PM	Lecture 3: Development of Representation Approach - Learning Materials	Speaker: Dr. Debbie Marie B. Verzosa Professor, USM Moderator: Dr. Leonard M. Paleta Associate Professor, USM
2:15 - 2:30	Break	
2:30 - 3:40 PM	WORKSHOP	Facilitators: MST and PhD students
3:40 - 4:40 PM	Paper Presentation: ➤ Bridging Ethnomathematical Practices of Obo Manobo Tahiti Farmers and Mathematics Education (Phase 2): Designing Mathematical Problem and Exploring Teachers' Perception ➤ THE APPLICATION OF ENHANCED DAMATH IN LEARNING OPERATIONS ON INTEGERS AND DEVELOPING STRATEGIC THINKING ➤ The Effect of PowToon to the Proficiency Level in General Mathematics of Grade 11 Students in Bacongo National High School	Presentors: Wendell Juntilla Cherrylee Buhay Elaine Grace H. Adto Moderator: Prof. Fitzmee Ann D. Tamalak Instructor, USM

Time (Day/Time Duration)	Topic/Activity (Title of the Lecture/Discussion)	Speakers/Presentors/Personnel
May 31, 2025 (Saturday)		
8:00 - 8:15 AM	Arrival/Settling In	Secretariat Participants
8:15 - 8:30 AM	Recap of the Previous Day Activities	Participants
8:30 - 10:00 AM	Lecture 4: Design-Based Research	Speakers: Dr. Leorence C. Tandog Professor, USM Prof. Anna Jean S. Garcia Associate Professor, USM Moderator: Prof. Sandra A. Nanding Instructor, USM
10:00 - 10:30	Break	
10:30 - 12:00 PM	WORKSHOP	Facilitators: MST and PhD students
12:00 - 1:00 PM	Lunch Break	
1:00 - 2:00 PM	Group Presentation & Feedbacking	Participants
2:00 - 2:15 PM	Break	
2:15 - 3:15 PM	Paper Presentation: ➤ The Role of Manipulatives and Low-Floor High-Ceiling Tasks on the Six Trigonometric ratios ➤ MATHEMATICAL CONCEPTS EMBEDDED IN THE SYMMETRIC PATTERNS OF MAGUINDANAOS' WOVEN TEXTILES ➤ Automated Formative Feedback for Learning Statistics and Cultivating Growth Mindset among College Students	Presentors: Apple Mae Valencia Jeric Raquel Bernadeth L. Bañados Moderator: Dr. Paul John B. Ongcoy Associate Professor, USM
3:15 - 4:00 PM	Closing Program/Awarding of Certificates Evaluation of Speakers/Conference	Dr. Philip Lester P. Benjamin Secretariat


➤ Lectures and Workshop:



➤ Active Involvement of Recipients during Training/Workshop



➤ Sample Outputs:




EMPOWERING EDUCATORS: CRAFTING LEARNING MATERIALS AND IMPLEMENTING DESIGN-BASED ACTION RESEARCH
Juntilla, W.C., Adto, E.G.H., Usman, S.E.

EVALUATING EXPONENTS

Solves exponential equations and inequalities (M11GM-1e-f-1)

SPECIFIC

Students will be asked to fold the paper (depending on their assigned number of folds and record the number of rectangles formed by the creases on the paper.



NUMBER OF FOLDS	NUMBER OF RECTANGLES FORMED
1 fold	
2 folds	
3 folds	
4 folds	

How about 10 folds?

How about 15 folds?

EXPRESSIVE

What operation/s could be used to solve for the number of rectangles?

Formulate a rule for any number of folds?

Apply the rule you formulated on the following:

$2^2 =$
 $5^2 =$
 $3^3 =$
 $6^3 =$


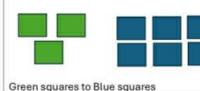
WORD PROBLEM

If you are to choose between Php. 5 000 000.00 given outright or 1 centavo (Php. 0.01) that doubles everyday for 30 days, what would you choose? Why?

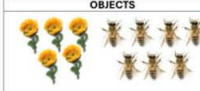
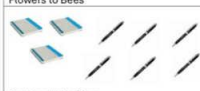
RATIO AND PROPORTION

A. Relating Fraction to Ratio.

1.

OBJECTS	FRACTION FORM	FORM IN RATIO
 Hearts to stars	$\frac{4}{5}$	$2 : 5$
 Green squares to Blue squares	$\frac{3}{6} = \frac{1}{2}$	$3:6 = 1 : 2$


2. Instruction: Count the objects and write the fraction and ratio in simplest form.

OBJECTS	FRACTION FORM	FORM IN RATIO
 Flowers to Bees		
 Notebooks to Pens		


B. Illustrating Ratio and Proportion

1. For every 2 pieces of lemon, 5 cups of lemonade are made.

Lemons



Lemonade



We can also say that the ratio of the number of lemons used to the number of cup of lemonade made is 2 : 5.



Figure 3. Salvacion HS junior high school students taking the diagnostic test



Figure 8. Orientation meeting with Salvacion HS teachers.



Figure 13. Participants of the seminar-workshop with MST and PhD Ed Math Students



CONDITIONAL STATEMENTS

COUNTING BY TABULAR METHOD

Level 1

Activity 3: Stylish Combos

Ara has 3 shirts (red, yellow, white) and 2 pairs (gray, blue). She wants to know the number of ways she can put her shirts and jeans. Help Ara by completing the table below.



		SHIRTS		
		Red	Yellow	White
JEANS	Gray			
	Blue			
Total Possible Outcomes = a choice for jeans x a choice for shirts = _____ possible pairings				

LEVEL 1: Introduction to Basic Concepts

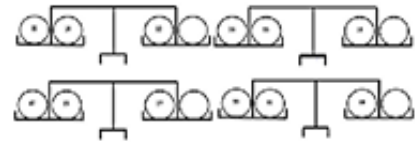
Activity 1: Find my Match!

Instructions: Draw a line to match each antecedent/hypothesis with its corresponding consequent/conclusion of a conditional statements.

ANTECEDENT/ HYPOTHESIS	CONSEQUENT/ CONCLUSION	CONDITIONAL STATEMENTS ... (If/Then Statements)
I will study for my math final test.	I can finish my math.	_____
The power goes out.	I will get a bad grade.	_____
The ATM is offline.	I might receive my cash for refund.	_____
My credit card almost expired.	I will see a doctor or hospitalize.	_____
I forgot to set your alarm.	I can no longer call and send text messages.	_____

Activity 3: Scale Balancing

Let us balance the scale by adding numbers that make both sides equal.



Activity 4: Building Numbers by Tens

Let us observe the coins below and fill the blanks in the following statements.



LESSON 3 MODE

Mode is the most frequent value in a set of data and that value can be a number, word, or category.

Types of Mode

Unimodal - The data set has only one value that appears most often.
Bimodal - The data set has two values appear most often and equally.
Multimodal - The data set has three or more repeating values.
No Mode - The data set has no repeating values.

ACTIVITY 1: What's your MODE today?

Based on the given data sets, identify the number of each element, the mode and the type of mode. Show it in the box.

Data Set	Number of each element	Which element has more number?	Mode	Type of Mode
 Hearts = 5 Squares = 3 Triangles = 2		Hearts	Hearts	Unimodal
 Red = 2 Blue = 2 Green = 2 Yellow = 2 Purple = 2		All colors	All colors	Bimodal
 1, 2, 3, 4, 5, 6, 7, 8, 9, 10		All numbers	All numbers	No Mode

Recognizing Patterns

Study each of the patterns below and supply the next few elements.

- _____
- _____
- _____
- _____
- _____

Let's be challenged!

Complete the sequence of numbers. Look at each of the sequences below and extend. Reduce two terms in the given sequence.

- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, _____
- 1, 3, 4, 6, 8, 10, _____
- 1, 3, 5, 7, 9, _____
- 1, 4, 9, 16, 25, _____
- 1, 4, 9, 16, 25, 36, _____
- 1, 3, 5, 7, 9, 11, 13, _____
- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, _____
- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, _____
- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, _____
- 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, _____

Have You Got the Post-Test?

Here is a compound sequence with repeating pattern. Match the operation needed to get a number, whether addition or multiplication, in Column B. In Column C, identify the number that is included.

COLUMN A	COLUMN B	COLUMN C
(1) 15, 20, 25, 30	addition	8
(2) 3, 12, 48, 192		
(3) 25, 37, 54, 81		
(4) 1, 4, 16, 64		
(5) 1, 1, 2, 3, 5, 8, 13		

Let us Classify them!

Classify the sequences below according to common property. Place in the same box sequences with the same pattern.

1, 5, 14, 33	1, 4, 9, 16	1, 4, 16, 64
14, 13, 8, 4	3, 5, 7, 9	20, 15, 10, 5
22, 9, 3, 1		140, 80, 40, 20

Box A	Box B
Box C	Box D

Let us Classify them Further!

Classify the sequences below according to common property. Place in the same box sequences with the same pattern.

1, 5, 14, 33	1, 4, 9, 16	1, 4, 16, 64
14, 13, 8, 4	3, 5, 7, 9	20, 15, 10, 5
22, 9, 3, 1		140, 80, 40, 20

Box A	Box B
-------	-------

Property common to sequences in Box A: _____

Property common to sequences in Box B: _____

Lesson 1: Introduction to Sets

Learning Competency: The learner describes well-defined collections of objects.

Activity 1: Sort, Explain, Think (SET)

Directions: Categorize each object in the appropriate column (A, B, C, or D) based on shared characteristics, functions, or themes.



A	B	C	D
coffee mug	blouse	comb	cellphone
spat	notebook	cap	ruler
			laptop
			camera

Activity 2: The Well-Defined Detective Mission!

Directions: Let us investigate whether each collection below is a well-defined or not. A well-defined collection has clear, objective membership. A collection of well-defined objects is called a set. A collection is not well-defined if membership is subjective, vague, or based on debatable criteria and considered not a set.

Collection of objects	Well-defined (Yes or No)	Justification	IS IT OR NOT SET?
Counting number from 1-10	Yes	Clear members: 1, 2, 3, 4, ..., 10	Set
All difficult questions in the chapter test.	No	'Difficult' is subjective - a difficult question for one may be easy for another.	Not a set
All delicious fruits.			

NUMBER ARRANGEMENTS

Activity 1: Smallest and Biggest Number Possible

Let us arrange the given digits to form the smallest and greatest numbers possible.

Digits	Smallest Possible Number	Greatest Possible Number	Smallest Possible 3-digit Number	Largest Possible 3-digit Number	Smallest Possible 2-digit Number	Largest Possible 2-digit Number
9, 3, 7, 1	1 2 3 9	9 7 3 1	103	973	13	97
1, 4, 4, 4						
4, 4, 3, 1						

2. Given the digits 1, 1, 9, and 5.

a. Find the sum of the largest and smallest possible 3-digit number.

Answer: _____

b. Find the difference of the largest and smallest possible 2-digit number.

Answer: _____

3. Using the digits 4, 3, 5, 3, form the largest possible number increased by 100.

Answer: _____ + 100 = _____

4. Using the digits 9, 8, 1, and 5, form the smallest possible number and multiply it by 2.

Answer: _____

Activity 2: Making Target Numbers

These kids are playing arranging cards to be the closest value as possible to the target number. Who do you think will win?

John's digits: 9, 7 and 1	Lena's digits: 9, 6 and 8
John: 9 7 1	Lena: 9 6 8
John: 9 7 1	Lena: 9 6 8
John: 9 7 1	Lena: 9 6 8

Activity 4: Estimating Products

Let us estimate the number of days these animals can live.

Estimate the number of days a cat can live. 100 x 100 = 10,000 100 x 100 = 10,000 100 x 100 = 10,000	Estimate the number of days a chicken can live. 100 x 100 = 10,000 100 x 100 = 10,000 100 x 100 = 10,000	Estimate the number of days a dog can live. 100 x 100 = 10,000 100 x 100 = 10,000 100 x 100 = 10,000
---------------------------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------

Activity 5: Quick Products

Let us quickly estimate products by rounding each number.

- 140 x 4 is approximately 100 x 4 = 400
The product is _____ Less than 500 Greater than 500
- 89 x 8 is approximately _____
The product is greater than _____
- 99 x 7 is _____
The product is _____ Less than 700 Greater than 700
- The area of a rectangle is 140 x 200, which of the following represent the best estimate of its area?
a. 100 x 200 b. 100 x 400 c. 140 x 400 d. 140 x 300
- An airplane flies about 1200 kilometers. At this speed, about how many kilometers does it fly in an hour?
Answer: _____

Figure 14. Samples of developed LMs

Implementation of LMs

After the preliminary arrangements and school visits, implementation commenced in mid-September 2026, with MST and PhD students taking the lead in deploying the (LMs) they had developed, under the guidance of faculty members from the Department of Mathematics and Statistics. The extension project team was allocated every Friday by the partner school for the implementation of the LMs.



Outcomes of the Project

The targeted major outcome of this project is the enhancement of numerical literacy and mathematics performance and among barangay high school students through the implementation of the developed LMs

1. **Improved** overall performance of the target school and increase the chances of its senior high school (SHS) students being admitted to the University of Southern Mindanao (USM).
 - Improved numeracy



Figure 18. Pretest and Posttest performance of students