Marlajar: Journal of Science, Technology and Innovation
Volume 1, Issue 1, 2026: ISSN:xxxx-xxxx
DOI: https://doi.org/10.66784/marlajar.v1i1.17

Understanding The Concept of Plant Diversity by Utilising the School Environment in Biology Lessons

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Article History
Received: 2026-01-05
Revised: 2026-01-20
Accepted: 2026-01-29
Published: 2026-02-05

Keywords
Concept Understanding, Plant Diversity, And School Environment

How to cite:
Amin, A., Sitio, H., Farrell, J., Saadoon, A.R., and Simanjuntak, M.R.P. 2026. Understanding The Concept of Plant Diversity by Utilising the School Environment in Biology Lessons. *Marlajar: Journal of Science, Technology and Innovation, 1*(1), 1-8.

Abstract
The result of preliminary observation at some SMP Negeri 10 Denpasar City Municipality, showed that there were some difficulties faced by the teacher in the learning process. One of them was that it was difficult to teach concept understanding of plant diversity to the students. The purposes of this action research were (1) to fine out whether or not the benefit of school environment could improve the concept understanding of plant diversity, (2) to improve the student's ability in completing the group task in studying the plant diversity. The data were obtained from the test and observation, they were analyzed by the use of percentage. The result of data analysis showed the learning success in cycle I, 71,79%, in cycle II, 84,62%, and in cycle III, 94,87%. The showed that there was good improvement from cycle I, to cycle III. There fore the benefit of school environment could improve the student's concept understanding of plant diversity. The student's cooperation in completing the group task improve, seen from their activities in group discussion and their ability in completing the task.

INTRODUCTION

Based on preliminary observations at several schools in Denpasar, such as SMP Negeri 1, 2, 5, and 10 in Denpasar City, teachers face several obstacles in biology instruction. One of these obstacles is teaching the concept of plant diversity. According to the teachers, instilling the concept of plant diversity in students is very difficult. This difficulty is caused by students having difficulty memorizing the names of existing plants, a lack of references, limited time, and teachers' busy teaching hours (Febriani 2021). From interviews with biology teachers at SMP Negeri 10 Denpasar City, it was also revealed that the school environment has never been utilized in the learning process, especially for plant diversity. This finding is in accordance

with Arief's (Khafid 2022) opinion that in the biology teaching and learning process, teachers still predominantly transfer knowledge to students without making students active in learning. In reality, teachers mostly use the lecture method in biology instruction. According to Sukmadinata (Ernawati 2021) a good teacher is a teacher who is successful in teaching, namely a teacher who can prepare students to achieve learning objectives as formulated in the curriculum. Many articles have highlighted the environment, but these studies have not directly addressed efforts to improve conceptual understanding, particularly the concept of plant diversity. The lecture method in biology learning tends to make students passive, and there is no desire for students to try simple research in learning. Therefore, studying biology, especially plant diversity, requires a learning process using a process skills approach. The process skills approach trains students to make observations and directly try problems that they encounter in the learning process (Chandra and Khiong 2024).

According to Funk and Harlen (Sugito 2021) process skills are intellectual skills used to process information obtained in learning. As stated in the Ministry of Education and Culture (Andini and Fitria 2021) process skills approach is an approach in the teaching and learning process that emphasizes the formation of skills to acquire and communicate these acquisitions. By using the process skills approach, it is hoped that learning objectives will be achieved in accordance with the objectives of the teaching curriculum as stated by Bloom, including aspects of knowledge (cognitive domain), aspects of attitudes (affective domain), and aspects of skills (psychomotor domain) ((Retnowati and Widiana 2021). From the opinions of the experts above, it can be concluded that the process skills approach is considered the most appropriate approach for teaching biology. In Sarjono's research (2000) it was stated that the application of students' process skills was very lacking so that students showed an inability to express ideas in their own way. On the other hand, it was also seen that the average NEM for Science at SMP Negeri in East Java was still low, such as in 1996/1997 at 5.18, 1997/1998 at 4.81 and in 1998/1999 at 4.74, while the average NEM for Science at SMP Negeri 10 Denpasar City in 2025/2026 was 5.29, lower than other fields of study such as Mathematics (6.26), PPKN (7.16), Indonesian (6.76), Social Studies (6.47), and English (7.70).

Observing the above symptoms, it is necessary to improve students' understanding of the concept of plant diversity and its implementation in learning by utilizing the school environment as a learning resource. The school environment is everything around the school, including the living environment (biotic) such as plants and animals and the non-living environment (abiotic) such as soil, water, air, climate, and sunlight. In this regard, Kimmins (1997) stated that there are two important components in an organism's environment, namely abiotic (physical and chemical) and biotic factors. This environment is used as a learning resource in biology lessons at SLTPN 10, Denpasar City.

According to Rifai ((Hutagalung 2023) students must be familiarized with real efforts to preserve biodiversity in their surrounding environment, such as visiting seed collection gardens, city parks, schoolyards, zoos, nature reserves, and so on. These visits will broaden their insight into the importance of utilizing biodiversity resources wisely, especially in the learning process. Another impact of these efforts is that students understand the importance of diversity, especially plant diversity. Sulasmi (Hidayatullah 2019) states that plant diversity is a form of appearance or natural manifestation of different plants found in a region. These natural manifestations can be in the form of morphological, anatomical, physiological, genetic and ecosystem characteristics or traits of plants (Arimbawa 2021).

From the background and theoretical basis above, the research problem is formulated as follows. (1) Can the use of the school environment in learning improve the understanding of the concept of plant diversity in class IB students of SMP Negeri 10 Denpasar City? (2) Can the use of the school environment improve students' ability to work on Student Activity Sheets (LKS) in groups to understand the concept of plant diversity? From the background and formulation of the problem above, the objectives of this research are: (1) to improve the understanding of the concept of plant diversity in class IB students of SMP Negeri 10 Denpasar City, and (2) to improve students' ability to work on activity sheets in groups to understand the concept of plant diversity.

METHODS

This research is a classroom action research. The implementation of classroom action research at SMP Negeri 10 Denpasar City was due to obstacles that arose in the learning process, such as the lack of understanding of the concept of plant diversity among students. To overcome this, efforts are needed to improve the learning process by teachers, because only teachers know best about the conditions of the class they manage. Lewin (Sofiani, Jimmi Copriady, and Mahdum 2022)describes action research as a continuous action of spiral-shaped steps, each step (cycle) containing planning, action implementation, observation (evaluation) and reflection of action. This research was conducted collaboratively between researchers and biology teachers of grade I SMP Negeri 10 Denpasar City. This research took place in three cycles, each cycle consisting of four stages, namely (1) the planning stage, including: providing teachers with supplies, preparing learning models, preparing test instruments (pretest, posttest), observation sheets and forming student study groups, (2) the action implementation stage, including: implementing activities from the plans made, (3) the observation stage, namely observing the implementation of actions through observation guidelines, and (4) the reflection stage, namely analyzing and giving meaning to the implementation of actions, so that action plans can be made in the next cycle.

The data in this study were collected using test tools and observation guidelines. The test was used to obtain data on increasing students' understanding of the concept of plant diversity. The test tool used consisted of 25 items in each cycle, so that the total number of questions from the three cycles was 75 items. In order for the preparation of the test to measure the necessary aspects and be in accordance with the main and sub-topics being taught, a test grid was first prepared (Fatihah et al. 2023). Furthermore, the test that had been prepared was first tested so that the test (instrument) could be used to collect data accurately. In relation to the test trials, (a) validity tests, (b) reliability tests, (c) difficulty level tests, and (d) discrimination tests were conducted. Furthermore, after the test met the requirements for a good test, it was used to collect data in the research, such as conducting pretests and posttests in each cycle. Students were considered to have completed their learning if they had achieved a score of 6.5 or above or 65%, while students who received a score of less than 6.5 were declared to have not completed their learning. Posttests were conducted at the end of each cycle, while observation guidelines were used to observe teacher and student activities. To support the observation results, the researcher also recorded the learning process activities using a photo camera (Fadiyah Andirasdini and Fuadiyah 2024).

The collected data was analyzed using a percentage formula. Next, the students' scores were matched to a five-point scale conversion table. The results of this analysis were used to determine learning completion. According to the Ministry of Education and Culture (1994), the classical learning completion rate is 85% of students who obtain a score of 6.5 or 65%. This means that students can only be considered to have completed the learning if they have obtained a score of at least 6.5. If a student obtains a score of less than 6.5, they are considered to have not completed the learning. The students concerned are then placed into one or two groups depending on the number of students who have not completed the learning. These students receive the teacher's attention (focus) during the implementation of actions in the following cycles.

RESULTS AND DISCUSSION

A year before the actual research began, the researcher, along with biology teachers and first-grade students in 2025/2026, on August 9, 2025, planted plants in the schoolyard of SMP Negeri 10 Denpasar City. The goal was to increase the diversity of plants in the school environment, so that the school environment would support the implementation of the research. The types of plants planted included: water hyacinth, roses, hibiscus, bougainvillea, cempaka, croton, palm, and ferns, such as suplir fern, bird's nest fern, and staghorn fern. At the time of the research, the plants had grown perfectly, because they had been well maintained by the school staff. During the planting, students were given the task of compiling a report in groups starting from selecting the plants to be planted until the plants grew (Ramadhani and Khairuna 2022).

Furthermore, the research was carried out in three cycles. In the first cycle, three meetings were held, discussing the concepts of algae, fungi, and moss, each meeting taking 2 x 45 minutes. The time distribution is 10 minutes of initial motivation from the teacher and group division, 30 minutes of field

activities and 40 minutes of class discussion and presentation of results and 10 minutes later ended with a summary by the teacher. Each cycle begins with a pre-test and at the end of the cycle a post-test is held. The results of observations on the implementation of cycle I are as follows, namely (a) the teacher has started learning by motivating students and ending by making a summary, (b) in each activity the teacher has tried to accompany students, (c) student group work is still less active, especially groups 5, 6, and 7 which are active groups 1, 2, 3, and 4, (d) from the results of the post-test there are as many as 28 people or 71.79% of students who have completed learning, while 11 people or 28.21% of students have not completed learning. The results of reflection on cycle I were (a) students' activity in group work was lacking, (b) students were not yet able to draw conclusions correctly, (c) teachers encouraged students to be brave in asking and answering questions, and (d) 71.79% of students had completed their learning and 28.21% of students had not completed their learning.

From the reflection on actions in cycle I, an action plan for cycle II was prepared as follows, namely (1) the teacher changed the group composition by putting students who were less successful into two groups (group 1 and group 2), (2) putting students who had not completed into the two groups, (3) the teacher had to focus more attention on students who had not completed, (4) the teacher suggested that students work more systematically, and (5) students were required to read the lesson at least one day before. In cycle II, one meeting was held, the concept discussed was ferns with a time breakdown of 2 x 45 minutes. The implementation of actions in learning was generally the same as in cycle I, except that the teacher's focus of attention was on the two groups that had not completed. The results of the observation of actions in cycle II are as follows, namely (a) group discussions increased, (b) students actively discussed and asked questions, (c) each group was able to complete their tasks, (d) from the post-test results there were 33 people or 84.62% of students who had completed their studies, while 6 people or 15.38% had not completed their studies. The reflection of the actions was (a) students had been active in learning, (b) students actively asked and answered questions, (c) students completed their tasks more quickly and (d) there were still 15% of students who had not completed their studies (Arundhati, Widana, and Hermawan 2019).

From the reflection of actions in cycle II, an action plan was then prepared for cycle III as follows, namely (1) the teacher changed the group composition, by including 6 students who had not succeeded into one group, namely group 1, (2) the teacher focused more attention on the group of students who had not completed, and (3) the teacher divided the learning model for the next cycle at the end of the cycle II meeting. In cycle III, three meetings were held, each 2 x 45 minutes, the concept discussed was seed plants (Spermatophyta) including: open seed plants (Gymnospermae), closed seed plants (Angiospermae). The division of time and implementation techniques were generally the same as cycle I and cycle II. The results of observations of actions in cycle III are as follows, namely (a) the teacher carried out the learning process well, (b) student group work went well, (c) students actively discussed and asked questions, (d) group activities that were the focus of the research went well and actively, (e) from the post-test results there were 94.87% (37 people) who had completed learning, while 5.13% (2 people) had not completed learning from 39 students who were the subjects of the research. Reflection of actions in cycle III as follows: (a) group cooperation and activeness went well, (b) The group that was the focus of the research was able to improve its understanding of the concept, (c) the level of learning completion in a classical manner reached 94.87% or as many as 37 people, meaning it was above 85%, and (d) the implementation of the next cycle was no longer necessary.

From the three cycles, the results obtained consecutively were (a) 71.79% in cycle I, (b) 84.62% in cycle II, and (c) 94.87% in cycle III. This means that there was an increase in the understanding of the concept of plant diversity mastered by class IB students of SMP Negeri 10 Denpasar City in the biology learning process. Thus, the proposed hypothesis that optimal use of the school environment can improve the understanding of the concept of plant diversity in class IB students of SMP Negeri 10 Denpasar City City can be accepted, because it has been proven true.

Discussion

The use of the school environment in biology learning can improve the understanding of the concept of plant diversity in students. This has been proven from the results of the implementation of

actions in each cycle as described in chapter IV, namely the research results (Liao, Chen, and Shih 2019). From these data, there is a very convincing increase in students' conceptual understanding, meaning that the school environment is very supportive when utilized in the learning process because it can accelerate the understanding of the concept of plant diversity in class IB students of SMP Negeri 10 Denpasar City. This finding is in accordance with the opinion of Arief (1996) who stated that the use of media in original form will be more meaningful for students and for the development of biological science compared to media in the form of models, pictures and sketches. This finding is also supported by the research of Lisowski and Disinger (Prasetiyo 2017) who stated that students' conceptions of the concept of ecology and the influence of field teaching strategies can improve their understanding and retention of this concept. In line with these findings, Yount and Horton (Talakua and Sesca Elly 2020) stated that students who have a better attitude towards the environment will be able to make better decisions in efforts to preserve their surrounding environment (Deslauriers et al. 2019).

When compared with the findings of other researchers referred to, this study has its own characteristics, namely the use of plants in the school environment in an effort to accelerate students' understanding of the concept of plant diversity. The results of this study are beneficial for students, such as (1) students have the skills to acquire knowledge in the form of "process skills" or scientific methods, (2) students' enthusiasm for learning increases, reflected in students' activeness in carrying out activities in the field and in class, and (3) learning becomes meaningful, because once the concept is understood, the concept can be remembered longer. This finding is supported by Arikunto's opinion (Gkintoni et al. 2025) that the school environment is something that is close to the world of students and is easily recognized in everyday life, and the school environment is a place that supports some of the students' needs (Septian, Darhim, and Prabawanto 2020). This study is also useful for teachers, because (1) teachers can deepen the approaches and methods used, (2) teachers become more professional, because of increased knowledge and understanding of PTK. This finding is supported by Susilo (Nurlia et al. 2017) who stated that teachers who are skilled at carrying out classroom action research (PTK) are teachers who are always willing to improve the learning process they manage.

The implications of this study for schools are that schools have professional teachers and schools can add to their collection of plants that are useful in the learning process, beauty, coolness, and environmental preservation. This finding is no less important for researchers because (1) it can increase knowledge about CAR, (2) get to know more deeply about biology learning in junior high school, and (3) can pioneer partnership cooperation with schools and teachers (Soori, Arezoo, and Dastres 2023). Utilizing the school environment can improve students' ability to work on worksheets in groups. This can be realized because in each implementation of the action, the teacher always forms groups consisting of five to six students, then distributes the worksheets. These groups are not always fixed, because in each cycle the composition of its members always changes. This change aims to (a) make it easier for teachers to guide students, (b) get students used to working in groups with each person, and (c) increase active discussion with a new atmosphere, and students will be more enthusiastic about learning. In cycle I there were three groups that were not yet active, namely groups 4, 6, and group 7. From the results of observations, it was shown that these groups were not yet active in discussions, were not yet able to complete tasks completely and were not yet able to draw correct conclusions. Dentsch (in Lazarowith and Slavin, 1984) stated that in order for learning to take place through group work, students must prepare themselves to be positively interdependent with other group members (Ryan and Bowman 2022).

In cycle II, with changes to the group composition and the teacher's focus directed more towards groups that were less successful, group activity was improved and more active. This was evident in (a) each group's ability to complete its assignment, and (b) students' willingness to ask and answer questions from their peers. This demonstrates that group cooperation can be built from the awareness of each individual within the group. This finding supports Slavin's (Chen and Huang 2023) opinion that a distinctive characteristic of group learning is that this method encourages students to work together to learn and take responsibility.

In cycle III, the group composition was changed again. This change was necessary because in cycle II, there were still six students who had not completed their learning, even though overall group work had shown good activity. Including students who had not completed the learning into one group apparently

motivated them to learn and work better, as evidenced by the post-test results in cycle III, which reached 94.87%. These results indicate that students' understanding of the concept of plant diversity and their ability to work in groups were in the good category.

CONCLUSION

Based on the research results and discussion, the following conclusions can be drawn. Utilizing the school environment in the learning process can improve students' understanding of the concept of plant diversity. This is evidenced by the increase in student learning completion in each cycle, namely 71.79% in Cycle I, 84.62% in Cycle II, and 94.87% in Cycle III. The learning completion in cycle III, namely 94.87%, has exceeded the standard of 85%, so that learning is considered complete. Group collaboration improved with each cycle. This success was demonstrated by students' active participation in group and class discussions, making learning more meaningful for them. Teachers are becoming more creative and professional because with the experience of conducting PTK, teachers gain provisions for professional development and developing the learning process in their classrooms. Based on the above conclusions, the following suggestions can be made. When building schools, the government is expected to create shady yards rich in plant diversity, so that they can be used for biology learning, environmental conservation and beauty. The Ministry of National Education should pay attention to teachers so that they understand and are able to carry out PTK, so that they can follow the problems faced in the learning process at their schools. It is recommended that school principals provide opportunities for their teachers to develop their creativity and professionalism in learning, so that teachers do not only transfer knowledge but encourage students to discover or prove theories through direct experience. Teachers are expected to always add new ideas and knowledge to learning so that they can increase students' enthusiasm for learning

Acknowledgments

We would like to express our gratitude to the principal of SMP Negeri 10 Denpasar City and the teachers who supported this research. We also extend our gratitude to our students who agreed to participate in this research.

Author Contributions

This article was written by Five individuals, Amin, A., Sitio, H., Farrell, J., Saadoon, A.R., and Simanjuntak, M.R.P who have read and approved the published version of this manuscript. Amin, A., Sitio, H. designed the study and analyzed the data, while H., Farrell, J., Saadoon, A.R performed the laboratory work. Saadoon, A.R., and Simanjuntak, M.R.P, wrote the manuscript. They drafted the original manuscript, prepared the introduction, results, discussion, methodology, and conclusion. Amin, A., Sitio, H., Farrell, J., Saadoon, A.R., and Simanjuntak, M.R.P. also contributed ideas to the research process, data processing, translation into English, review, and editing. All members of the research team collaborated at every stage until this article was completed.

Funding

Funding in this research is supported by the institution, the amount of which is adjusted to the applicable regulations on campus.

Conflicts of Interest

This research is conducted to provide information to the public regarding the research that has been conducted so that it can be used for educational purposes. in addition, this research is used by researchers for lecturer performance loads and accreditation needs of study programmes and institutions

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