

Contextualized Learning Resource Material (C-LRM) on the Species Distribution of Flora and Fauna in MT. AGAD AGAD

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ABSTRACT

The study develops a Contextualized Learning Resource Material (C-LRM) incorporating the Local Ecological Knowledge (LEK) in the learning process to develop active information and long-term knowledge. The flora and fauna of species of specific areas like Mt. Agad Agad have enormous importance for the study of ecological forests, and the relationships between the biological things that are currently in existence as well as those relationships. However, more and more students are missing the benefits of environmental awareness that lends itself to promoting responsible ecological management. Learners have difficulty with science because of abstract concepts, lack of exposure, insufficient material, and limited resource material. The study aims to design C-LRMs containing tasks and lessons that suit the Sustainable Developmental Goals (SDGs). SDG 4 (Quality Education), SDG 15 (Life on Land), SDG 13 (Climate Action). This study employs a Quantitative and Qualitative Research Design to support a comprehensive understanding. This study anchored the 4D model developed by S. Thiagarajan, Semmel, and Semmel in 1974. This model is educational design and development to systematically develop and apply teaching resources, the 4D steps are (1) Define, (2) Design, (3) Develop, and (4) Disseminate. The education experts evaluate the efficiency of C-LRM before the dissemination. The materials are suitable for the student's level and contribute to achieving specific objectives, with a mean rating of 3.89. The format, including print quality, illustrations, and design, received a mean rating of 3.79, with high marks for clarity, appeal, and cultural relevance. The presentation and organization of the material were rated 3.88, demonstrating engaging, logical flow. Accuracy and up-to-date scores were 3.83, with no significant conceptual, factual, grammatical, or computational errors, confirming the quality and effectiveness of the materials.

Keywords: Contextualized Learning Resource Material (C-LRM), Local Ecological Knowledge (LEK), Sustainable Developmental Goal, flora and fauna, Mt. Agad Agad, 4D model

INTRODUCTION

The environment, which includes both actual and contextual elements, provides a basis for teaching and the learner-learning process that has a great impact on student learning outcomes. Incorporating Local Ecological Knowledge (LEK) in the learning process develops active information and long-term knowledge. The integration of ecosystem learning and environmental change as topics in Biology continues to evolve annually (Zidan, 2023). Ecosystems represent a foundational concept in understanding the interactions between living organisms and their environments. SDG 4 (Quality Education) states that it Ensures inclusive and equitable quality education and promotes lifelong learning opportunities for all. SDG 15 (Life on Land) integrates the biological organization for biodiversity conservation, species protection, and understanding of the ecosystem, and SDG 13 (Climate Action) incorporates the conservation of the ecosystem to preserve the ecological community.

The purpose of this study is to help students expand their knowledge about ecosystems and escalate their

affection for the environment Make the process of learning as interesting as possible so that the students are willing to comprehend the existing problem, stand responsible for the environment, and act their part in preserving nature (Coracero et al, 2022). Incorporated into this Contextualized is content that focuses on the ecosystems of Mt. Agad Agad, a huge and biologically diverse mountain. By including data about the fauna and flora located in Mt. Agad Agad. The contextualized learning resource material also enhances the students' knowledge of ecosystems and establishes a link between the concepts learned at school and real-life experiences. The fact that Mt. Agad Agad is approximately 520 meters above sea level, offering a panoramic view of Iligan City, which increases the site's susceptibility to human disturbances (Guiang et al. 2022). As well it stands to reason that the fauna and flora endemic to it are some of the most different and endangered in the region, the case study urges to implementation of long-term protection and local conservation initiatives in the mountain ecosystem (Amoroso et al., 2022). Incorporating environmental-focused design learning materials into lessons provides a valuable opportunity to explore the complex dynamics of population and species interactions, as well as the potential for conservation, contributing to a bright and sustainable future for the area.

Science is essential for learning in the 21st century due to its deep effect on society's economics, health, and social status (Lasala, 2023). The environments are widely used in science education to provide reliable learning experiences, achieving credibility via connection to real life, uncommon scientific phenomena, and practices in a chemical laboratory Güth, & Vorst, (2024). However, both (Benedito et al., 2023) and Agbunag (2022) highlight that the learners are having difficulty to relate in science because of abstract concepts, lack of exposure, insufficient material, and limited resources material. According to the study of Agbunag (2022), Science is a particularly challenging subject for students across both private and public schools because the annual results from various achievement and proficiency tests in Science and Technology consistently reveal that learners struggle with these subjects. A critical issue is the absence of educational resources that provide strong transitions between curriculum content and local ecological contexts.

OBJECTIVE OF THE STUDY

The main objective of this study is to develop Contextualized Learning Resource Material (C-LRM) on Ecosystem for Grade 7 students. To attain the general objective, it aims to:

1. Identify the needs of the teachers and school administrators on Contextualized Learning Resource Material (C-LRM) on Ecosystem for Grade 7 students;
2. Design Contextualized Learning Resource Material (C-LRM) on Ecosystem;

METHODS

This study anchored the 4D model developed by S. Thiagarajan, Semmel, and Semmel in 1974 (Hariyanto, B., Mz, I., Su, W., & Rindawati, N. 2022).

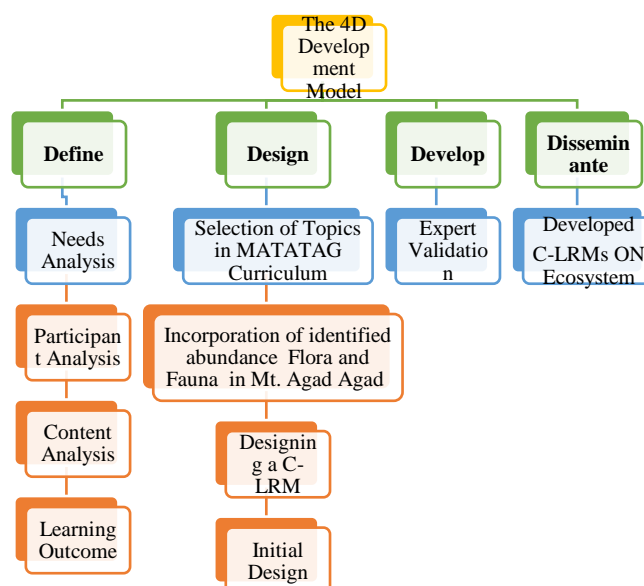


Figure 1. 4D model developed by S. Thiagarajan, Semmel, and Semmel in 1974

4D Model

The 4D model, which is a model of top-down design by S. Thiagarajan, Semmel, and Semmel in 1974, is a complete, careful process of designing and creating educational materials, and thus, of developing high variability (effective) educational resources (Haryanto, B., Mz, I., Su, W., & Rindawati, N. 2022). The various stages of this model are the four routines: Define, Design, Develop, and Disseminate. In the context of Creating Learning Resource Materials (C-LRM), the 4D model is useful for ensuring that these learning resources are not only aimed at the teaching and students but are also aligned with the educational standards followed.

Define

In the Define phase, the first step within the given process is to undertake a survey from the various schools so as to understand the particular requirements of science teachers and school administrators more precisely. The purpose of this survey is to identify instructional gaps in teaching science and determine the need to address the context.

Design

The second phase, Design, focuses on constructing a detailed plan for the Contextualized Learning Resources Material (C-LRM). This step involves aligning the content in Ecosystem with the identified needs and educational standards from Metatag Curriculum.

Develop

The third phase, Develop, involves the actual creation of the Learning Resources Material (LRM) based on the design specifications. This includes producing educational contextual materials such as interactive activities, multimedia content, and hands-on experiments. This might involve developing case studies of species in Mt. Agad Agad.

Disseminate

The final phase, Disseminate, involves the implementation and distribution of the developed Contextualized Learning Resource Materials (C-LRM).

Needs Assessment Interview of the School Head and Science Teachers

Key informants' needs assessment is an activity that involves the garnering of information from persons who usually have a huge stored knowledge base or an experience that would be highly essential in the making of the educational resources. Key informants to be selected in the development of the Contextualized Learning Resource Material (C-LRM) about species distribution in Mt. Agad Agad. The researcher adopted and modified a needs assessment interview from the study of Allonar et al. (2023) to gather insights from (5) five grade 7 teachers, and (4) school Principals in School Year 2024-2025. The focus was on contextualized Learning Resource Materials (C-LRMs) and ecosystem topics, addressing both community needs and the requirements of the developed material in the teaching ecosystem.

Designing a Contextualized Learning Resource Material (C-LRM)

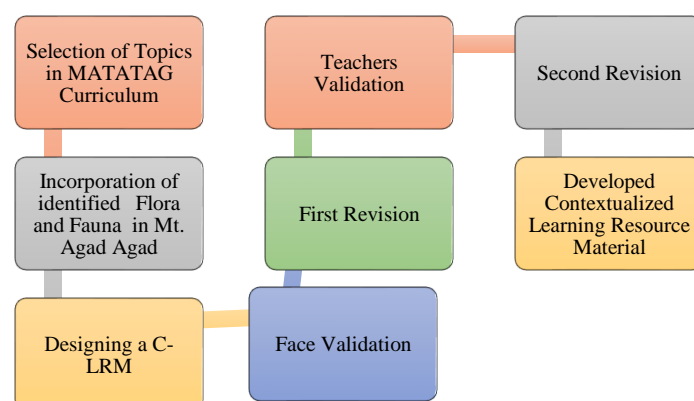


Figure 2. Process of Developing Contextualized Learning Resource Material (C-LRM) for Ecosystem Grade 7

The researcher primarily identified key topics to include in Developing Contextualized Learning Resource Material (C-LRM), focusing on essential concepts in ecosystems such as biotic and abiotic components, levels of organization, ecological relationships, energy transfer, effect of abiotic changes on ecosystems and food pyramid. Moreover, the content of the Learning Resource Material (LRM) was developed using insights from key informants, ensuring that it addressed relevant topics and needs.

Selection of Topics in MATATAG Curriculum

The researcher first tries to find out the relevant areas to focus on in the Developing Contextualized Learning Resource Material (C-LRM), which included topics such as biotic and abiotic factors, organization levels, ecological relations, transfer of energy, impact of abiotic factors on ecosystems, and food pyramids. Additionally, the Contextualized Learning Resource Material (C-LRM) was formulated based on the insights of key informants on the topics that were important and addressed the goals of relevance. They were instrumental in restructuring the lessons and activity such that they were more productive and relevant to the learners' experiences with and understanding of systems of ecosystems.

Incorporation of identified Fauna and flora in Mt. Agad Agad

Ecosystem-based context contextualized learning resource material (C- LRM) has been developed and interesting activities have been integrated into its location, created on the usage of species found in Mt. Agad Agad. The purpose of the material stems from the environmental features, which are urban and physical culture. Including the fauna and flora in the C-LRM allows the students to take an active walk to appreciate the diverse aspects of life on Mt. Agad Agad. This scheme brings about understanding through the application of applicable concepts as opposed to conditioning.

Designing a Contextualized Learning Resource Material (C-LRM)

The selected topics were aligned to the learning competency outlined in the MATATAG Curriculum. Whereas, the process of aligning the content to the incorporation of the ecosystem of Mt Agad Agad environment and local fauna and flora in the area. Furthermore, the activities and assessments with contextual learning material were acquired and developed from learning exemplars and learning activity sheets in science to ensure that what is taught and evaluated directly corresponds to the skills and knowledge students are expected to acquire effectively.

Face Validation

The developed Contextualized Learning Resource Material (C-LRM) on the topics in Ecosystem in grade 7 was evaluated by the adviser and the 3 three panel members. The adviser and panel members will evaluate the Contextualized Learning Resource Material (C-LRM) focused on Ecosystem topics. This evaluation aimed to assess the effectiveness, content, Design, and relevance of the materials in associate knowledge.

Teachers Validation

Contextualized Learning Resource Material (C-LRM), was evaluated by 5 Five in-service public school science teachers in grade 7, the evaluator of the materials must have a specific selection criterion: each evaluator needed to be a biology major and possess knowledge of contextualization. The study employed adapted standardized criteria from the Department of Education (DepEd) established in 2021, this framework creates a structure to assess the quality and effectiveness of the developed CLRMs. Through following these criteria, the evaluation sought to ensure that the Contextualized Learning Resource Material.

Second Draft/ Second Revision

Before utilizing the developed Contextualized Learning Resource Material (C-LRM), the ratings, comments, and suggestions of the evaluators were considered for the improvement of the developed contextualized CLRMs on the topics in Ecosys

Developed Contextualized Learning Resource Material

The developed and enhanced Contextualized Learning Resource Material (C-LRMs) for seventh-grade science

nurturing emotional engagement with ecology subjects.

RESULTS AND DISCUSSIONS

Validation and Utilization of the Needs Assessment Survey Questionnaires for Key Informants

Prior to conducting the study, a needs assessment was conducted with four (4) School Principals and five (5) Grade 7 Science Teachers from four (4) different schools in Misamis Oriental and Lanao Del Norte: Libertad National High School, Matangad National High School, Lubluban Integrated School and Esperidion F. Encabo Memorial High School. These people are referred to as the Key Informants. The output of the needs assessment will serve as a basis for the designing and developing of the Contextualized Learning Resource Material (C-LRM).

Table 4.1.1 Key Informants Needs Assessment on the Contextualized Learning Resource Material (C-LRMs) results by evaluators

Component	Mean	Description
A. Content and Development	3.78	Excellent
B. Format, Organization, and Structure	3.93	Excellent
C. Grammar	4.00	Excellent
Overall Mean	3.88	Excellent

Legend: 1.00-1.74 (needs improvement); 1.75-2.49 (good); 2.50-3.24 (very good); 3.25-4.00 (excellent)

Table 4.1.1 shows the results of the evaluation of the Contextualized Learning Resource Material (C-LRMs) based on three components: Content and Development, Format, Organization, and Structure, and Grammar. The evaluation results indicate that the C-LRMs are rated as excellent in all areas. The Content and Development component received a mean score of 3.78, suggesting that the content gained a clearer understanding of course activities and improved their performance on assessments (Orr et al, 2022) learning objectives. The Format, Organization, and Structure component achieved the highest mean score of 3.93, indicating that the material is logically organized and Instructional materials play a crucial role in the teaching and learning process (Cubillas, 2020). The Grammar component received a perfect score of 4.00, demonstrating that the material is free from grammatical errors and well-written. Overall, the C-LRMs scored an overall mean of 3.88, which further emphasizes that the resource materials are of high quality and meet the standards for effective teaching and learning.

Summary of the Results of the Needs Assessment Interview of the Key Informants

The four (4) school principal, and five (5) in-service grade 7 science teachers were among the respondents in the needs assessment interview. To ensure respondent privacy, the study employed data coding, where **NP1**, **NP2**, **NP3**, and **NP4** referred to the School Principal Needs Assessment, and **NT1**, **NT2**, **NT3**, **NT4**, and **NT5** stood for the Science Teacher Needs Assessment.

Table 4.1.2 Summary of the Responses of the School Principal and Science Teachers on Difficulties in Teaching Ecosystem

Themes	Codes	Utterances
Difficulties Encountered in Teaching Ecosystem	Availability of materials	NP1: Difficult for logistics in teaching materials. NP3: The diffiulties encountered by teachers are resources and instruments, practices in the community, and adaptability of the learning approach.

	Time constraints	<p>NP4: Some of the common difficulties are time constraints, daily workload pressure, especially applying 45 minutes in lesson per subject, and classroom management.</p> <p>NT1: The topic "ecosystem" is a bit broad, and as much as I want to introduce all the types of ecosystems, we have limited time only.</p>
	Teaching Ecosystem Challenges	<p>NP2: They have difficulties in integrating differentiated instruction in teaching.</p> <p>NT2: Students cannot differentiate biotic and abiotic factors using words, but when pictures are used, they somehow understand</p> <p>NT3: Generally, they have difficulty in interconnecting the different relationships of species to other species in maintaining and sustaining the balance of the ecosystem</p> <p>NT4: Components of biotic and abiotic factors are unfamiliar to the learners. They cannot fully grasp the meaning of an ecosystem.</p> <p>NT5: one problem is the complexity of the relationship in an ecosystem. Student find it difficult to understand how one change can have a ripple effect throughout an ecosystem</p>

Table 4.1.2, The data points out several major issues that teachers face in delivering effective teaching methods. Some of the common problems include logistical challenges such as sourcing teaching materials and resources, and time factors, where there is less time for each subject and this becomes a challenge to delivering lessons. Teachers also face problems in incorporating differentiated instruction for different students. Some difficulties will, therefore arise with the introduction of ecosystems as some topics require long elaboration. The students find difficulty in grasping abstract ideas such as distinguishing between abiotic and biotic factors that would be understood best by the use of pictures.

In Asian countries, such as the Philippines, instructional materials are lacking in public schools due to education reform (Manlunas, 2023). The shortage is further compounded by the lack of quality support through a system that also includes essential education and training for program personnel as well as constant technical assistance for program providers and individual care providers. These elements are necessary for ensuring effective service delivery and overall better education results (Peralta, 2023). Furthermore, in the study of Manlunas (2022), it is also revealed that instructional inadequacies material can considerably influence teacher routine and prevent students from achieving full knowledge.

According to the MATATAG Curriculum DO No. 10, s. 2024, all learning areas will be given 45 minutes a day for five days, and the Homeroom Guidance Program for 45 minutes once a week. However, if a subject is unmotivating or not particularly engaging, students may skip or overlook certain sections and rush through the text in an attempt to finish quickly, as noted by Navarro et al. (2024). This highlights the importance of making subjects engaging to ensure that students fully engage with the material rather than rushing through it.

Table 4.1.3 Summary of the Responses of the School Principal and Science Teachers on Interventions Done to Address the Impediments in Teaching Ecosystem

Themes	Codes	Utterances
Interventions to help these difficulties	Seeking Sponsorship and Support	<p>NP1: We ask sponsorship from stakeholders</p> <p>NP3: Seek partners and stakeholders for material resources needed, hold community meetings, and consultations with parents, stakeholders, and learners for participation and support.</p>

	School Learning Action Cell (LAC) Seminars	<p>NP2: Conduct a seminar through school learning action cell.</p> <p>NP4: Time management, originally through conducting LAC (Learning Action Cell) sessions with the curriculum leader teachers</p>
	Interactive and Digital Learning	<p>NT2: Use interactive learning through hands-on activities and digital tools, where students can manipulate and label diagrams themselves. Use local examples to enhance understanding.</p> <p>NT5: using world examples and utilizing visual aids and interactive tools.</p>
	Structured Lesson Approach	<p>NT1: Introduce the whole part of the lesson, then tackle the strategy. Introduce the main topic, followed by the subtopics, with examples and actual images.</p>
	Apply contextualization/ localization example	<p>NT3: Provide concrete and simpler examples through contextualization.</p> <p>NT4: Use realia and localization in teaching.</p>

Table 4.1.3, Several challenges arise in the teaching of ecosystems, specifically regarding resources, time available, and the complexity of the topic. The inability to have ample teaching material and logistics easily hinders effective instruction. Time pressure in terms of managing day-to-day workloads, and delivering lessons that require 45 minutes, all contribute to the difficulty. It is hard to address all areas within the ecosystem topic in the time given. Further, teachers often face a problem in applying differentiated instruction, as it is tough for students to understand the interrelationship of species and the balance in the ecosystem. Further, there is an understanding gap in distinguishing between biotic and abiotic factors that require graphic aids.

The Learning Action Cell (LAC), as defined in DepEd Order No. 35, s. 2016, consists of a group of teachers who participate in collaborative learning meetings to address shared challenges encountered in the school, facilitated by both the school head and the curriculum head. This LAC is one of the best remedies for the school's head and aside from that the using of Interactive and Digital Learning according to Guzman & Guzman, (2024) it is essential to review or test media and materials before the actual lesson to ensure everything functions correctly.

Table 4.1.4 Summary of the responses of the School Principal and Science Teachers on Contextualization and Localization of Science Subjects

Themes	Codes	Utterances
Familiarity with Contextualized Teaching	Contextualizing lessons or activities	<p>NP4: Yes, to make learning meaningful the students we should link our lesson to real world and local context</p> <p>NT2: I am familiar with contextualization and localization of lessons it is relating lessons activities to the real-world experiences. Examples culture and cultures and environment of the student</p> <p>NP1, NP2, NP3, NT1, NT3, NT4, and NT5: Yes</p>
Training on Contextualizing the Lessons	Attended seminars/webinars	<p>NP1: Yes, I attended seminars and trainings about contextualizing and localizing also, these would be helpful for the teachers in their professional development</p> <p>NP2: Yes, we did it many times for the recent activity we have use also give it during our recent in-service training.</p>

		<p>NP3: Yes of course,</p> <p>NP4: Yes, after the seminar they equipped with practical tools and strategies that they can apply in the classroom to make lesson more relevant</p> <p>NT1. Yes, attending seminars webinars about these topics is helpful I get to be updated and elevated my skills in in this field</p> <p>NT2: I attended once contextualization and localization of lessons activities are powerful strategies that enhance the student’s engagement and comprehension it enhances the learning process making it more relevant and impactful</p> <p>NT3: Yes, contextualization and lesson is relating educational content to the real scenarios or situation experiences knowledge a local environmental of students. It is made easier for the student to understand the lesson and able an easy apply it (learning) to real situation</p>
	No Training	NT4 and NT5: No
Benefits of Contextualization in the Teaching-Learning Process	Transfer of knowledge	<p>NP1: Yes, I see successful transfer of knowledge through contextualized and localized of learning transfer</p> <p>NP2: yes, I find it very important because it is how learning experience of the learner successfully transfer the knowledge through understanding based on their context.</p>
	Anchored experiential learning	<p>NP3: Yes, absolutely this anchored experiential learning it is easy to group learning if it is based the way the learning stands or resides meaning he is familiar</p> <p>NP4: Yes, context to listen localization play a crucial role in creating meaningful learning experience accused they connect academic content to student’s real-world experience and develop critical life skills</p> <p>NT1: Yes, I always believe that experience good experience especially is the best teachers if the learners have first-hand experience, it won’t take much of the teacher’s time understanding the lesson</p> <p>NT4: Yes, due to the it’s reliable factor there is meaning for learning experience at the student’s end they better appreciate the lesson because they are familiar with the use input or contacts</p>
	Bridge the gap between theory and real-world application	NT2: Yes, this kind of approach help bridge the gap between theory and real-world application additionally it fosters a deeper connect facilitation of critical thinking skills
	High retention	NT3: Yes, since it’s something relatable to them so easy to understand easy to remember (high retention)
	Simplifying complex concepts	NT5: Yes, it leads to better understanding by simplifying complex concepts by relating to familiar sittings, improving comprehension.

Table 4.1.4, The data show that contextualization contributes to better teaching and learning. Many teachers are actually familiar with the concept, which is contextualizing a lesson to relate content and the real world and locale. Training in contextualization, through seminars and webinars, has provided them with practical tools to make lessons even more relevant and interesting to students. These professional developments are worth it to heighten the effectiveness of teachers. Several reasons are perceived for contextualization.

Teachers view it as something that enhances the transfer of knowledge. It also enhances experiential learning and also helps bridge the gap between theory and real-life application. Moreover, this kind of teaching improves high retention of information, as most students find it easier to relate to and understand the lessons connected to their day-to-day lives. Also, contextualized teaching makes complex issues easier to comprehend for most students.

The "Teachers for Learners" initiative aims to motivate educators towards promotion while promoting the development of contextualized materials tailored to various regions and the diverse needs of learners, ultimately paving the way for localized resources that are well-suited to specific types of students (Peralta, 2023). The localization and contextualization make science lessons highly relevant and responsive to the learners' needs (Montero & Geducos, 2022). Thus, the unexperienced activities must be localized or contextualized for teachers to effectively deliver the curriculum content and help learners better grasp and understand the lesson Manlunas, (2022).

Table 4.1.5 Summary of the responses of the School Principal and Science Teachers Learning Resource Material LRMs)

Themes	Codes	Utterances
Familiarity with Learning Resource Material (LRM)	Teaching and learning Material	NP1: Yes, it's use for teaching and learning in the influence on process NT2: Yes, I am familiar with learning resource material it is a dedicated space within a line an educational institution that provides a variety of learning materials to support teaching and learning
		NP3, NP4, NT1, NT3, NT4, NT5: Yes
		NP2: 1. I am not familiar with it, but I like to know about it.
Training on LRM	Attended seminars/webinars	NP1: Yes, they are one seminars about learning user's materials construction seminars on both DEPED and private school NP3: Yes, the material allow learner to Browse to understand and provide them to develop skills and inputs and two works in a variety of ways NP4: Yes, because they help make the subject matter more relevant relatable and understandable for students by connecting ecological concept NT1: Yes, it all boils down to the teacher's prerogative in providing The LRMs and in DEPED if only we have enough resources and time then it will work all the time. NT2, I attended learning resource materials seminar in school learning resource material is about material resource that allows self-assessment to track their progress it is a high-quality learning resource essential for effective teaching and learning enhancing student Engagement and success. NT3: Yes, these are materials facilitating the learning process examples are textbooks works books modules journal magazine and etc.

		<p>NP2: Not so far</p> <p>NT4: 3. now I was not able to attend any seminars/ webinars</p> <p>NT5: No, I have not</p>
Benefits of Contextualized LRM on the Teaching-Learning Process	Useful in teaching ecosystem	<p>NP1: Yes, I pretty believe that there are learning resource materials as teacher and learning materials can be contextualized and it's Useful in teaching ecosystem</p> <p>NP2: Yes, because in teaching ecosystem topic levels we can context delays and localize days in our language and common their use that learners can easily understand</p> <p>NT1: Yes, to encourage active participating since the learner can relate to the lesson</p> <p>NT4: yes, it will be useful in teaching ecosystem become the learners and familiar with the input/knowledge content used in the lessons. Relatable content with w/c allows meaningful learning experiences.</p> <p>NT2: CLRM done significantly enhance the teaching and learning of ecosystem by making the subject matter more relevant and impactful</p>
	Addresses local context	<p>NP3: Yes, because it will be highlighting materials or whatever it is available in the Existing environment. How people animal and living things survive in their habitat</p> <p>NP4: Yes, because they help make the subject matter more relevant relatable and understandable for students by connecting ecological concept</p> <p>NT3: Yes, absolutely it is also much useful and meaningful because student can so much relate about species mentioned because it is what they are familiar with</p> <p>NT4: yes, because it is tailored to the student's local context and addresses their specific learning needs</p>

Table 4.1.5, The data reveals that numerous teachers are conversant about the Contextualized Learning Resource material in the LRM that provides teaching enhancement, particularly topics like ecosystems. Some teachers have attended seminars regarding how LRM connects academic content and its real and local content. This helps the learning of students in achieving engagement and understanding. Because of contextualized LRM, lessons become relevant for the students to learn by heart and easier to apply to their everyday experiences of life. However, few had attended the LRM training.

Contextualized Teaching and Learning, in the study of Manlunas, (2022) is an approach that has the potential to strengthen the connection between the learning environment and the community. Contextualized learning activities have notably enhanced students' conceptual understanding (Montero & Geducos, 2022). Additionally, the use of contextualized learning materials, such as simplified reading modules with differentiated activities tailored to students' needs, has shown positive outcomes in improving reading lessons (Manlapaz et al., 2022). The contextualized module also provides a teaching guide for parents to help them become more effective partners in facilitating learning (Guzman & Guzman, 2024).

Selection of Learning Competency in MATATAG Curriculum from DepEd

The Lesson Exemplar of MATATAG Curriculum served as the basis for developing the Contextualize learning resource material. This is because they outline the vital competencies, knowledge, and skills that grade 7 learners are expected to complete. This enables student to adapt their learning process based on previous experiences, specific needs, and strengths, which can flourish through the application of modern approaches (Guzman, 2023).

Moreover, the MATATAG Curriculum ensures that the lessons contained in the Learning Resource Materials are appropriate and aligned to the grade level, performance expectations, and content standards of the learners.

Table 4.2.1 Selection of Topics in Lesson Exemplar from MATATAG Curriculum DepEd

Quarter	Content Standard	Performance Standard	Learning Competencies and Objectives	Duration
2nd	The level of biological organization provides a simple way of connecting the simplest part of the living world to the most complex	By the end of the quarter, learners will explain and use diagrams to make connections between organisms and their environment at various levels of organization.	The student will use a labelled diagram to describe the connections between the levels of biological organization to one another from cells to the biosphere.	Week 7
	Identifying trophic levels helps understand the transfer of energy from one organism to another, as shown in a food pyramid.	By the end of the Quarter, learners will explain the process of energy transfer through trophic levels in food chains.	Describe the trophic levels of an organism as levels of energy in a food pyramid.	Week 8

Table 4.1 presents the content standard, performance standard, learning competencies and objective, and duration used in the study. The study focused on two specific learning competencies: (1) The student will use a labeled diagram to describe the connections between the levels of biological organization from cells to the biosphere. Describe the trophic levels of an organism as levels of energy in a food pyramid.

According to Navarro et al. (2024), a crucial component of the curriculum is to aid in helping students become competent in specific skills by fostering intellectual development, shaping attitudes, cultivating interest, and enhancing both skills and creativity. Moreover, deepening curriculum contextualization through indigenization is vital for communities with cultural practices distinct from the majority in the same locality (Peralta, 2023).

Learning Competency Mapping of the Contextualized Learning Resource Material (C-LRM)

Once the targeted learning competencies were determined, the learning resource material were broken down into smaller, more manageable subtasks. Each Contextualize learning resource material contains four engaging activities that students are to complete within a given timeframe. Contextualized Learning Resource Material (C-LRM) is divided into 5 materials namely C-LRM 1, C-LRM 2, C-LRM 3, C-LRM 4 and C-LRM 5.

Table 4.2.2 MATATAG Curriculum Mapping of the Contextualize learning resource material in the Topics of ecology

Learning Competencies	Topic	Subtasks	Activities and label	C-LRM
The student will use a labelled diagram to describe the connections between the levels of biological organization to one another from cells to the biosphere	<ul style="list-style-type: none"> · Ecosystem · Biotic and abiotic components · Characteristic of living things 	<ol style="list-style-type: none"> 1. Identify the biotic and abiotic components of an ecosystem 2. Compare Biotic and Abiotic component of an ecosystem 	<p>Activity 1 “Mt Agad Agad Biotic and abiotic”</p> <p>Activity 2 “Life with in small world”</p>	C-LRM 1

		3. Cite the importance of biotic and abiotic in sustaining life.	<p>Activity 3</p> <p>“find fauna and Flora”</p> <p>Activity 4</p> <p>“What does mean to be alive”</p>	
	<ul style="list-style-type: none"> · Ecological Level of Organization · Function of the ecosystem 	<ol style="list-style-type: none"> 1. Determine the ecological level of organizations 2. Organize the difference ecological level 3. Relate the importance of the ecosystem in daily living 	<p>Activity 1</p> <p>“where do I belong?”</p> <p>Activity 2</p> <p>“environmental science world scramble challenge”</p> <p>Activity 3</p> <p>“levels of orgazation in ecology”</p> <p>Activity 4</p> <p>“Unravelling The Complexity Of Life”</p>	C-LRM 2
	<ul style="list-style-type: none"> · Ecological relationship · Effect ecological relationship 	<ol style="list-style-type: none"> 1. describe the different ecological relationship between and among organisms in an ecosystem. 2. Explain how the organisms are affected by the relationships 3. Discuss the importance of these relationships for the survival of the Organism 	<p>Activity 1</p> <p>“Ecological Relationship Match-Up”</p> <p>Activity 2</p> <p>“Observing Local Ecological Interaction”</p> <p>Activity 3</p> <p>“Ecological relationship and human impact”</p> <p>Activity 4</p> <p>“Poster Making On Ecological Relationship in Mt. Agad Agad”</p>	C-LRM 3
Describe the trophic levels of an organism as levels of energy in a food pyramid	<ul style="list-style-type: none"> · Tropical pyramid · Food chain · Energy flow 	<ol style="list-style-type: none"> 1. Distinguish between producer and consumer 2. Identified the organisms comprising food chain and the function of each 3. Construct a food chain to show the energy flow from one topic level to another. 	<p>Activity 1</p> <p>“Where is producers, consumers, and decomposers”</p> <p>Activity 2</p> <p>“Your Food and Their Food”</p> <p>Activity 3</p> <p>“Who Eats Who”</p>	C-LRM 4

			<p>Activity 4</p> <p>“They Can Make Food”</p>	
	<ul style="list-style-type: none"> · Biotic and abiotic factor · Abiotic factor and their effect on the ecosystem 	<ol style="list-style-type: none"> 1. Identify the biotic factor in the ecosystem 2. Determine that the effect of changes in abiotic factor in the ecosystem. 3. Give the importance of a biotic factor in maintaining the balance in the ecosystem 	<p>Activity 1</p> <p>“Existing but not living”</p> <p>Activity 2</p> <p>“Exploring Challenges in Biotic Factor and Their Impact on The Ecosystem of Mt Agad Agad”</p> <p>Activity 3</p> <p>“Maintaining ecosystem balance sustainability challenges in Mt. Agad Agad ”</p> <p>Activity 4</p> <p>“Protect it, by using your words ”</p>	<p>C- LRM 5</p>

Table 4.2.3 The MATATAG Curriculum Mapping offers a comprehensive context allows students to engage with ecological concepts through both theory and hands-on activities, making the learning process more interactive and applicable to real-world ecosystems. This method emphasizes understanding the levels of biological organization, trophic relationships, biotic and abiotic factors, and the ecological relationships that sustain life on Earth.

Validation of the developed Contextualized Learning Resource Material (C-LRM)

The feedback of five (5) evaluators on developed Contextualized Learning Resource Materials (C-LRMs). In-service teachers provided ratings after the revisions, which are outlined in the evaluation results. The evaluators used the standardized evaluation-rating sheet from DepEd (2015)

Table 4.2.3

Factors	Mean	Description
Factor 1: Content	3.89	Very Satisfactory
Factor 2: Format	3.79	Very Satisfactory
Factor 3: Presentation and Organization	3.88	Very Satisfactory
Factor 4: Accuracy and Up-to-datedness of Information	3.83	Not Present

Legend (factors 1-3): 1.00-1.74 (not satisfactory); 1.75-2.49 (poor); 2.50-3.24 (satisfactory); 3.25-4.00 (very satisfactory)

Legend (factor 4): 1.00-1.74 (poor); 1.75-2.49 (present & requires major re-development); 2.50-3.24 (present but very minor & must be fixed); 3.25-4.00 (not present)

The table 4.2.3 presents the result of the evaluation on the print resources. The print resources are evaluated in terms of the four (4) factors. Results revealed that on the average the print resources are very satisfactory in

terms of content, format, and presentation and organization. It is found also that the errors are not present in the print resources. The evaluation results show that the Contextualized Learning Resource Materials (C-LRMs) instructions for each activity in the material are clear and easy to understand (Cubillas, 2023).

In terms of content, the materials are suitable for the student's level and contribute to achieving specific objectives, with a mean rating of 3.89. The format, including print quality, illustrations, and design, received a mean rating of 3.79, with high marks for clarity, appeal, and cultural relevance. The presentation and organization of the material were rated 3.88, demonstrating engaging, logical flow. Accuracy and up-to-datedness scored 3.83, with no significant conceptual, factual, grammatical, or computational errors, confirming the quality and effectiveness of the materials.

CONCLUSION

The needs assessment of grade seven science teachers and administrators has proved that Teachers are struggling with time and sourcing of teaching materials among other logistical issues in delivering effective teaching methods. When teaching ecosystems, time and material shortages do make it difficult to teach effectively. Contextualization is beneficial by connecting the lessons to the surrounding area and real-life scenarios which improve the level of both teaching and learning. A lot of teachers know this approach which helps to enhance the quality of education offered.

The developed Contextualized Learning Resource Materials (C-LRMs) were shown to be of good content quality, well organized, and grammatical, resulting in improved student comprehension of biodiversity. Students found the materials interesting, while the teachers claimed they helped teach difficult concepts in ecology. The content rated 3.89, format 3.79, presentation and organization 3.88, and accuracy 3.83, which proves the materials' relevance, clarity, attractiveness, and efficacy in improving the teaching and learning processes in science education.

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