

IMPROVING STUDENTS' UNDERSTANDING OF CONCEPTS THROUGH THE IDEA LEARNING MODEL

Sunandar Azma'ul Hadi¹, Dian Noer Asyari²
Program Studi Tadris Fisika, Universitas Islam Negeri Mataram, Indonesia¹
Program Studi Tadris Matematika, Universitas Ibrahimy, Indonesia²
Corresponding author email: sunandar@uinmataram.ac.id

Article History

Received : 23 October 2023
Revised : 6 November 2023
Published: 20 November 2023

ABSTRACT

This research aims to increase students' understanding of concepts regarding the transport of substances in cells through the IDEA learning model. The research subjects chosen in this study were 23 students of the Class A Physics Study Program, Semester 1, Mataram State Islamic University (UIN), using the One-Group Pretest-Posttest Design. The data analysis technique in this research uses quantitative description. The results of this research show that the IDEA learning model is effectively used to increase students' understanding of concepts. This is proven by all students who took the test using the concept understanding test instrument getting classical completion results with a completion percentage of 82.6%. 4 students did not complete due to the learning productivity factors of the students concerned, such as learning independence and a weak understanding of basic concepts. The results of this research prove that the IDEA learning model is effectively used to increase students' understanding of concepts regarding the transport of substances in cells. It is hoped that the results of this research can then be implemented by lecturers to help students improve their understanding of concepts in biology material.

Keywords: *IDEA, Constructivist, Concept Understanding*



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.

LATAR BELAKANG

Natural science is a branch of biological science that does not only consist of rote concepts and theories but several activities that use scientific thinking and attitudes in studying nature and how nature influences life and the environment. To understand causal phenomena that occur in nature, science applies learning methods by observing and conducting experiments (Putra, 2013).

One branch of science is Biology. In understanding biology, we need to understand that the elements of science in biology are obtained, namely by carrying out observations, experiments, conclusions, and formulating theories that are interrelated with each other. With these steps, biology learning should be able to improve students' thinking skills by the demands of the curriculum in educational institutions. The thinking skills in question are high-level thinking skills which are the ideals in preparing Indonesia's golden era in 2045. To have high-level thinking skills, students must of course be equipped with a strong understanding of concepts so that they can carry out analysis of the concepts they will use. he understands.

Thinking skills are the basic capital that students must have at both school and college levels. The learning outcomes contained in the higher education curriculum are obtained through the internalization of knowledge, attitudes, skills, competencies, and accumulated work experience. The aspects mentioned above are a unit that cannot stand alone in building students' thinking skills. The knowledge aspect is quite important because it supports students' basic understanding of the concepts that must be mastered. Knowledge is systematic mastery

of concepts, theories, methods, and philosophies of certain fields of science obtained through reasoning in the learning process, student work experience, research, and community service related to learning (Dirjendikti, 2014).

A preliminary study conducted on students in the first semester of Tadris Physics at the State Islamic University (UIN) Mataram who took the General Biology 1 course showed that students' conceptual understanding of the material transport of substances in cells, especially diffusion and osmosis, was still relatively low. The results of this preliminary study are proven by the students' incomplete completion of the classical pretest carried out by the researcher. The weak understanding of concepts is also reflected in the teaching and learning process in class, students tend to only follow the flow of the lecturer's explanation without being actively involved in two-way discussions. This learning style tends to make students memorize the concepts they receive without understanding the meaning of these concepts.

Improving students' understanding of concepts can be done by presenting contextual learning, namely presenting learning material in the context of students' lives. The aim of presenting the material in the context of students' lives is that the material the students will study is well known and even experienced by the students, is appropriate to the student's age category, is close to the student's learning environment, and is liked or is a passion for the students so that learning becomes meaningful. Meaningful learning will occur if the new material that students will learn (new knowledge) is connected to the initial

knowledge that has been stored in students' cognition (old knowledge), connected to students' daily experiences, and what daily activities students like. One of the principles of contextual learning is constructivism.

Constructivist learning is one solution that can be applied to make the teaching and learning process more interactive. Syarifah (2017) in her research revealed that the teaching and learning process must be carried out with two-way interaction so that student understanding can be achieved optimally. One of the constructivist learning models is the IDEA learning model.

IDEA consists of 4 activity stages, namely: identify, define, explain, and apply. At the Identify stage, students can identify certain elements or ingredients in a product or text, identify questions or problems, and so on. At the define stage, students will become familiar with each element they identify in the domain of definition or understanding, function, role, and linguistic meaning in the context of a particular field of science. At the explained stage, all things that have been defined need to be explained conceptually in a certain context or even across connections. At the "apply" stage, students who have mastered concepts, principles, and theories are trained to apply their knowledge, especially to explain an event that involves aspects of this knowledge, including solving relevant problems.

Previous research has proven that the IDEA learning model can improve students' conceptual understanding,: Setiawan (2021), in his research stated that the IDEA learning model is relevant for increasing students' conceptual understanding and meeting the needs of lecturers in teaching

students conceptual understanding. The second research conducted by Gunawan, Suranti, and Rahmatiah (2018) stated that virtual laboratories increased students' understanding of concepts. There are similarities between laboratory learning and IDEA learning, namely that they both apply scientific experiments to understanding the subject matter. Further research was conducted by Adam, et al (2023) who stated that the IDEA learning model had a positive effect on understanding concepts in arithmetic material in class X students.

Based on the analysis of the level of understanding of students who are at the formal operational stage consisting of abstract thinking, testing hypotheses, and forming concepts that are not dependent on physical reality. Therefore, the IDEA learning model is suitable for use at the current stage of student abilities.

METODE PENELITIAN

The subjects chosen in this research were 23 Semester 1 Students of the Tadris Physics Study Program, Class A, State Islamic University (UIN) Mataram. The selected research subject is currently programming the General Biology 1 course. This research was carried out from 1 - 15 September 2023 which took place over 3 face-to-face meetings. The location of this research was carried out at Campus 2, Mataram State University. The learning tools used to improve students' understanding of concepts are learning tools developed by researchers based on the IDEA learning model. This learning tool was developed using a 4D development model consisting of design, define, develop, and define. The 4D model was then adapted by Ibrahim (2002) for definition, design, development, and counseling.

The instrument used to measure students' level of conceptual understanding is a test instrument consisting of 20 multiple-choice questions. All questions in the concept understanding test instrument are stated to have a sensitivity index with sensitive criteria to differentiate students' level of conceptual understanding before and after receiving learning. The student concept understanding test is given in 2 stages, namely the pretest and posttest stages using the same test instrument. Students are declared complete based on the minimum completeness criteria (KKM) in understanding concepts if they get a score of 75 which is the established KKM standard.

Researchers use student activity sheets (LKM) to convey material during the teaching and learning process. The student activity sheets used were developed by the researchers themselves based on the IDEA model which has passed the validity and reliability stages with valid and reliable results. The student activity sheet consists of 2 activities which include material on the transport of substances in cells. On each activity sheet, students have the following steps: identify, define, explain, and apply. At the Identify stage, students can identify certain elements or ingredients in a product or text, identify questions or problems, and so on. At the define stage, students will become familiar with each element they identify in the domain of definition or understanding, function, role, and linguistic meaning in the context of a particular field of science. At the explained stage, all things that have been defined need to be explained conceptually in a certain context or even across connections. At the "apply" stage, students who have mastered concepts, principles, and theories are trained to apply

their knowledge, especially to explain an event that involves aspects of this knowledge, including solving relevant problems. The steps contained in the student activity sheet enable lecturers to create student-centered learning so that students are expected to be able to reconstruct their knowledge it has an impact on increasing understanding of the concept of transport of substances in cells. Setiawan and Mustangin (2020) in their research revealed that using student activity sheets (LKM) makes learning better and more interesting for students.

HASIL DAN PEMBAHASAN

Result

Student learning outcomes, especially in the aspect of understanding the concept of material transport of substances in cells, can be seen in Table 1.

Std	Mark		Indv. Completeness	Class. Completeness
	pre	post		
A1	45	95	Complete	82,6%
A2	45	95	Complete	
A3	25	85	Complete	
A4	45	75	Complete	
A5	50	95	Complete	
A6	35	95	Complete	
A7	45	85	Complete	
A8	45	75	Complete	
A9	50	75	Complete	
A10	35	80	Complete	
A11	45	90	Complete	
A12	20	55	Not Completed	
A13	30	95	Complete	
A14	25	35	Not Completed	
A15	55	95	Complete	
A16	30	80	Complete	

A17	45	95	Complete
A18	25	90	Complete
A19	35	60	Not Completed
A20	30	60	Not Completed
A21	20	80	Complete
A22	45	75	Complete
A23	50	95	Complete

Discussion

The data in Table 1 shows that there was not a single student who passed the pretest on the aspect of conceptual understanding regarding the transport of substances in cells because they did not reach the maximum completeness criteria (KKM) that had been set, namely 75. The kcal completeness at this pretest stage was 0%. Meanwhile, at the posttest stage, 19 students were declared complete and 4 students were declared incomplete. Classically, students' level of understanding of concepts is declared complete with a completion percentage of 82.6%.

Students' incompleteness in the aspect of understanding concepts is caused by several factors such as activities carried out by students during the learning process that are not productive and internal factors of the students themselves which can influence the level of student motivation such as lack of independence in learning. Sunandar, Azmi, and Rosida (2021) in their research stated that student learning styles are identical to independent learning styles. The results of the student concept understanding test showed that the 23 students had a classical completeness of 82.6%. The learning outcomes of student concept understanding are generally declared complete. This finding is

supported by the statement expressed by Simsek and Kabapinar (2010), in their research stating that knowledge can increase optimally if students are actively involved in the learning process accompanied by guidance and support from the teacher. Active involvement of students in the learning process can be achieved by implementing a student-centered learning model.

This incompleteness can also be caused by the lecturer's failure to check the extent of students' understanding of the material presented so that students are far from the closest development zone (ZPD). Considering that the research subjects were physics students, the understanding of the concept of material transport of substances in cells was quite low, causing the students to be far from their closest development zone. Vygotsky believes that learning can take place optimally when students are in their closest development zone (Slavin, 2006). This statement is supported by Zaslavsky's (1997) research stating that students' ignorance of concepts is caused by epistemological barriers.

The opinion expressed by Slavin is supported by the statement expressed by Moldovan and Moldovan (2012), in their research stating that the zone of proximal development of students depends on the cognitive level possessed by each student, therefore the approach used in schools should be able to stimulate appropriate learning resolution strategies. effective so that students remain in the zone of proximal development.

KESIMPULAN

Based on the research data obtained, it can be concluded that the IDEA learning model can be used to increase students'

understanding of concepts regarding the transport of substances in cells. This is proven by students' classical completion in the conceptual understanding aspect test. Students' understanding of concepts can increase significantly if students can reconstruct their knowledge through several scientific activities contained in the IDEA learning model. There are several obstacles in implementing this learning model that cause students to become incomplete, including (1) less productive student activities during the learning process; (2) Students being less independent in learning, and (3) students' understanding of basic biological concepts is still far away.

DAFTAR PUSTAKA

- Dirjendikti 2014 *Panduan Penyusunan Capaian Pembelajaran Lulusan Program Studi* (Jakarta: Direktorat Pembelajaran dan Kemahasiswaan Dirjendikti Kementerian Pendidikan dan kebudayaan).
- Gunawan, G., Nisrina, N., Suranti, N. M. Y., Herayanti, L., & Rahmatiah, R. (2018, November). Virtual laboratory to improve students' conceptual understanding in physics learning. In *Journal of Physics: Conference Series* (Vol. 1108, No. 1, p. 012049). IOP Publishing.
- Hadi, S. A. U., Azmi, K., & Rosida, S. A. (2021). Melatih Keterampilan Berpikir Kritis Anak Usia Dini melalui Penerapan Model Pembelajaran Inkuiri Terbimbing. *Schemata: Jurnal Pasca Sarjana IAIN Mataram*, 10(2), 151-162.
- Ibrahim M 2002 *Pengembangan Perangkat Pembelajaran* (Modul-Bio-C-06 Direktorat Sekolah Lanjutan Tingkat Pertama Direktorat Jenderal Pendidikan Dasar dan Menengah Departemen Pendidikan Nasional).
- Moldovan T and Moldovan S 2012 *Specific Methodological Particularities for Studying the Advancing in the Zone of Proximal Development* (Elsevier. Doi: 10.1016/j.sbpro.2012.01.286).
- Putra S R 2013 *Desain Belajar Mengajar Kreatif Berbasis Sains* (Jogjakarta: Divo Press).
- Setiawan, Y. E. (2021). Relevansi Model Pembelajaran IDEA dalam Menanamkan Pemahaman Konsep. *JMPM: Jurnal Matematika dan Pendidikan Matematika*, 6(2), 177-186.
- Setiawan, Y. E., & Mustangin, M. (2020). Kepraktisan model pembelajaran IDEA (issue, discussion, establish, and apply) dalam pembelajaran matematika. *Aksioma: Jurnal Program Studi Pendidikan Matematika*, 9(3), 776-788.
- Simsek P and Kabapiar F 2010 The Effects of Inquiry Based Learning on Elementary Students' Conceptual Understanding of Matter, Scientific Process Skills and Science Attitudes (Elsevier. Doi: 10.1016/j.sbpro.2010.03.170).
- Slavin R E 2006 *Educational Psychology Theory Into Practice* (Boston: Allyn and Bacon Publisher).
- Syarifah, L. L. (2017). Analisis kemampuan pemahaman matematis pada mata kuliah pembelajaran matematika SMA II. *JPPM (Jurnal Penelitian dan Pembelajaran Matematika)*, 10(2).
- Zaslavsky, O. (1997). Conceptual Obstacles in the Learning of Quadratic Functions. *Focus on learning problems in mathematics*, 19(1), 20-44.