Contextualized Stem Lesson on Plant Asexual Reproduction Among Grade 7 Learners

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ABSTRACT

Contextualized STEM lessons on asexual reproduction in agriculture offer significant benefits for student learning, particularly in rural areas where agriculture plays a central role in students' daily lives. Recognizing the vital contribution of agriculture to the Philippine economy and the urgent need for effective instructional materials in this domain, the research commenced with a needs assessment involving five school administrators and five in-service science teachers. These key informants highlighted major challenges, including the lack of appropriate teaching resources and the need for sustained professional development to enhance instructional effectiveness. In response, the researchers developed a STEM lesson plan that incorporated locally relevant examples, aiming to bridge the gap between theoretical concepts and real-life agricultural practices. Quantitative data were analyzed using descriptive statistics to summarize trends and assess lesson effectiveness, while thematic analysis of feedback from teachers and administrators underscored the importance of localized pedagogy. The lesson plan received very satisfactory evaluations, with mean scores of 3.69 for content, 3.85 for format, 3.58 for presentation and organization, and 3.83 for accuracy, indicating its relevance and correctness. The findings recommend that educators adopt more localized, interactive, and visually engaging approaches in their STEM instruction. Moreover, enhancing access to quality teaching materials and increasing opportunities for professional development can further improve the effectiveness of science education in rural contexts.

Keywords: STEM Lesson, Asexual Reproduction, Agriculture Education, Hands-On Activities

INTRODUCTION

The integration of STEM (Science, Technology, Engineering, and Mathematics) education into the Philippine curriculum has been prioritized as part of efforts to align the country's educational system with global standards and address skills gaps in critical fields. Agriculture, a cornerstone of the Philippine economy, presents a significant opportunity for the application of STEM principles. Asexual reproduction in plants, a fundamental concept in biology and agriculture, is an ideal focus for contextualized STEM lessons to bridge the gap between theoretical knowledge and practical application. Such initiatives are particularly crucial in the Philippines, where food security and agricultural sustainability remain pressing concerns (Arnado & Pene, 2022; Aquino et al., 2023).

Incorporating contextualized lessons into STEM education allows students to connect abstract concepts with

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real-world applications, fostering deeper understanding and engagement. This approach aligns with the Department of Education's policy to contextualize and localize instruction, making learning relevant to students' environments and cultural contexts (Pawilen & Yuzon, 2019; Morales et al., 2022). Research has demonstrated that localized STEM instruction enhances student achievement and promotes critical thinking skills, particularly in rural settings where agricultural education is vital (De La Cruz, 2022; Mordeno et al., 2019).

The main objective of this study is to develop a STEM Lesson Plan on Asexual Reproduction for Grade 7 students. To attain the general objective, it aims to:

Identify the needs of teachers and administrators regarding instructional materials on asexual reproductions in plants.

Develop contextualized STEM lessons on asexual reproduction in plants.

Evaluate the developed contextualized STEM lesson on asexual reproduction in plants.

METHODS

Research Design

This study employed a developmental research design to identify instructional material needs, develop contextualized STEM lessons, and evaluate the effectiveness of the developed lessons on asexual reproduction in plants. The research was conducted in three sequential phases aligned with the study's objectives.

A qualitative descriptive approach was used to identify the instructional needs of science teachers and school administrators. Key informant interviews were conducted with five in-service science teachers and five school administrators from selected rural schools. The data were analyzed thematically to determine common challenges, gaps in teaching resources, and recommendations for improving instruction on asexual reproduction in plants.

Based on the findings of the need's assessment, the researchers designed contextualized STEM lesson plans integrating local agricultural practices and real-life examples relevant to students in rural settings. The development process followed the 4D Model, focusing on pedagogical alignment, local context, and STEM integration.

To evaluate the developed lessons, a mixed-methods approach was utilized. Quantitatively, a panel of experts comprising science teachers and curriculum specialists rated the lessons using a validated evaluation rubric, assessing content accuracy, format, presentation, and contextual relevance. Descriptive statistics (mean and standard deviation) were used to interpret the ratings. Qualitatively, feedback was gathered through semi-structured interviews and open-ended survey questions, and thematic analysis was conducted to gain deeper insights into the lessons' effectiveness and applicability.

Research Subjects

The research involved two groups of purposively selected participants. For the needs assessment phase, a total of ten key informants participated, comprising five in-service science teachers and five school administrators from selected public high schools in rural areas. These individuals were chosen due to their direct involvement in science instruction and school leadership, making them well-positioned to provide insights into the challenges and needs related to teaching asexual reproduction in plants. In the lesson evaluation phase, a panel of five expert evaluators was engaged to assess the quality and effectiveness of the developed contextualized STEM lessons. The panel included experienced science teachers, curriculum specialists, and teacher educators, all with demonstrated expertise in biology education and instructional material development. Their evaluation focused on the content accuracy, contextual relevance, presentation, and overall pedagogical soundness of the lessons. All participants were briefed about the purpose and scope of the study, and their voluntary participation was ensured through the administration of informed consent.

Procedures

The study followed the 4D Model—Define, Design, Develop, and Disseminate—as the framework for its developmental research process. In the Define phase, a needs assessment was conducted to determine the instructional material requirements of science teachers and school administrators for teaching asexual reproduction in plants. Five in-service science teachers and five school administrators from rural public high schools participated as key informants. Data were gathered through semi-structured interviews, transcribed, and analyzed thematically to identify prevailing challenges, resource gaps, and contextual needs in STEM instruction. In the Design phase, the researchers conceptualized and outlined contextualized STEM lesson plans grounded in the findings from the needs assessment. These lessons incorporated local agricultural practices to bridge the gap between scientific concepts and students' everyday experiences. During the Develop phase, the lesson plans were finalized and subjected to expert validation. A panel of five evaluators—composed of experienced science teachers, curriculum specialists, and teacher educators—assessed the materials using a standardized evaluation rubric. The evaluation focused on content accuracy, format, presentation, and contextual relevance. Descriptive statistics were used to analyze the quantitative ratings, while qualitative feedback was examined through thematic analysis. Finally, in the Disseminate phase, the validated lessons were prepared for implementation and potential distribution in science classrooms. The feedback and results informed recommendations for further refinement, emphasizing the value of localized, interactive, and resource-accessible instruction in rural STEM education.

Implementation

The implementation of the study was conducted in a public secondary school situated in Barangay Santiago, Iligan City, Philippines. This rural setting was purposefully selected due to its strong agricultural context and alignment with the study's aim of contextualizing STEM instruction. The school served as the pilot site for administering the developed lesson on asexual reproduction in plants. During implementation, science teachers facilitated the lesson using the contextualized materials, integrating local examples and engaging students through interactive, real-life applications. Observations and feedback were gathered from both teachers and students to assess the lesson's clarity, relevance, and effectiveness in enhancing understanding. The setting provided a practical context for evaluating how well the developed STEM lesson addressed the instructional needs identified in the earlier phases of the research.

Data Analysis

The study employed both quantitative and qualitative data analysis techniques to comprehensively evaluate the effectiveness of the developed contextualized STEM lesson. For the quantitative aspect, evaluators rated the lesson plan using a standardized rubric that assessed content accuracy, format, presentation, and contextual relevance. The ratings were analyzed using descriptive statistics, specifically mean and standard deviation, to determine the overall quality and level of satisfaction with the instructional material. For the qualitative component, data from the needs assessment interviews and evaluator feedback were analyzed using thematic analysis. This involved transcribing the responses, coding the data, and identifying emerging themes related to instructional material gaps, contextual relevance, and suggestions for improvement. The integration of both statistical summaries and thematic insights allowed the researchers to validate the effectiveness of the developed lesson and ensure it addressed the specific needs of science educators and administrators in rural settings.

RESULTS AND DISCUSSIONS

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

The five (5) science coordinators 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 SA1, SA2, SA3, SA4, and SA5 referred to the School Science Coordinators Needs Assessment, and ST1, ST2, ST3, ST4, and ST5 stood for the Science Teacher Needs Assessment.

Table 4.1 Summary of the Responses of the School Administrators and Science Teachers on Difficulties in Teaching Asexual Reproduction.

Themes	Codes	Utterances
Teachers difficulties	Lack of materials	SA1: Teachers face several challenges in the lacking of localization teaching materials and insufficient professional development programs to effectively essential contextualized subject
		SA2: Lack of localization material where teacher must create their own, adding to workload, and insufficient training where limited guidance on modifying lesson while meeting competencies
		ST1: Teaching asexual reproduction can be difficult for grade 7 students because the process, like building and grafting, are not easily seen in everyday life. Many students also confuse sexual and sexual reproduction especially in plants that use both methods. The lack of plant samples and materials makes it harder to do hands-on activities and some little background in farming or gardening. Another challenge is that sexual reproduction takes time to observe but lessons need to follow a schedule.
	Student Diversity	SA3: Student Diversity
	Lack of interest	SA4: Student lack of interest
		SA5: In my case slight difficulties that I encountered when it comes teaching approaches like student lack focus
	Teaching Asexual reproduction Challenges	ST2: Students hardly recall their differences and cannot enumerate examples
		ST4: student struggles with forms of asexual reproduction.
	Support technology or visual aid Time Constraint	ST5: need to support technology or visual aid to identify the advantages and disadvantages of asexual reproduction. ST3: Concept complexity, hands on experience and limited time

The table 4.1 shows the difficulties of teaching intricate subjects such as asexual reproduction are elaborated in the data. The primary concerns include the absence of appropriate teaching materials as well as a lack of adequate professional development, which enhances the teachers' burden while reducing the quality of teaching. Another challenge includes the lack of engagement and diversity, as many students have low interest or low attention, which makes teaching very difficult. Furthermore, students often struggle with differentiating asexual from sexual reproduction and recalling examples, which adds to the complexity of teaching. There are not enough plant samples and other materials for active participation, and attempts to cover various ideas are hampered by time limitations. There is also a greater need to provide support using technologies and other visual aids for understanding complex biological concepts. All in all, a combination of lacking materials, unmotivated learners, and constrained time creates very difficult conditions for effective science teaching.

The difficulties in teaching asexual reproduction in plants are supported by findings in existing literature. Research by Adnan et al. (2019) emphasizes the significance of providing appropriate teaching materials to enhance student engagement and understanding, underscoring the need for schools to invest in localized resources that resonate with students' contexts. Collectively, these studies highlight the multifaceted nature of the challenges encountered in teaching asexual reproduction and underscore the importance of a comprehensive

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approach that addresses resource allocation, professional development, innovative teaching strategies, curriculum design, and the creation of supportive learning environments.

Table 4.2 Summary of the Responses of the School Administrators and Science Teachers on Interventions Done to Address the Impediments in Teaching Asexual Reproduction

Themes	Codes	Utterances
Interventions to help these difficulties	Use localized teaching Material	SA1: Encourage teacher to create an incorporate localized teaching materials of resources that can also be adapted locally based on contents. SA2: ready- made localized material, l training on contextualization, community collaboration, and flexible teaching strategies
	Incorporate enrichment activity	SA3. Use different instruction such as variety activities assessment and pacing, incorporate multiple intelligence and learning style in lessons, Invite remedial, and enrichment activity for different skill levels.
		ST1: Hands-on Activity where teacher let students propagate these problems
		ST2: Students will be asked to bring real strategies and sorted as a sexual and sexual types.
	Innovative activities	SA4: Encourage the use of videos or games as innovation SA5: I always make sure that during my class it's not boring and learning is fun.
	Use of visual and animation	ST3: videos and worksheet ST4: Use of visual aids incorporate video animation to show the process. ST5: using videos and additional activities or actual activities for application of this competences.

The table 4.2 data suggest several interventions aimed at helping teachers address the challenges they face. One important intervention is using localized teaching materials, which aid in adapting lessons to specific local contexts, thus making the lessons interesting and relevant to the students. Moreover, enrichment activities such as different types of teaching, assessment, and pacing strategies are helpful. Lessons, along with remedial and enrichment activities for different levels of ability, are also emphasized with the inclusion of multiple intelligence and learning styles. For instance, teachers are encouraged to make use of innovative activities such as videos and games to enhance the interaction in class. Furthermore, the use of visual aids and animations is particularly effective, as students are able to comprehend complex processes such as reproduction through the use of videos and animation. The interventions are designed to foster greater participation, improve understanding, and provide more relevant, practical learning opportunities for the students.

In teaching asexual reproduction in plants. One crucial implication is the need for curriculum development that integrates localized and contextualized teaching materials. This approach enhances the relevance of lessons and engages students more effectively (Andreou & Vasillis, 2020). Research has established that using culturally relevant pedagogies can significantly boost students' interest and understanding (Paris & Alim, 2017). Moreover, the emphasis on differentiated instruction in the responses suggests that further exploration into various teaching strategies is needed to accommodate diverse learner needs. A study by McCarthy et al. (2018) supports this notion, indicating that differentiated instruction can lead to improved learning outcomes in varied student populations. The incorporation of innovative technologies, such as videos and games mentioned in the findings, also calls for further investigation. Research by Liu et al. (2019) found that multimedia tools can enhance student comprehension by promoting active engagement with the material.

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In addition, the highlighted importance of visual aids and animations is consistent with findings by Egbert (2018), which suggest that visual learning supports retention and cognitive engagement, particularly in science education. Furthermore, the mention of community collaboration points to the potential for local resources to enrich teaching practices. A study by Vang et al. (2020) indicates that partnerships with local organizations can significantly enhance educational experiences and provide practical learning opportunities for students. Assessing the effectiveness of these collaborative teaching methods and their impact on student outcomes is crucial. Research by Hattie (2020) emphasizes that teacher-student interactions are pivotal for academic success, suggesting that further studies should investigate the relationships between the discussed interventions and student performance, motivation, and interest in science, ultimately contributing to improved educational practices in the field.

Table 4.3 Summary of the responses of the School Administrators and Science Teachers on Contextualization and Localization of Science Subjects

Themes	Codes	Utterances
Familiarity with Contextualized Teaching	Contextualizing lessons or activities	SA1-SA4, ST1, ST4, ST5: Yes SA5: It's a specific need of learner's background, situation, so that learning is more relevant and meaningful. ST2: Yes, on different topics ST3: Yes, I have heard about it
Training on Contextualizing the Lessons	Attended seminars/webinars	SA1: Already attended about this lesson, yes it will help me much to provide innovative strategies in teaching and learning process SA2: yes/yes SA4: Yes, and I greatly believe that seminars on contextualization and localization will be a great help for teachers. ST1: Yes, its learner-centered ST2: Yes, in one of the seminars at MSU-IIT we made manuals ST3:NA ST4: Yes, it is a big help to teacher for an effective implementation and considered teaching quality of science lesson.
	Not attended	SA3: No, I haven't attended seminars about that, yes it will help us teachers SA5: I was not included in the training ST5: not yet
Benefits of Contextualization in the Teaching-Learning Process	Learning relevant	SA3: Yes, contextualization and localization are crucial factor in the successful transfer of knowledge and in achieving meaningful learning experiences because they make learning relevant, enhance understanding and retention and promote critical thinking and problem solving. ST3: Yes, Localizing can give better attention to students because of its relevance to learners' lives and it can also boost engagement to students.
	Provide concrete sample	SA4: Yes, because it allows them to identify concrete examples found in their daily lives.
	Reflect real life	SA5: Yes, because it involves adjusting the content of a lesson or

	situation	activities to reflect the real-life situation, experience, and cultural context ST2: Yes, because it is to organize an objective or highlight in the manual. ST5: Yes, they can relate their own experience because they may get unforgettable experiences.
	Learner centered	ST1: Yes, its learner centered

The table 4.3 analysis centers about teachers' understanding of contextualized teaching, their prior training, and the benefits that arise from contextualization in the teaching-learning interface. For many teachers, contextualizing lessons or activities is a familiar practice. This is the process of modifying lessons in such a way that learners' needs, backgrounds and circumstances are incorporated and thus, learning becomes meaningful. Many teachers perceive that learning through contextualization is beneficial because students are actively engaged and learning is contextually relevant.

Contextualization of lessons is approached with mixed responses. While several teachers report having attended seminars and webinars on constructing learner-centered localized lessons, others do not. Those who have attended such seminars report that they help in formulating ways of effective teaching and enhancing the quality of science lessons.

The teachers recognize the positive effects of contextualization or the benefits of contextualization, claiming that it makes learning relevant and motivates learners to think critically, solve problems, and retain information much better. It also assists students in linking the lessons to their lives and culture which makes the content relevant. Teachers, too, appreciate the value of instructions based on clear facts and practical situations because they enable the students to participate actively in the lessons. In a nutshell, contextualization encourages a learner- centered strategy which leads to greater learner participation and achievement.

The contextualization and localization of science subjects illuminate a crucial link between teacher training and enhanced student engagement in learning. The positive reception of contextualized teaching among educators aligns with recent studies, highlighting that when lessons are tailored to reflect students' backgrounds and real-life experiences, there is a significant increase in motivation and comprehension (Beck & O'Donoghue, 2018). This finding reinforces the assertion by Wang et al. (2019) that contextualized instruction not only fosters critical thinking and problem-solving skills but also bridges the gap between theoretical knowledge and practical application, making learning more relevant to students' lives. Additionally, the reports of positive experiences stemming from seminars emphasize the importance of professional development in equipping teachers with effective strategies for implementing contextualized learning frameworks (Lee, 2020). The implications are clear: investing in teacher training focused on contextualization can profoundly impact educational practices, ultimately leading to improved student outcomes and a deeper connection to the material being taught.

Table 4.4 Summary of the responses of the School Administrators and Science Teachers to STEM Lesson Plan

Themes	Codes	Utterances
familiar with STEM Education	Science technology engineering and mathematics	SA1, SA3, ST1, ST3, ST4, ST5: YES SA2: Yes.Science technology engineering and mathematics SA5: Yeah, STEM stands for Science Technology Engineering and Mathematics Education it is interdisciplinary approach ST2: Yes, it means science and technology engineering and math. SA4: No

Training on STEM	Attended seminars/webinars	SA1: Yes, STEM plays a critical role in preparing students for the future. It encourages critical thinking and innovation through engaging students in real- world challenges that are more practical and relevant. SA2: Yes, STEM education bridge class classroom learning with real word application help students develop critical thinking, problem solving, and creativity. It prepares them for future career in science technology engineering and math were in high demand today through hands on activity and teamwork students learn how to innovate and adapt the fast-changing world STEM also encourage curiosity and lifelong learning make it essential in technology in technology driven society. ST1: Yes, it is applicable to all students. The teacher must be Innovative and must accept the challenges brought by this kind of teaching strategy.
Benefits of Contextualized STEM Lesson	Easily comprehend	SA1: Yes, by using lesson plans that are familiar and locally available students can easily relate to the lesson like vegetative propagation and fermentation etc. SA2: Yes, Using localize education approach the topic a sectional reproduction in plants can be taught by relating it to plants commonly found in the student's community instead of using for an example teacher can use local crops like cassava bananas with potatoes and sugar cane which produce a sexual and are essential to agriculture in the Philippines ST3: Yes, this material could make students not only gain a deeper understanding of biological processes but also see how this knowledge can be used to address local challenges, such as improving agriculture, enhancing sustainability, and preserving biodiversity.
	Hands-on learning	SA3: yes, contextualize slash localize time Lesson plan that employs STEM education would be highly useful in teaching a sexual reproduction in plant for several reasons that contextualization and localization improve relevant and encouraging hands-on learning ST4: Yes, I think this kind of approach could help students better understand the process of asexual reproduction to avoid misconceptions of the topics/ lesson thus creating a more engaging, hands-on learning experience.
	Addresses local context	SA4: yes, Teaching science lesson in general will be more effectively and relevant to learner when it is contextualized and localized SA5: yes, a contextualized or localized STEM lesson plan can be useful in teaching asexual reproduction in plants by integrating the concept of science, technology, and engineering. ST1: Yes, I guess. STEM Lesson plan using STEM education concurrently enhances learning about sexual reproduction in plants in the classroom. By using familiar plants like cassava and banana students can easily relate to the topic and understand its real-world applications. Hands on activities such as Propagation plant through the grafting or cutting, allow students explore the process first hand making learning more engaging. Through problem solving and

		experimentation, they develop critical thinking skills finalizing how different condition affects plant growth not only makes lesson more meaningful but also prepares students to apply scientific concepts in everyday life
	Teaching Approach	ST2: Yes, because it will create a framework on how the topic or classroom will be approach ST5: yes, because it's expanded the possibility of the lesson meaningful and student can engage and innovate through this STEM lesson plan.

Table 4.4 summarizes the responses from school administrators and science teachers about STEM lesson plans. Most respondents appeared to be well-versed with the term STEM, albeit very few did not understand what it stood for. As indicates in Table 4.5, School administrators and teacher respondents reported that they have attended STEM seminars and webinars, though some had not been trained formally. A majority of respondents talked about the advantages of contextualized STEM lessons and localization, emphasizing how it facilitates reliability. For instance, the use of local examples such as cassava and bananas were believed to help students relate to the topics being taught, especially about asexual reproduction of plants. Respondents expressed that unmatched local lessons have the potential to stimulate motivation, energy, and engagement with the subject matter. They also noted that attending STEM lessons enhanced problem-solving and critical thinking skills, besides preparing learners for future careers in science, technology, engineering and math. To summarize, most respondents not only preferred contextualized and hands-on approaches, but also believed they are imperative in STEM education.

The study's findings have several critical implications for enhancing STEM teaching practices and improving student outcomes. One significant implication is the necessity for comprehensive training programs tailored specifically for educators, as the mixed responses regarding formal STEM training highlight a gap in teacher preparedness. Desimone (2019) emphasizes that ongoing professional development is vital for effectively implementing innovative teaching practices. Furthermore, fostering interdisciplinary approaches should be a priority; collaborative strategies that encourage educators from different subjects to work together can create a more integrated learning environment. Beers (2020) asserts that interdisciplinary learning enhances relevance and equips students with essential skills to tackle complex real-world problems.

Another vital implication is the emphasis on contextualized learning. Given teachers' focus on the relevance of localized education, curriculum developers should prioritize connecting STEM topics to students' daily lives and community issues. Ma and Liu (2021) suggest that such localized education can significantly boost students' interest and understanding by illustrating the practical applications of their studies. Additionally, the importance of hands- on activities for student engagement cannot be overstated. Hattie and Donoghue (2016) confirm that active learning experiences lead to enhanced motivation and achievement, underscoring the need for interactive components in STEM lessons that allow students to explore and apply their knowledge.

Lastly, the need for ongoing assessment and evaluation of STEM programs is essential to ensuring their effectiveness. McCoy et al. (2020) argue that regular feedback from both educators and students can inform curriculum adjustments and improve teaching methods, enhancing the overall effectiveness of STEM education in schools. Collectively, these implications not only reflect the insights garnered from educators but also present actionable steps that can be undertaken to maximize the impact of STEM education.

DepEd's MATATAG Curriculum Learning Competencies

The DepEd's MATATAG Curriculum integrates STEM education, fostering critical thinking, problem-solving, and innovation. By emphasizing scientific, technological, engineering, and mathematical competencies, it equips students with essential skills, preparing them for future challenges and contributing to national development. This integration implies a shift toward a more interdisciplinary and future-ready education system, ensuring learners are better aligned with global standards and workforce demands.

Table 4.5 Selection of Topics in DepEd's MATATAG Curriculum Learning Competencies

Quarter	Content Standard	Performance Standard	Learning Competencies and Objectives	Durations
2nd	Learners learn that: 1. Familiarity and proper use of a compound microscope are essential to observe cells. 2. The organelles of plant and animal cells can be identified using a compound microscope. 3. Cells are the basic unit of life and mitosis, and meiosis are the basic forms of cell division. 4. Fertilization occurs when a male reproductive cell fuses with a female reproductive cell. 5. Sexual reproduction is the basis of heredity. 6. The level of biological organization provides a simple way of connecting the simplest part of the living world to the most complex. 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 demonstrate understanding of the parts and function of a compound microscope and use this to identify cell structure. They recognize that the cell is the basic unit of life and that some organisms are unicellular and some are multicellular. They explain that there are two types of cell division, and that reproduction can occur through sexual or asexual processes. They use diagrams to make connections between organisms and them environment at various levels of organization. They explain the process of energy transfer through trophic levels in food chains.	**Learning Competency** 1. differentiate sexual from asexual reproduction in terms of: a) number of parents involved, and b) similarities of offspring to parents **Lesson Objectives** 1. Differentiate asexual reproduction and sexual reproduction. 2. Identify the advantages and disadvantages of asexual reproduction. 3. Enumerate the types of asexual reproduction.	Week 6 and Week 7

Table 4.5 presents the 2nd quarter. Students focus on the complex microscope's role in relation to cells as basic units of life, studying cell structure and cell functions from MATATAG Curriculum. The MATATAG Curriculum explores processes such as mitosis, meiosis, and fertilization while distinguishing between sexual and asexual reproduction. By the conclusion of the quarter, learners should be able to discuss the differences between the reproduction methods, explain the merits and demerits of asexual reproduction, and articulate the connection of sexual reproduction to heredity. Also, the MATATAG Curriculum intends to learn about biological organization levels and the energy flow through the trophic levels in ecosystems, thus relating organisms and their environments. Weeks 6 and 7 emphasize classification of reproduction types and associated processes.

Learning Competencies Mapping of Contextualized

The MATATAG Curriculum Mapping for the Contextualized STEM Lesson Plan on asexual reproduction

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explores the impact of vegetative propagation in plants, emphasizing its role in food security and sustainable agriculture.

Table 4.6 MATATAG Curriculum Mapping of the Contextualize STEM Lesson Plan on the Topics of asexual reproduction

Learning Competencies	**Topic**	**Subtasks**	**Activities and label**
1.differentiate sexual from asexual reproduction in terms of: 2. a) number of parents involved, and b) similarities of offspring to parents	1. Differentiate asexual reproduction and sexual reproduction	Students will analyze how asexual reproduction in plants can contribute to food security and sustainable agriculture.	**Activity 1:** **“Exploring** the Impact of Asexual Reproduction on Food Security”
		To explore vegetative propagation as a sustainable agricultural practice and brainstorm complementary methods.	**Activity 2:** "Propagate & Innovate"
	2. Identify the advantages and disadvantages of asexual reproduction	To deepen students’ understanding of the biological principles and benefits of vegetative propagation through an interactive approach.	**Activity 3**: "Propagate the Knowledge"
		To enable students to make informed decisions on the most appropriate propagation methods for different plant species while considering environmental factors.	**Activity 4:** "Propagate Wisely"
		To apply theoretical knowledge in a hands-on propagation activity by developing and executing a step-by-step plan for propagating a chosen plant.	**Activity 5:** "Plant It Right!"
	3. Enumerate the types of asexual reproduction.	To monitor and evaluate the effectiveness of different vegetative propagation methods through observation, journalism, and discussion.	**Activity 6:** "Propagation Progress Report"
		To present and evaluate the outcomes of different vegetative propagation methods and discuss their implications for sustainable agriculture.	**Activity 7:** "Propagation Showcase & Reflection"

The table 4.6 shows the MATATAG Curriculum Mapping for Contextualized STEM Lesson Plan on Asexual Reproduction takes an interactive learning approach. It guides students to analyze factors like the number of parents involved and the resemblance of offspring to help them differentiate between sexual and asexual reproduction. Units like “Impact of Asexual Reproduction on Food Security” help students understand theoretical concepts on sustainable agriculture. In “Propagate & Innovate” and “Plant It Right!” students learn to plant and practice herbaceous stem propagation. Through assessment activities on the advantages, disadvantages, and methods of asexual reproduction, learners are prepared to make decisions on the techniques of propagation they choose to use. In the final stages of the unit, students are invited to reflect and present the work they have done, developing their thinking and problem- solving skills withina STEM setting.

Validation of the Developed Contextualized

Feedback was provided by five (5) evaluators of the constructed Contextualized STEM Lesson Plan. In-service science coordinator rated these after the revisions which are specified in the evaluation results. The evaluators utilized the standardized evaluation-rating sheet from DepED (2015).

Table 4.7 Evaluator's Rating of the Contextualized STEM Lesson Plan in Plant Asexual Reproduction

Components	Mean	Description
Factor 1: Content	3.69	Very satisfactory
Factor 2: Format	3.85	Very satisfactory
Factor 3. Presentation and Organization	3.58	Very satisfactory
Factor 4. Accuracy and Up-to-datedness of Information	3.89	Very satisfactory

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)

The table 4.7 shows the evaluator's rating of the Contextualized STEM Lesson Plan on Plant Asexual Reproduction shows a generally positive assessment. Factors related to the content (3.69), format (3.85), and presentation/organization (3.58) all received "very satisfactory" ratings, indicating that these elements were well-received and met expectations. 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 study successfully demonstrated the significant impact of developing and implementing a contextualized STEM lesson plan on plant asexual reproduction tailored for Grade 7 learners in a rural Philippine setting. Grounded in a comprehensive needs assessment involving school administrators and in-service science teachers, the research highlighted core challenges in teaching asexual reproduction, such as the lack of localized instructional materials, inadequate professional training, student disengagement, and limited access to hands-on resources. These constraints posed a barrier to effective teaching and conceptual understanding of complex biological processes.

In response, the development of a contextualized lesson plan incorporating local examples, interactive activities, and hands-on applications addressed these pedagogical gaps. This approach aligned well with the MATATAG Curriculum's learning competencies, emphasizing real-world relevance and learner-centered strategies. Activities such as "Plant It Right!", "Propagate & Innovate", and "Propagation Progress Report" exemplified how theory can be seamlessly integrated with practice, thereby improving learner engagement and retention.

The evaluation results from education experts also validated the quality of the instructional material. The contextualized lesson plan received very satisfactory ratings across key components: content (3.69), format (3.85), presentation/organization (3.58), and accuracy/up-to- datedness (3.83). These scores affirm the instructional soundness and relevance of the lesson to both curriculum standards and classroom realities.

Furthermore, the study illuminated the importance of ongoing professional development and teacher training in contextualized instruction and STEM integration. Teachers who had attended training reported greater ease and creativity in adapting lessons to student backgrounds, while those without such exposure acknowledged its necessity.

Ultimately, the research underscores the transformative potential of localized and contextualized STEM education in enhancing science instruction. By bridging the gap between abstract content and learners' real-life

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experiences, the lesson fostered critical thinking, scientific inquiry, and agricultural awareness—essential competencies for sustainable development and lifelong learning. The findings advocate for broader adoption of similar approaches, the provision of resources for contextual teaching, and the inclusion of more capacity-building initiatives for educators. These strategies can collectively elevate the quality of science education in the Philippines, especially in rural and agriculture-oriented communities.

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