REPUBLIC OF THE PHILIPPINES
UNIVERSITY OF THE SOUTHERN MINDANAO
KABACAN, COTABATO

College of Science and Mathematics

BACHELOR OF SCIENCE IN APPLIED MATHEMATICS

LEVEL I
OCTOBER 26 - 30, 2026

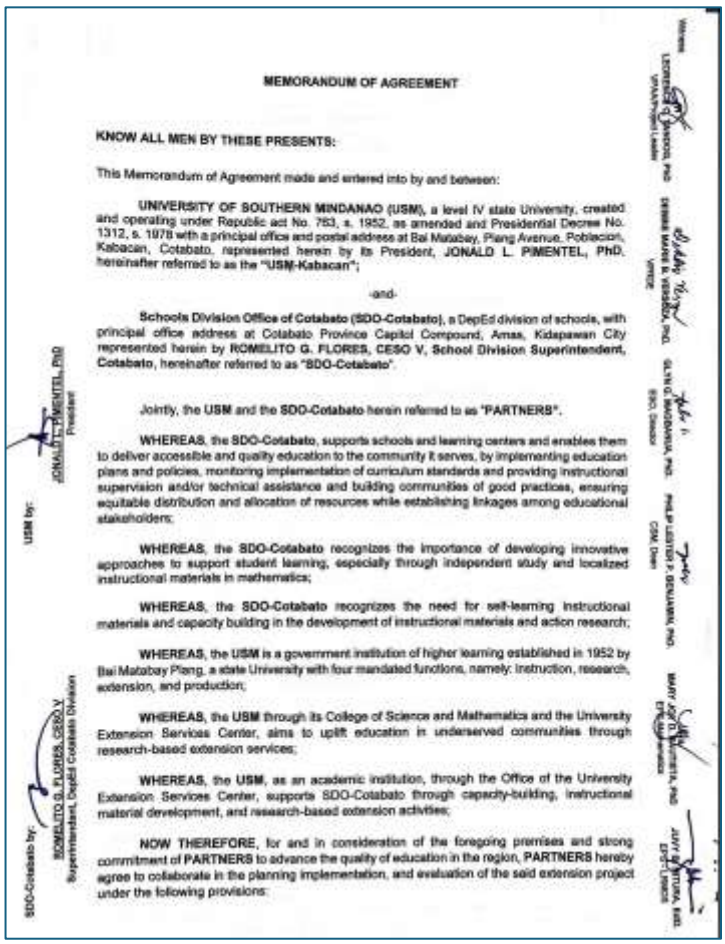


AREA VI
Extension and Community Involvement

SYSTEM-INPUTS AND PROCESSES

S.1. There is a strategy for involving the community, government and private agencies in the Extension Program.

- ❖ **MOA**



MEMORANDUM OF AGREEMENT

KNOW ALL MEN BY THESE PRESENTS:

This Memorandum of Agreement made and entered into by and between:

UNIVERSITY OF SOUTHERN MINDANAO (USM), a level IV state University, created and operating under Republic act No. 763, s. 1952, as amended and Presidential Decree No. 1312, s. 1978 with a principal office and postal address at Bal Matabay, Plang Avenue, Poblacion, Kabacan, Cotabato, represented herein by its President, **JONALD L. PIMENTEL, PhD**, hereinafter referred to as the "**USM-Kabacan**";

-and-

Schools Division Office of Cotabato (SDO-Cotabato), a DepEd division of schools, with principal office address at Cotabato Province Capitol Compound, Amas, Kidapawan City represented herein by **ROMELITO G. FLORES, CESO V, School Division Superintendent, Cotabato**, hereinafter referred to as "**SDO-Cotabato**".

Jointly, the **USM** and the **SDO-Cotabato** herein referred to as "**PARTNERS**".

WHEREAS, the **SDO-Cotabato**, supports schools and learning centers and enables them to deliver accessible and quality education to the community it serves, by implementing education plans and policies, monitoring implementation of curriculum standards and providing instructional supervision and/or technical assistance and building communities of good practices, ensuring equitable distribution and allocation of resources while establishing linkages among educational stakeholders;

WHEREAS, the **SDO-Cotabato** recognizes the importance of developing innovative approaches to support student learning, especially through independent study and localized instructional materials in mathematics;

WHEREAS, the **SDO-Cotabato** recognizes the need for self-learning instructional materials and capacity building in the development of instructional materials and action research;

WHEREAS, the **USM** is a government institution of higher learning established in 1952 by Bal Matabay Plang, a state University with four mandated functions, namely: Instruction, research, extension, and production;

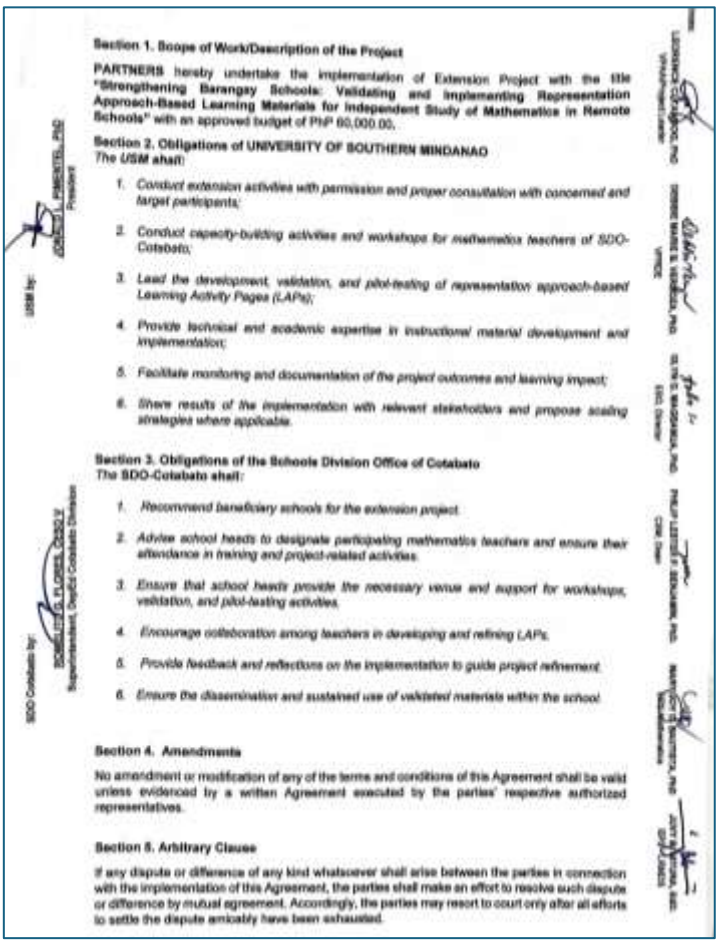
WHEREAS, the **USM** through its College of Science and Mathematics and the University Extension Services Center, aims to uplift education in underserved communities through research-based extension services;

WHEREAS, the **USM**, as an academic institution, through the Office of the University Extension Services Center, supports SDO-Cotabato through capacity-building, instructional material development, and research-based extension activities;

NOW THEREFORE, for and in consideration of the foregoing premises and strong commitment of **PARTNERS** to advance the quality of education in the region, **PARTNERS** hereby agree to collaborate in the planning implementation, and evaluation of the said extension project under the following provisions:

USM by: JONALD L. PIMENTEL, PhD, President

SDO-Cotabato by: ROMELITO G. FLORES, CESO V, Superintendent, DepEd Cotabato Division



Section 1. Scope of Work/Description of the Project

PARTNERS hereby undertake the implementation of Extension Project with the title "**Strengthening Barangay Schools: Validating and Implementing Representation Approach-Based Learning Materials for Independent Study of Mathematics in Remote Schools**" with an approved budget of PhP 60,000.00.

Section 2. Obligations of UNIVERSITY OF SOUTHERN MINDANAO
The USM shall:

1. *Conduct extension activities with permission and proper consultation with concerned and target participants;*
2. *Conduct capacity-building activities and workshops for mathematics teachers of SDO-Cotabato;*
3. *Lead the development, validation, and pilot-testing of representation approach-based Learning Activity Pages (LAPs);*
4. *Provide technical and academic expertise in instructional material development and implementation;*
5. *Facilitate monitoring and documentation of the project outcomes and learning impact;*
6. *Share results of the implementation with relevant stakeholders and propose scaling strategies where applicable.*

Section 3. Obligations of the Schools Division Office of Cotabato
The SDO-Cotabato shall:

1. *Recommend beneficiary schools for the extension project.*
2. *Advise school heads to designate participating mathematics teachers and ensure their attendance in training and project-related activities.*
3. *Ensure that school heads provide the necessary venue and support for workshops, validation, and pilot-testing activities.*
4. *Encourage collaboration among teachers in developing and refining LAPs.*
5. *Provide feedback and reflections on the implementation to guide project refinement.*
6. *Ensure the dissemination and sustained use of validated materials within the school.*

Section 4. Amendments

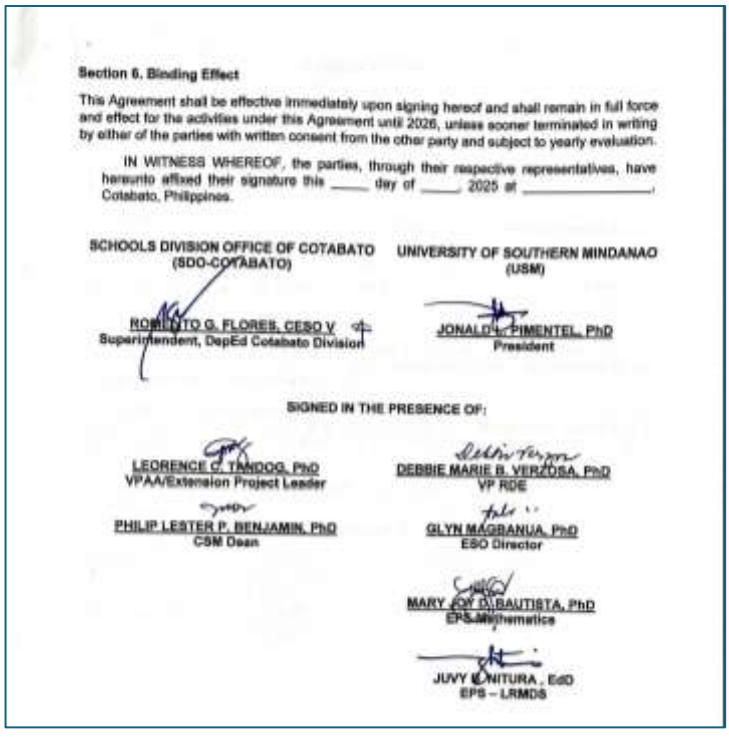
No amendment or modification of any of the terms and conditions of this Agreement shall be valid unless evidenced by a written Agreement executed by the parties' respective authorized representatives.

Section 5. Arbitrary Clause

If any dispute or difference of any kind whatsoever shall arise between the parties in connection with the implementation of this Agreement, the parties shall make an effort to resolve such dispute or difference by mutual agreement. Accordingly, the parties may resort to court only after all efforts to settle the dispute amicably have been exhausted.

USM by: JONALD L. PIMENTEL, PhD, President

SDO Cotabato by: ROMELITO G. FLORES, CESO V, Superintendent, DepEd Cotabato Division



Section 6. Binding Effect

This Agreement shall be effective immediately upon signing hereof and shall remain in full force and effect for the activities under this Agreement until 2026, unless sooner terminated in writing by either of the parties with written consent from the other party and subject to yearly evaluation.

IN WITNESS WHEREOF, the parties, through their respective representatives, have hereunto affixed their signature this ____ day of ____, 2025 at ____, Cotabato, Philippines.

SCHOOLS DIVISION OFFICE OF COTABATO (SDO-COTABATO)	UNIVERSITY OF SOUTHERN MINDANAO (USM)
ROMELITO G. FLORES, CESO V Superintendent, DepEd Cotabato Division	JONALD L. PIMENTEL, PhD President

SIGNED IN THE PRESENCE OF:

LEORENCE C. TANDOG, PhD
VPAA/Extension Project Leader

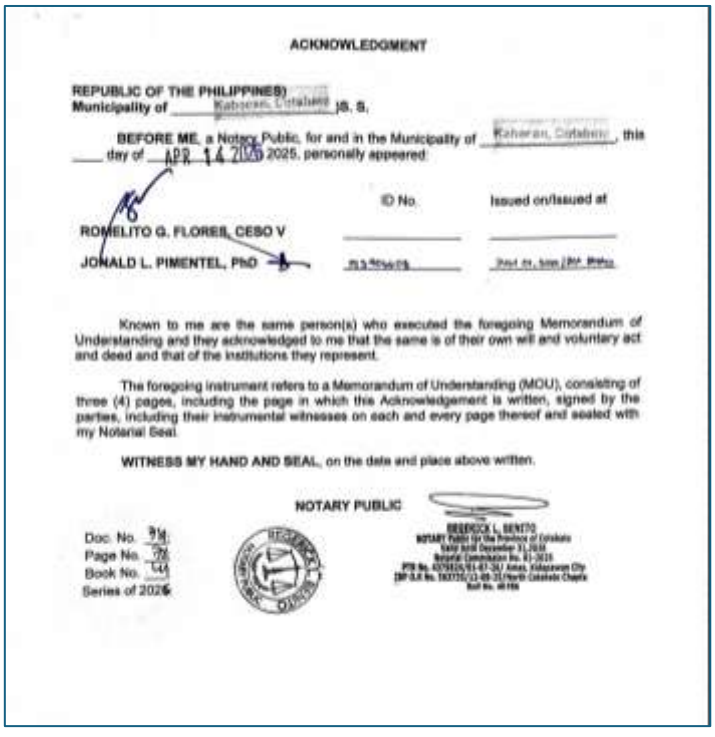
DEBBIE MARIE B. VERZOSA, PhD
VP RDE

PHILIP LESTER P. BENJAMIN, PhD
CSM Dean

GLYN MAGBANUA, PhD
ESO Director

MARY JOY D. BAUTISTA, PhD
EPS – Mathematics

JUVY C. NITURA, EdD
EPS – LRMDS



ACKNOWLEDGMENT

REPUBLIC OF THE PHILIPPINES)
Municipality of Kabacan, Cotabato)S. S.

BEFORE ME, a Notary Public, for and in the Municipality of Kabacan, Cotabato, this ___ day of APR 14 2026 2025, personally appeared:

	ID No.	Issued on/Issued at
ROMELITO G. FLORES, CESO V		
JONALD L. PIMENTEL, PhD	[illegible]	[illegible]

Known to me are the same person(s) who executed the foregoing Memorandum of Understanding and they acknowledged to me that the same is of their own will and voluntary act and deed and that of the institutions they represent.

The foregoing instrument refers to a Memorandum of Understanding (MOU), consisting of three (4) pages, including the page in which this Acknowledgement is written, signed by the parties, including their instrumental witnesses on each and every page thereof and sealed with my Notarial Seal.

WITNESS MY HAND AND SEAL, on the date and place above written.

NOTARY PUBLIC

Doc. No. 94;
Page No. 20;
Book No. 44;
Series of 2026

REBECCA L. BENTO
NOTARY Public for the Province of Cotabato
Until December 31, 2026
Appointment No. 81-2025
PTR No. 8378526/01-07-26/ Amas, Kidapawan City
[illegible]
Roll No. 46186

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

❖ RDE Agenda

1.3 RDE Agenda (BOR Resolution No. 69, series 2021)

In support to the national agenda and in consultations with stakeholders, the RDE themes are as follows:

RDE Themes	RDE Priority Areas
Quality Learning, Skills Development, and Literacy	Innovative teaching strategies; development and evaluation of functional education materials and modalities, and teaching strategies/approaches, motivation, and engagement; school climate; school and knowledge management; special education; remedial education; curriculum development and implementation; alternative learning system; assessment studies; soft skills; practical skills; adult education; language literacy; numerical literacy; data literacy; computer literacy; international studies; tracer studies; livelihood programs;; capacity building; capability building
Social Development, and Strong Institutions	Gender and development GAD; peace initiatives; community development; human security; justice; public policy and legislations; social rehabilitation; governance; organizational studies; behavioral studies; social institutions; ethics and public accountability; programs/project assessment; community needs assessment and interventions; partnerships and linkages; technology adoption; Institutional development; upgrading of laboratory and lecture facilities
Preservation of Culture	Multicultural studies; educational materials for IPs; indigenous knowledge systems and practices; development of materials for cultural knowledge and promotion; arts; language and literature studies; traditional dance, sports and music; halal studies
Environmental Protection, Conservation, and Risk Reduction	Environment rehabilitation studies; biodiversity; climate change adaptation; risk, hazard and mitigation; biosafety; natural resources conservation and management; bioremediation; flood control; waste management; ecological preservation and care; environmental impact assessment; tourism; agroecology; natural farming
Food Security and Poverty Reduction	Agricultural and fisheries research; biotechnology; innovations; quality food product development; technology development; halal food production; sustainable production; responsible consumption; organic agriculture; food testing; smart agriculture; precision farming; farm machineries; post-harvest facilities; vertical farming; indigenous food; food tourism; development of new breeds and varieties
Good Health and Wellbeing	Nutrition; nutraceuticals; sports, physical education; physical fitness; sports psychology; health resiliency; psycho-social health; medical and medicinal studies; hygiene and sanitation; functional foods; food and water quality and safety; mental and emotional health; therapy; coping mechanism; preventive measures; emerging diseases; health management; traditional and alternative medicine; community health; risk assessment and mitigation; health informatics, regenerative medicine, emergency response medicine
Innovations in Science, Engineering, and Technology	Innovations and futures thinking; product and technology development; energy; materials science; nanotechnologies; robotics; artificial intelligence; internet of things; Science, Engineering, Communication, and Technologies (SECT) 4.0; biotechnology and OMIC technologies; inventions and discoveries; basic research; information technologies; electronics; drug discovery; mathematics; emerging technologies; fabrication; transport system; waste management; infrastructure; water systems; simulation studies; industrial and allied technology, Data Science and Analytics, GIS, Remote sensing, machine learning; quantum technology; smart cities
Sustainable Entrepreneurship and Management	Economics; micro and macro scale business; product development; marketing; commercialization; networking; franchising; financial management; business feasibility studies; risk and opportunities; value adding; value chain analysis; organizational management; quality service assessment; human resource management; production management; sustainable cooperative studies; Entrepreneurial studies

❖ Capsule Proposal for Extension

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Philippines

CAPSULE PROPOSAL FOR EXTENSION

A. BASIC INFORMATION	
1. Project Title	Strengthening Barangay High Schools: Validating and Implementing Representation Approach-Based Learning Materials for Independent Study of Mathematics in Remote Schools
Component 1	Building Capacity for Teachers in Instructional Development
Component 2	Building Capacity for Teachers in the Conduct of Action Research
Component 3	Design and Development of Representation Approach-Based Learning Materials for Independent Learning of Mathematics
Component 4	Validation and Packaging of Representation Approach-Based Learning Materials for Independent Learning of Mathematics
Component 5	Implementation of Representation Approach-Based Learning Materials for Improved Learning of General Mathematics
2. Proponent/s Indicate Name Designation, Office	Leorence C. Tandog, Debbie Marie Verzosa, Jonald Pimentel, Philip Lester Benjamin, Leonard Paleta, Anna Jean Sebastian, Jupiter Pilongo, Daryl Mae Catubig, Lawton Yabes, Roel Valenton, Sandra Nanding, Rowel Madio Faculty, College of Science and Mathematics
2.1. Email Address	lctandog@usm.edu.ph
2.2. Contact Number	09466115568
3. Lead Unit/College	College of Arts and Sciences
3.1. Collaborating Unit/College	Graduate School
3.2. Partner Agency	

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Philippines

CAPSULE PROPOSAL FOR EXTENSION

4. Thematic Area	☐ Quality Learning Skills Development and Literacy ☐ Food Security and Poverty Reduction ☐ Social Development, and Strong Institutions ☐ Good Health and Well-being ☐ Preservation of Culture ☐ Innovations in Science, Engineering, and Technology ☐ Environmental Protection, Conservation, and Risk Reduction ☐ Sustainable Entrepreneurship and Management
5. Sector/Discipline	Mathematics Education
6. Project Duration	One year
7. Project Service Area/s:	DepEd Cotabato
8. Total Budget Requested (Php)	50,000

B. TECHNICAL DESCRIPTION

1. **Need-based Rationale**

(State rationale based on current set-up, the need, your solution, and connect) please refer to Magbanua, G.G. (n.d.) Writing a Need-based Rationale for Extension Proposal, TeknoGuro. University of Southern Mindanao.

Barangay high schools, formerly known as barrio high schools, were established in 1964 to provide wider access to secondary education (Orata, 1979). Since then, additional barangay high schools have opened with the passage of RA 6054 or the "Barrio High School Charter" in 1969. The establishment of barangay high schools is considered as equalizing opportunity for all Filipino children to access education regardless of their place of residence or economic condition.

The performance of Philippine barangay schools has always been viewed to be inferior. In 1987 the Department of Education (DepEd) temporarily halted the opening of barangay high schools with acknowledgement that the quality of instruction in most of the barangay high schools suffered as evidenced by poor results in national achievement tests (DepEd DO 69, s. 1987). The quality of education in barangay high schools could not be sufficiently maintained due to a lack of experienced teachers and funding (Ishida, 1995) resulting in a lack of quality material resources and infrastructures (Bai, 2023). However, due to the insistent demand of the local communities for secondary education and the pressing need to improve access to education in remote areas, barangay high schools continued to operate and increased in number.

IMPLEMENTATION

I.1. The College/Academic Unit is committed to the service and development of the community, and.

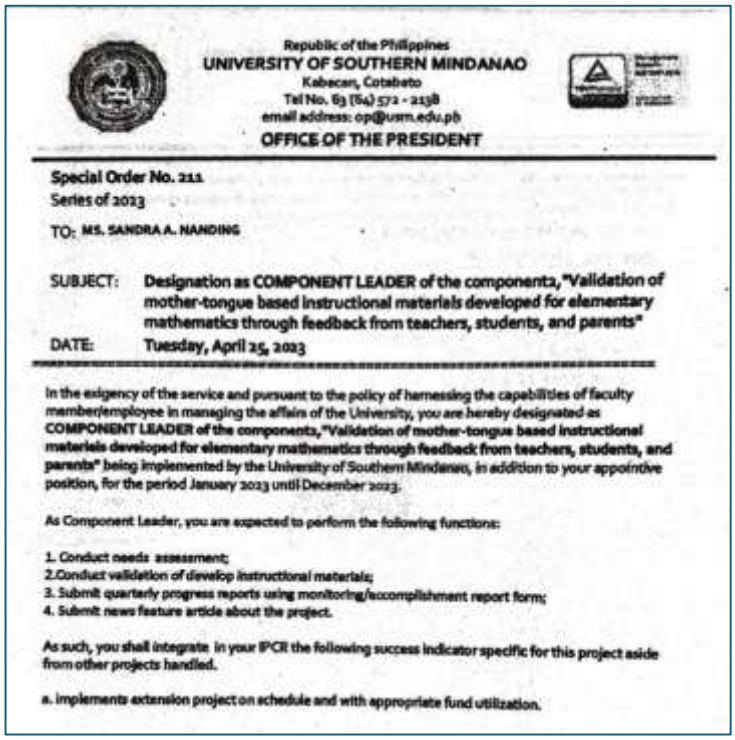
I.1.1. initiates and maintains community development projects.

Year	Project Title	Project Implementor/s	Beneficiary / Site	Status
2023	Strengthening mother-tongue based education of elementary teachers in DepEd Cotabato/MBHTE BARMM through instructional materials development and validation	Project Leader: Philip Lester Benjamin Component Leader: Sandra Nanding	Nangaan Elementary School, DepEd Cotabato	Completed
2025	Strengthening Barangay High Schools: Validation and Implementation of Representation-Based Learning Materials for Independent Study of Mathematics in Remote Schools	Project Leader: Leorence Tandog Component Leaders: Philip Lester Benjamin Debbie Marie Verzosa Leonard Paleta Jupiter Pilongo	Salvacion High School, Matalam, Cotabato	Completed
2026	Strengthening Barangay Schools (Phase 2): Sustaining Mathematics Learning through Teacher Mentoring and Weekly Student Learning Support	Project Leader: Sandra Nanding Component Leaders: Philip Lester Benjamin Leorence Tandog	Rubio Elementary School and Salvacion High School, Matalam, Cotabato	On going
2027	BlOnihan Para sa Karunungan in Columbio: Strengthening Pedagogical Excellence through Model Lesson Plans and Contextualized Learning Resources for Mathematics	Project Leader: Sandra Nanding Component Leaders: Philip Lester Benjamin Jead Macalisang	Schools in Columbio, Sultan Kudarat	Approved

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

I.1.2. involves the students, faculty, staff administrators in the projects; and

- ❖ **SO**



Republic of the Philippines
UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Tel No. 63 (64) 572 - 2138
email address: op@usm.edu.ph
OFFICE OF THE PRESIDENT

Special Order No. 211
Series of 2023

TO: MS. SANDRA A. NANDING

SUBJECT: Designation as COMPONENT LEADER of the component2, "Validation of mother-tongue based instructional materials developed for elementary mathematics through feedback from teachers, students, and parents"

DATE: Tuesday, April 25, 2023

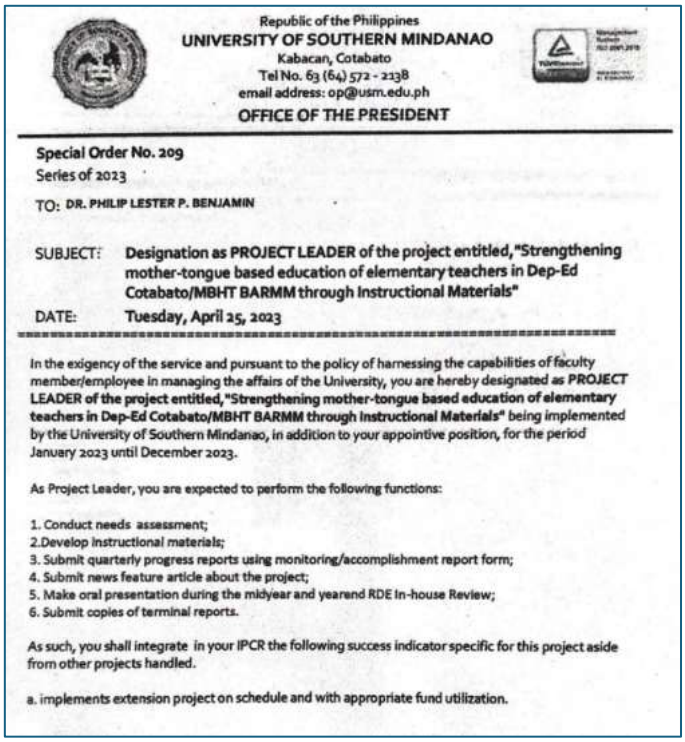
In the exigency of the service and pursuant to the policy of harnessing the capabilities of faculty member/employee in managing the affairs of the University, you are hereby designated as COMPONENT LEADER of the components, "Validation of mother-tongue based instructional materials developed for elementary mathematics through feedback from teachers, students, and parents" being implemented by the University of Southern Mindanao, in addition to your appointive position, for the period January 2023 until December 2023.

As Component Leader, you are expected to perform the following functions:

1. Conduct needs assessment;
2.Conduct validation of develop instructional materials;
3. Submit quarterly progress reports using monitoring/accomplishment report form;
4. Submit news feature article about the project.

As such, you shall integrate in your IPCR the following success indicator specific for this project aside from other projects handled.

a. implements extension project on schedule and with appropriate fund utilization.



Republic of the Philippines
UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Tel No. 63 (64) 572 - 2138
email address: op@usm.edu.ph
OFFICE OF THE PRESIDENT

Special Order No. 209
Series of 2023

TO: DR. PHILIP LESTER P. BENJAMIN

SUBJECT: Designation as PROJECT LEADER of the project entitled, "Strengthening mother-tongue based education of elementary teachers in Dep-Ed Cotabato/MBHT BARMM through Instructional Materials"

DATE: Tuesday, April 25, 2023

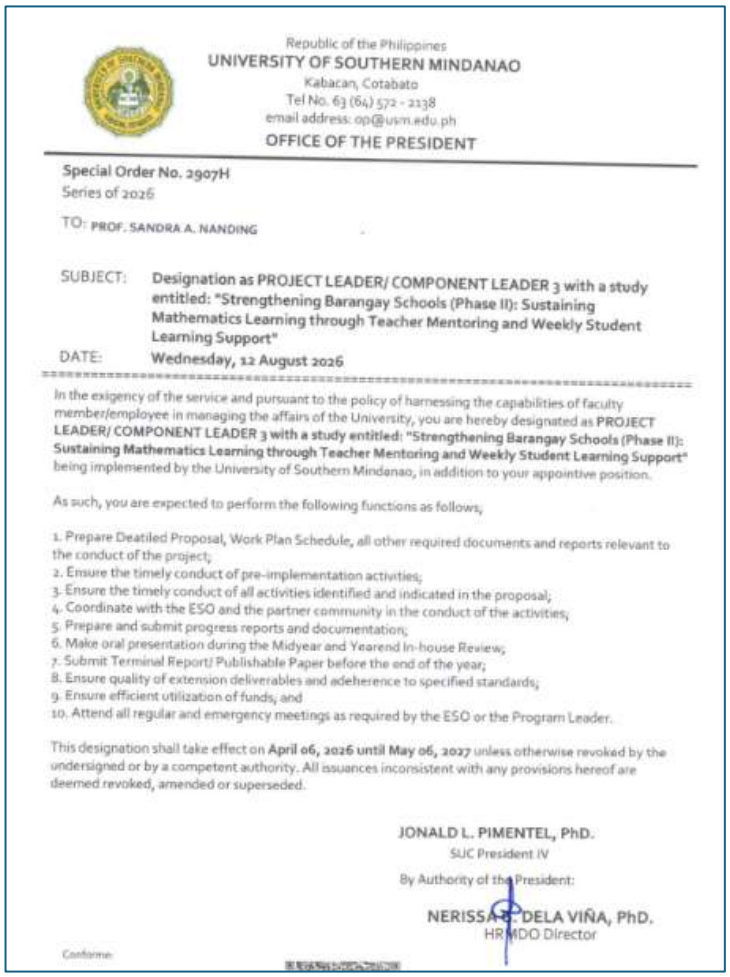
In the exigency of the service and pursuant to the policy of harnessing the capabilities of faculty member/employee in managing the affairs of the University, you are hereby designated as PROJECT LEADER of the project entitled, "Strengthening mother-tongue based education of elementary teachers in Dep-Ed Cotabato/MBHT BARMM through Instructional Materials" being implemented by the University of Southern Mindanao, in addition to your appointive position, for the period January 2023 until December 2023.

As Project Leader, you are expected to perform the following functions:

1. Conduct needs assessment;
2.Develop instructional materials;
3. Submit quarterly progress reports using monitoring/accomplishment report form;
4. Submit news feature article about the project;
5. Make oral presentation during the midyear and yearend RDE In-house Review;
6. Submit copies of terminal reports.

As such, you shall integrate in your IPCR the following success indicator specific for this project aside from other projects handled.

a. implements extension project on schedule and with appropriate fund utilization.



Republic of the Philippines
UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Tel No. 63 (64) 572 - 2138
email address: op@usm.edu.ph
OFFICE OF THE PRESIDENT

Special Order No. 2907H
Series of 2026

TO: PROF. SANDRA A. NANDING

SUBJECT: Designation as PROJECT LEADER/ COMPONENT LEADER 3 with a study entitled: "Strengthening Barangay Schools (Phase II): Sustaining Mathematics Learning through Teacher Mentoring and Weekly Student Learning Support"

DATE: Wednesday, 12 August 2026

In the exigency of the service and pursuant to the policy of harnessing the capabilities of faculty member/employee in managing the affairs of the University, you are hereby designated as PROJECT LEADER/ COMPONENT LEADER 3 with a study entitled: "Strengthening Barangay Schools (Phase II): Sustaining Mathematics Learning through Teacher Mentoring and Weekly Student Learning Support" being implemented by the University of Southern Mindanao, in addition to your appointive position.

As such, you are expected to perform the following functions as follows;

1. Prepare Deatiled Proposal, Work Plan Schedule, all other required documents and reports relevant to the conduct of the project;
2. Ensure the timely conduct of pre-implementation activities;
3. Ensure the timely conduct of all activities identified and indicated in the proposal;
4. Coordinate with the ESO and the partner community in the conduct of the activities;
5. Prepare and submit progress reports and documentation;
6. Make oral presentation during the Midyear and Yearend In-house Review;
7. Submit Terminal Report/ Publishable Paper before the end of the year;
8. Ensure quality of extension deliverables and adeherence to specified standards;
9. Ensure efficient utilization of funds, and
10. Attend all regular and emergency meetings as required by the ESO or the Program Leader.

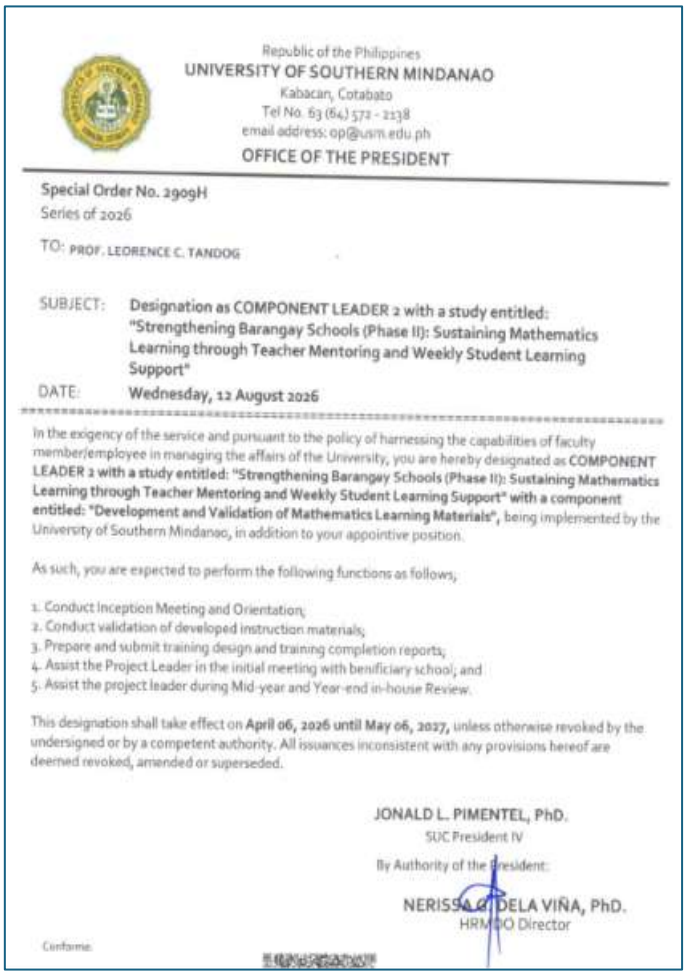
This designation shall take effect on **April 06, 2026 until May 06, 2027** unless otherwise revoked by the undersigned or by a competent authority. All issuances inconsistent with any provisions hereof are deemed revoked, amended or superseded.

JONALD L. PIMENTEL, PhD.
SUC President IV

By Authority of the President:

NERISSA R. DELA VIÑA, PhD.
HRMDO Director

Conforme:



Republic of the Philippines
UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Tel No. 63 (64) 572 - 2138
email address: op@usm.edu.ph
OFFICE OF THE PRESIDENT

Special Order No. 2909H
Series of 2026

TO: PROF. LEORENCE C. TANDOG

SUBJECT: Designation as COMPONENT LEADER 2 with a study entitled: "Strengthening Barangay Schools (Phase II): Sustaining Mathematics Learning through Teacher Mentoring and Weekly Student Learning Support"

DATE: Wednesday, 12 August 2026

In the exigency of the service and pursuant to the policy of harnessing the capabilities of faculty member/employee in managing the affairs of the University, you are hereby designated as COMPONENT LEADER 2 with a study entitled: "Strengthening Barangay Schools (Phase II): Sustaining Mathematics Learning through Teacher Mentoring and Weekly Student Learning Support" with a component entitled: "Development and Validation of Mathematics Learning Materials", being implemented by the University of Southern Mindanao, in addition to your appointive position.

As such, you are expected to perform the following functions as follows;

1. Conduct Inception Meeting and Orientation;
2. Conduct validation of developed instruction materials;
3. Prepare and submit training design and training completion reports;
4. Assist the Project Leader in the initial meeting with benificiary school; and
5. Assist the project leader during Mid-year and Year-end in-house Review.

This designation shall take effect on **April 06, 2026 until May 06, 2027**, unless otherwise revoked by the undersigned or by a competent authority. All issuances inconsistent with any provisions hereof are deemed revoked, amended or superseded.

JONALD L. PIMENTEL, PhD.
SUC President IV

By Authority of the President:

NERISSA R. DELA VIÑA, PhD.
HRMDO Director

Conforme:

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

❖ Attendance

University of Southern Mindanao
EXTENSION SERVICES CENTER
Kabacan, Cotabato
ATTENDANCE SHEET

ACTIVITY: _____

VENUE: _____ DATE: _____

SPONSORS: _____

No.	Name	Gender	Designation/ Affiliation	Office/ Unit/ Organization	Mobile Number/ Email Address	Signature
16.	MIKKO ANGELA M. ELIVAS	F	T-1	MBHTE – BARMM	09853148547	
17.	JOHARIMAE P. TOMINES	F	T-1	MBHTE – BARMM	09518040747	
18.	ROCHAIDA W. CORNEJA	F	T-1	MBHTE - BARMM	09263[illegible]88	
19.	SARAJEAN A SAMPUAN	F	T-III/TK	MBHTE – BARMM	09120411594	
20.	ANELYN B. VASAN	F	T-1	MBHTE – BARMM	09150405714	
21.	JENNIFER R. LICAROS	F	Assoc Prof	Math & Stat Dept./CSM	09120822356	
22.	ANNA JEAN S. GARCIA	F	Assoc Prof	Math & Stat Dept/CSM	09228842968	
23.	JERMAINE MAE M. GANU	F	DM	CBDEM/ESO	09977823420	
24.	Lawrence Tancoy	M	Prof VI	GS/CSM		
25.	Jonald L. Pimentel	M	Prof VI	Math & Stat.		
26.	MAURICIO J. MACALLON JR	M	Assoc I	Math & Stat		
27.	Sarah B. Lisarbal					
28.	[illegible] B. [illegible]			Math & Stat Dept		
29.	[illegible] MADL	M	ASB Prog 4	Math & Stat		
30.	[illegible]	M	Assoc Prof 5	Math and Stat		

CERTIFIED TRUE COPY:
MARGIE N. MOTUAN-GALANG
Chief Administrative Officer
University of Southern Mindanao
Date: _____

USM-EXT-F02-Rev.3.2021.01.26

University of Southern Mindanao
EXTENSION SERVICES CENTER
Kabacan, Cotabato
ATTENDANCE SHEET

ACTIVITY: strengthening mother-tongue based education of elementary teachers in deped Cotabato through instructional material development and validation

VENUE: GS Hall, USM DATE: APRIL 23, 2024

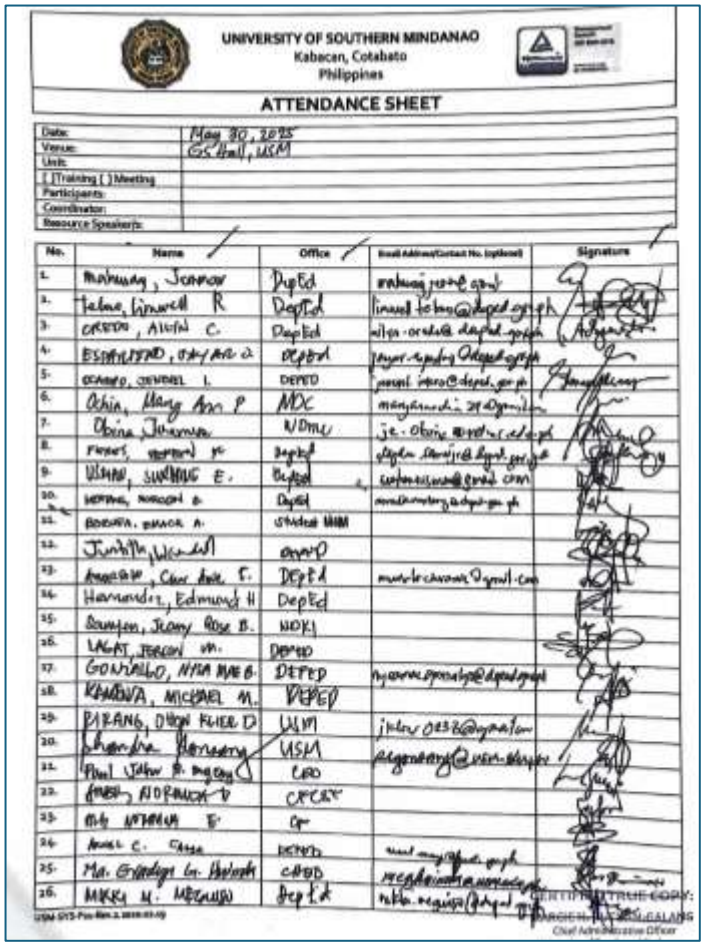
SPONSORS: _____

No.	Name	Gender	Designation/ Affiliation	Office/ Unit/ Organization	Mobile Number/ Email Address	Signature
1.	Jennifer R - PAMA	F	ASSO Prof. V/DM	Dept of Math, CSM	USM 09512534900	
2.	Sandra A. Nanding	F		Dept of Math/CSM	09206092397	
3.	Rhed M. Ferraren	M	BSDM - Student	Dept. of CBDEM/ESO	09631[illegible]	
4.	Josiel C. Dorego	F	BSDM Student	Dept. of CBDEM/ESO	0979 383 4358	
5.	Sangira M. Abdullah	F	BSDM Student	CBDEM/ESO	09462318[illegible]	
6.	Langalan, Princian M.	F	BSDM Student	Dept. of CBDEM/ESO	09381115655	
7.	PAWETA, LEONARDO M.	M	MATH-CSM-USM			
8.	RUEL S. VALENTON	M	Math - Csm - usm	Math & Stat Dept	09497760905	
9.	Daryl Mae Ramm	F	Math	Math	09156463259	
10.	Fatima Ali Ajad	F	Teacher-1	MBHTE- BARMM	09105854947	
11.	Ramona P. Tacuiken	F	Teacher-1	MBHTE- BARMM	09752720803	
12.	Bhoi P. Magumto	F	Teacher -1	MBHTE - BARMM	09161241019	
13.	BAHOLINE L SOLAIMAN	F	Teacher -1	MBHTE -BARMM	09044857998	
14.	Muhaimina M. Balayaman	F	T-III	MBHTE -BARMM	09854411398	
15.	MARY L. ALON	F	T-1	MBHTE- BARMM	09165135746	

CERTIFIED TRUE COPY:
MARGIE N. MOTUAN-GALANG
Chief Administrative Officer
University of Southern Mindanao
Date: _____

USM-EXT-F02-Rev.3.2021.01.26

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES



UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

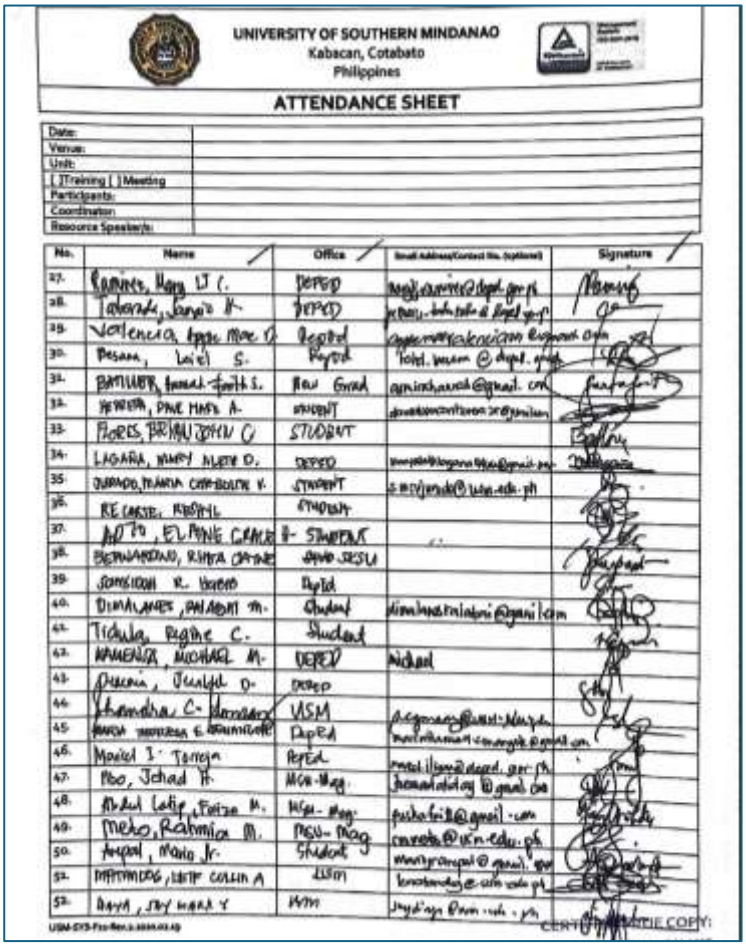
ATTENDANCE SHEET

Date: May 30, 2025
Venue: GS Hall, USM
Unit:
[ ]Training [ ] Meeting
Participants:
Coordinator:
Resource Speaker/s:

No.	Name	Office	Email Address/Contact No. (optional)	Signature
1.	Mahinay, Jennor	DepEd		
2.	Talam, Linwell R.	DepEd		
3.	ORDOÑO, ALVIN C.	DepEd		
4.	ESPARTERO, [illegible]	DepEd		
5.	OCAMPO, JENNIEL L.	DEPED		
6.	Ochia, Mary Ann P.	MDC		
7.	Obina, Jovanna	NDMU		
8.	[illegible]	DepEd		
9.	USMAN, SUHAILA E.	DepEd		
10.	[illegible]	DepEd		
11.	BONITA, DANICA A.	Student USM		
12.	Jumilla, [illegible]	DepEd		
13.	[illegible]	DepEd		
14.	Hernandez, Edmund H.	DepEd		
15.	Bompon, Jhany Rose B.	NDMU		
16.	LAGAT, JERICHO M.	DEPED		
17.	GONZALO, NIÑA MAE B.	DEPED		
18.	KAMANDA, MICHAEL M.	DEPED		
19.	PARANG, DIXIE FLIER D.	USM		
20.	[illegible]	USM		
21.	Paul John B. Bagay	CBD		
22.	[illegible]	CPCSY		
23.	[illegible]	CP		
24.	[illegible]	DEPED		
25.	Ma. Gregelyn [illegible]	CBDD		
26.	MIKEL M. MERCADO	DepEd		

CERTIFIED TRUE COPY:
[illegible]
Chief Administrative Officer

USM-SYS-Pro-Rec-2.2019.01.19



UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

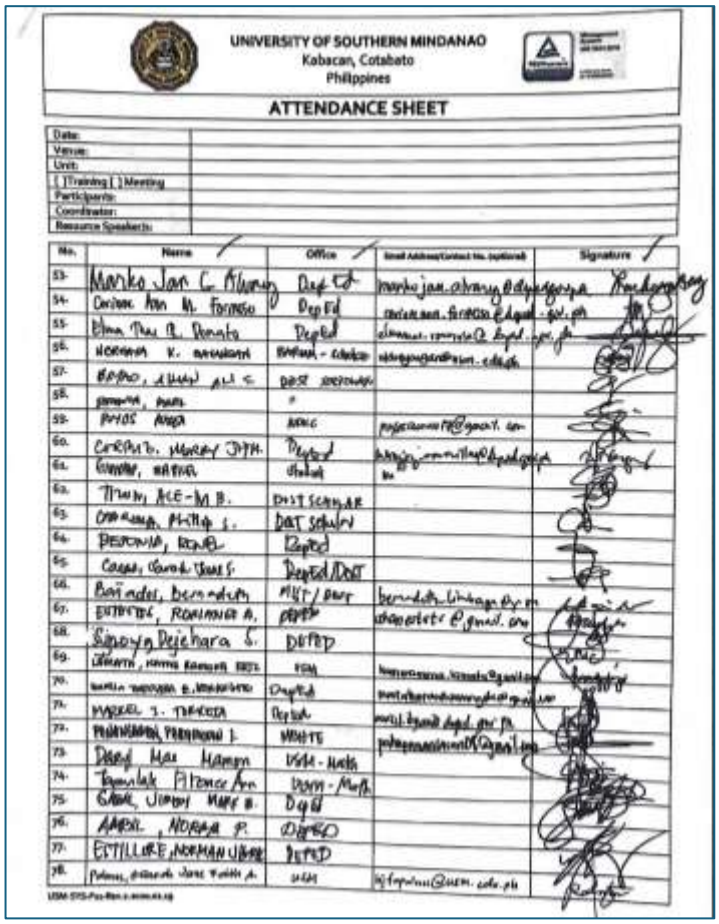
ATTENDANCE SHEET

Date:
Venue:
Unit:
[ ]Training [ ] Meeting
Participants:
Coordinator:
Resource Speaker/s:

No.	Name	Office	Email Address/Contact No. (optional)	Signature
27.	[illegible]	DEPED		
28.	Talavera, Sonya M.	DEPED		
29.	Valencia, Eppie Mae V.	DepEd		
30.	Besana, Laiel S.	DepEd		
31.	BANTILAN, Jamal-Faith S.	Non Grad		
32.	[illegible]	STUDENT		
33.	FLORES, [illegible]	STUDENT		
34.	LAGARA, MARY ALETH D.	DEPED		
35.	QUIAMCO, MARIA CHRISTINE V.	STUDENT		
36.	RE CASIL, KRISHA	STUDENT		
37.	[illegible]	STUDENT		
38.	BERNARDINO, RINA GRACE	GRAD SCHL		
39.	SOMOSON, R. [illegible]	DepEd		
40.	DIMALANES, [illegible]	Student		
41.	Tichua, Regine C.	Student		
42.	KAMENDA, MICHAEL M.	DEPED		
43.	Quiana, Jenifer D.	DEPED		
44.	[illegible]	USM		
45.	[illegible]	DepEd		
46.	Maniel T. Tarroja	DepEd		
47.	Abo, Jehad H.	MSU-Mag.		
48.	Abdul Latip, Faiza M.	MSU- Mag.		
49.	Mieko, Rahmina M.	MSU- Mag.		
50.	Ampal, Mario Jr.	Student		
51.	[illegible]	USM		
52.	[illegible]	USM		

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USM-SYS-Pro-Rec-2.2019.01.19



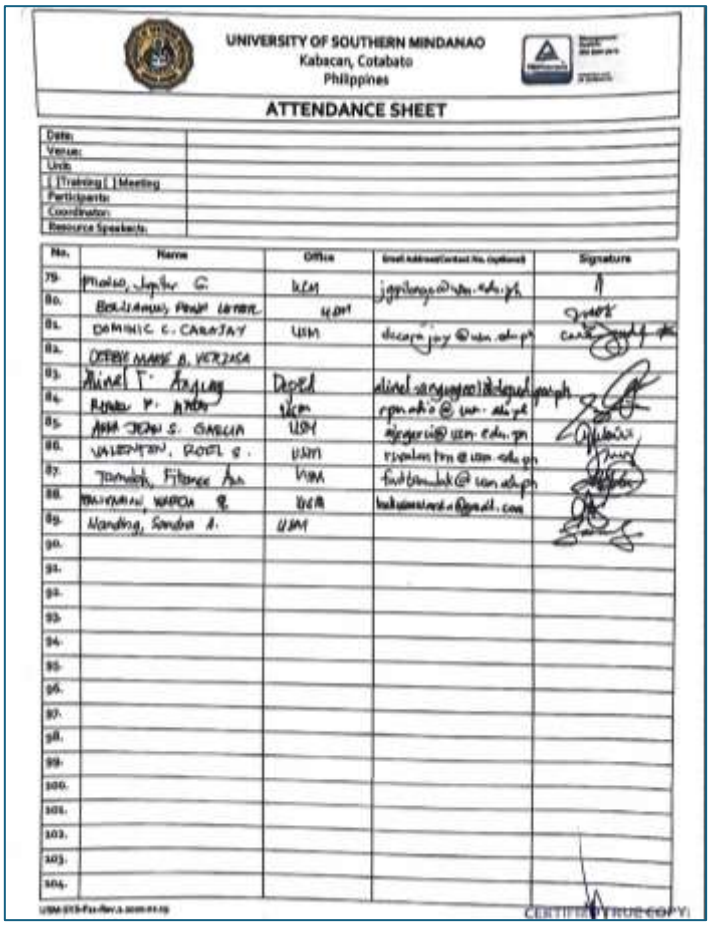
UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

ATTENDANCE SHEET

Date:
Venue:
Unit:
[ ]Training [ ] Meeting
Participants:
Coordinator:
Resource Speaker/s:

No.	Name	Office	Email Address/Contact No. (optional)	Signature
53.	Mariko Jan C. Alvarez	DepEd		
54.	Carlene Ann M. Formoso	DepEd		
55.	Elma Mae B. Donato	DepEd		
56.	[illegible]	[illegible]		
57.	[illegible]	[illegible]		
58.	[illegible]	[illegible]		
59.	[illegible]	[illegible]		
60.	[illegible]	[illegible]		
61.	[illegible]	[illegible]		
62.	[illegible]	[illegible]		
63.	[illegible]	[illegible]		
64.	[illegible]	[illegible]		
65.	[illegible]	[illegible]		
66.	[illegible]	[illegible]		
67.	[illegible]	[illegible]		
68.	[illegible]	[illegible]		
69.	[illegible]	[illegible]		
70.	[illegible]	[illegible]		
71.	[illegible]	[illegible]		
72.	[illegible]	[illegible]		
73.	[illegible]	[illegible]		
74.	[illegible]	[illegible]		
75.	[illegible]	[illegible]		
76.	[illegible]	[illegible]		
77.	[illegible]	[illegible]		
78.	[illegible]	[illegible]		

USM-SYS-Pro-Rec-2.2019.01.19



UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

ATTENDANCE SHEET

Date:
Venue:
Unit:
[ ]Training [ ] Meeting
Participants:
Coordinator:
Resource Speaker/s:

No.	Name	Office	Email Address/Contact No. (optional)	Signature
79.	[illegible]	USM		
80.	[illegible]	USM		
81.	DOMINIC C. CABAJAY	USM		
82.	[illegible]	[illegible]		
83.	[illegible]	DepEd		
84.	[illegible]	USM		
85.	[illegible]	USM		
86.	[illegible]	USM		
87.	[illegible]	USM		
88.	[illegible]	[illegible]		
89.	Nanding, Sandra A.	USM		
90.				
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CERTIFIED TRUE COPY:

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PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

- **Photo documentation**



Figure 1. *Faculty members and students collaboratively setting up and preparing the venue for the extension training-workshop*



Figure 2. *Faculty members and student volunteers managing attendee registration and documentation at the registration desk prior to the event*

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES



Figure 3. *Mathematics Department faculty members and student volunteer Manuel Lisondra posing for a photo following the successful conclusion of the activity*



Figure 4. *CSM faculty member Sandra Nanding, USM Extension Services Office staff members Diether Barro and Rahima Cabunto, and Salvacion High School teachers gathered during the project monitoring and evaluation visit.*

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

I.1.3 coordinates its community programs and services with the target clientele

❖ Minutes of the meeting

Project Title: Strengthening Mother-Tongue Based Education of Elementary Teachers in DepEd Cotabato through Instructional Materials Development and Validation

Minutes of Meeting

Date: November 10, 2023
Time: 10:00 AM
Venue: Dean's Office

Attendance

- Philip Lester Benjamin
- Sandra Nanding
- Arnel Toledo
- Jennifer Pama
- Leorence Tandog
- Debbie Marie Verzosa
- Leonard Paleta
- Jupiter Pilongo
- Anna Jean Garcia
- Daryl Mae Mamon
- Roel Valenton
- Rowel Madio
- Lawton John Yabes
- Jeaneth Licaros
- Meriam Rubio
- Florie Jane Tamon

Agenda

1. Schedule of Field Visit to Nangaan Elementary School
2. Preparation of Materials for the Activity
3. Food and Transportation Arrangement

Discussion

- The team agreed to visit Nangaan Elementary School on November 16, 2023 (morning) to conduct pre-test activities and interviews with teachers.
- Learning materials such as instructional comics and project orientation program will be finalized and printed.
- Pre-test instruments for teachers will also be prepared.
- Arrozcaldo will be served to the pupils during the activity.
- Packed lunch will be provided for participating teachers.
- Two cars will be used for the field visit to accommodate team members and materials.

Meeting end at 12:30PM

Prepared by:

SANDRA NANDING
Project Member

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Project Title: *Strengthening Mother-Tongue Based Education of Elementary Teachers in DepEd Cotabato through Instructional Materials Development and Validation*

Minutes of Inception Meeting

Date: November 16, 2023
Time: 9:00 AM
Venue: Nangaan Elementary School

Attendance:

- Philip Lester Benjamin
- Sandra Nanding
- Arnel Toledo
- Jennifer Pama
- Leorence Tandog
- Leonard Paleta
- Jupiter Pilongo
- Anna Jean Garcia
- Daryl Mae Mamon
- Jeaneth Licaros
- Meriam Rubio
- Florie Jane Tamon
- Romina Tacuken
- Bhai Magunto
- Muhaima Balayman
- Mona Alon
- Sarah Lumambas
- Amelaida Kasan
- Roshaida Kamensa
- Fatima Afdal
- Sarah Jean Sarapudin
- Mikko Angela Eliyas

Purpose of Meeting
To formally introduce the extension project to Nangaan Elementary School, establish collaboration, and gather input for the design and implementation of MTB-MLE instructional materials in mathematics.

Discussion

- The school principal expressed appreciation and full support, sharing that it was the first time the school received this kind of external support.
- Teachers shared that they experience difficulty understanding and teaching math, particularly fractions.
- They expressed the need for new strategies and techniques for teaching challenging math topics in a way that is easy for students to understand.
- The project team proposed a training session on Instructional Materials (IM) development, which was warmly welcomed by the teachers.
- Teachers agreed to collaborate in refining existing IMs, ensuring that materials are relevant, useful, and aligned with their classroom needs.
- A training session for teachers on how to develop and implement localized IMs will be scheduled soon.
- It was agreed that a group chat (GC) will be created to ensure smooth coordination and faster updates regarding training and other activities.

Meeting end at 11:00 AM

Prepared by:
SANDRA NANDING
Project Member

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Minutes of Meeting

Date: March 28, 2025
Time: 10:00 AM

MEETING on Math Dept Extension

INITIAL PLANNING

✓MOA w/ Deptd [c/o Mam Debbie] @✓

Schedule

Capacity building [April 4, 2025]

GS to join | Summer Institute for Linguistics

- to attend
- training design
- laminate materials

w/drew not voted

1) Needs assessment - interview teachers
c/o Bryan Flores those topics that
think needed

2) Capacity building

2 days

Workshop

speaker : lecturer online

topic: mathematics teaching
in development

Non-teaching positions

Ian Garcia (online) / Flor Francisco
Debbie Verzosa
Leonora Tandog
Jeanette Lisno] Re-echo ICME@Athens

Tentative Date: May 30-31, 2025 [Fri & Sat]

Venue: Graduate School

- Ask ... Register ... attach
about official receipts

Output of the Seminar:

DepEd endorsement - to process @ Regional
Apply for CPD units

- Validation during workshop
- Template that they will use to enhance
Their IMs
- Action research [Puyos / Dr. Bill]

Topics: [SEMINAR]

1.) Development of representation approach -
learning materials [Debbie Verzosa]
May 30, 8:30 - 10am / GS Hall

2.) Writing good math problems [Ian Garcia w/ Rene Mallo]
Level
May 30, 10:30am - 12nn / GS Hall

3.) Workshop
1 - 3 pm

4.)
a. Action research [Arven Puyos]
May 30, 3pm / GS Hall

b. Design-based research [Lorena Tarlac w/ Jennifer Licanos]
May 31, 8:30 am - Room

5.) Workshop
Time: 10:30am

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Committee:

Instructional Design / Application form / Eval Form - [Ranel Ana Sandra]
Compile CVs in PRC template - Lawton Jaspher
Financial projection - Daryl Manor
Certificates - Lawton / Jaspher -
Pub Mat - Benjamin
Program of activities - Roel

Deadline: MONDAY [March 31, 2025]

Registration: Php 2,000
Registration Form: "I commit to attend"

Conference Chair: Benjamin / Tawbay

Title:

Documentation/: Manuel Lisondra /
completion report DIST and PhD students

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES



Planning Meeting for the 2025 Training-Workshop



PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Minutes of Meeting

Date of Meeting: May 24, 2025
Time: 4:00 PM – 5:00 PM
Platform: Google Meet (Online)

Agenda

1. Final preparations for the May 30–31 training-workshop
2. Distribution of tasks and responsibilities

Attendance:

- Philip Lester Benjamin
- Sandra Nanding
- Arnel Toledo
- Jennifer Pama
- Leorence Tandog
- Debbie Marie Verzosa
- Leonard Paleta
- Jupiter Pilongo
- Anna Jean Garcia
- Daryl Mae Mamon
- Roel Valenton
- Rowel Madio
- Lawton John Yabes
- Jeaneth Licaros
- Jead Macalisang
- Fitzmee Ann Tamulak
- Hannah Jane Faith Palmos
- Jaymark Diaya
- Normaila Putong
- Dominic Carajay

Discussion

A. Task Checklist and Assigned Persons
   1. Venue Setup
      - TV screen at the back
      - White screen for projection
      - Laptop assigned per TV screen

      In-charge: Jead Macalisang
   2. Audio Equipment
      - 5 wireless microphones
        - 2 for speakers
        - 2 for audience
        - 1 for emcee
   3. Backup batteries for mics
   4. Cooling Equipment
      - 2 electric fans (in case air-conditioning fails)
   5. Training Materials
      - Markers
      - Bond paper
      - Manila paper
      - Ballpens

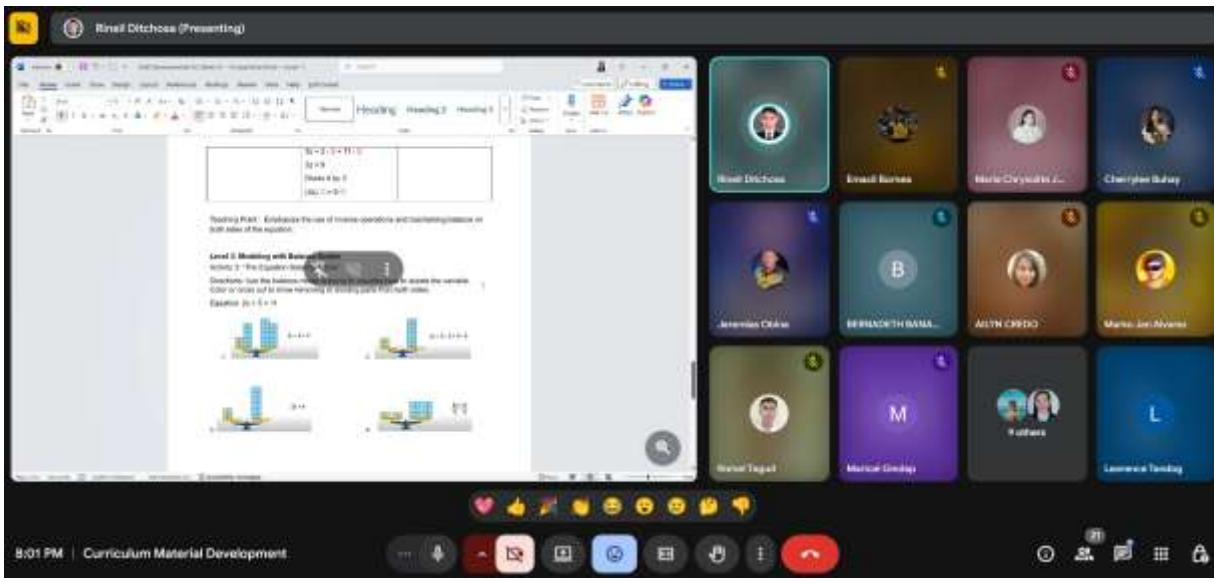
      In-charge: Fitzmee Ann Tamulak
   6. Restroom Check
      - Ensure comfort rooms (CR) are functioning and accessible

      In-charge: Jay Mark Diaya

B. All team members agreed to finalize preparations by May 29, 2025.
C. A short final coordination briefing will be scheduled prior to the workshop day.

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES







PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES





Inception meeting with Principal and Teachers of Nangaan Elementary School





Courtesy meeting with the new principal of Salvacion High School.

I.2. There is community participation and involvement in extension activities in the following:

I.2.1. planning;

Minutes of Meeting

Date: March 28, 2025
Time: 10:00 AM



- Ask ... Register ... attach
about official receipts

Output of the Seminar:

DepEd endorsement - to process @ Regional
Apply for CPD units

- Validation during workshop
- Template that they will use to enhance
Their IMs
- Action research [Puyos / Dr. Bill]

Topics: [SEMINAR]

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learning materials [Debbie Verzosa]
May 30, 8:30 - 10am / GS Hall

2.) Writing good math problems [Ian Garcia w/ Rene Mallo]
Level
May 30, 10:30am - 12nn / GS Hall

3.) Workshop
1 - 3 pm

4.)
a. Action research [Arven Puyos]
May 30, 3pm / GS Hall

b. Design-based research [Lorena Tarlac w/ Jennifer Licanos]
May 31, 8:30 am - Room

5.) Workshop
Time: 10:30am

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Committee:

Instructional Design / Application form / Eval Form - [Ranel Ana Sandra]
Compile CVs in PRC template - Lawton Jaspher
Financial projection - Daryl Manor
Certificates - Lawton / Jaspher -
Pub Mat - Benjamin
Program of activities - Roel

Deadline: MONDAY [March 31, 2025]

Registration: Php 2,000
Registration Form: "I commit to attend"

Conference Chair: Benjamin / Tawbay

Title:

Documentation/: Manuel Lisondra /
completion report DIST and PhD students

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES



Planning Meeting for the 2025 Training-Workshop



PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Minutes of Meeting

Date of Meeting: May 24, 2025
Time: 4:00 PM – 5:00 PM
Platform: Google Meet (Online)

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1. Final preparations for the May 30–31 training-workshop
2. Distribution of tasks and responsibilities

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- Jennifer Pama
- Leorence Tandog
- Debbie Marie Verzosa
- Leonard Paleta
- Jupiter Pilongo
- Anna Jean Garcia
- Daryl Mae Mamon
- Roel Valenton
- Rowel Madio
- Lawton John Yabes
- Jeaneth Licaros
- Jead Macalisang
- Fitzmee Ann Tamulak
- Hannah Jane Faith Palmos
- Jaymark Diaya
- Normaila Putong
- Dominic Carajay

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        - 2 for audience
        - 1 for emcee
   3. Backup batteries for mics
   4. Cooling Equipment
      - 2 electric fans (in case air-conditioning fails)
   5. Training Materials
      - Markers
      - Bond paper
      - Manila paper
      - Ballpens

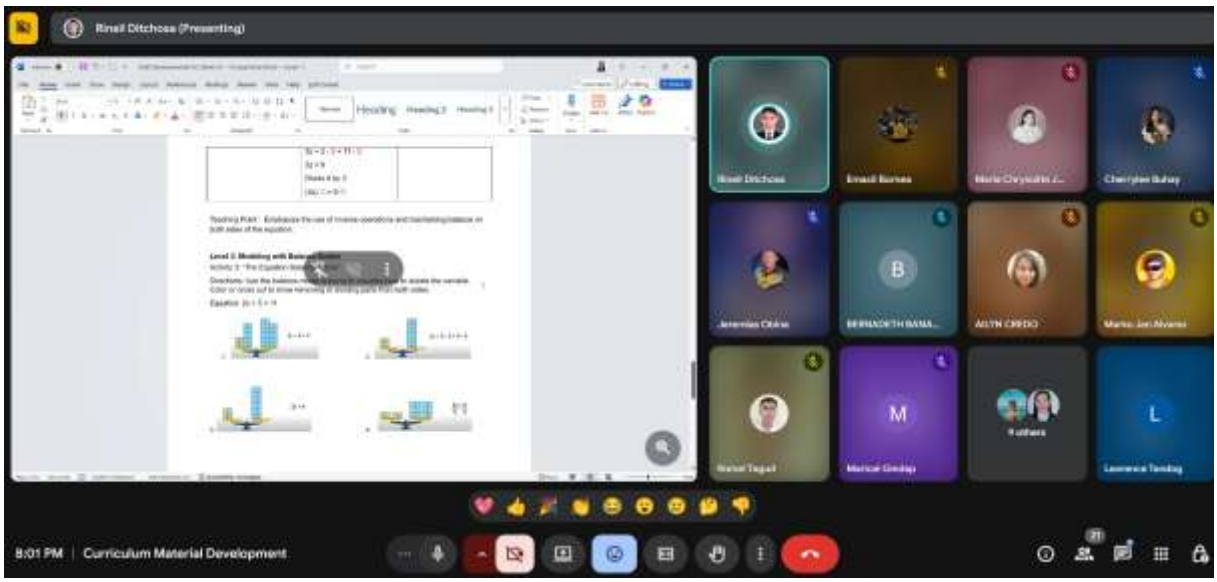
      In-charge: Fitzmee Ann Tamulak
   6. Restroom Check
      - Ensure comfort rooms (CR) are functioning and accessible

      In-charge: Jay Mark Diaya

B. All team members agreed to finalize preparations by May 29, 2025.
C. A short final coordination briefing will be scheduled prior to the workshop day.

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES







PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES





Inception meeting with Principal and Teachers of Nangaan Elementary School







Orientation meeting with Salvacion HS teachers.

Result of Needs Assessment

During our visit to Nangaan Elementary School to conduct a needs assessment, several needs were identified among the educators:

1. They need more materials to help teach fractions better.
2. They want easier ways to explain fractions to students.
3. They think it's important to use the students' own language and culture when teaching math.
4. Teachers want training to improve how they teach math, especially fractions.
5. They believe sharing ideas and materials with other teachers is important for improving teaching.

Prepared by:

SANDRA A. NANDING
Component Leader

Noted by:

PHILIP LESTER P. BENJAMIN, PhD
Project Leader

I.2.2. implementation and dissemination;

- **Training - workshop**









PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

❖ IM Implementation






Certificates for Participants


College of Science and Mathematics
University of Southern Mindanao
in partnership with Nangaan Elementary School

presents this

Certificate of Participation

to

for attending the **Training – workshop on Instructional Materials Development** held on 23 April 2024 at the Graduate School Hall, University of Southern Mindanao, Kabacan, Cotabato.
Given this 23rd day of April, 2024.

Philip Lester P. Benjamin, PhD
Dean, CSM/ Project Leader


CERTIFICATE
OF PARTICIPATION

AWARDED TO

Bryan John Flores

for participating in the seminar-workshop "**Zines as Alternative Pathways to Numeracy and Literacy: A Representation-Based Approach to Independent Learning**" held on **November 8, 2025,**
at the University of Southern Mindanao, Kabacan, Cotabato.
Program Accreditation Number: PROG-2025-122102
4 CPD units
University of Southern Mindanao
(Accredited CPD Provider PTR-2024-580)

LEORENCE C. TANDOG, PhD
VICE PRESIDENT FOR ACADEMIC AFFAIRS

I.2.3. monitoring and evaluation;

University of Southern Mindanao
EXTENSION SERVICES OFFICE
Kabacan, North Cotabato

MONITORING/ ACCOMPLISHMENT REPORT
for the 1st Quarter, C.Y. 2023

Project Title: Strengthening Mother-tongue based Education of Elementary Teachers in DepEd Cotabato/MBHTE BARMM through Development and Validation of Instructional Materials for Elementary Mathematics

Proponent/s: Philip Lester Benjamin, Sandra Nanding, Leorence Tandog, Debbie Marie Verzosa, Florie Jane Tamon, Rowel Madio, Roel Valenton, Anna Jean Garcia, Leonard Paleta, Meriam Rubio, Jeaneth Licaros, Daryl Mae Mamon, Jonald Pimentel, Jennifer Pama, Honey Vincent Valle

College/Unit: Graduate School/College of Science and Mathematics | **Budget Utilization to date: (%)**

ACTIVITIES	Accomplishment		% Completion (Cumulative)	Problem/s Encountered	Action/s Taken	Remarks/ Recommendations
	Target	Actual				
Obtain necessary permissions and approvals from relevant authorities	10%	100%	10%	None	None	
Conduct profiling and needs assessment	20%	100%	30%	None	None	

Prepared by:

PHILIP LESTER P. BENJAMIN
Project Leader
April 7, 2023
Date

Noted by:

LEORENCE C. TANDOG
College/Unit Head
April 10, 2023
Date

MARY JOY S. CAÑOLAS
Director for Extension Services
April 10, 2023
Date

USM-EXT-F07-Rev.3.2021.01.26

University of Southern Mindanao
EXTENSION SERVICES OFFICE
Kabacan, North Cotabato

MONITORING/ ACCOMPLISHMENT REPORT
for the 2nd Quarter, C.Y. 2023

Project Title: Strengthening Mother-tongue based Education of Elementary Teachers in DepEd Cotabato/MBHTE BARMM through Development and Validation of Instructional Materials for Elementary Mathematics

Proponent/s: Philip Lester Benjamin, Sandra Nanding, Leorence Tandog, Debbie Marie Verzosa, Florie Jane Tamon, Rowel Madio, Roel Valenton, Anna Jean Garcia, Leonard Paleta, Meriam Rubio, Jeaneth Licaros, Daryl Mae Mamon, Jonald Pimentel, Jennifer Pama, Honey Vincent Valle

College/Unit: Graduate School/College of Science and Mathematics | **Budget Utilization to date: (%)**

ACTIVITIES	Accomplishment		% Completion (Cumulative)	Problem/s Encountered	Action/s Taken	Remarks/ Recommendations
	Target	Actual				
% Completion 1st Quarter			30%			
Development and refining of existing IMs	25%	100%	55%	None	None	

Prepared by:

PHILIP LESTER P. BENJAMIN
Project Leader
July 3, 2023
Date

Noted by:

LEORENCE C. TANDOG
College/Unit Head
July 3, 2023
Date

MARY JOY S. CAÑOLAS
Director for Extension Services
July 5, 2023
Date

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

University of Southern Mindanao
EXTENSION SERVICES OFFICE
Kabacan, North Cotabato

MONITORING/ ACCOMPLISHMENT REPORT
for the 3rd Quarter, C.Y. 2023

Project Title: Strengthening Mother-tongue based Education of Elementary Teachers in DepEd Cotabato/MBHTE BARMM through Development and Validation of Instructional Materials for Elementary Mathematics

Proponent/s: Philip Lester Benjamin, Sandra Nanding, Leorence Tandog, Debbie Marie Verzosa, Florie Jane Tamon, Rowel Madio, Roel Valenton, Anna Jean Garcia, Leonard Paleta, Meriam Rubio, Jeaneth Licaros, Daryl Mae Mamon, Jonald Pimentel, Jennifer Pama, Honey Vincent Valle

College/Unit: Graduate School/College of Science and Mathematics | **Budget Utilization to date: (%)**

ACTIVITIES	Accomplishment		% Completion (Cumulative)	Problem/s Encountered	Action/s Taken	Remarks/ Recommendations
	Target	Actual				
% Completion 2nd Quarter			55%			
Validation of the instructional materials	25%	0%	55%	Unable to proceed due to scheduling conflict	Identified scheduling conflict and attempted to reschedule	

Prepared by:

PHILIP LESTER P. BENJAMIN
Project Leader
September 11, 2023
Date

Noted by:

LEORENCE C. TANDOG
College/Unit Head
September 11, 2023
Date

MARY JOY S. CAÑOLAS
Director for Extension Services
September 14, 2023
Date

University of Southern Mindanao
EXTENSION SERVICES OFFICE
Kabacan, North Cotabato

MONITORING/ ACCOMPLISHMENT REPORT
for the 4th Quarter, C.Y. 2023

Project Title: Strengthening Mother-tongue based Education of Elementary Teachers in DepEd Cotabato/MBHTE BARMM through Development and Validation of Instructional Materials for Elementary Mathematics

Proponent/s: Philip Lester Benjamin, Sandra Nanding, Leorence Tandog, Debbie Marie Verzosa, Florie Jane Tamon, Rowel Madio, Roel Valenton, Anna Jean Garcia, Leonard Paleta, Meriam Rubio, Jeaneth Licaros, Daryl Mae Mamon, Jonald Pimentel, Jennifer Pama, Honey Vincent Valle

College/Unit: Graduate School/College of Science and Mathematics | **Budget Utilization to date: (%)**

ACTIVITIES	Accomplishment		% Completion (Cumulative)	Problem/s Encountered	Action/s Taken	Remarks/ Recommendations
	Target	Actual				
% Completion 3rd Quarter			55%			
Validation of the instructional materials	25%	100%	80%	None	None	
Report Writing	20%	100%	100%	None	None	

Prepared by:

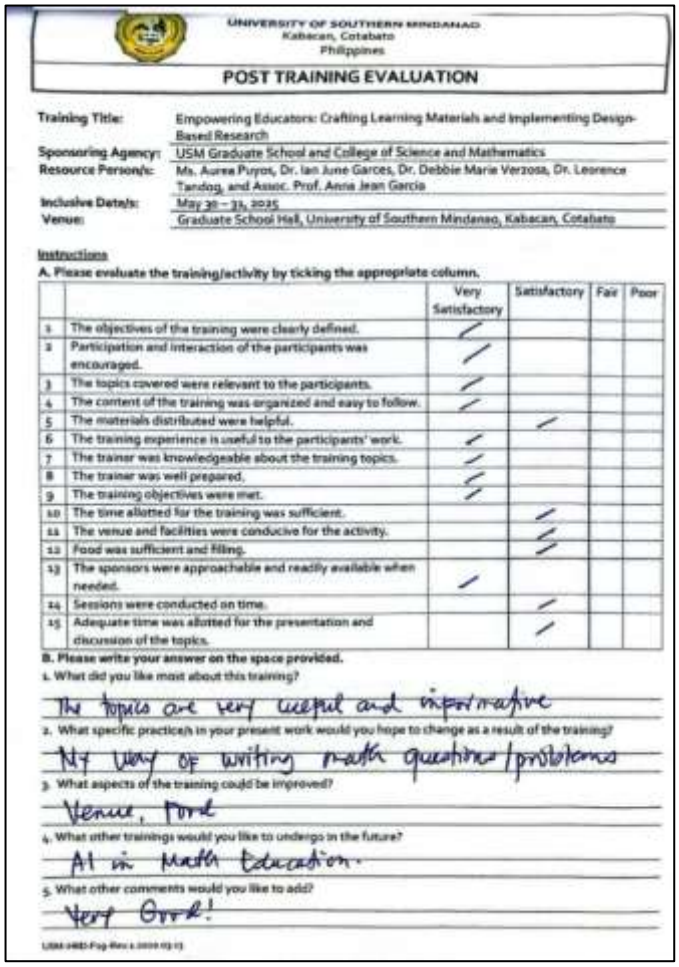
PHILIP LESTER P. BENJAMIN
Project Leader
December 18, 2023
Date

Noted by:

LEORENCE C. TANDOG
College/Unit Head
December 18, 2023
Date

MARY JOY S. CAÑOLAS
Director for Extension Services
December 21, 2023
Date

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES



UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

POST TRAINING EVALUATION

Training Title: Empowering Educators: Crafting Learning Materials and Implementing Design-Based Research
Sponsoring Agency: USM Graduate School and College of Science and Mathematics
Resource Person/s: Ms. Aurea Pyros, Dr. Ian June Garces, Dr. Debbie Marie Verzosa, Dr. Leonence Tandog, and Assoc. Prof. Anna Jean Garcia
Inclusive Date/s: May 30 – 31, 2025
Venue: Graduate School Hall, University of Southern Mindanao, Kabacan, Cotabato

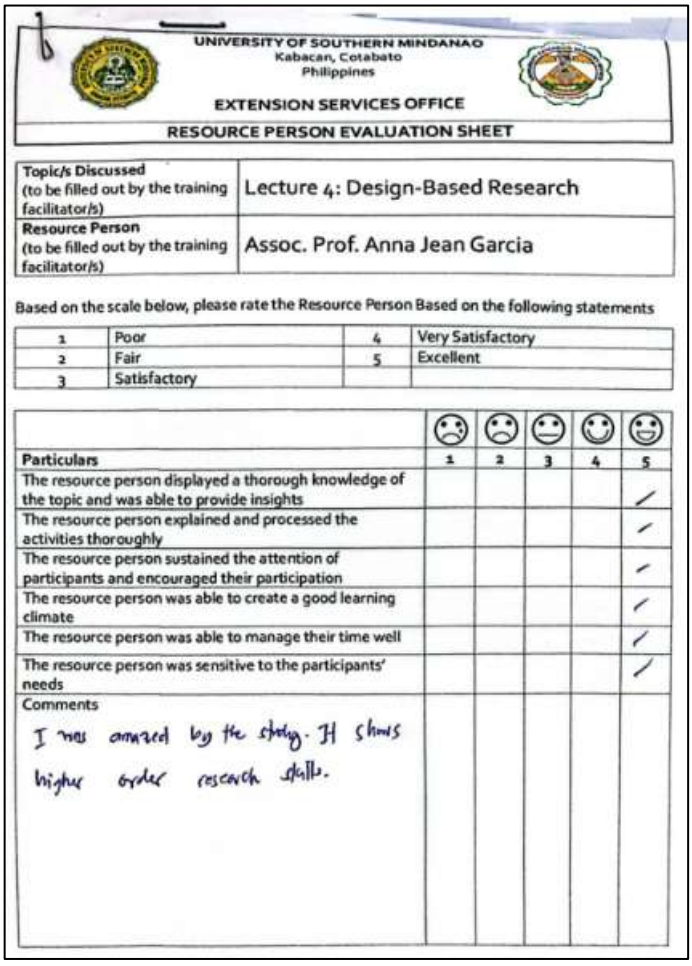
Instructions
A. Please evaluate the training/activity by ticking the appropriate column.

		Very Satisfactory	Satisfactory	Fair	Poor
1	The objectives of the training were clearly defined.	✓			
2	Participation and interaction of the participants was encouraged.	✓			
3	The topics covered were relevant to the participants.	✓			
4	The content of the training was organized and easy to follow.	✓			
5	The materials distributed were helpful.		✓		
6	The training experience is useful to the participants' work.	✓			
7	The trainer was knowledgeable about the training topics.	✓			
8	The trainer was well prepared.	✓			
9	The training objectives were met.	✓			
10	The time allotted for the training was sufficient.		✓		
11	The venue and facilities were conducive for the activity.		✓		
12	Food was sufficient and filling.		✓		
13	The sponsors were approachable and readily available when needed.	✓			
14	Sessions were conducted on time.		✓		
15	Adequate time was allotted for the presentation and discussion of the topics.		✓		

B. Please write your answer on the space provided.

1. What did you like most about this training?
The topics are very useful and informative
2. What specific practice/s in your present work would you hope to change as a result of the training?
My way of writing math questions/problems
3. What aspects of the training could be improved?
Venue, Food
4. What other trainings would you like to undergo in the future?
AI in Math Education.
5. What other comments would you like to add?
Very Good!

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UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato
Philippines

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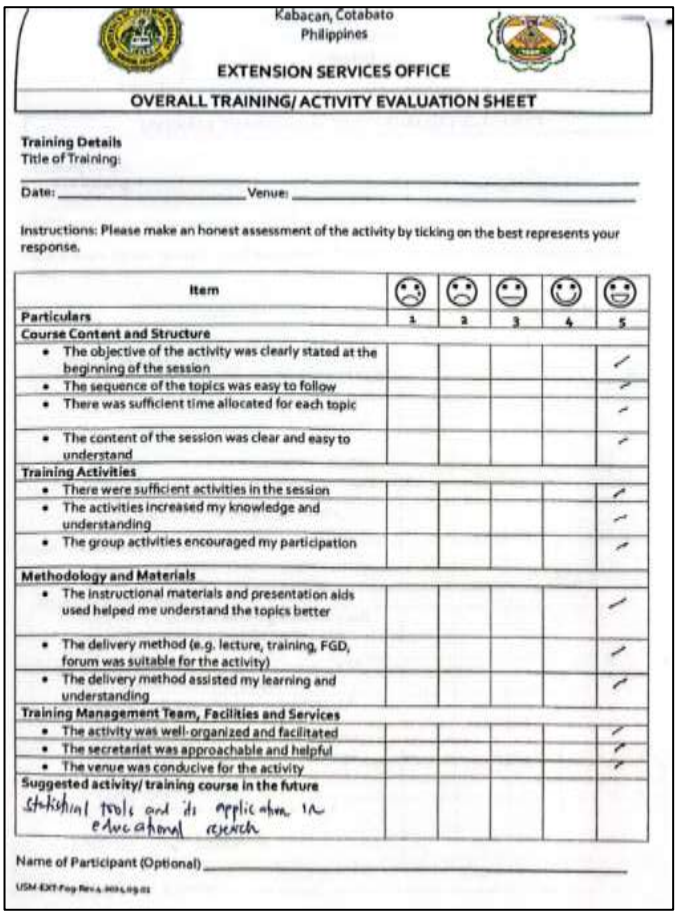
RESOURCE PERSON EVALUATION SHEET

Topic/s Discussed (to be filled out by the training facilitator/s)	Lecture 4: Design-Based Research
Resource Person (to be filled out by the training facilitator/s)	Assoc. Prof. Anna Jean Garcia

Based on the scale below, please rate the Resource Person Based on the following statements

1	Poor	4	Very Satisfactory
2	Fair	5	Excellent
3	Satisfactory		

Particulars	1	2	3	4	5
The resource person displayed a thorough knowledge of the topic and was able to provide insights					✓
The resource person explained and processed the activities thoroughly					✓
The resource person sustained the attention of participants and encouraged their participation					✓
The resource person was able to create a good learning climate					✓
The resource person was able to manage their time well					✓
The resource person was sensitive to the participants' needs					✓
Comments: I was amazed by the study. It shows higher order research skills.					



Kabacan, Cotabato
Philippines

EXTENSION SERVICES OFFICE

OVERALL TRAINING/ ACTIVITY EVALUATION SHEET

Training Details
Title of Training: _____
Date: _____ Venue: _____

Instructions: Please make an honest assessment of the activity by ticking on the best represents your response.

Item / Particulars	1	2	3	4	5
Course Content and Structure					
• The objective of the activity was clearly stated at the beginning of the session					✓
• The sequence of the topics was easy to follow					✓
• There was sufficient time allocated for each topic					✓
• The content of the session was clear and easy to understand					✓
Training Activities					
• There were sufficient activities in the session					✓
• The activities increased my knowledge and understanding					✓
• The group activities encouraged my participation					✓
Methodology and Materials					
• The instructional materials and presentation aids used helped me understand the topics better					✓
• The delivery method (e.g. lecture, training, FGD, forum was suitable for the activity)					✓
• The delivery method assisted my learning and understanding					✓
Training Management Team, Facilities and Services					
• The activity was well-organized and facilitated					✓
• The secretariat was approachable and helpful					✓
• The venue was conducive for the activity					✓
Suggested activity/ training course in the future					
Statistical tools and its application in educational research					

Name of Participant (Optional) _____

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PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Table 2. Mean Satisfaction Ratings of Beneficiaries on the "Strengthening Barangay Highschool" Project (n = 50)

Indicator	Weighted Mean	Interpretation
A.1 Addressed Community Needs	4.36	Strongly Agree
A.2 Knowledge & Skills	4.40	Strongly Agree
A.3 Implementation of Objectives	4.46	Strongly Agree
A.4 Followed Schedule	4.29	Strongly Agree
A.5 Clarity of Activities	4.34	Strongly Agree
A.6 Listened to Suggestions	4.46	Strongly Agree
A.7 Improved Lives	4.46	Strongly Agree
A.8 No Negative Effects	3.80	Agree
A.9 Overall Satisfaction	4.52	Very High Satisfaction
A.10 Recommend to Others	4.50	Very Likely
OVERALL GRAND MEAN	**4.36**	**Excellent**



Figure 1. *CSM faculty member Sandra Nanding, USM Extension Services Office staff members Diether Barro and Rahima Cabunto, and Salvacion High School teachers gathered during the project monitoring and evaluation visit.*

I.2.4. out-sourcing of funds, material and other service inputs; and

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Philippines

INVITATION LETTER

April 22, 2025

DR. IAN JUNE L. GARCES
Associate Professor, Department of Mathematics
Ateneo De Manila University
Loyola Heights, Metro Manila

Dear Dr. Ian June L. Garces,

Greetings!

On behalf of University of Southern Mindanao, we are pleased to extend our warm invitation to you as one of the speakers for our upcoming seminar-workshop titled: **"Empowering Educators: Crafting Learning Materials and Implementing Design-Based Action Research"**

The event will be held on May 30–31, 2025 at Graduate School, University of Southern Mindanao, Kabacan, Cotabato.

This event aims to bring together educators and researchers to strengthen their capabilities in developing instructional materials and conducting action research in real classroom settings.

This two-day seminar is designed to:

1. Equip participants with the skills to create instructional materials using multiple representations for better student engagement and learning outcomes;
2. Guide them in formulating meaningful and challenging mathematics problems that foster critical thinking; and
3. Assist them in identifying and refining relevant research questions for classroom-based inquiry.

We believe your expertise in Writing Good Math Problems would greatly inspire and benefit our participants. Your insights would be invaluable in enriching discussions and helping educators gain practical tools for enhancing their teaching practices. Should you accept this invitation, we would be happy to coordinate the details of your talk at your convenience. We can also provide any necessary support in terms of logistics or presentation needs.

Thank you for considering this invitation. We hope to have the privilege of welcoming you as one of our esteemed speakers.

Warm regards,

PHILIP LESTER P. BENJAMIN, PhD
Conference Chair
Email: plbenj@usm.edu.ph
Contact number: 09338245352

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

PROGRAM

SEMINAR-WORKSHOP ON EMPOWERING EDUCATORS: CRAFTING LEARNING MATERIALS AND IMPLEMENTING DESIGN-BASED ACTION RESEARCH

Venue: Graduate School, University of Southern Mindanao, Kabacan, Cotabato

Date: May 30-31, 2025

This serves as an invitation

Schedule of Activities

May 30, 2025 (Friday)		
6:30AM – 7:15AM	**Registration**	
7:15AM – 7:45 AM	**Opening Program** Master of Ceremony: **Hannah Faith Jane A. Palmos and Roel S. Valenton**	
	Invocation and National Anthem	**AVP**
	Welcome Remarks	**Dr. Philip Lester P. Benjamin** Dean, College of Science and Mathematics
	Overview and Rationale	**Dr. Leorence C. Tandog** Vice President for Academic Affairs
7:45AM – 9:45 AM	**Plenary Talk 1**	
	Introduction of the Plenary Speaker	**Roel S. Valenton** Moderator
	Plenary Talk 1: *Action Research*	**Ms. Aurea Puyos** Senior Instructor, Notre Dame of Kidapawan College
9:45AM – 10:00 AM	Break	
10:00AM – 12:00 PM	**Plenary Talk 2**	
	Introduction of the Plenary Speaker	**Rowel P. Madio** Moderator
	Plenary Talk 2: *Writing Good Math Problems*	Dr. Ian June L. Garces Associate Professor, Ateneo de Manila
12:00PM – 1:00PM	Lunch	
1:00PM – 2:00PM	**Plenary Talk 3**	
	Introduction of the Plenary Speaker	**Leonard M. Paleta** Moderator
	Plenary Talk 3: *Development of Representation Approach - Learning Materials*	**Dr. Debbie Marie B. Verzosa** Professor, University of Southern Mindanao
2:00PM – 2:15PM	Break	
2:15PM – 4:15PM	Workshop 1: *Development of Learning Mateirals*	**Sandra A. Nanding, Watarie E. Manto, and Leif Cullin A. Matandog** Facilitator
4:15PM – 4:40PM	**Paper Presentation**	
	Fitzmee Ann D. Tamulak Moderator	
	Bridging Ethnomathematical Practices of Obo Manobo Tahiti Farmers and Mathematics Education (Phase 2): Designing Mathematical Problem and Exploring Teachers' Perception	**Wrendell Juntilla** Speaker
4:40PM – 5:05PM	The Application of Enhanced Damath in Learning Operations on Integers and Developing Strategic Thinking	**Cherrylee Buhay** Speaker
5:05PM – 5:30PM	The Effect of PowToon to the Proficiency Level in General Mathematics of Grade 11 Students in Bacongco National High School	**Elaine Grace H. Adto** Speaker



I.2.5. utilization of technology, knowledge learned, skills acquired from the extension projects and activities.

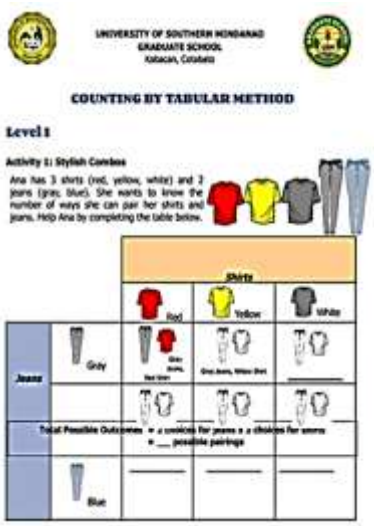
❖ **Samples of outputs created by community participants**





PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

❖ Samples of developed LMs

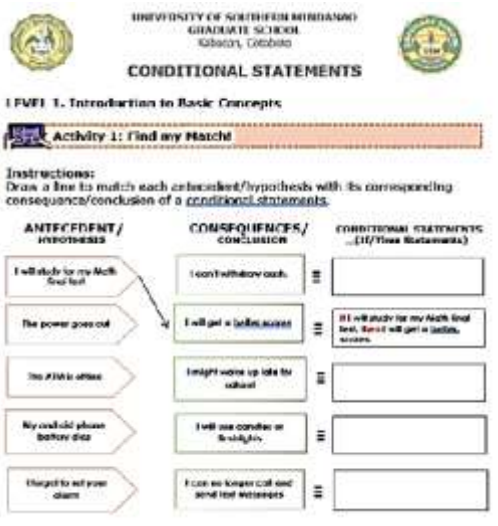

UNIVERSITY OF SOUTHERN MINDANAO
GRADUATE SCHOOL
Kabacan, Cotabato

COUNTING BY TABULAR METHOD

Level 1

Activity 1: Stylish Combos

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


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GRADUATE SCHOOL
Kabacan, Cotabato

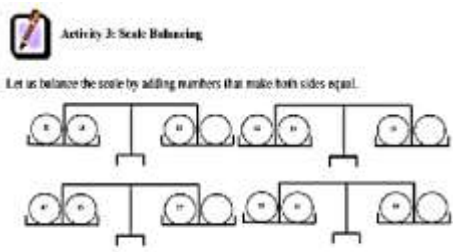
CONDITIONAL STATEMENTS

LEVEL 1. Introduction to Basic Concepts

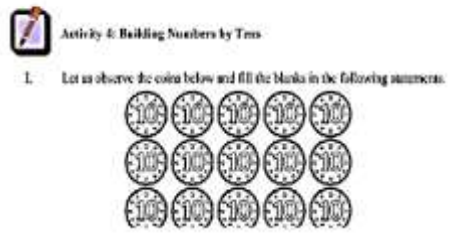
Activity 1: Find my Match

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

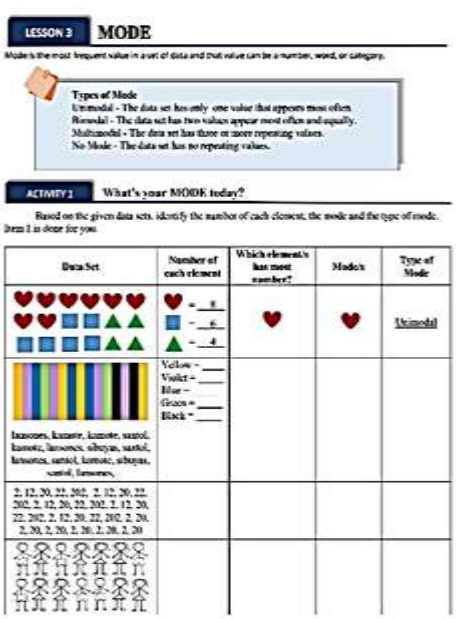
ANTECEDENT / HYPOTHESIS	CONSEQUENCES / CONCLUSION	CONDITIONAL STATEMENTS (If/Then Statements)
I will study for my Math final test	I can't believe ouch.	
The power goes out	I will get a ladies scooter	If I will study for my Math final test, then I will get a ladies scooter.
The AVA is offline	I might wake up late for school	
My cool old phone battery dies	I will use candles or flashlights.	
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

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


LESSON 3 MODE

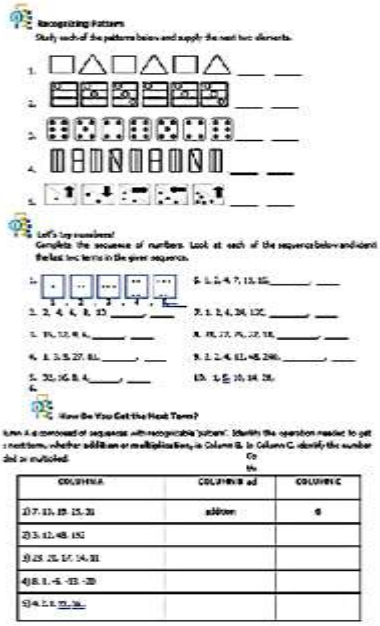
Mode is the most frequent value in a set of data and that value can be a number, word, or category.

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. Item 1 is done for you.

Data Set	Number of each element	Which element/s has most number?	Mode/s	Type of Mode
♥♥♥♥♥♥ ■■■■■■ ▲▲▲▲▲▲	♥ = 6 ■ = 6 ▲ = 4	♥	♥	Unimodal
	Yellow = ____ Violet = ____ Blue = ____ Green = ____ Black = ____			


Recognizing Patterns

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

1. □△□△□△ ___ ___
2. ▭▭▭▭▭ ___ ___
3. ⚀⚀⚀⚀⚀ ___ ___
4. ▯▯▯▯▯▯▯ ___ ___
5. ___ ___

Let's Say numbers!

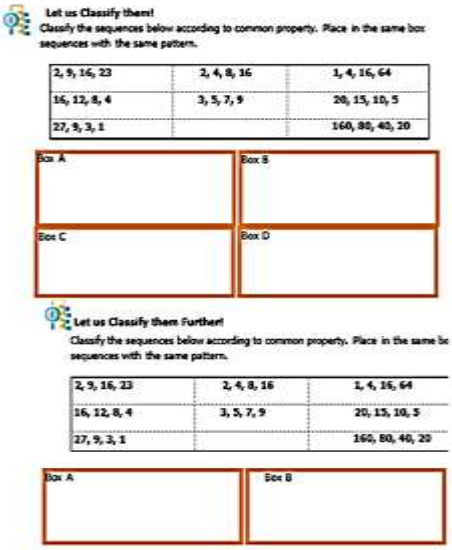
Complete the sequence of numbers. Look at each of the sequence below and identify the last two terms in the given sequence.

1. ... ___, ___
2. 2, 4, 6, 8, 10 ___, ___
3. 1, 3, 5, 7, 9, ___, ___
4. 3, 5, 9, 17, 33, ___, ___
5. 32, 16, 8, 4, ___, ___
6. 1, 1, 2, 3, 5, 8, 13, ___, ___
7. 1, 2, 4, 8, 16, ___, ___
8. 81, 27, 9, 3, 1, ___, ___
9. 1, 2, 4, 11, 46, 230, ___, ___
10. 1, 5, 10, 14, 28, ___, ___

How Do You Get the Next Term?

Given a sequence of sequence with recognizable 'pattern'. Identify the operation needed to get a next term, whether addition or multiplication, in Column B. In Column C, identify the number that is multiplied/added.

COLUMN A	COLUMN B	COLUMN C
1) 7, 13, 19, 25, 31	addition	6
2) 3, 12, 48, 192		
3) 625, 125, 25, 5, 1		
4) 8, 1, -6, -13, -20		
5) 4, 2, 1, 0.5, 0.25		


Let us Classify them!

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

2, 9, 16, 23	2, 4, 8, 16	1, 4, 16, 64
16, 12, 8, 4	3, 5, 7, 9	20, 15, 10, 5
27, 9, 3, 1		160, 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.

2, 9, 16, 23	2, 4, 8, 16	1, 4, 16, 64
16, 12, 8, 4	3, 5, 7, 9	20, 15, 10, 5
27, 9, 3, 1		160, 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 collection of objects.

Activity 1- Sort, Explore, Think (SET)!

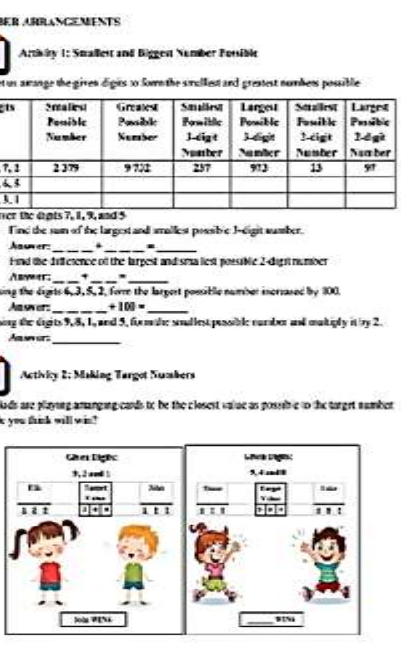
Directions: Categorize each object in the appropriate column (A, B, C, or D) based on shared characteristics, functions, or themes.

A	B	C	D
cabbage	camera		
Collection of _____	Collection of gadgets	Collection of objects that can be worn	Collection of _____

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	SET 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

1. 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, 2	2 379	9 732	237	973	23	97
1, 4, 6, 5						
8, 4, 3, 1						

2. Given the digits 7, 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 6, 3, 5, 2, form the largest possible number increased by 300.
   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?


Activity 6: Estimating Products

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

Activity 7: Quick Products

Let us quickly estimate products by rounding each numbers.

1. 146 × 4 is approximately 150 x 4 = 600
   The product is..... ☐ Less than 500 ☑ Greater than 500
2. 89 × 6 is approximately _____
   The product is greater than _____
3. 99 × 7 is
   The product is..... ☐ Less than 700 ☐ Greater than 700
4. The area of a rectangular lot is 141 x 398, which of the following represent the best estimate of its area?
   a. 100 x 390 b. 100 x 400 c. 140 x 400 d. 140 x 300
5. An airplane flies about 12km/minute. At this speed, about how many kilometers does it fly in an hour?
   Answer: _____

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Outcomes of the Project

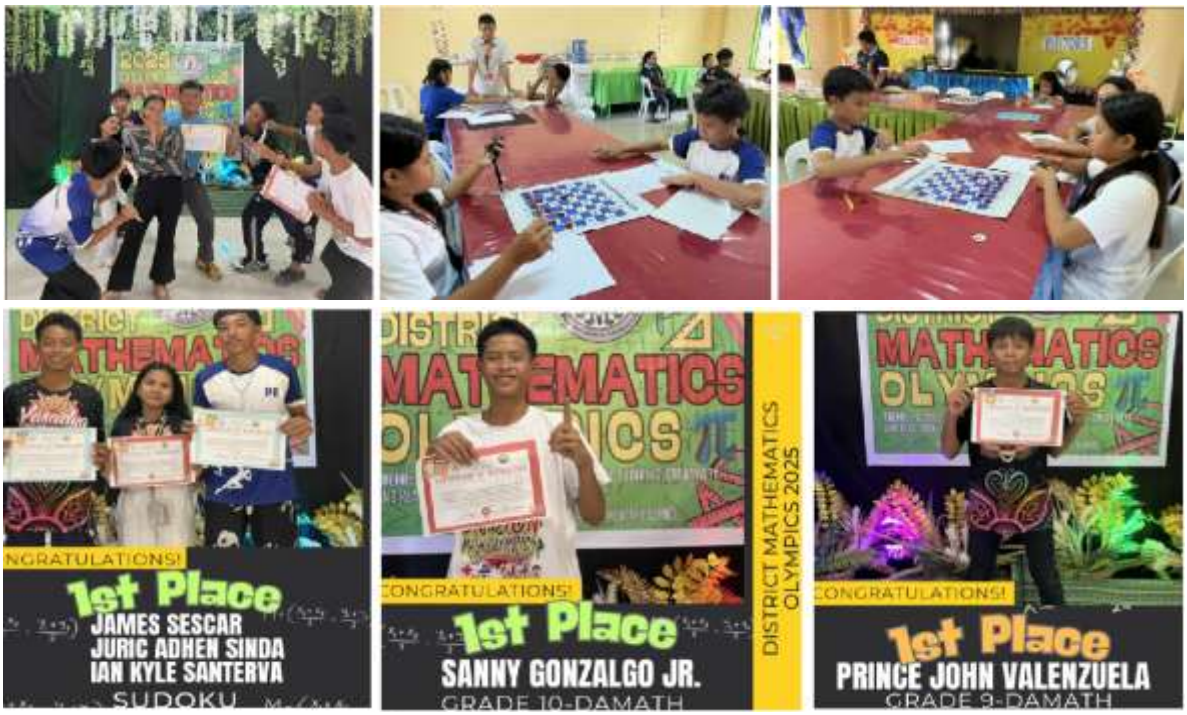
The targeted major outcome of this project is the enhancement of numerical literacy and mathematics performance and among barangay high school students through the implementation of the developed LMs

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 1. Pretest and Posttest performance of students

2. **Improved** ranking in mathematics competitions



PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES



3. Enhanced potential for college admission

Data	SY 2024-25		SY 2025-26	
	f	%	f	%
Grade 12 Grad	23		19	
Took the Exam	5	21.7	6	31.6
Passed USM CEE	2	40	6	100.0
Admitted to BS Program	2			
Admitted to Associate Program	1			

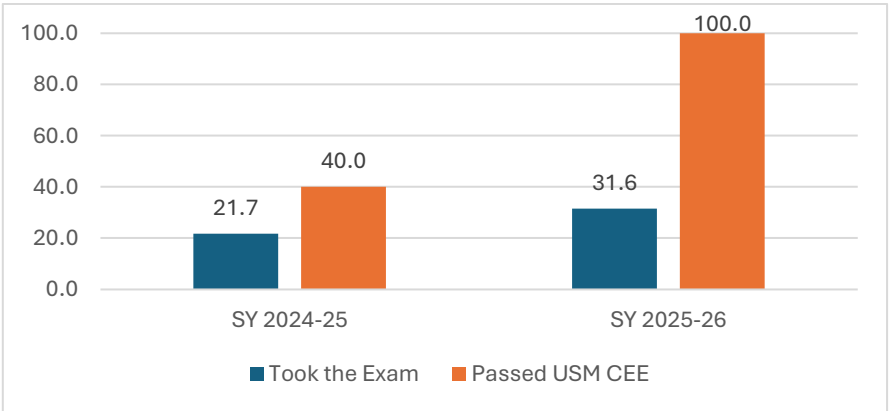
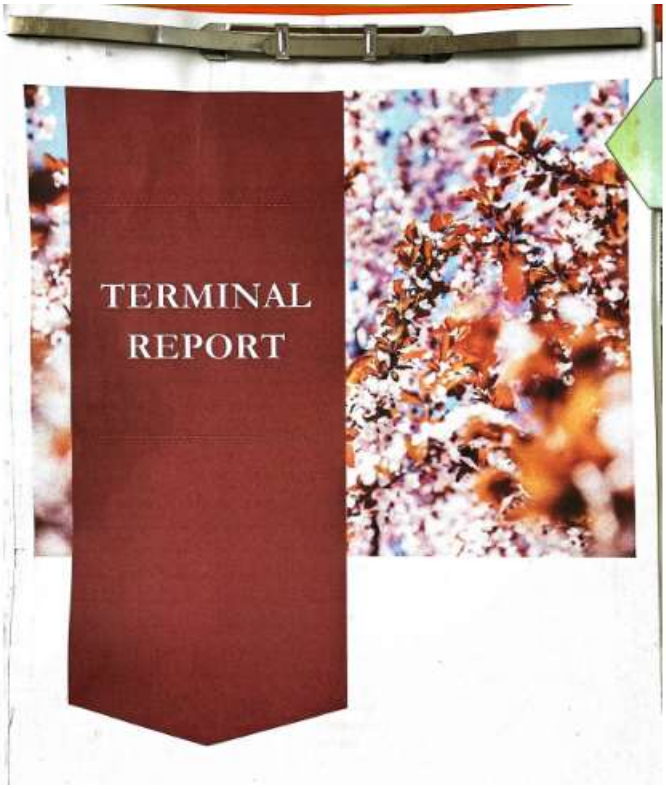
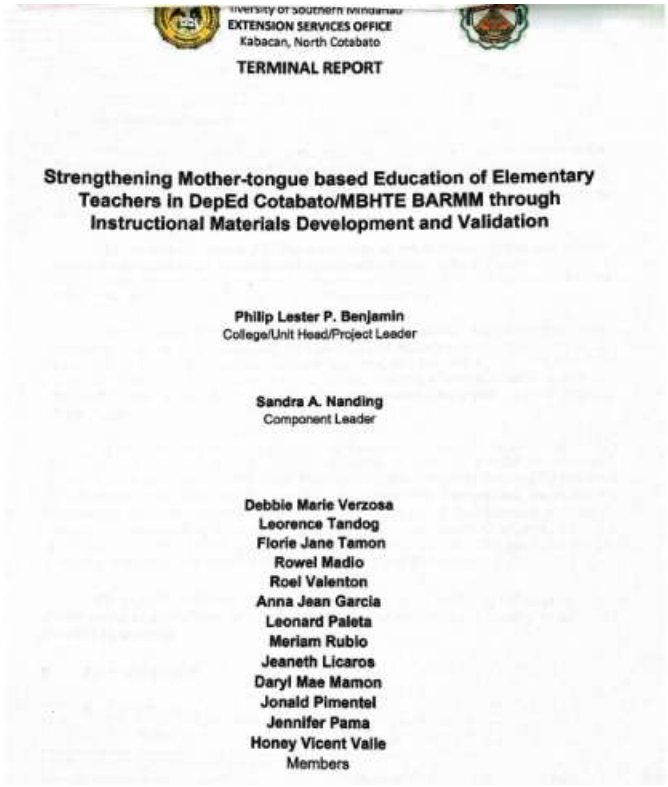


Figure 2. Comparative performance of Senior HS students in USMCEE

OUTCOME/S

O.1. There is wholesome coordination between the Extension Program implementers and the target clientele/beneficiaries.





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Kabacan, North Cotabato

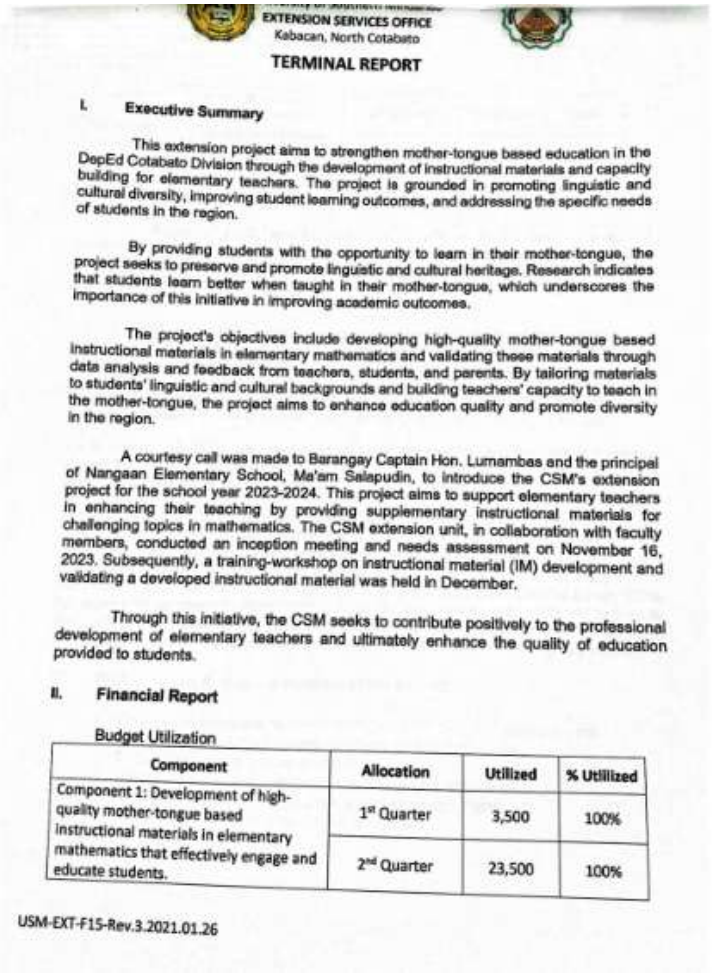
TERMINAL REPORT

Strengthening Mother-tongue based Education of Elementary Teachers in DepEd Cotabato/MBHTE BARMM through Instructional Materials Development and Validation

Philip Lester P. Benjamin
College/Unit Head/Project Leader

Sandra A. Nanding
Component Leader

Debbie Marie Verzosa
Leorence Tandog
Florie Jane Tamon
Rowel Madio
Roel Valenton
Anna Jean Garcia
Leonard Paleta
Meriam Rubio
Jeaneth Licaros
Daryl Mae Mamon
Jonald Pimentel
Jennifer Pama
Honey Vicent Valle
Members



EXTENSION SERVICES OFFICE
Kabacan, North Cotabato

TERMINAL REPORT

I. **Executive Summary**

This extension project aims to strengthen mother-tongue based education in the DepEd Cotabato Division through the development of instructional materials and capacity building for elementary teachers. The project is grounded in promoting linguistic and cultural diversity, improving student learning outcomes, and addressing the specific needs of students in the region.

By providing students with the opportunity to learn in their mother-tongue, the project seeks to preserve and promote linguistic and cultural heritage. Research indicates that students learn better when taught in their mother-tongue, which underscores the importance of this initiative in improving academic outcomes.

The project's objectives include developing high-quality mother-tongue based instructional materials in elementary mathematics and validating these materials through data analysis and feedback from teachers, students, and parents. By tailoring materials to students' linguistic and cultural backgrounds and building teachers' capacity to teach in the mother-tongue, the project aims to enhance education quality and promote diversity in the region.

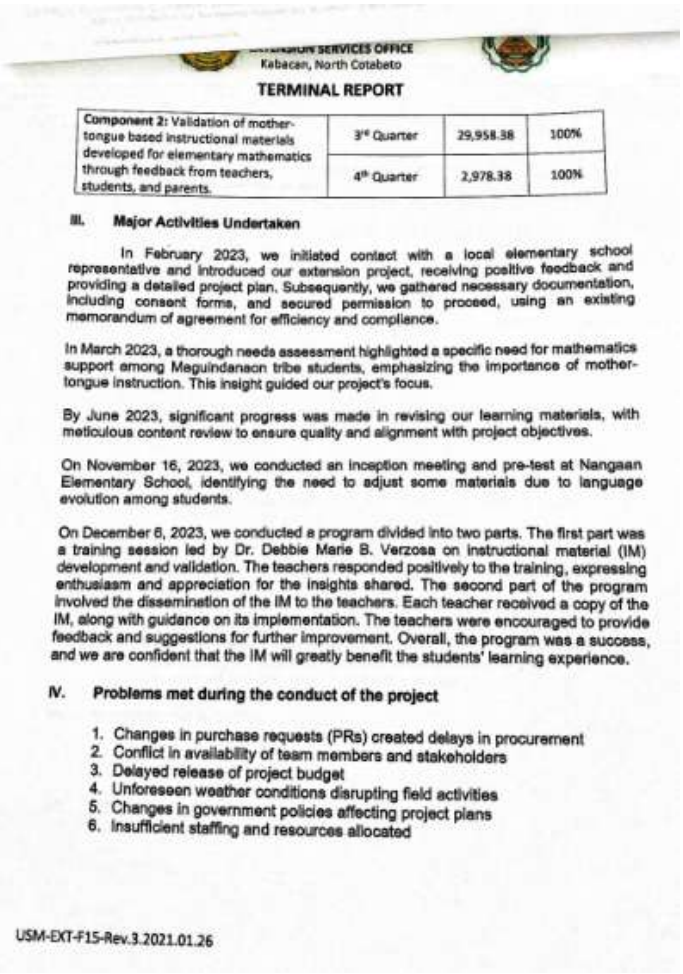
A courtesy call was made to Barangay Captain Hon. Lumambas and the principal of Nangaan Elementary School, Ma'am Salapudin, to introduce the CSM's extension project for the school year 2023-2024. This project aims to support elementary teachers in enhancing their teaching by providing supplementary instructional materials for challenging topics in mathematics. The CSM extension unit, in collaboration with faculty members, conducted an inception meeting and needs assessment on November 16, 2023. Subsequently, a training-workshop on instructional material (IM) development and validating a developed instructional material was held in December.

Through this initiative, the CSM seeks to contribute positively to the professional development of elementary teachers and ultimately enhance the quality of education provided to students.

II. **Financial Report**

Budget Utilization

Component	Allocation	Utilized	% Utilized
Component 1: Development of high-quality mother-tongue based instructional materials in elementary mathematics that effectively engage and educate students.	1st Quarter	3,500	100%
	2nd Quarter	23,500	100%



Kabacan, North Cotabato

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Component 2: Validation of mother-tongue based instructional materials developed for elementary mathematics through feedback from teachers, students, and parents.	3rd Quarter	29,958.38	100%
	4th Quarter	2,978.38	100%

III. **Major Activities Undertaken**

In February 2023, we initiated contact with a local elementary school representative and introduced our extension project, receiving positive feedback and providing a detailed project plan. Subsequently, we gathered necessary documentation, including consent forms, and secured permission to proceed, using an existing memorandum of agreement for efficiency and compliance.

In March 2023, a thorough needs assessment highlighted a specific need for mathematics support among Maguindanaon tribe students, emphasizing the importance of mother-tongue instruction. This insight guided our project's focus.

By June 2023, significant progress was made in revising our learning materials, with meticulous content review to ensure quality and alignment with project objectives.

On November 16, 2023, we conducted an inception meeting and pre-test at Nangaan Elementary School, identifying the need to adjust some materials due to language evolution among students.

On December 6, 2023, we conducted a program divided into two parts. The first part was a training session led by Dr. Debbie Marie B. Verzosa on instructional material (IM) development and validation. The teachers responded positively to the training, expressing enthusiasm and appreciation for the insights shared. The second part of the program involved the dissemination of the IM to the teachers. Each teacher received a copy of the IM, along with guidance on its implementation. The teachers were encouraged to provide feedback and suggestions for further improvement. Overall, the program was a success, and we are confident that the IM will greatly benefit the students' learning experience.

IV. **Problems met during the conduct of the project**

1. Changes in purchase requests (PRs) created delays in procurement
2. Conflict in availability of team members and stakeholders
3. Delayed release of project budget
4. Unforeseen weather conditions disrupting field activities
5. Changes in government policies affecting project plans
6. Insufficient staffing and resources allocated

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V. Recommendations

1. Establish a clear and streamlined process for PR creation and approval to minimize changes and delays.
2. Coordinate schedules in advance to ensure availability of all parties involved in project activities.
3. Advocate for timely release of project budgets and maintain regular communication with the funding agency.
4. Develop contingency plans for weather-related disruptions, such as rescheduling activities or implementing remote work arrangements.
5. Stay updated on government policies and regulations, and adapt project plans accordingly.
6. Allocate additional resources or personnel to address workload challenges and ensure timely project delivery.

VI. Project Impact/Output

The project is expected to at least generate the following:

Outputs:
- Developed and validated mathematics instructional materials tailored for mother-tongue based education.
- Improved mathematics academic performance and learning outcomes for students through the use of these materials.

Impact:
- Increased cultural pride and self-esteem among students as they see their language and culture represented in their education.
- Strengthened linguistic and cultural identity among students, fostering a sense of belonging and connection to their heritage.
- Enhanced quality of education in the area by providing effective and culturally relevant teaching materials, ultimately improving student engagement and understanding in mathematics.

VII. Supplemental Activities

VIII. Other Accomplishment

IX. Pictorials



Inception Meeting with Teachers of Nangaan Elementary School







Conduct of needs assessment and Pre-test



Visit at Nangaan Elementary School





Training on IM Development and Validation of IM with the resource person Dr. Verzosa.



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Strengthening Barangay High Schools: Validation and Implementation of Representation-Based Learning Materials for Independent Study of Mathematics in Remote Schools

Leorence C. Tandog, Ph.D.
Project Team Leader

Funded by

USM Fund 101

Terminal Report
March 2026

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Cotabato

ABSTRACT

Strengthening Barangay High Schools: Validation and Implementation of Representation-Based Learning Materials for Independent Study of Mathematics in Remote Schools

Project members: *Leorence Tandog, Shandra Nanding, Philip Lester Benjamin, Jupiter Pilongo, Rowel Madio, Lawton Yabes, Dominic Carajay, Lidey Sultan, Debbie Marie Verzosa, Jonald Pimentel, Leonard Paleta, Anna Jean Sebastian, Daryl Mae Catubig, Jeanette Licaros, Roel Valenton, Jennifer Pama, Arnel Toledo, DOST-SEI Project Strand-N Scholars, MST and PhD Ed Math Students*

This extension project aimed to improve mathematics learning in barangay high schools, with Salvacion High School in Cotabato serving as the primary beneficiary, through the development and implementation of representation-based, self-instructional learning materials. The project responded to persistent challenges faced by barangay high schools in the Philippines, including the shortage of qualified teachers, limited instructional resources, and consistently low performance in national achievement assessments. It built on a research initiative launched in 2021 that introduced representation-based instructional materials, which demonstrated positive effects on students' understanding of mathematics and science.

The project engaged faculty members and graduate students from the PhD in Education and MST in Mathematics programs in collaborative lesson study, materials development, and action research. A systematic implementation process was followed, which included baseline data collection, teacher training, material development, validation and refinement, and classroom implementation. As a result, the project produced Learning Activity Pages (LAPs) designed to support independent learning and address identified learning gaps in mathematics in a remote area.

The implementation was conducted at Salvacion High School with the active support of the teachers and the school heads. The effectiveness of the intervention was assessed using pre- and post-tests on mathematical achievement and numeracy, student feedback, and teacher observations. Findings indicated a significant improvement in the numeracy skills of the student respondents, particularly in the various mathematical thinking skills. Moreover, the school beneficiary demonstrated enhanced overall performance, as reflected in their better rankings in district-wide competitions and increase in the number of senior high school students who qualified to enroll at USM based on USMCEE score.

The results of the project provided empirical evidence to support further refinement and possible scaling of the developed materials for use in other low-resource educational settings. Overall, the project contributed to the advancement of inclusive, equitable, and quality education by empowering students and teachers through accessible, research-based, and context-responsive learning resources.

Keywords: *Representation-Based Learning, Self-Instructional Materials, Learning Activity Sheets, Mathematics Education, Barangay High Schools*

UNIVERSITY OF SOUTHERN MINDANAO
Kabacan, Philippines

A. BASIC INFORMATION		
1. Title	Strengthening Barangay High Schools: Validation and Implementation of Representation-Based Learning Materials for Independent Study of Mathematics in Remote Schools	
2. Status	☐ Ongoing ☐ Completed	
3. Project Leader Study Leader	**Dr. Leorence C. Tandog** College of Science and Mathematics	
Email Address	lctandog@usm.edu.ph	
Contact Number	09466115568	
4. Lead Unit/College	College of Science and Mathematics	
Collaborating Unit/College	DepEd Cotabato Division	
5. Category	☐ Program ☑ Project ☐ Study	
6. Classification	☐ Research	☐ Development ☑ Extension
	☐ Basic ☐ Applied	☐ Pilot Testing ☐ Prototype Development ☐ Tech. Promotion/Commercialization
7. Thematic Area	☑ Quality Learning, Skills Development, and Literacy ☐ Social Development, and Strong Institutions ☐ Preservation of Culture ☐ Environmental Protection, Conservation, and Risk Reduction ☐ Food Security and Poverty Reduction ☐ Good Health and Well-being ☐ Innovations in Science, Engineering, and Technology ☐ Sustainable Entrepreneurship and Management	
8. Sustainable and Development Goals	☐ No Poverty ☐ Zero Hunger ☐ Good Health & Well-Being ☑ Quality Education ☐ Gender Equality ☐ Clean Water & Sanitation ☐ Affordable and Clean Energy ☐ Decent Work & Economic Growth ☐ Industry Innovation & Infrastructure	☐ Reduced Inequalities ☐ Sustainable Cities & Communities ☐ Responsible Consumption & Production ☐ Climate Action ☐ Life Below Water ☐ Life on Land ☐ Peace, Justice and Strong Institutions ☐ Partnership for the Goals
9. Project Duration	One year	
10. Project Location	Matalam, Cotabato	
11. Total Budget	PhP 60,000	

TERMINAL REPORT

B. TECHNICAL DESCRIPTION

1. Rationale / Significance

Rationale

The performance of Philippine barangay high schools has long been perceived as inferior due to persistent challenges—foremost among them is the lack of qualified teachers. Teacher shortage is a critical issue in many rural areas globally but is particularly acute in barangay schools. These institutions often serve as entry points for novice teachers who are frequently assigned to teach out-of-field subjects due to staffing limitations and the small number of class sections typically offered in remote locations. Serving predominantly underprivileged and marginalized communities, barangay schools are often overlooked in favor of larger, better-resourced institutions.

In 2021, our team initiated a multi-dimensional response to the urgent educational disruptions brought about by the COVID-19 pandemic. This involved the development of instructional materials and technological tools designed to support student learning under constrained conditions. We introduced teaching innovations that featured interactive elements, visual aids, and manipulable representations. These efforts resulted in notable improvements in students' understanding of mathematics and science concepts.

Building on the success of that initiative, faculty members and graduate students from the PhD in Education and MST major in Mathematics programs engaged in a collaborative lesson study. This led to the development of research-based lessons and Learning Activity Pages (LAPs) that employ multiple representational approaches. These materials are designed to enable students to grasp essential concepts and skills even with minimal teacher supervision—or in the absence of a teacher altogether.

With these resources now prepared for validation, this extension project seeks to address the unique educational challenges faced by barangay schools through their strategic deployment and use.

Significance

This extension project was significant in addressing the persistent teacher shortage in barangay schools through the development of learning materials (LMs) that support independent learning. These materials were contextualized to reflect the realities of local school settings and the mathematical deficiencies of target learners, making them more relevant and responsive to the needs of barangay students. The initiative contributed to the long-term improvement of barangay high schools by enhancing instruction through the use of high-quality, research-based resources.

In addition to promoting content mastery, the materials foster lifelong learning by integrating soft skills such as number sense, critical thinking, problem-solving, and self-efficacy. These competencies continue to prepare students for real-world challenges and academic success. The project also aimed to enhance students' chances of admission to

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tertiary education, a critical pathway to socio-economic advancement and improved quality of life, particularly for learners in remote areas.

Grounded in lesson study and collaborative educational research conducted by faculty members of the Mathematics Department and graduate students, the project supported professional development and strengthened academic–community partnerships.

Furthermore, this initiative aligned with the broader goal of achieving inclusive and equitable quality education. The approach and materials can be adapted for use in other low-resource schools across the country, positioning the project as a potential model for broader implementation. By supporting barangay high schools, this project helps ensure that Filipino learners have access to meaningful and quality learning experiences, regardless of their geographic location.

Objectives

This project aimed to enhance the mathematics education received by students in barangay high schools in DepEd Cotabato with the use of carefully designed and validated self-instructional LMs.

The specific objectives of the extension project were to:

1. **strengthen** mathematics teachers' capacity to develop representation-based, self-instructional materials and to conduct action research or design-based research using these materials;
2. **engage** teachers in the collaborative development of research lessons and the design of self-instructional learning materials (LMs) in the form of Learning Activity Pages (LAPs);
3. **validate, pilot-test, and refine** activity sheets to effectively facilitate independent learning of mathematics concepts and skills;
4. **enhance** mathematics performance and numerical literacy among barangay high school students through the implementation of action research using the developed instructional materials; and
5. **improve** the 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).

2. Review of Related Literature

Barangay high schools, formerly known as barrio high schools, were established in 1964 to provide wider access to secondary education (Orata, 1979). Since then, additional barangay high schools have opened with the passage of RA 6054 or the "Barrio High School Charter" in 1969. The establishment of barangay high schools is considered as equalizing opportunity for all Filipino children to access education regardless of their place of residence or economic condition.

The performance of Philippine barangay schools has always been viewed to be inferior. In 1987 the Department of Education (DepEd) temporarily halted the opening of barangay high schools with acknowledgement that the quality of instruction in most of the barangay high schools suffered as evidenced by poor results in national achievement tests (DepEd DO 69, s. 1987).

Self-regulated and independent study is vital in cases where teachers are not available to facilitate learning. Effective LMs significantly support independent learning since resources that can be learned without needing the assistance of a teacher can empower students to take control of their studies, learn at their own pace, and develop self-discipline and independent thinking. Research shows that supplemental printed materials significantly facilitate successful learning of math concepts (Brown and Gilmer, 2009) and self-instructional worked examples are effective in the development of both conceptual and procedural knowledge (Sheldon, 2013).

In 2021, we initiated a multi-dimensional approach to respond to the challenges that emerged from the urgent educational adaptations driven by the pandemic through material and technology tools development (Tandog & Verzosa, 2021). Our project introduced teaching innovations that utilized interactive elements, visual features, storytelling, and manipulable representations. Various studies have shown that these features and tools enhance learning (De las Peñas & Bautista, 2008), facilitate visualization (Taka, Taka, & Budinski, 2010), and develop creativity (Shelomovskiy & Nosulya, 2012). Representation is an important element in the study of mathematics and is considered at the heart of cognitions associated with mathematical activity (Kaput, 1987).

3. Methodology

A. Development Phase:

1. Baseline Data Collection / Needs Assessment

Surveys were conducted on school performance and admission SHS graduates to college to profile Salvacion High School. Ocular visits and interviews with teachers and school heads assessed existing learning resources, identified students' learning gaps, and considered contextual factors for project implementation. A diagnostic pretest was also administered to determine specific student needs to guide material development.

2. Planning and Training

An orientation introduced project goals, and the learning needs to be addressed. Training was conducted on the representation approach, scaffolding techniques, action research, and design-based research to support teachers in material development. Plans of activities for developing, reviewing, validating, and pilot-testing instructional materials were prepared.

3. Development, Validation, Pilot Testing, and Refinement

Instructional materials were developed collaboratively by MST and PhD students with faculty of the Mathematics and Statistics Department as subject experts. Faculty and students validated the content, and pilot testing involved selected high school students to assess engagement and learning outcomes. Materials were refined using feedback from needs assessment, validation, and pilot testing to suit students' capabilities and curriculum requirements.

4. Packaging and Reproduction of LAPs

Final layouts considered cost-efficiency, readability, and usability. LAPs were reproduced for target beneficiaries, and implementation feedback informed refinement for potential future use, patenting, and wider dissemination.

C. Implementation Phase

The project was implemented at Salvacion High School, an annex of Kibia High School. Support was provided to teachers and the TIC during student engagement, outputs were evaluated to guide ongoing support, and action research assessed improvements in learning outcomes.

D. Evaluation Phase

Project effectiveness was measured through comparison of pretest and posttest scores, student outputs, and teacher observations. Student feedback was gathered through interviews and focus groups. Impact on school operations was assessed via principal and teachers' narratives on how the materials addressed teacher scarcity and improved school performance.

4. Results and Discussion

Baseline data

An ocular site visit and interviews conducted with the teachers and the former Principal of Salvacion High School at the start of the extension project revealed critical gaps in instructional support for mathematics education. One of the most pressing issues identified was the lack of learning resources, particularly in mathematics, as the Department of Education (DepEd) has been unable to provide textbooks for the subject. Additionally, it was found that none of the teachers in junior high school specialized in mathematics. Instead, mathematics classes are handled by teachers with academic backgrounds in Science and Filipino, underscoring the urgent need for subject-specific instructional support.



Figure 1. MST Math students and Salvacion HS teachers during initial site visit

Secondary data on the results of the Rapid Mathematics Assessment (RMA) for Grades 7–10 at Salvacion High School revealed that none of the students in the partner school demonstrated proficiency in the cognitive domain at their current grade level. This finding aligns with the recently released EDCOM 2 report, which indicated that only 0.40% of Grade 12 students in the Philippines attained the minimum level of competency (Second Congressional Commission on Education [EDCOM II], 2026). The RMA further revealed that most of the target students, despite being in high school, possess mathematics competencies equivalent to Grade 2 level, with the highest observed competency reaching only up to Grade 4 level.



Figure 2. Rapid Mathematics Assessment Result for Grades 7-10.

A diagnostic test was administered to Grades 7-10 students to assess their number sense across three key categories: Numbers; Operations and Computational Estimation; and Data Sense Making.



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

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Figure 8. Orientation meeting with Salvacion HS teachers.

Capacity Building of Teachers

This project started with the enhancement of teachers' capacity in instructional material development and the conduct of action research as essential inputs to the implementation of the extension program. To achieve this objective, two seminar-workshops were conducted, with participants including graduate students engaged in curriculum development, teachers from the extension site, and other interested educators.

The first was a two-day seminar-workshop designed to strengthen three key areas of professional growth: instructional material development using representation-based approaches, the conduct of action research, and an understanding of design-based research. The seminar was carefully structured to enable participants to develop effective curriculum materials while simultaneously engaging in action research to improve instructional practice. Design-based research was introduced to equip participants—particularly the graduate students—with the research skills necessary for the continuous refinement of the developed materials for wide-scale distribution.



Figure 9. Seminar-workshop publication material and attendees

The seminar provided a space for participants to collaborate, share ideas, and create instructional tools they can apply in their own classrooms, and possible action research while implementing the innovations. The seminar workshop was attended by 72 teachers who highly rated the various aspects of the seminar with an overall rating of 4.71 (excellent). It also contributed to professional growth of teachers, including those from the beneficiary school with the PRC approved 8 CPD points for the seminar.



Figure 10. Seminar participants presenting their developed LM and collaborating for possible action research

The second workshop seminar was conducted as result of some challenges in the initial implementation of the LMs developed. Some students have difficulty reading texts and understanding activity instructions. There also seemed to be other preferences for learning. This seminar explored alternative pathways to numeracy and literacy. Still grounded in the principles of the representation-based approach, it emphasized how zines—small, self-published booklets—can serve as powerful tools to enhance both numeracy and literacy development. Training participants explored how to design and integrate zines into their teaching practices through hands-on activities such as creating sample zines, collaborating with peers, and developing classroom applications that align with curriculum goals. The one-day seminar workshop was awarded 4 CPD points by PRC.



Figure 11. Seminar publication material and certificate awarded

By the end of the one-workshop, teacher participants were equipped with both theoretical grounding and practical tools to implement zine-making as a pedagogical strategy that bridges literacy and numeracy learning in innovative and meaningful ways. The seminar workshop ended with presentation and critiquing of the zines developed by the participants.



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Figure 12. Sample of zines produced by seminar participants

The seminar workshop was attended by 102 teachers, who rated the event very highly, giving it an overall score of 4.88 (excellent), reflecting strong satisfaction with the content, organization, and practical applicability of the activities. The comments extracted from the Overall Training Evaluation Sheets has three themes:

1. Positive and Enriching Training Experience. Participants described the training as enriching, insightful, and valuable, indicating that the session provided meaningful learning experiences. Many reported gaining new knowledge and insights. The creativity introduced with zines generated interest among participants in adopting creative approaches as instructional tools.

2. Contribution to Professional Practice. Participants acknowledged that the seminar enhanced their knowledge and skills, enabling them to improve and adapt their professional practice. They noted that the session provided practical ideas and tools to support their teaching, particularly in numeracy and literacy instruction.

3: Desire for Continuous Professional Development. Participants expressed strong interest in attending additional seminars and training programs, particularly those focused on strengthening pedagogy and instructional skills. They also suggested incorporating digital or software-based demonstrations, such as Canva and other applications, to better support teachers who prefer computer-based activities over handmade outputs.



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

Design, Development, Validation, and Development of LMs

The extension project initially intended to involve the mathematics teacher at the beneficiary school; however, this did not materialize due to the absence of a designated mathematics teacher. The design and development of the instructional materials were therefore undertaken collaboratively by PhD and MST students, together with faculty members from the Department of Mathematics and Statistics serving as subject matter experts.

The development was anchored on the positive outcomes of a previous research initiative (Tandog & Verzosa, 2021), as well as on the initially developed LMs and the Professional Learning Community (PLC) structure for lesson study and pedagogical sharing established during the previous extension project (Tandog et al., 2022). The LMs prioritized the development of mathematical thinking and skills, with curriculum content serving primarily as a vehicle for cultivating the identified competencies. This approach seeks to address gaps in basic education, where instruction often tends to emphasize content coverage over the development of mathematical thinking and conceptual understanding.

The developed materials emerged from research lesson study conducted by the assigned groups and were guided by representation-based frameworks deemed appropriate by each group, including the Multiple Representation Approach (MRA), Concrete–Representational–Abstract (CRA), Representation Construction Approach (RCA), Concept Attainment (CA), and other related approaches, as shown in the following table.

Table 1. Mathematical thinking skills and content coverage of developed LMs.

Mathematical Thinking Skill	Content	Topics	Framework	Validation
Number Sense and Estimation	Numbers and Number Sense	-Number	- McKintosh/MRA	Complete
		-Operations (Multiplication)	-Array Models	(on-going)
		-Fractions	-RCA	Complete
Proportional Reasoning		-Percents	-Proportional Thinking	Complete
Relational Thinking	Sets	-Sets and Set Operations	-RCA -CA	Complete
Data Sense Making/ Quanti-tative Reasoning	-Descriptive Statistics	-Data Presentation -Average & spread	Microlearning	Complete
Predicting/Induct ive Reasoning	Patterns and Sequences	-Number Sequence	Inductive Learning Model	Complete
		-Arithmetic/ Geometric Seq		(On-going)
Spatial Reasoning	Geometry	-Polygons	-CA -Van Heile -CRA	Complete
		-Areas and Perimeter		(On-going)
Logical Reasoning	Mathematical Logic	- Conditional Statements	-CRA -Van Heile	Complete
Probabilistic Thinking	Combinatoric s	-Counting Techniques	-CRA	Complete
		-Combination -Permutation	-CA -CRA	(On-going)
	Probability	-Simple Probability		(On-going)
Symbolic Thinking	Algebra	-Alg. Expressions		(On-going)
Problem Solving		-Linear Equation		(On-going)
Measuring	Measurement		-	(On-going)

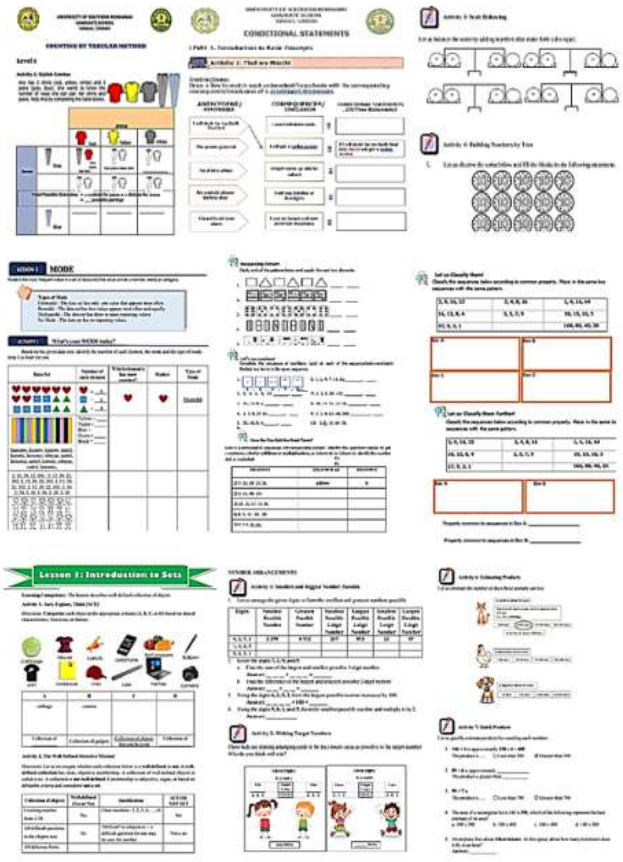


Figure 14. Samples of developed LMs

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The initial review of the developed materials was conducted online, with PhD Mathematics Education students serving not only as reviewers but also as critics who provided suggestions for improvement. The validation process was conducted primarily face-to-face with faculty members from the Department of Mathematics and Statistics, who served as subject matter experts.

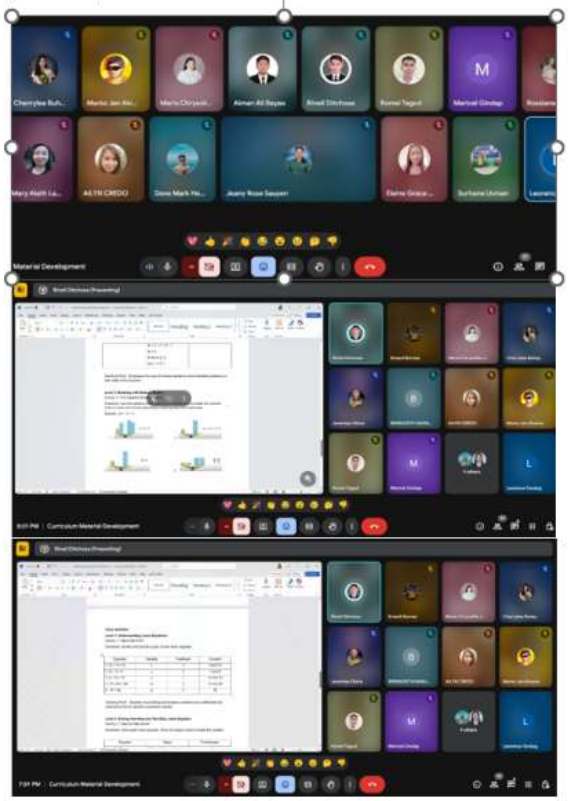


Figure 15. Online meetings and presentations of developed LMs

The pilot testing of the developed LMs varied across groups. Some groups conducted pilot tests with students in their respective schools. Others selected a small number of students who shared similar characteristics with the target users to implement the materials and determine whether, after using them, the students were able to answer the intended pretest items. Revisions were made based on the results of these pilot tests.

For several groups, the initial implementation of the validated materials in the beneficiary school functioned as pilot testing, with revisions undertaken topic by topic. Adjustments were made including in the pacing of instruction and the number of activities assigned, based on how students interacted with the materials in the preceding lessons.

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.





Figure 15. PhD Ed and MST math students during deployment and implementation of LMs

At the start of deployment, several student difficulties in using the materials were observed.

- Numbered instructions were interpreted as test items to be answered.
- Lettered examples were perceived as multiple-choice options to be encircled.
- Black-and-white printing rendered color-highlighted important texts unnoticeable.

These observations indicated underlying issues in reading comprehension and test-taking habits. The LM writers suggested color printing to make important texts more noticeable. Adjustments in numbering and formatting were also considered. However, upon reflection, the original numbering and example formats were retained to address students' tendency to treat lettered items as multiple-choice options and to encircle answers mechanically without fully comprehending the instructions or content. Table 2 shows the schedule of implementation of different LMs.

Table 2. Schedule of LM deployment and implementation

Mathematical Thinking Skill	Content	Topics	Dates Implemented	Grade Level
Number Sense and Estimation	Numbers and Number Sense	-Number	September, October	Grades 7-12
		-Operations (Multiplication)	For Implementation	
		-Fractions	For Implementation	
Proportional Reasoning		-Percents	For Implementation	
Relational Thinking	Sets	-Sets and Set Operations	October, November	Grade 8,10
Data Sense Making/ Quantita-tive Reasoning	-Descriptive Statistics	-Data Presentation -Average & spread	October, November	Grade 9
Predicting/Inductive Reasoning	Patterns and Sequences	-Number Sequence	October, November	Grades 11-12
		-Arithmetic/ Geometric Seq	For Implementation	
Spatial Reasoning	Geometry	-Polygons	For Implementation	
		-Areas and Perimeter		
Logical Reasoning	Mathematical Logic	- Conditional Statements	For Implementation	
Probabilistic Thinking	Combinatorics	-Counting Techniques	For Implementation	
		-Combination -Permutation	For Implementation	
	Probability	-Simple Probability	For Implementation	
Symbolic Thinking	Algebra	-Alg. Expressions	For Implementation	
Problem Solving		-Linear Equation	For Implementation	
Measuring	Measurement		For Implementation	

Of the 11 targeted mathematical thinking skills, only four were fully implemented. The start of implementation was delayed by one month due to the extended validation and revision of the LMs and pretests, which took longer than anticipated. Additional factors also contributed to the partial implementation of the developed LMs, including class suspension due to school district's scheduled activities, cancellation of classes following an earthquake, and shortened class periods due to armed conflict in a neighboring area.

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Figure 16. Extensionists Ensuring Student Safety During the October 10 Earthquake

The deployment of the learning materials was halted in November due to a land conflict in a nearby barangay and a killing incident on December 2, 2025, along the road leading to Salvacion. This decision was made to ensure that the safety of the graduate students and faculty members actively participating in the extension program was not compromised. As such many of the developed materials are still for implementation as shown in Table 2.



Figure 17. Newsclips of incidents that affected project implementation

Aside from the deployment of learning materials (LMs), a review in preparation for college admission examinations was conducted for senior high school students. The Department of Mathematics and Statistics provided review sessions on mathematics and quantitative reasoning, aiming to improve students' problem-solving skills and test-taking strategies. Other test components, such as English and Science, were delegated to the school as it has available teachers to handle these subjects. This collaborative effort provided a comprehensive review experience and helped enhance students' readiness and confidence for college admission examinations.



Figure 17. USM conducting a review for college admission tests

The school also requested assistance from the Mathematics and Statistics faculty extensionists in training selected students for the Damath competitions, further strengthening the collaboration between the university and the partner school while providing students with opportunities to develop their mathematical and strategic skills. This support helped enhance students' computational skills, and strategic decision-making, which are essential in mathematical problem-solving and competitive events.



Figure 17. USM coaching student contestants for DAMATH competition

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

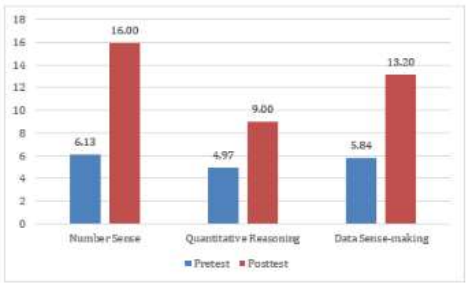


Figure 18. Pretest and Posttest performance of students

2. **Improved** ranking in mathematics competitions





3. Enhanced potential for college admission

Data	SY 2024-25		SY 2025-26	
	f	%	f	%
Grade 12 Grad	23		19	
Took the Exam	5	21.7	6	31.6
Passed USM CEE	2	40	6	100.0
Admitted to BS Program	2			
Admitted to Associate Program	1			

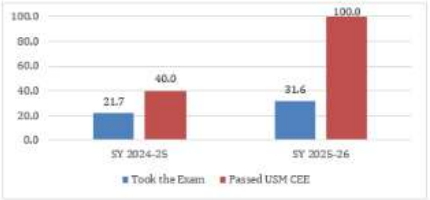


Figure 19. Comparative performance of Senior HS students in USMCEE

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Extension Project Outputs

This project has produced the following outputs:

1. Developed and validated learning materials on at least ten topics
2. Three completed action research
3. One research article ready for journal publication submission



Improving Students' Quantitative Reasoning and Data Sense-Making through Microlearning-Based Gradual Release Scaffolding

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Dave Mark A. Herbosa
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Abstract

Developing quantitative reasoning and data sense-making skills among students are two essential goals of statistics education. However, students face difficulties in understanding statistical concepts, choosing appropriate graphs for representing and organizing data and drawing conclusions. Microlearning was known for its effectiveness in enhancing retention and reducing cognitive load, but there is limited literature that examines its application in improving students' statistical skills. Moreover, the integration of the Gradual Release of Responsibility (GRR) model as a form of scaffolding in microlearning has not yet been fully explored. Hence, this study aimed to determine the effectiveness of microlearning based gradual release scaffolding in improving students' quantitative reasoning and data sense-making. Using a one-group pretest and posttest design, 32 students from Sabacan High School answered a validated two-part test. Part I was a 20-item multiple choice test that measured their ability to understand and compute measures of central tendency and to read and interpret graphs. Part II measured their ability to construct graphs from a given set of data. Results revealed that after the two-week intervention using the researcher-made microlearning material, there was a significant difference in the pretest and posttest scores of students in quantitative reasoning and data sense-making where both of their p-values were less than 0.01 and lower than the 0.05 level of significance. Moreover, it was found that the said instructional approach has a large effect in the improvement of students' quantitative reasoning (effect size $r=0.62$) and data-sense making (effect size $r=0.72$). This implies that microlearning based gradual release scaffolding is effective in the development of students' ability to understand statistical concepts and to interpret and present data in graphs meaningfully. Researchers recommended conducting studies using larger samples, different grade levels and subject areas and investigating long-term retention to further

Statistics provides tools and methods in everyday decision-making. It enables people to see patterns, relationships and trends that are usually hidden in raw data. In the field of education, statistics is not only about computations but also about quantitative reasoning and data sense-making. Developing these skills are the two essential goals of statistics in mathematics education. (Quantitative reasoning focuses on using mathematical concepts to logically reason quantities, and relationships (Hartford & Pierce, 2025). In that sense, teachers encourage students to read, interpret, draw conclusions and make predictions in the collected data. On the other hand, data sense- making involves interpreting, analyzing, and drawing conclusions in sets of data without using formal analytical tools as well as constructing different representations of data such as graphs and tables (Lavigne et al., 2021; Fukofka et al., 2021).

However, many students struggle with these skills due to difficulties in connecting mathematical procedures with conceptual understanding that limits their ability to apply statistics in real-life situations (Chan et al., 2019; Saldi and Dela, 2019; Ng & Chew, 2023). In the Philippine educational context, assessments have shown that Filipino students continue to encounter difficulties in understanding statistical concepts, specifically using constructing and simplifying data, choosing appropriate graphs in representing and organizing data, drawing conclusions from graphing and tabular data and even solving and interpreting measures of central tendency (Paul, 2020; Jamero et al., 2021; Chang et al., 2021). Given the challenges faced by students, it is essential to explore different instructional strategies that can strengthen their skills in statistics and mathematics in general.

Microlearning has gained attention as a strategy that can improve engagement, retention and understanding by reducing cognitive overload and allowing learners to focus on specific objectives (Lai & Lee, 2019; Mindrelis, 2025). Research suggests that students learn more effectively when complex concepts are broken down into smaller and manageable segments that allows them to process the information gradually (Sandiuk et al., 2017; Sathiyaseelan et al., 2024). Supporting microlearning with gradual release of responsibility (GRR) as a form of scaffolding offers an effective instruction in improving students' quantitative reasoning and data sense-making. In this approach, students first observe interpretation of graphs and computational procedures, then complete partially guided tasks, and finally construct graphs or solve problems independently while making the content into short and manageable segments. This ensures that students are provided enough time to answers guided practice with feedback, and gradually releases responsibility as they develop independence in computing and

Figure 20. Research article from extension project for journal publication

REFERENCES

De las Peñas M. L. A., & Bautista, D. M (2008). Understanding and developing proofs with the aid of technology. *Electronic Journal of Mathematics and Technology*, 2(3), 262-273.

Gutierrez, J., & Bilefsky, D. (2021). With schools closed, Covid-19 deepens a Philippine education crisis. Retrieved October 19, 2021, from https://www.nytimes.com/2021/09/13/world/asia/philippines-students-remote-covid.html

Ishida, K (1995). A Study on the Process of the Establishment of Barangay High Schools in the Philippines. *Comparative Education*, 1995. Released on J-STAGE January 27, 2011.

Orata, P. (1979). Barangay High Schools for Countryside Development. *International Review of Education*, 25(4), 545-550.

Taka D., Taka A., & Budinski N. 2010. On visualization problems using the GeoGebra and Scientific Workplace packages. *International Journal for Technology in Mathematics Education 17(4)*



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Outcomes of the Project

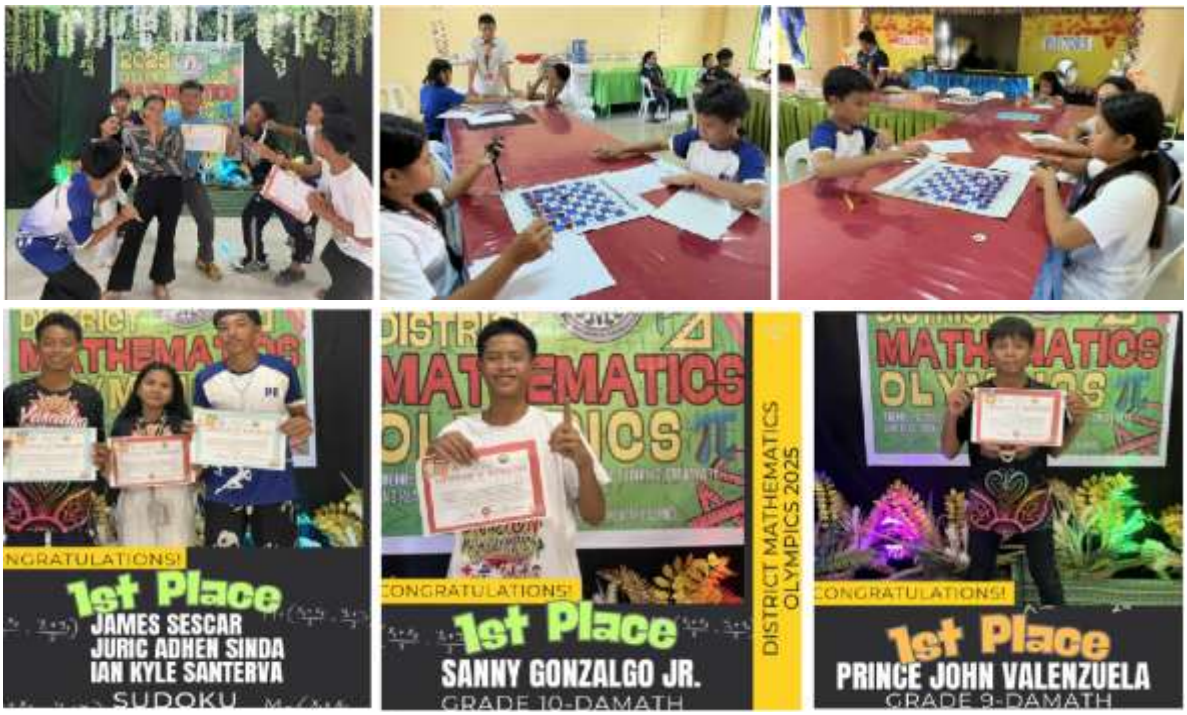
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Figure 1. Pretest and Posttest performance of students

5. **Improved** ranking in mathematics competitions



PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES



6. Enhanced potential for college admission

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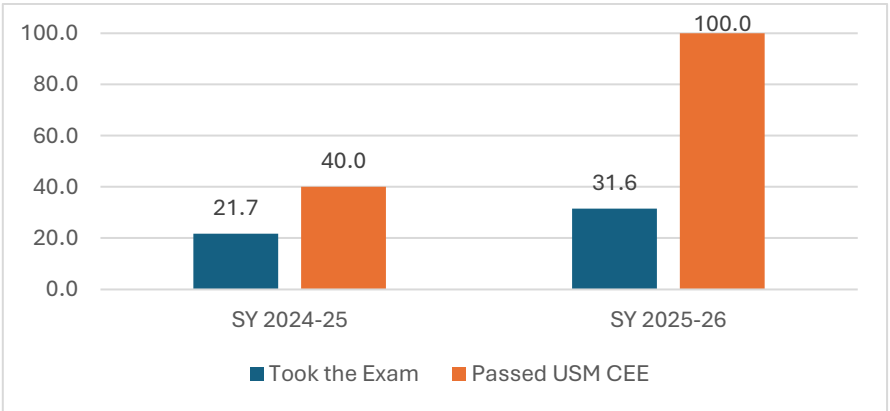


Figure 2. Comparative performance of Senior HS students in USMCEE

PARAMETER D: COMMUNITY INVOLVEMENT AND PARTICIPATION IN THE INSTITUTION'S ACTIVITIES

Photo documentation



Figure 1. *Group photo of College of Science and Mathematics faculty members together with the elementary school teachers of Nangaan Elementary School following the activity.*



Figure 2. *Group photo of faculty members alongside the training-workshop participants, including DepEd school teachers and student*