

# Development of Contextualized Learning Activity Packets in Biodiversity for Grade 10 Learners

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## ABSTRACT

The study aimed to develop Contextualized Learning Activity Packets (CLAPs) in teaching biodiversity. Biodiversity is a difficult subject in high school as it requires a deep understanding of ecological concepts and complex issues (Suryanda et al., 2020). There are no existing studies that used the mangrove ecosystem as a main input to teach biodiversity. The developed CLAPs would help students gain a conceptual understanding of biodiversity within the context of the mangrove ecosystem. It would also help them understand the topic better since the lesson is localized. This clap contains various activities that involve reading, solving, species identification, poster making for invasive species, drawing, teamwork, and decision-making. The two (2) least mastered competencies from the study of Santos et al. (2021) in the K-12 science curriculum guide, specifically biodiversity, served as a foundation of this lesson. Based on the results of the needs assessment, it was evident that there is a need to develop CLAPs for the participating school. The CLAPs were rated as very satisfactory with an average mean of 3.87 in terms of content, format, presentation, accuracy, and up-to-dateness information. Therefore, based on the findings and analysis, it is considered valid and acceptable supplementary material for classroom use.

**Keywords:** Biodiversity, Contextualized Learning Activity Packets (CLAPs), field sampling, local, mangrove ecosystem

## INTRODUCTION

Learning about nature and sustainability is of great importance to our daily activities and existence. The significance of conservation of species is essential, especially in utilizing species and ecosystems. Nature provides food for consumption, energy, and sort of various materials needed for our daily lifestyle and to continue our very existence. As a matter of fact, many of us were unaware of such threats that are constantly emerging in the local area, especially the increase of invasive species at an alarming rate, the factors that affect the native species which lead to the extinction of many other species and the lack of knowledge and interest of the students towards biodiversity (DENR-BMB, 2016; Hughes, 2017, Fresco, 2018; Coracero et

al., 2022).

Research findings have also reported difficulties encountered by teachers when teaching biodiversity. These include students not being exposed to community resources, not having enough instructional materials, and struggling with the relevance of the materials (Combalicer, 2016; Valin & Janer, 2019). This problem calls for educational interventions to bridge the knowledge gap between environment, school, and home. Therefore, bridging this gap involves contextualization so the students can connect their ideas with their own experiences and real-world examples (Tecson et al., 2019). However, one challenge of contextualized instruction is the lack of resources in many schools in the Philippines (Tecson et al., 2019).

Upon conducting a literature review, there are no existing studies that used the mangrove ecosystem as a main input to teach biodiversity, nor did a study conducted a contextualized lesson or activities in Kauswagan, Lanao del Norte.

The low performance of Filipino students in science, mathematics and reading was another significant concern addressed in this study. Despite efforts to improve the quality of education, the Philippines consistently ranks low in international assessments such as PISA and TIMSS, indicating inadequate mastery of basic competencies (Santos et al., 2021).

To address the problem, the new curriculum known as Matatag curriculum has been introduced, focusing on adjustments to what is taught in classrooms, including updates to subject content, instructional methods, and assessment strategies aimed at enhancing student learning outcomes (Estrellado, 2023). However, this curriculum will be implemented on S.Y. 2027-2028.

Regarding the need to improve students' reading comprehension, the Department of Education (DepEd) issued a memorandum requiring all public schools from Grades 1 to 12 and all community learning centers to implement "Catch-up Fridays" (Labad, 2024). Catch-up Fridays is a reading intervention program that requires schools to dedicate half of the day to reading activities every Friday until the end of the school year 2023-2024 (Saro et al., 2024). With this, the integration of Contextualized Learning Activity Packets (CLAPs) is timely and relevant in the classroom.

Moreover, the impact of pollution, overexploitation of species, and habitat loss due to human activity have become very apparent in the coastal regions of Kauswagan (Gomez & Baldago, 2016). Thus, incorporating these environmental issues on CLAPs can aid in developing useful skills such as problem-solving and critical thinking to address the problem. According to Bello et al. (2023), integrating the lesson into the local environment helps teachers and students better grasp the concept, making the lesson more relevant, suitable, and tailored to their needs.

As for utilizing Kauswagan's Lanao Del Norte resources, the mangrove ecosystem is interlinked with seagrass and coral reefs (Marquardt and Trevena, 2009). Therefore, Goal 15 (Life on Land) and Goal 14 (Life Below Water) were included in this study, which aims to protect terrestrial and marine ecosystems. These Sustainable Development Goals (SDGs) adopted by the United Nations in 2015 are related to priority areas of the Department of Science and Technology (DOST). In response to the gaps mentioned above, it is essential to develop Contextualized Learning Activity Packets (CLAPs) in teaching biodiversity to enhance the conceptual understanding of grade 10 learners.

### **Objectives of the Study**

The study aimed to seek the following objectives:

To assess the needs of the school principal, science department chairperson, and in-service teachers to better

teach biodiversity

To develop Contextualized Learning Activity Packets (CLAPs) on biodiversity to amplify students' knowledge of biodiversity.

## METHODOLOGY

The following subsections describe the development of the Contextualized Learning Activity Packets (CLAPs) on Biodiversity.

### Needs Assessment Survey Interview of the Key Informants

To evaluate the necessity for the CLAPs, a modified needs assessment survey questionnaire adapted from the study of (Allonar et al. and Guiritan et al., 2023) was carried out. For the needs assessment, semi-structured questionnaires were given to the school principal, science department chairperson, and in-service teachers. The responses of the key informants were thematically analyzed and categorized into three (3): (1) teaching experience and challenges faced, (2) contextualization and localization of the subject, and (3) familiarity with the learning activity packet.

### Development of Contextualized Learning Activity Packets (CLAPs) on Biodiversity

The present study utilized the Successive Approximation Model (SAM model) proposed by Michael Allen (2014) to better understand the process involved in developing Contextualized Learning Activity Packets (CLAPs). This process included the following steps: preparation, iterative design, and iterative development.

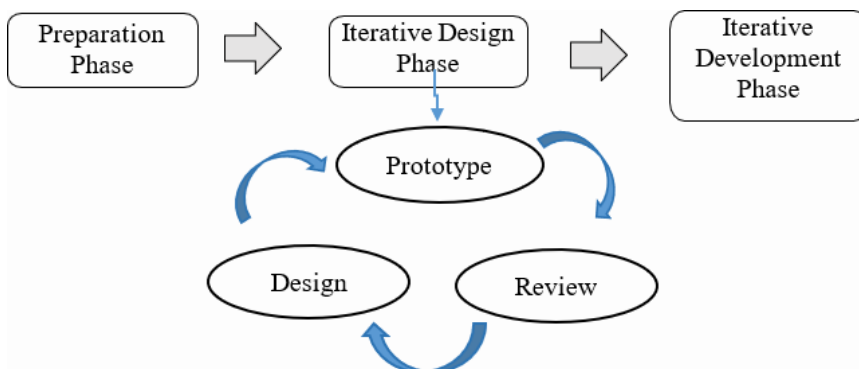


Figure 3.1 Successive Approximation Model by Michael Allen (2014)

### Preparation Phase

Collecting background information was the first step in this research.

#### A. Identification of Local Species

No study used a mangrove ecosystem as a main input to teach Biodiversity, nor did a study conduct a contextualized lesson or activities in Kauswagan, Lanao del Norte. Thus, the researcher collaborated with marine biologists and fishermen from the Department of Environment and Natural Resources (DENR) on April 8, 2024, to conduct field sampling in selected mangrove areas of Kauswagan, Lanao del Norte. The objective was to identify various species, identify environmental issues within the community, and measure the physicochemical parameters of water in these areas. Data gathered from field sampling from Tacub and Kawit of Kauswagan served as the main input into the content structure of CLAPs. For the species that can not be identified during the field sampling, images were taken with a phone camera to document the

specimen to be identified by the expert in the field from the Department of Biological Sciences, College of Science and Mathematics, MSU-IIT.

## **B. Lesson Focus**

The researcher was guided by Science Learning Module for grade 10 and the needs assessment interview result of the key informants. This was conducted to know their perspectives on the need to design and develop the CLAPs about Biodiversity.

## **C. Mapping of Competency**

An analysis was carried out by analyzing the least mastered competencies of Science from the Most Essential Learning Competencies (MELCs) and K-12 science curriculum from the Department of Education (DepEd) to establish the content to be covered. The analysis used in this study includes identifying the learning objectives to be covered, the target audience, and the resources available for developing learning materials, namely Contextualized Learning Activity Packets (CLAPs). In addition, literature studies and field studies were used. This is intended to find concepts that could be applied to the CLAPs. Then, once all the information is gathered, it is ready for the next phase, which is to develop a prototype/sample.

## **Iterative Design Phase**

At this stage, there are three parts:

### **A. Prototype**

The researcher created a rough outline of the CLAPs. This involves drawing to illustrate the healthy and unhealthy mangrove ecosystems and the interlinking of mangrove ecosystems to seagrass and coral reefs using the Canva app. The data gathered from field sampling and literature studies were converted into a passage, including the issues within communities. Also, there's a variety of activities included in this packet, such as quizzes, solving, species identification, poster, and drawing. This was based on the key informant's responses that the learning material should include a variety of activities such as readings, quizzes, and hands-on exercises and, at the same time, should be aligned with MELCs (Alpha release feedback).

### **B. Reviews**

Once the contextualized learning activity packet is completed, the CLAPs go through the evaluation, and subsequent feedback is received. In the first revision, the instruments were evaluated by the four (4) research panels through face validation. The ratings, comments, and suggestions of the evaluators were considered.

## **Designing and Conceptualization of the Lesson on Biodiversity**

In designing and conceptualizing the lesson, the content, performance standards, and learning competencies from MELCs of the Department of Education were considered.

### **C.1 Framework for the CLAPs**

The researcher modified the study of Nollen (2020) and Navarro et al. (2023) for the framework of the CLAPs. The following are the twenty-two (22) elements in developing CLAPs. These are (1) Title Page, (2) Acknowledgment, (3) Student's Profile, (4) Introductory Message, (5) Instructions, (6) Badges/Reward, (7) Time Allotment, (8) Table of Contents, (9) Overview, (10) Objectives, (11) Pre-assessment Activity, (12)

Mini-lesson, (13) Activities (with rubrics), (14) Generalization, (15) Application (16) Post Assessment, (17) Enrichment Activity, (18) Connecting with others, (19) Student's Evaluation, (20) Learning Resources, (21) References, (22) Answer Keys.

Each packets contain six (6) activities; three (3) for main activities with rubrics, one (1) for “What have I learned” also called generalization activity, one (1) for “What Can I Do” activity or application activity, and one (1) for “Let Us Explore More” activity known as enrichment activity. Each packet contain pre-assessment and post assessment activities that have key answer on the last page which serve as a self review for students.

## C2. Identification of Social Issues within the Community

The focus was placed on the coastal- mangrove ecosystem since the residents living in the coastal regions of Kauswagan rely on resources from mangroves (Gomez and Baldago, 2016). Unfortunately, there have been reports of over-exploitation of shells and other aquatic life for consumption, pollution, endangered species, habitat loss, and human settlements near coastal mangrove areas. To address this issue, real images were shown on each packet. Each packet contains a “What Can I Do” activity, also known as an application activity, which heavily focuses on environmental problems within the community.

## C3. Identification of Potential Solution

The result from field sampling was converted into a passage, and published research that was conducted in Kauswagan that can be applied in this study was also converted into the passage. Also, the importance of the mangrove ecosystems was converted to passage. This is for students to read during “Catch Up Friday,” a reading intervention program that requires schools to dedicate half of the day to reading activities. Also, there was a solving activity such as computation for species richness and evenness, and a poster making for invasive species. Students were also tasked to choose an animal they liked and how one of its body parts helps it survive in its habitat. This activity involves drawing, where students can expand their creativity and critical thinking skills. There was a “What I Know” activity to asses students' skills in identifying diverse species in Kauswagan, whether that species is endangered, and if they had seen that species in said area.

## C4. Needs for Knowledge

The students can learn based on the developed CLAPs provided by the researcher. Each packet contain mini lesson, this information is provided on the notion of Biodiversity such value of Biodiversity, different types of species and their adaptation to the environment. Also, there are five activities that involves conservation of Biodiversity, importance of mangrove, and common threats facing mangroves in the community.

## Iterative Development Phase



Figure 2. Cover Page of Contextualized Learning Activity Packets on Biodiversity

Figure 2 displays the four cover pages of the Contextualized Learning Activity Packets (CLAPs), which feature photos of the coastal mangrove ecosystem, a key aspect of the study. The CLAPs were subjected to content validation by five (5) in-service science teachers with Master’s or PhD degrees in terms of content, format, presentation and organization, accuracy, and up-to-date information for classroom use. The criteria for selecting evaluators were considered. The evaluator (1) must currently handle science subjects and (2) have experience teaching the subject area, which is Biodiversity. Then, the developed CLAPs on Biodiversity were used throughout the study.

## RESULTS AND DISCUSSION

The following subsections were the results and discussion of needs assessment interview of key informants and the evaluators rating of the developed learning material.

### Needs Assessment Interview of the Key Informants to develop CLAPs

The needs assessment interview results were the basis of the development of the CLAPs on Biodiversity. This was evaluated by four (4) research panels and five (5) in-service science teachers through a rubric by Bontilao et al. (2021). The school principal, science head chairperson, and four (4) in-service science teachers were among the respondents in the needs assessment interview. Tables 1, 2, and 3 provided an overview of the key informant’s responses and were categorized into three (3): (1) teaching experience and challenges faced by teachers, (2) contextualization and localization of the subject, and (3) familiarity of the learning activity packet. To protect the privacy of the respondents, the study used data coding SPNA meant school principal needs assessment, SDC for Science Department Chairperson, and STNA meant for science teacher needs assessment.

Table 1. Summary of the Key Informants’ Responses on Interventions Done to Address the Difficulties in Teaching Biodiversity

Themes	Codes	Sample Responses
Teaching Experience	Years of Teaching	16 years (SDC), 10 years (STNA 1 and STNA 2), 23 years (STNA 3), 6 years (STNA 4)
Challenges Faced	Difficult competencies to teach	<p><b>STNA 1, 3 and 4:</b> Explaining how species diversity increases the probability of adaptation and survival of organisms in changing environments (S10LT-IIIh-41)</p> <p><b>STNA 2:</b> Explain the relationship between population growth and carrying capacity (S10LT-IIIh-42)</p>
	Problem encountered when teaching biodiversity	<p><b>STNA 1:</b> Teaching destruction of habitat and exploitation of species and ecosystem (Lesson)</p> <p><b>STNA 2:</b> Creating engaging lesson plans and understanding different learning styles</p>

		<p><b>STNA 3:</b> Lack of hands on, experience, limited access to outdoor environments. In some areas with rich biodiversity hinder learners ability to observe and understand biodiversity</p> <p><b>STNA 4:</b> Lack of exposure to some activity</p>
Interventions to address the problem	Reasons why they find it hard to teach	<p><b>STNA1:</b> Its hard to deliver it to the learners because itrequires a deep understanding of ecological concepts and complex issues</p> <p><b>STNA2:</b> Some topics were challenging to teach because of its abstract ideas like taxonomic concepts</p> <p><b>STNA 3 and 4:</b> Not being able to go outside and see nature up close. Its harder to understand how different plants live together and how they depend on each other</p>
		<p><b>STNA 1:</b> Reintroducing the lesson</p> <p><b>STNA 2:</b> Connect the topic real world applications, introduce role playing activities, and employ animated videos and other technological interventions</p> <p><b>STNA 3 and 4:</b> I utilized multimedia resources, nature documentation, conducted outdoor learning activities.</p>

Table 1 shows the themes of the teaching experience, the challenges faced by teachers in teaching Biodiversity, and the interventions implemented to address the problem. According to the results, all of the in-service teachers have between 6 and 23 years of teaching experience. This suggests that they are likely to have developed a deeper understanding of the topic of biodiversity and student engagement, making them valuable participants in this study. Due to their familiarity with what works in different classroom settings, they can better assess and effectively implement new teaching tools in the classroom. This is consistent with Redondo and Ladage’s (2022) study, which suggests that as teachers gain experience, they tend to improve their effectiveness, leading to positive student achievement gains. In this study, it was important to consider the perceptions of in-service teachers from the participating school regarding the developed CLAPs, as they are familiar with the classroom setting.

The study results shows that among the challenges faced by teachers, three (3) science teachers expressed difficulty in teaching the competency with code “S10LT-IIIh-41” while one (1) teacher reported difficulty in teaching the competency with code “S10LT-IIIi-42”. These findings are aligned with Santos et al.’s study (2021) identification of the least mastered competency in grade 10 biology. This is because science teachers find teaching Biodiversity challenging due to the need to create engaging lesson plans, difficulty in understanding the different learning styles of students, lack of hands-on experience, and limited access to outdoor environments. To address these challenges, reintroducing lessons, connecting topics to real-world applications, using role-playing activities, multimedia resources, and other technological interventions, nature documentation, and outdoor learning activities can be helpful to improve the teaching and learning experience.

Unfortunately, teachers nowadays tend to use multiple-choice questions more often for several reasons. Primarily, they offer efficiency in grading, which is beneficial in large classes, freeing up teachers to focus on other instructional tasks (Haladyna, 2022). This aligned with the STNA 4 response that they have difficulty teaching Biodiversity because of the lack of exposure to some activities, especially when it involves contextualization. Thus, the student’s understanding of biodiversity concepts may remain limited, as they may only grasp certain aspects, and their development of essential skills, such as creativity, may be restricted due to a lack of exposure to varied activities. Based on the responses of the key informants, it was evident that there is a need to develop learning materials that involve varied activities.

Aside from the varied activities, the background of the students, the language education, and lack of assistance from teachers may hindrance the effectiveness of the learning material (Mupa & Chinooneka, 2015). This is why the teacher is also an important factor in the teaching-learning process

Table 2. Summary of the Key Informants Responses on Contextualization and Localization of Lesson on Biodiversity

Themes	Codes	Responses
Contextualization and localization of the subject	Familiarity of contextualization and localization of lessons/ activities	<b>SPNA, SDC, STNA 1, 2, 3 and 4:</b> Yes, definitely. This helps students more engaged and motivated to learn the lessons that are flexible, relevant and engaging to learners
	Benefits	<p><b>STNA 1:</b> Adapting content to fit the available local resources.</p> <p><b>STNA 2:</b> Contextualizing and localizing lessons or activities make it flexible, relevant and understandable to learners</p> <p><b>STNA 3:</b> Tailoring lessons and activities involve content to align with the specific context.</p>



		<p><b>STNA 4:</b> It helps teacher and students to comprehend concepts by relating and presenting a lesson in the context of prevailing local environment, culture or resources</p>
	Effectiveness	<p>Yes, depends on the topic if it may help them to understand the lesson (<b>STNA 1</b>). It is vital for meaningful learning experiences as they make content relevant, accessible to learners by connecting it to real life situations and adapting it to their cultural and social context (<b>SDC</b>)</p>
	Difficulties	<p><b>SPNA:</b> Make lessons interesting to students, prepare a self directed and fun filled activities and design lesson plan that cater different learning capabilities of learners</p> <p><b>SDC:</b> Adapting traditional methods to online formats, maintaining student engagement, providing effective feedback, ensuring fair access to resources and technology, and accommodating diverse learning styles and needs.</p> <p><b>STNA 2:</b> Its flexibility is limited and adapting to different learning contexts will be difficult.</p>
	Intervention	<p><b>SPNA:</b> Classroom observation, provision of technical assistance, LAC sessions INSET on teaching strategies.</p> <p><b>SDC:</b> Training, LAC sessions for teachers on online teaching methods, providing support for feedback, offering personalized learning options and access to internet</p>
	Seminar/webinars attended	<p>Yes, during INSET (<b>SPNA, SDC, STNA 1 and 4</b>). It involves adapting educational content to specific</p>

		cultural, linguistic and regional context. <b>STNA 2:</b> No
	Insights	<b>SPNA and SDC:</b> It will help teachers in their personal and professional growth <b>STNA 1:</b> Helps students gain a deeper understanding of the subject matter by relating materials that encountered in real life <b>STNA 2:</b> Aid learners comprehend concepts, thus, improving their academic performance <b>STNA 3:</b> It make relevant and accessible to learners

Table 2 shows the theme of familiarity, benefits, effectiveness, difficulties, and insights about contextualization. With regards to familiarity with the contextualization of lessons/ activities, all key informants were familiar with this approach because this was introduced by the Department of Education. Based on the results, the teachers have all agreed that contextualizing and localizing lessons or activities helps students become more engaged and motivated to learn. This is because adjusting the educational material to align with the resources available in the local area makes the lessons flexible, relevant, and understandable to learners, hence deepening their understanding of the subject matter (Montero et al., 2022). In addition, three (3) teachers responded that the benefits of contextualizing and localizing can contribute to their personal and professional growth. However, the effectiveness of contextualization and localization depends on the topic, as it needs to connect content to real-life situations and cultural contexts. Also, making lessons interesting, preparing self-directed activities, and adapting traditional methods to online formats are challenges faced by them. To address this problem, the science head of the department (SDC) suggested the following interventions: classroom observation, technical assistance, training sessions such as LAC sessions, and support for feedback.

With regards to the seminar or webinar attended, one teacher responded that she never attended any seminar nor webinar related to contextualization, this is because few teachers were given the opportunity to attend by the school head. This means that she is missing out on training about contextualization, which leads to a gap in knowledge. Hence, students' learning might be affected as they may find the learning material harder to grasp and less interesting. This is aligned with the study by Reyes et al. (2019), who found that attending training related to contextualization plays an important role in equipping teachers with the skills and knowledge needed in their teaching practices. Moreover, professional growth has an impact on their performance in classroom instruction (Acosta et al., 2022). Likewise, learning will be more meaningful and effective when students see how their learning connects to their own experiences. With this, students are more likely to engage with the learning material and understand its relevance. To sum it up, the finding reinforces the need to develop contextualized learning material to aid learners in understanding the lesson better.

Table 3. Summary of the Key Informants Responses on Contextualized Learning Activity Packet s (CLAPs)

Themes	Codes	Responses
	Familiarity of LAPs	<b>SDC, SPNA, STNA 2, 3, and 4:</b> No

Familiarity of Learning Activity Packets (LAPs)		<b>STNA 1:</b> Yes
	Insights	<b>SDC:</b> I think these are structured materials designed to guide students through independent learning activities, self paced learning environment, contain variety of exercises and assessment to support the learning objectives  <b>STNA 1 and 2:</b> an instructional materials used in teaching
	Seminar/webinars attended	<b>SPNA, SDC, STNA 1 and 2:</b> No
	Usefulness	<b>SPNA and SDC:</b> Not sure, I haven't tried using it  <b>STNA 1 and 2:</b> Yes, because it will increase student engagement and provide real world application. It makes the learning process engaging and memorable ( <b>STNA 3</b> )
	Comments & suggestions to LAP Utilization	<b>SDC:</b> I would suggest that instructions for each activity are clear and easy to understand; include variety of activities such as readings, quizzes, hands on exercises; should be aligned with MELC; incorporate feedback mechanism, ensure all necessary resources, provide flexibility in the pacing and completion of activities.  <b>STNA3:</b> Ensure that the learning objectives and activities are clearly stated and aligned with the curriculum standard or desired learning outcomes.

Table 3 shows the themes of familiarity, insights, training, and usefulness of Learning Activity Packets (LAPs). Based on the responses of key informants about the LAPs, 5 out of 6 respondents agreed that they are not familiar with it nor attended any seminar or webinar training related to it. However, two (2) teachers described LAPs as structured instructional material designed to guide students through independent learning activities in a self-paced environment, containing a variety of exercises and assessments to support learning objectives. Despite not knowing the usefulness of these LAPs, two (2) science teachers believed that it would increase student engagement at the same time, provide real-world application, making the learning process engaging and memorable to students.

According to Navarro et al. (2023), Learning Activity Packets (LAPs) are instructional materials that contain lessons based on Most Essential Learning Competencies (MELCS). These LAPs usually refer to a smaller set of instructions that are more focused on targeted lessons. This can be used independently by learners and may contain exercises, readings, and varied activities. Thus, the development of Contextualized Learning Activity Packets (CLAPs) was designed to engage students, providing them with self-learning activities and supporting 21st-century learning skills while aligning standards and educational goals set by the Department of Education (Canaria, 2022).

As such, a teacher suggested that instructions for each activity of LAPs should be clear and easy to understand, the material should include a variety of activities such as readings, quizzes, and hands-on exercises, and it should be aligned with MELCs. Additionally, it was recommended to incorporate a

feedback mechanism, ensure all necessary resources are provided, and allow flexibility in the pacing and completion of activities. The researcher took all of these suggestions into consideration when developing the CLAPs. Although, it is unfortunate that many of the science teachers didn't receive training on learning activity packets. This reinforces the results that there was a need to create contextualized learning materials to support their teaching and learning process. This is aligned with the Department of Education's implementation under RA 10533, which mandates contextualization of the curriculum (Official Gazette, 2013).

To date, there is a need for more learning resources, such as learning packets, which poses a problem for teachers in delivering high-quality education (Allonar et al., 2022). This problem was highlighted in the research conducted by Mtsi and Maphosa (2016) and Sadera et al. (2020), which identified the lack of instructional materials and insufficient funding for science education as the main problem faced by junior high school students in learning science.

### Development of Contextualized Learning Activity Packets (CLAPs) on Biodiversity

The results of the needs assessment from key informants were used as the basis for designing and developing the CLAPs. During the development process, an analysis was conducted to identify the least mastered competencies in Science from the Most Essential Learning Competencies (MELCs) as studied by Santos et al. (2021). Comments and suggestions from the participating school were also integrated in designing and developing the CLAPs.

### Selection of Learning Competency in MELCs from DepEd

Aside from the needs assessment of the key informants, the Most Essential Learning Competencies (MELCs) also serve as the basis for developing the CLAPs. This is because they outline the essential competencies, knowledge, and skills that grade 10 students are expected to achieve. This ensures that the learning materials can prioritize the most important concepts and skills needed for students to acquire and develop during the crisis (De Guzman, 2022). Furthermore, the MELCs guarantee that the lessons in the packet are appropriate and coherent for the students' grade level, performance, and content criteria.

Table 4 Selection of Topics in Most Essential Learning Competencies (MELCs) from DepEd

Quarter	Content Standard	Performance Standard	Most Essential Learning Competencies	Duration	K to 12 CG Code
3rd	The learners demonstrate understanding of...	The learners should be able to...			
	The influence of biodiversity on the stability of ecosystems	Write an essay on the importance of adaptation as a mechanism for the survival of a species	Explain how species diversity increases the probability of adaptation and survival of organisms in changing environments	Week 7	S10LT - IIIh – 41
	An ecosystem as being capable of supporting a limited number of organisms		Explain the relationship between population growth and carrying capacity	Week 7	S10LT - IIIi – 42

Table 4 presents the content standard, performance standard, learning competencies, duration, and K to 12 curriculum guide code used in the study. The study focused on two specific learning competencies: (1)

“explain how species diversity increases the probability of adaptation and survival of organisms in changing environments” with the code S10LT -IIIh – 41, and “explain the relationship between population growth and carrying capacity” with the code S10LT -IIIi – 42. These competencies were chosen as they are the least mastered competencies in the study of Santos et al. (2021).

### Validation of the developed CLAPs on Biodiversity by the In-Service Science Teachers

The developed CLAPs was evaluated by five (5) in-service science teachers with Master’s or PhD degree through standardized rubric from the Department of Education (DepEd, 2015) to ensure that the developed CLAPs feasibility is accurate and appropriate before being utilized in the classroom.

Table 5. Evaluator’s Rating of the Developed Contextualized Learning Activity Packets (CLAPs) in Biodiversity

Components	Average Mean	Interpretation
1) Content	3.8	Very Satisfactory
2) Format	3.93	Very Satisfactory
3) Presentation and Organization	3.84	Very Satisfactory
4) Accuracy and Up-to-datedness of information	3.93	Very Satisfactory
<b>Overall Average Mean</b>	3.87	Very Satisfactory

Note: 4.00-3.25: Very Satisfactory

2.49-1.75: Poor

3.24-2.50: Satisfactory

1.74-1.00: Not Satisfactory

The validation that was carried out consists of several criteria, namely content, format, presentation and organization, accuracy, and up-to-date information. The Contextualized Learning Activity Packets were rated very satisfactory in all components with an overall average mean of 3.87. Hence, the developed CLAPs proved to be valid, therefore it had a guaranteed level of quality as a supplementary material for the classroom use.

## CONCLUSIONS

The study offered valuable insights into the challenges teachers encounter when contextualizing lessons and activities about biodiversity. Based on the result, it was found that two (2) competencies with code S10LT-IIIh-41 and S10LT-IIIi-42 were challenging to discuss. Although the principal, science department chairperson, and science teachers were aware of the use, benefits, and effectiveness of contextualized lessons, they were not familiar with Learning Activity Packets (LAPs). Hence, the findings highlight the need to develop Contextualized Learning Activity Packets. These packets could serve as teaching aids, activities, or even review material for efficient use by students to enhance the students’ ideas and comprehension about biodiversity through familiar sample organisms. Also, these packets enable students to understand the connections between living organisms and their surroundings, as well as the impact of human activities on these relationships. Thus, the incorporation of the packets could help students develop valuable skills such as analysis, problem-solving, and critical thinking in dealing with environmental issues.

Moreover, the content, format, presentation and organization, accuracy, and up-to-date information were all described as very satisfactory with an average mean of 3.87. This means that the CLAPs proved to be valid and could be implemented for classroom use.

Based on the results of needs assessment, teachers employ various approaches such as role-playing

activities, animated videos, multimedia resources, and outdoor learning activities when teaching biodiversity. Despite these commendable efforts, time constraints limit their implementation because apart from teaching, teachers often engage in various other responsibilities such as administrative tasks within the school environment.

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