Development of a Contextualized Strategic Intervention Materials (CSIMs) on Marine Ecosystem

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ABSTRACT

The aim of this study is to address the gaps highlighted in the results of the performance of Filipino students in PISA and TIMSS namely, misalignment between the curriculum and international standards, lack of teaching resources, and low student engagement specifically in science education. Developing a Contextualized Strategic Intervention Materials (CSIMs) on Marine Ecosystem improves conceptual understanding of science concepts specifically on Ecosystem and assist teachers through the creation of the CSIMS which can be utilized as a supplemental material. This study employs a Quantitative with Qualitative support research design with one group pretest/posttest composed of 46 learners to have a better understanding of the study. The study was anchored on the 4D model developed by S. Thiagarajan, Semmel, and Semmel in 1974, the 4D steps are: (1) Define, (2) Design, (3) Develop, (4) Disseminate. Teaching Ecosystem also aligns with international initiatives like the SDGs, the ones that address life on land (SDG 15) and below water (SDG 14) UN, 2021). The materials are suitable for the learner's level, based from the panel of evaluator's ratings with a mean rating of 3.845 interpreted as Very Satisfactory with high marks for Accuracy and up-to-datedness of information, with no significant conceptual, factual, grammatical, or computational errors, confirming the quality and effectiveness of the materials. The Content was rated 3.71, Format with 3.86, and Presentation and Organization with 3.88, all interpreted as Very Satisfactory. The developed CSIMs can be recommended as a basis for developing more Contextualized SIMs for other topics in Biology.

Keywords: Contextualization, Strategic Intervention Materials, CSIMs, Ecosystem, 4D Model, Conceptual Understanding, SDGs

INTRODUCTION

The Philippine educational system has undergone a recent significant and magnanimous change, particularly in the implementation of a new curriculum – the MATATAG curriculum, which focuses on improving and enhancing the current K–12 curricula to cater to the needs of the learners and teachers by decongesting the learning competencies found in the current K-12 curricula. One of the main reasons why the MATATAG Curriculum was created is because of the problems that the Filipino learners face in both national and international exams where they have garnered low scores making Filipinos as whole think of better ways to alleviate these difficulties we are facing. This major step gives stress on enhancing fundamental abilities and competencies across courses, especially science (Department of Education [DepEd], 2023). The topic ecosystems is one of the fundamental context included in the science curriculum for Grade 7. Living things interact with their physical environment and among themselves in a dynamic ecosystem. Also emphasized in the curriculum is the significance of environmental stewardship and sustainable goals. The mangrove ecosystem serves as a prime example for learner's learning about ecosystems and the need to preserve biodiversity and natural resources. These teachings are in line with international initiatives like the Sustainable Development Goals (SDGs), especially the ones that address life on land and below water (United Nations, 2021). Due to the poor performance of Filipino learners during the PISA and TIMSS, the following critical gaps were highlighted, including the misalignment of the curriculum with the international standards, not enough teacher training, lack of resources, and low learner motivation and engagement. These issues point out to the need for a more

meaningful, fitting, and contextually relevant curriculum, as mandated by the Department of Education (DepEd). It is imperative that these gaps be addressed, to improve learner results and better prepare them for global issues.

Strategic Intervention Material also known as SIM in Philippine Education is one of the answers employed by the Department of Education to alleviate the academic performance of students in science. According to Bunagan (2012), SIMs are teacher-made learning resources designed to developing learner's competencies by concentrating on difficult concepts in a simplified and appealing manner. It is an instructional material made for remediation, supplemental material, and intervention purposes. In this study, the developed material is utilized as a supplemental material during actual classroom discussion. As a result, the researcher is inspired to assist teachers and their learners by creating Contextualized Strategic Intervention Materials (CSIMs) on Marine Ecosystem. These materials would not only address the important topics of ecosystem, a major theme in the science curriculum for Grade 7, but also assist students in making the connection between what they are learning and real-world applications by considering their environment, experiences, and responses when interpreting the learning content.

Objectives of the Study

The main objective of the study is to develop a Contextualized Strategic Intervention Materials (CSIMs) on the topics of Ecosystem as a supplemental material for Grade 7 learners. Specifically, it aimed to seek the following objective:

1. Identify the needs assessment of the In-service Science Teachers and School Administrators on the Contextualized Strategic Intervention Materials (CSIMs) in the topic Ecosystem for Grade 7 learners.

METHODOLOGY

Research Design

The study employs the Quantitative with Qualitative support research design with one group pre-test/posttest. This design involved one group who received a pretest, which followed by a treatment (Contextualized SIMs), and then a post-test. Quantitative data includes pretest and posttest scores, and panel of validators' ratings while for Qualitative data includes Validator's comments and suggestions, student's perception, and teacher perception.

Research Participants

The participants in the study are the following: The five (5) In-service Science teachers and the three (3) School Administrators from 3 different schools, who were referred as Key Informants. They will be responsible in answering the Needs Assessment Questionnaire. Their responses will serve as the basis in developing a Contextualized Strategic Intervention Materials (CSIMs) on Marine Ecosystem. Another group of participants who participated in this study are the five (5) Panel of Evaluators who validated the instruments namely: Needs Assessment Questionnaire and the developed CSIMs; the Science Master Teacher as an observer who have observed the researcher during the implementation of the Contextualized SIMs. Another set of ten (10) Grade 7 learners coming from another section, from the research setting was selected for the limited testing. Lastly, forty-six (46) learners from one section were the respondents during Implementation.

Research Instruments

The following are the research instruments utilized in the study: (1) Needs Assessment Questionnaire for the Key Informants (School Administrators & In-service Science Teachers; (2) Rubrics for the Needs Assessment Questionnaire; (3) Rubric for the developed Contextualized Strategic Intervention Materials (CSIMs) on Marine Ecosystem; (4) Pre-test & Posttest Questionnaire; (5) Student's Perception Survey; and (6) Teacher's Perception Survey.

Data Gathering Procedures

Before the conduct of this study, the researcher has sent formal letters asking for permission to the respective

authorities who have authorized the legal conduct of the study: the following are: (1) School's Division Superintendent; (2) School Administrator; (3) Municipal Mayor's Office; (4) Barangay Captain. Ethics approval was required by the College of Education, MSU-IIT, in which the study have undergone evaluation from the Ethics Committee before the conduct of the study. Another set of letter request of consent were given to the five (5) In-service Science Teachers and three (3) School Administrators to confirm their agreement to participate of their own accord in the study. The questionnaire was administered to them using the adapted and validated Needs Assessment Questionnaires. After that, the results of the Needs Assessment were tabulated and thematically analyzed.

Data Analyses

The following statistical tools were used to analyze and interpret the data collected by the researcher:

1. Mean was used to analyze the ratings in the Needs Assessment Questionnaire and the developed Contextualized Strategic Intervention Materials (CSIMs) on Marine Ecosystem.
2. Standard deviation was used to identify how distributed in in relation to the mean.
3. Weighted mean and overall weighted mean were also utilized. This was done by multiplying the product of the number of responses in each scale by the number of respondents.
4. The overall weighted mean was calculated by averaging all of the weighted mean.

Moreover, the thematic analysis was used to create the theme on the responses of the five (5) In-service Science Teachers and three (3) School Administrators on the Needs Assessment Questionnaire.

RESULTS AND DISCUSSIONS

The needs assessment questionnaire results were the bases of the development of the contextualized SIMs on Marine Ecosystem. This was evaluated by the panel of evaluators who are In-service teachers through a Needs Assessment Questionnaire rubric by Bontilao, et., al. (2021). The results of the validation were shown in Table 1 below. The following subsections were the results and discussions of the needs assessment questionnaire of the key informants.

Needs Assessment Questionnaire on the School Principal and Science Teachers

The needs assessment questionnaire was administered to three (3) School Principal and five (5) In-service Science Teachers in three (3) different schools in Misamis Oriental. To protect the privacy of the respondents this study used data coding. NA-SP meant Needs Assessment - School Principal, and NA – ST meant Needs Assessment – Science Teacher.

Table 1. Key Informants Needs Assessment Questionnaire Validation Result by Evaluators

Components	**Mean**	**Description**
Content and Development	3.80	Excellent
Format, Organization, and Structure	4.00	Excellent
Grammar	4.00	Excellent
Overall Mean Score	3.93	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 1 presents the result of the of the needs assessment questionnaire The Needs Assessment Questionnaire are evaluated in terms of the three (3) components. Results of evaluation revealed that on the average the Needs Assessment Questionnaire are E*xcellent* in terms of content and development, format, organization and structure, and grammar.

The Needs Assessment Questionnaire showed an overall mean score of 3.93 which means that the Needs Assessment Questionnaire was considered "Excellent." It means that it has the ability to collect and gather accurate, clear, and substantial data and responses. Additionally, the "Content and Development" part showed a mean score of 3.80 which indicated how useful the questionnaire was in achieving the stakeholders' demands in terms of information, enhanced by higher scores for clarity of questions and reliability. This is aligned with the ideas from Dillman (2007) and Kothari (2004), who highlights the value of accurate, appropriate, and tailored investigations in raising accuracy of answers and engagement. The eligibility of the questionnaire for a successful needs analysis is shown by its capacity to address the needs of the school and the concerns of stakeholders.

The "Format, Organization, and Structure" and "Grammar" components showed a perfect mean score of 4.00, which demonstrated greater organization of logic, concise writing, and sophisticated language mechanisms. These results are consistent with those of the results of Hartley (2008) and Fowler (2014), who backs up the utilization of prearranged and correct tools in terms of grammar to increase reliability and integrity. As noted by Brinkerhoff (2003), the validation results generally confirm the questionnaire's usefulness as an evidence-based instrument for determining stakeholder needs, assisting in the making of well-informed decisions for program creation and strategic planning. The questionnaire's strong design makes it a useful tool for developing focused and successful interventions.

Summary of responses of the Key Informants on the Needs Assessment Questionnaire

The responses of the Key Informants were analyzed thematically, containing a number of codes. Each code contains a number of mentions and sample utterances made by the School Principal and Science Teachers.

Table 2. Summary of the responses of the School Principal and Science Teachers on Difficulties in Teaching Ecosystem

Themes	Codes	Mentions	Utterances
Problems encountered in Teaching Ecosystem	Diverse learning needs and learning styles	3	**NA-SP1**: "Diverse learning needs." **NA-SP3**: "Diverse learning styles and learning pace. **NA-ST2**: "Students cannot differentiate abiotic and biotic factors using words only but when shown with pictures somehow understand."
	Limited Time	3	**NA-SP1**: "Time constraints" **NA-SP3**: "Time may not be enough applying 45 minutes." **NA-ST4**: "The topic ecosystem is a bit broad and as much as I wanted to introduce all the topics/types of ecosystems, we have limited time only."
	Poor background knowledge	2	**NA-ST3**: "Most of the students have a poor background of the said topic. With that, I need to refresh and review the very basic topic in connection with this." **NA-ST5**: "Learners have insufficient background knowledge."
	Difficult topic	2	**NA-SP2:** "They have difficulty in integrating differentiated instruction in teaching." **NA-ST1**: "Difficulty to grasp abstract concepts like energy flow, nutrient cycles, and interdependence among organisms."

As shown in Table 2, one (1) theme was determined on the answers provided by the school principal and science teachers on the needs assessment questionnaire. The theme is: Problems Encountered in the Teaching Ecosystem. The theme contained a number of codes obtained from the responses of the School Principal and the science teacher. Each code a certain number of mentions and sample utterances made by the school Principal and teachers are all presented in Table 2.

Emphasized in the comments of the science teachers and the school heads are the key challenges in teaching ecosystems. Among these challenges includes: a myriad of requirements and types for learning, a lack of time for instruction, not enough prior knowledge, and the difficulty of the subject matter. Participants who saw different learning pace and the need for visual aids to assist learners in distinguishing between biotic and abiotic components reported that diverse learning needs were a persistent difficulty. This is aligned with current research that highpoints the value of using differentiated teaching strategies to address students' diverse learning styles and enhance conceptual understanding in scientific education, such as mentioned in the study of Dsouza et al. (2021). Similarly, Villanueva et al. (2020) stated that to improve learners' conceptual understanding of abstract ecological concepts, supporting the use of visual aids and technology is a must.

Another noteworthy problem to mention was time constraints, as teachers were having a hard time to cover the extensive and complex subject of ecosystems in the allotted 45-minute classes as mandated by the DepEd under the MATATAG Curriculum. This is consistent with a study by Kumar et al. (2020) that states that to teach difficult science subjects effectively is hindered by a lack of or with limited time for instruction. These complications are even worsened by insufficient prior knowledge, which forces teachers to spend more time backtracking and going over basic ideas before moving forward to more complex subjects. Lastly, students have a hard time with the abstract topics of ecosystems, especially ideas like transfer of energy and interrelationships. Recent research stresses the value of tailor-made instruction and experiential, hands-on learning strategies, to make such subjects more approachable for students (Gopal et al., 2022). These findings recommend that facing and trying to give answers to these problems requires teaching strategies that are innovative, ample time for instruction, and interventions that are tailored to effectively meet diverse student needs.

Table 3. Summary of the responses of the School Principal and Science Teachers on Interventions Done to Address the Difficulties in Teaching Ecosystem

Themes	Codes	Mentions	Utterances
Interventions to Address the Problems	Professional Development Opportunities	3	**NA-SP1**: "I gave always my support, make a collaboration among other teachers and professional development opportunities for teachers." **NA-SP2**: "Conduct seminar through School Learning Action Cell (LAC)." **NA-SP3**: "Conduct LAC session on varied content delivery to cater multiple intelligences of learners."
	Use of Interactive Tools and Visual aids	3	**NA-ST1**: "Interventions applied are using real-world examples and utilizing visual aids and interactive tools" **NA-ST2**: "Use interactive learning through hands-on activities using digital tools wherein students can manipulate and label diagrams using local examples to enhance understanding." **NA-ST5**: "To address clarity of the lesson, I usually use diagrams and illustrations which could only take about more or less 10 minutes. These diagrams/illustrations aid in the student's confusion about the lesson."

	General to Specific and Specific to General Approach	2	**NA-ST3**: "Little by little or step by step just to impart the topic. Then groupings also is helpful. Preparing worksheet also and most of all, remediation." **NA-ST4**: "I introduced the "Whole to Part" teaching strategy, I tackle/introduce the main topic then the subtopic followed by examples with actual images."

As shown in Table 3, one (1) theme was determined on the answers provided by the school principal and science teachers on the needs assessment questionnaire. The theme is: Interventions to Address the Problems The theme contained a number of codes obtained from the responses of the School Principal and the science teacher. Each code a certain number of mentions and sample utterances made by the school Principal and teachers are all presented in Table 3.

Based from the responses of the key informants, there are three basic ways to solve or alleviate the problems of teaching the topic ecosystems: (1) the usage of interactive tools and visual aids during classes, (2) implementing teaching approaches that are specific like the general-to-specific approach, and (3) professional development opportunities given to teachers. Professional development given to teachers has become a critical approach to enhance teachers' educational techniques and delivery of content in School Learning Action Cell (LAC) meetings and other cooperative efforts among the teaching force with school heads leading of course. Teachers' abilities to make use of diverse teaching styles in a classroom setting and adjust to the learners' numerous academic needs is improved by ongoing and available professional development programs according to research by Al-Amin et al. (2021).

Another common intervention as mentioned by the key informants was the use of visual aids and gadgets that are interactive. Teachers used digital resources, infographics, and practical exercises to engage students and explain abstract ideas. The use of interactive and graphic learning resources significantly enhances learners' knowledge of difficult subjects, especially in science classes according to research by Anwar et al. (2022). Similarly, teachers used methodical procedures namely, "whole-to-part" and step-by-step strategies to help learners comprehend the material. In line with these methods are the results of the study of Gómez & Ruiz (2021), who backs up the practice of scaffolded learning strategies to create core knowledge preceding to introducing more complicated concepts.

Contextualized Strategic Intervention Materials or CSIMs are considered a necessity due to the following reasons: they provide tailored, interactive, and learning experiences that are localized that encompass learners' diverse learning choices, these issues are crucial for CSIMs to tackle. CSIMs encourage knowledge and engagement effectively by including real-world examples and applications, culturally relevant content, and scaffolding techniques compared to traditional materials for instruction. According to Rivera & Gozales (2023) contextualized learning resources have shown to progress learner's learning significantly, especially in difficult subjects like ecosystems that typically needs the use of visual aids and real-world investigation. By implementing CSIMs, teachers can surpass constraints in terms of time, improve traditional lessons, and suggest structured activities that match differentiated instruction.

Table 4. Summary of the responses of the School Principal and Science Teachers on Contextualization and Localization of Science Subjects

Themes	Codes	Mentions	Utterances
Familiarity with Contextualized Teaching	Contextualization and localization of lessons/activities	8	**NA-SP1, NA-SP2, NA-SP3, NA-ST1, NA-ST3, NA-ST4**: "Yes." **NA-ST2**: "I am familiar with contextualization and localization of lessons/activities."

			NA-ST5: "Yes. But not that expert on those."
Training on Contextualizing the Lessons	Attended seminars/webinars	7	**NA-SP1, NA-SP2, NA-SP3, NA-ST2, NA-ST3, NA-ST4, NA-ST5**: "Yes, we did many times, during In-Service Training or In-School Seminar" **NA-ST1**: "No. I have yet to attend such."
Benefits of Contextualization in the Teaching-Learning Process	Relevance to real-world experiences	4	**NA-ST1**: "Yes it makes your lessons relevant and increases student interest and motivation. It may be hassle at times due to time constraints as well as resource limitations." **NA-ST2, NA-ST4**: "I do contextualize and localize my lessons/activities to relate my lessons to the real-world experiences, cultures, and environment of students." **NA-SP1**: "In some ways because it is within reach of the teachers and learners."
	Effective and efficient Teaching-Learning Process	3	**NA-SP2**: "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." **NA-SP3**: "Yes, combining/applying several strategies can create effective learning environment for all students." **NA-ST3**: "Yes, it will make your lesson to be clearer on the part of the students."
	Appreciation and Preservation of Local cultures	1	**NA-ST5:** "Yes. As to my experience, contextualization and localization promotes appreciation and preservation of local cultures. Also, in the development of understanding, retention, and critical thinking skills of the students.

As shown in Table 4, three (3) themes were determined on the answers provided by the school principal and science teachers on the needs assessment questionnaire. The themes are the following: Familiarity with Contextualized Teaching, Training on Contextualizing the Lessons, and Benefits of Contextualization in the Teaching-Learning Process. The themes contained a number of codes obtained from the responses of the School Principal and the science teacher. Each code a certain number of mentions and sample utterances made by the school Principal and teachers are all presented in Table 4.

From to the comments of the science teachers and school principals, it can be understood that they are very familiar with localizing and contextualizing science topics. In spite of some teachers, like NA-ST5, who have expressed that they have limited experience in terms of this methods, they all acknowledged the significance of injecting contextualized and localized activities into their lessons. As seven out of the eight respondents positively confirmed that they have attended these professional development programs, attended regularly at seminars and webinars—basically through In-Service Training (INSET)—has given a very crucial effort in providing teachers with contextualization and localization strategies. One teacher (NA-ST1) did, though, draw consideration to the shortage of opportunities for that specific training, underscoring the importance of more relevant, timely, and easily accessible capacity-building efforts for teachers. As stated from the studies by Magsalin et al. (2022) saying that teachers who attend regular training programs concentrating on contextualization and localization suggestively improve their ability to make engaging and relevant lessons and activities that are tailored to learners' social and environmental experiences.

The following responses for the key informants were highlighted in terms of its ability to be applied to real-

world situations: making of conducive learning environments and the significant increase of culture awareness, and the contextualized and localized instruction's advantages. The respondents also added that contextualization enhances and develops learner's motivation and lesson retention by making lessons and activities more meaningful and interesting by relating them to learners' day to day experiences. Based from the responses of NA-ST3, this approach helped learners better comprehend difficult concepts, which is aligned with the research results of Santos & Rivera (2021) mentioning that connecting abstract ideas with concrete, real-world examples are how contextualized and localized instruction improves understanding. Furthermore, Fernandez and Cruz (2023) research confirm that by injecting local knowledge and information into the classroom science lessons, it will not only improve intellectual capacities of the learners but also promotes awareness socio-culturally which is aligned with what NA-ST5 is stating that contextualization also supports gratefulness of of the preservation of local cultures.

The Need for Contextualized Strategic Intervention Materials (CSIMs). CSIMs are important for enhancing learners' conceptual understanding, by filling in the gaps in conservative instructional resources. CSIMs provide teachers a well-ordered yet flexible outline that allows teachers to integrate interactive activities/lessons, localized contexts, and real-world scenarios to make science ideas more meaningful and significant. For an instance, CSIMs allow learners to relate science concepts to their direct environment, by exploring or visiting local ecosystems. CSIMs boost critical thinking and problem-solving abilities, by presenting real-life scenarios that encourage constructing questions and application (Rivera and Gonzales, 2023). Moreover, CSIMs facilitate one-on-one instruction by taking into account a myriad of learning needs and styles, as mentioned by Balicanta et al. (2022). In the end, CSIMs can inspire learners to give increase in value to culture and the environment while give importance on educational materials for developing a deeper conceptual understanding of scientific ideas.

Table 5. Summary of the responses of the School Principal and Science Teachers on Strategic Intervention Material (SIM)

Themes	Codes	Mentions	Utterances
Familiarity with Strategic Intervention Material (SIM)	Designed Educational Resource/ Material	4	**NA-SP1**: "It refers to specially designed educational resources aimed at addressing specific learning needs of difficulties faced by students." **NA-SP3**: "It is a designed material used primarily to help teachers support students who have learning difficulties." **NA-ST2**: "SIM is an educational resource designed to address specific learning needs and challenges of students." **NA-ST5**: "I think it is an educational material surely to address learner's needs. These can be a worksheet, a module, and the likes."
	Strategic Learning Tool	2	**NA-SP2**: "In my own understanding, it is a tool for learning done strategically for learning intervention." **NA-ST1**: "I think it is a strategy to help students."
	Instructional Material	1	**NA-ST3**: "SIM is a type of instructional material that is designed to use targeted and effective for students who are struggling with a particular concept or skills."
	Hetero type of class	1	**NA-ST4**: "Perfect for hetero type of class."
Training on SIM		3	**NA-SP3:** "Yes. SEAMEO online class (Teach Excel).

	Attended seminars/ webinars		**NA-ST3**: "Yes. This is also effective tools in order for the learner especially those struggling learners to address their needs." **NA-ST4**: "Yes. Not the main topic of the seminar/webinar but part of the topic and I find it more effective and efficient."
		5	**NA-SP1, NA-SP2, NA-ST1, NA-ST2, NA-ST5:** "No. We believe we haven't attended yet."
Benefits of Contextualized SIM on the Teaching-Learning Process	Tailor to student's learning	5	**NA-SP1:** "Yes, CSIMs can be very useful for several reasons: Relevance, Engagement, Differentiation, Application, and Improved retention." **NA-SP2:** "Yes, because in teaching Ecosystem we can contextualize and localize based on our own language and common terms used that learner can easily understand." **NA-SP3:** "Yes, for improvement in teaching. It is useful with varying needs and abilities of the learners." **NA-ST1**: "Yes, because it tailors learning to students' local context and addresses their specific learning needs." **NA-ST3**: "Yes, since the students can use their own environment as a laboratory, as a tool, as a source of information in connection with their lesson."
	Enriched and Effective in Teaching-Learning Process	3	**NA-ST2:** "CSIM enrich the teaching and learning of Ecosystems, making the subject more accessible and engaging for students." **NA-ST4**: "Yes, as a matter of fact, I applied it on my lesson and I find it very much effective and my school head and supervisor appreciated the strategies applied." **NA-ST5**: "It can be highly effective as it provides a localized engaging and relevant resources that would connect lesson concepts to student's everyday experiences. That could enhance student's appreciation and critical thinking skills.

As shown in Table 5, three (3) themes were determined on the answers provided by the school principal and science teachers on the needs assessment questionnaire. The themes are the following: Familiarity with Strategic Intervention Material (SIM), Training on SIM, and Benefits of Contextualized SIM on the Teaching-Learning Process. The themes contained a number of codes obtained from the responses of the School Principal and the science teacher. Each code a certain number of mentions and sample utterances made by the school Principal and teachers are all presented in Table 5.

Based from the comments of the School Principal and the Science teachers, it is understood that they have quite an understanding of Strategic Intervention Materials (SIMs) as a dedicated teaching resources made to target certain learning needs and difficulties. Most of the responders highlighted the significance of SIMs in terms of strategy and instruction by defining it as educational tools that help learners to overcome hindrances and difficulties in understanding specific complex science concepts like abstract topics on ecosystems. According to NA-ST5, SIMs also include worksheets, modules, and other educational materials, NA-ST3 still give a definition of SIMs as instructional materials with an aim to target struggling learners. Most of the respondents namely, (NA-SP1, NA-SP2, NA-ST1, NA-ST2, and NA-ST5) mentioned that they little or no experience whatsoever

with SIMs, even if the three of them respondents confirmed that they have attended seminars or webinars on the topic - SIMs. These utterances from the key informants suggests that there is the necessity for an in-depth training program specifically for SIMs. Research by Mendoza et al. (2022) suggested that it is important to give teachers the tools they need to design and implement SIMs successfully in the classroom through professional development programs.

Specifically, during a regular heterogeneous classroom setting, CSIMs are necessary resources for enhancing learners' conceptual knowledge and understanding especially with those learners who have difficulty in grasping abstract concept. By making use of examples and scenarios that are both culturally, socially, locally, and geographically relevant, they offer a localized approach of instruction that makes complicated concepts more meaningful, makes sense, and relatable. According to the study of Balicanta et al., (2022) by attending to the numerous needs and learning styles of learners, CSIMs encourage active participation, which improves academic success and closes learning gaps. For instance, teaching ecosystems in the classroom, CSIMs allow learners to explore their immediate or direct surroundings, including mangrove ecosystems, as a means to gain real-world experience. With the combination of interactive activities/exercises, real-world applications, and locally relevant resources, CSIMs can successfully improve critical thinking and conceptual understanding of learners. This ensures that learners not only recollect mere knowledge from the material but also effectively apply this knowledge and learnings in a diverse situations and circumstances.

CONCLUSION

It was discovered that the In-service Science Teachers and School Administrators had faced challenges/difficulties/problems when teaching ecosystems during the needs assessment that was conducted for them. Additionally, it was discovered that they were accustomed to localizing and contextualizing the activities. Thankfully, four of the five science teachers and all three school administrators were able to attend the contextualization training through LAC or INSET activities. Additionally, during the needs assessment, the principal of the school and the science teachers were acquainted with SIM as a strategic instructional tool and educational resource intended to serve the unique learning needs of learners who experience challenges.

The results of the needs assessment showed the need to develop Contextualized Strategic Intervention Materials (CSIMs) on Ecosystem. Similarly, the CSIMs utilized the learning competencies from the MATATAG Curriculum of the Department of Education.

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