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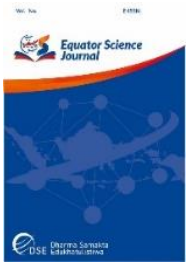

Attempts To Enhance The Learning Outcomes of Students by The Use of Image-Based Student Worksheets on Nervous System Materials

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ABSTRACT
The problem with this study is that the biological learning outcomes of SMA Lab School UPI students in class XI IPA 1 remain low. The objective of this study is to enhance the biology learning outcomes of students by utilizing image-based worksheets. The researcher conducted classroom action research in two cycles in order to accomplish this goal. This study involves collaborative action research in the classroom that makes use of the Kemmis and Taggart methodology. Students in class XI IPA 1 at SMA Lab School UPI served as the research subjects. Tests, surveys, and observations are the approaches used in this study to collect data. An observation sheet serves as the research tool, and it is assessed qualitatively. Additionally, the concept mastery test results, which are analyzed quantitatively, are supplied. The study's findings indicate that, when image-based student worksheets were used, biology learning outcomes in the nervous system of the classroom were improved, with 19% of students reaching the minimum completeness limit score. Similarly, in cycle I, the average result of the concept mastery test was 77, and 61% of students met the minimum completeness limit score. The average concept mastery score increased to 85 in Cycle II, and

a greater proportion of students met the 92% minimum completion criteria.

INTRODUCTION

Education that can help students develop in the future is education that can help them reach their full potential and be prepared to face and overcome life's challenges. There seems to be an ongoing effort to raise the standard of education. Up until now, educational reform has mostly addressed curriculum-related concerns; yet, effective curriculum modifications cannot be achieved without corresponding changes in outside-and inside-the-classroom learning methods.

Selecting the appropriate learning approach is crucial. As a result, selecting and putting into practice learning strategies requires the creativity and pedagogical expertise of teachers. The primary issue with education in formal schooling nowadays is students' poor absorption capacity. The average student learning outcomes, which are still quite concerning, demonstrate this.

In order for learning to be effective, students must be able to interact with both their teacher and the surrounding environment. This means that learning involves more than just absorbing facts and information; it also involves mental and experienced processes (Sanjaya, 2010: 87). According to Article 19 of Government Regulation No. 32 of 2013, "The learning process in educational units is carried out in an interactive, inspiring, fun, challenging manner, motivates students to participate actively, and provides sufficient space for initiative, creativity, and independence in accordance with talents, interests, physical development, and students' psychology" (Depdiknas, 2013). This demonstrates that the teacher's learning scenario must be focused on student actions.

Learning media is a vital component of education that helps students achieve their learning objectives. It serves as a medium for disseminating knowledge or instructional instructions to them. The inclusion of media in the teaching and learning process is thought to aid educators in imparting knowledge to students, which will raise academic attainment levels. Since learning objectives need to be met and students are to become more engaged in the teaching and learning process, teachers should include media into every learning process (Daryanto, 2010:6). Media is a learning tool that teachers and students utilize to communicate and interact more effectively during the teaching and learning process in the classroom (Oemar Hamalik, 1980:23).

Learning media can be used for a variety of purposes, including: (1) making lesson content more understandable so that it is not overly verbalistic (in the sense of written or spoken words); (2) overcoming physical, temporal, and sensory limitations; (3) overcoming a passive attitude toward students; and (4) assisting teachers in creating learning resources and raising students' enthusiasm and enjoyment of the learning process. Learning media evolves over time as well because new media addresses the shortcomings of older media (Sanjaya, 2010:206).

The Student Worksheet is one of the learning media that may be utilized to comprehend how students learn and what they do throughout teaching and learning activities. Worksheets for students are assignments that they have to complete. Worksheets for students typically include directions and steps needed to do a task. The fundamental competency that will be attained must be made explicit in the task order on a student's worksheet. Any subject can be covered by using student worksheets (Depdiknas, 2008).

According to Ratna Wilis Dahar (2001: 29), student worksheets are written assignments that include teacher-student interactions and information so that students can complete a learning task on their own by applying what they have learned to practice or accomplish learning objectives (commands). Based on the aforementioned perspectives, it can be inferred that Student Worksheets serve as an educational tool that attempts to engage learners, give them the freedom to pursue their own learning styles and interests, provide a diversity of instructional approaches to prevent boredom, and

stimulate learning activities. In order to promote constructivist learning, student worksheets serve as a guide for students as they explore the ideas being covered.

Based on the researcher's initial observations, it appears that SMA Lab School's biology instruction falls short of expectations. This suggests that the learning objectives for biology in the class especially for the nervous system material, which satisfied the class's minimal completion criterion. This suggests that the students' 85% learning objectives have not been accomplished. Student worksheets are one kind of educational resource that can encourage students to learn actively; with these resources, biology is a subject that students can easily pick up.

Student Worksheets

According to the Ministry of National Education (2008) student activity sheets (*student worksheet*) are sheets containing tasks that must be done by students which usually contain instructions and steps in completing the tasks. Student Worksheets are activity sheets for students in both intracurricular and co-curricular activities to facilitate understanding of the learning material they receive. Student worksheets can be in the form of training guides for developing cognitive aspects or guides for developing all aspects of learning in the form of experimental or demonstration guides. One alternative that can be done to improve student learning outcomes is to use learning media. Learning media in learning is very necessary as a facility in exploring students' knowledge potential.

One type of media is image-based student worksheets. LKPD is a medium to help and facilitate active and effective interaction between participants and learning resources, so that they can improve their learning outcomes. Student worksheets are also a learning medium to increase student learning activities so that the learning process is student-centered(*Student centered*) thereby minimizing the role of educators and making it easier for students to understand the material and assignments given.

Suryosubroto (in Zalika, 2019: 4) "the use of student worksheets is in line with Vigotsky's learning theory which states that learning occurs when children work or learn to handle tasks that have not yet been learned but these tasks are still within the range of their abilities, or These tasks are in the zone of proximal development."

Student worksheets must be designed using the existing approach to the learning cycle which is created from apperception to evaluation activities so that they can be used for a complete material learning process. The process of developing student-based worksheets*picture*refers to behavioristic, cognitive, constructivist and humanistic learning theories, but the more dominant learning theories that emerge in the development of image-based student worksheets are cognitive and constructivist learning theories. This is because in cognitive and constructivist learning theories students build their own knowledge which involves very complex thinking processes in accordance with the student worksheet products that are applied where students discover existing problems themselves. Apart from that, students must actively carry out activities, actively think, develop concepts, and give meaning to the things they learn.

Learning outcomes

Learning Outcomes is a process characterized by changes in a person. Changes as a result of the learning process can be shown in various forms such as knowledge, understanding, attitudes and behavior, skills, abilities, habits, as well as changes in other aspects of the individual learning (Nana, 2010: 5). Sudjana and Rivai (2011: 49) state learning outcomes as abilities resulting from changes in behavior from learning. Abdurrahman (2003: 37) states that learning outcomes are the abilities obtained by children after going through learning activities. Based on expert opinions, it can be concluded that learning outcomes are abilities that children gain as a result of changes in behavior after learning. Learning outcomes are obtained by students after carrying out learning activities.

For this reason, researchers are interested in conducting classroom action research by testing the effectiveness of using Student Worksheets in Class.

METHOD

The research subjects were students in class XI IPA 1 SMA Lab School UPI, totaling 26 students with

13 male students and 13 female students. The research was carried out at the UPI Lab School High School. Research is carried out offline.

The classroom action research procedure used in this research is the Kemmis and Mc model. Taggart. According to Kemmis and Mc Taggart in Kunandar (2008:70), classroom action research is carried out through a dynamic and complementary process consisting of four essential moments, namely plan, action, observation and reflection. The implementation of classroom action research consists of several stages, namely the pre-cycle which consists of observation and reflection, cycle I consists of planning, action, observation and reflection as well as cycle II and cycle III which consist of plan, action, observation and reflection.

The research instrument used in this research is a non-test instrument in the form of an observation sheet to measure the increase in students' learning activities. Meanwhile, the test instrument is in the form of test question sheets or evaluation questions to measure improvements in student learning outcomes.

Data analysis from the results of data collection in research activities includes three steps, namely: 1) Preparation phase; The activities carried out at this stage are checking the completeness of the data, namely checking the research instruments and checking the data entry. 2) Level of Pentabulation; In this stage the researcher clarifies the data through tabulating the data by checking the results of observations and giving scores to the test questions and adding up the scores obtained by each student, with the following conditions: making an average score, and adding up the scores of all students. 3) Data Application Stage; The data application stage is the activities carried out to interpret the data, namely adjusting the data to the research question and describing the research results and discussing them to draw conclusions. The results obtained through data interpretation are used as a reference for designing better learning at each stage of action.

RESULTS AND DISCUSSIONS

This classroom action research was carried out for 1 week from 9 May - 10 May 2023 in 2 meetings with a total time allocation of 4 x 45 minutes. The data obtained from each factor investigated was analyzed descriptively analytically in the form of percentages, average scores in each cycle which were then discussed according to the formulated research objectives.

The results of the students' concept mastery test were obtained from the cycle I pretest, cycle I posttest and cycle II final tests. The pretest is used to determine students' initial abilities before receiving treatment using the Student Worksheet media. This pretest question is in the form of multiple choice, totaling 20 questions with five answer choices. The pretest result data is shown in Table 1 below:

Table 1. Data from Students' Concept Mastery Test (Pretest) Cycle I

No	Information	Pre-test
1	Highest score	80
2	Lowest score	40
3	Average	60
4	Classical completion percentage	19%
5	Categories	Less

Based on Table 1 above, the average score of students before learning using the Student Worksheet was 19% in the poor category. The highest score obtained by students was 80, while the lowest score was 40. The score obtained was still far below the Minimum Completeness Criteria determined by the school, namely 75. So the minimum percentage of completeness during the pretest was still 19% with the number of students who There were 5 people who completed the pretest. After the pretest was held, learning was carried out using Student Worksheets.

For two cycles. The posttest was held at the end of cycle I to determine whether there was an increase in learning outcomes after implementing learning using Student Worksheets. Post-test result

data which is also cycle I data.

Cycle I

At the end of the lesson, the teacher provides an evaluation to the students. The results obtained are as follows:

Table 2. Evaluation Test Results of Cycle 1

No	Test Results	Cycle
1	Average	77
2	Complete	61%
3	Incomplete	39%
4	Classical learning completeness	Incomplete
5	Total	26

Based on the table above, in cycle 1 the learning completeness was 61%. The percentage score has not yet reached the expected 75% completeness because there are still 39% of students who get a score below the Minimum Completeness Criteria = 75. The following is a graph of the percentage of completeness of student learning outcomes in cycle I.

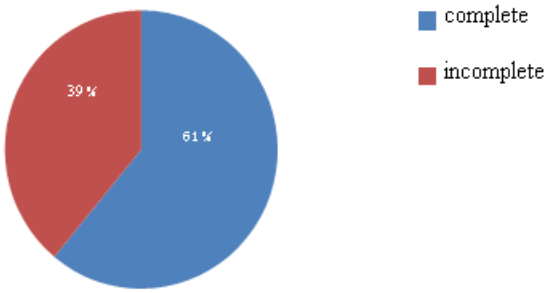

Fig 1. Completeness of learning cycle I

Based on Figure 1, it appears that classical completeness is 61% and incomplete is 39%, where the completeness value has not yet reached the expected percentage value of 75%. Based on the data on completeness, student learning outcomes have not yet reached ≥ 75%. Therefore, learning outcomes need to be improved through improving the actions taken to be implemented in cycle II.

Cycle II

The cycle planning stage II is the researcher's activities in preparing learning implementation plans, teaching materials, learning media, student worksheets, assessment rubrics and evaluation questions. In preparing the learning implementation plan, the researcher held discussions with the lecturer. The learning implementation plan is made according to the current material. Field notes were filled in by researchers to record events during the action and students' learning conditions when using student worksheets in learning. At this implementation stage the researcher carries out the learning implementation plan that has been prepared in the plan. In accordance with cycle II planning, there was 1 meeting. Learning in cycle II is divided into 3 activities, namely introduction, core activities, and conclusion.

During the implementation of learning in cycle II, students enthusiastically paid attention to the teacher's explanation, were no longer embarrassed to answer, and seemed enthusiastic in delivering their answers. Enthusiasm in working on students' worksheets. Students are happy because they can exchange ideas, are no longer embarrassed to ask questions and discuss and are more enthusiastic in

providing answers. At the end of the lesson, the teacher provides an evaluation to the students.

The results obtained are as follows Table 3.

Table 3. Evaluation Test Results of Cycle II

No	Evaluation Test Results 1	Cycle
1	Average	85
2	Complete	92%
3	Incomplete	8%
4	Complete classical learning	complete
5	Total	26

Based on the table above, in cycle II the learning completeness was 92%. From this percentage value, the expected 75% completeness has been achieved because there are 8% of students who get a score below the Minimum Completeness Criteria = 70.

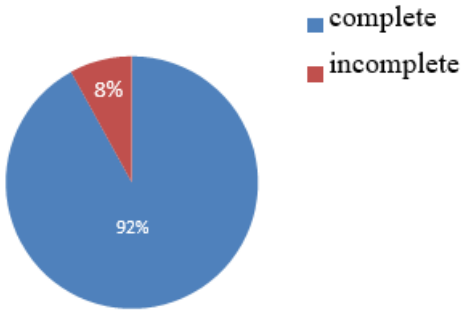

Fig 2. Completeness of learning cycle II

Based on the diagram above, it is clear that classically it has experienced 92% completeness, which exceeds the planned minimum completeness of 75%. In this final stage, namely reflection and analysis, where the researcher together as a collaborator and observer analyzes and evaluates the learning process in cycle II, whether the actions that have been given are in accordance with the planned research concept or not. Then the results of the second cycle of research were compared with the indicators of success.

In the learning process in cycle II, it appears that students are able to learn independently, are more conducive, and actively participate in learning activities. The following table shows the results for cycle I and cycle II. Based on data analysis regarding student learning outcomes in cycle I and cycle II, there was an increase. For more details, see the following table:

Table 4. Learning Outcome Values for Cycle I and Cycle II

Student Code	The Value of Learning Outcomes	
	Cycle I	Cycle II
S1	70	80
S2	80	100

Student Code	The Value of Learning Outcomes	
	Cycle I	Cycle II
S3	80	90
S4	80	90
S5	70	80
S6	80	90
S7	70	90
S8	80	100
S9	60	80
S10	70	80
S11	80	90
S12	70	80
S13	80	90
S14	70	80
S15	70	80
S16	90	90
S17	90	100
S18	70	70
S19	90	90
S20	90	90
S21	80	80
S22	80	80
S23	80	80
S24	80	80
S25	70	70
S26	80	80
Average	77	85
Completeness	61%	92%

Based on table 3, the average value shows an increase in student learning outcomes. Where in cycle I the average value of student learning outcomes was 77 while in cycle II learning outcomes rose to 85.

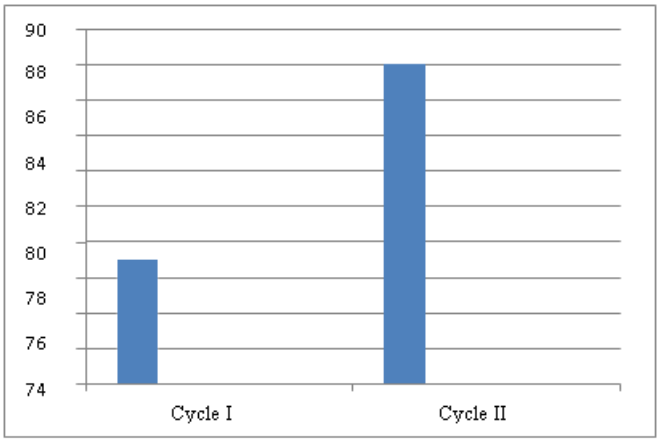

Fig 3. Average learning outcomes

The average value for cycles I and II. Likewise, for student completion in cycle I, the percentage of completion reached 61%, while in cycle II it rose to 92%. For more details, see Figure 4.

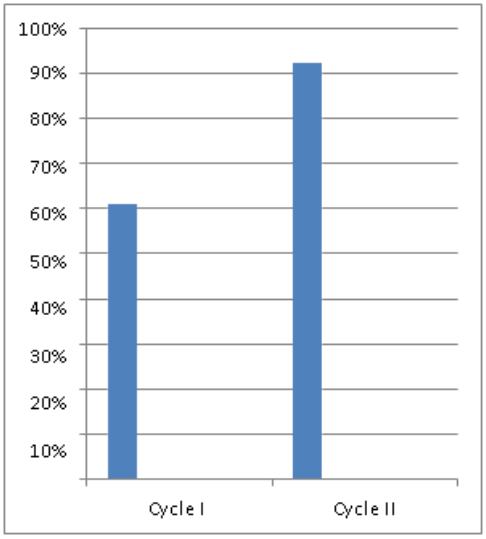

Fig 4. Completeness of learning cycle I and cycle II

The research results in the graph above show that the application of Mathematics learning using Student Worksheets is able to improve student learning outcomes. Where the average score obtained by students in cycle I was 77 and experienced an increase in cycle II which was 82 above the drinking and classical completion scores reaching 92% above the success completion indicator set at 75%. Considering that the indicators of success had been achieved, this classroom action research was stopped at the end of cycle II.

Students' mastery of concepts Based on the data from the research results above, a comparison of the average scores of students' Biology concept mastery test results on material on compound polarity, molecular shape and intermolecular forces before and after implementing learning using multimedia-based student worksheets on polarity, shape. molecules and intermolecular forces always increase. The pretest carried out before learning aims to determine students' initial knowledge regarding the material presented.

The average pretest score before implementing learning using student worksheets was 60, spread between the highest score of 80 and the lowest score of 45. From these data it can be seen that the average score *pretest* still below the minimum completeness score criteria, namely 75. Average results

pretest which tends to be low and below the KKM value can be caused by students' unpreparedness. In the learning process, this readiness influences students' learning outcomes. Students who are ready to learn will produce good grades compared to students who are not ready to learn.

Students do not have readiness to learn because in every teaching and learning process they never get it *pretest* from the teacher concerned so that students never read or study before the material is presented. Another influencing factor is the difficulty of students in working on the test questions given, because of the material contained in the questions *pretest* never been found before. So value *pretest* obtained is below the predetermined minimum completeness limit value. This research consists of two cycles, where each cycle consists of four main stages, namely planning, action, observation and reflection stages which repeat cyclically.

At the end of cycle I, students are given a mastery test of biological concepts in the form of a multiple choice test with 20 questions. A description of the results of the Biology concept mastery test in cycle I is presented in Table 4.3 above. Based on Table 4.3, it is known that the average score for students' concept mastery tests is 77 with the highest score being 90 and the lowest score being 70. The percentage of classical completeness in this cycle is 61% in the good category. The final test of cycle I is also a post-test with the aim of knowing students' mastery of concepts regarding the material taught in cycle I through the application of student worksheets.

The average posttest score in the second cycle of students is 85 which is spread between the highest score of 100 and the lowest score of 70. Based on the data that has been obtained, the pretest and posttest scores are used as comparison material to determine the effect of the student worksheets used during learning. The difference or difference between the pretest and posttest scores is a real achievement as an influence on the student's learning process. Therefore, learning activities through the application of student worksheets have a good influence on students' mastery of Biology concepts because the average posttest score is far greater than the average pretest score. Comparison of the average scores for students' mastery of concepts before and after implementing learning using student worksheets.

CONCLUSION AND SUGGESTION

According to the findings of two cycles of classroom action study, cycle I's average class score was 77, while cycle II's classical completeness was 61%. Cycle II saw a rise in the class average score to 85 and a 92% completion rate for classical study. Based on the study's findings, it can be said that using worksheets for students has improved their understanding of nervous system content.

REFERENCES

Dahar, R. W. (2001). *Media Penunjang Pembelajaran*, Jakarta: Bumi Aksara.

Depdiknas (2008). *Panduan Pengembangan Bahan Ajar*, Jakarta: Direktorat Jenderal

Hamalik, O. (1980). *Jenis-Jenis Media Pembelajaran*. Bandung : PT. Remaja Rosda Karya

Kunandar. (2008). *Langkah Mudah Penelitian Tindakan Kelas sebagai Pengembangan Manajemen Pendidikan Dasar dan Menengah*. Profesi Guru. Jakarta: Raja Grafindo Persada.

Sanjaya, W. (2010). *Strategi Pembelajaran Berorientasi Standar Proses Pendidikan*, Jakarta : Kencana Prenada Media