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Application of the Guided Inquiry Learning Model to Improve Student Creativity and Activeness in the Teaching and Learning Process Biology Education Study Program

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Abstract: One of the qualities of learning is determined by the learning process. Therefore, the accuracy of the teacher is required in diagnosing and determining appropriate learning strategies in the classroom. This research is classroom-in-action research carried out for 1 semester with the aim of increasing student creativity and activeness in the learning process in basic biology courses. The techniques and instruments used are, Observation, Test using an evaluation sheet. In addition, several students will be interviewed to confirm the data that has been obtained. Data analysis was carried out in a quantitative descriptive manner, and the results of the interviews will be explained according to the facts found. The results of the study with indicators of the success of this study, namely 75% of the guided inquiry model were carried out well and students completed classically. The results showed that the implementation of the guided inquiry model was in the well-implemented category, creativity, and learning outcomes increased by 80% from cycle I to cycle II. Based on the results and discussion of the research, it can be concluded that the guided inquiry learning model can increase creativity and student learning outcomes in basic biology courses.

Keywords: Creativity; Guided inquiry; Learning models; Learning outcomes.

Introduction

Education is the main pillar of the success of a country. Good quality education will produce quality human resources which are certainly able to improve the condition of a nation (Susiani et al., 2022). Therefore, the education system should be made for better human resource development. For example, in terms of curriculum. But in reality, education has not been able to improve the quality of human resources completely. Teachers still need effort and hard work in implementing a good teaching and learning process (Milyan, 2022).

Implementation of the curriculum in the learning process cannot be separated from the collaboration of teachers and students in the classroom (Sabrina et al., 2022). Apart from being in the classroom, the cooperation of all stakeholders in education, such as school principals, parents, and the environment, plays an important role in achieving the expectations or goals of the curriculum itself. Especially at this time in the 21st era, the development of technology is so rapid, which is able to break the world of education is growing. Access to learning through technology is very easy, it should be able to help teachers and students to be more creative in finding learning information.

Creativity in finding learning information has a good impact on one's understanding in processing information (Muchsin & Hamdi, 2021). Especially in learning science, especially biology, students must be able to learn and think scientifically. science learning that prioritizes scientific thinking is related to how to find, process and produce knowledge systematically. so you are not only looking for concepts or facts but also being able to find, reason, and even apply the principles of science. This is of course inseparable from science process skills.

Science processing skills according to (Setiawan & Sugiyanto, 2020) are to provide opportunities for students to explore the discovery process and compile a concept to apply it. twhus providing several advantages including; Providing provisions on how to obtain information to develop knowledge in the future, the process is creative, which of course increases direct

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thinking skills. This is in line with what (Sinaga et al., 2021) said that learning that emphasizes science skills will help students construct their own knowledge in terms of remembering, re-expressing and even making decisions. This is in accordance with the objectives of learning biology, namely being able to understand, discover and apply biological concepts in everyday life.

Biology learning is a branch of natural science whose main study is the components of living things and all their interactions (Suyanto et al., 2022). By studying biology students are expected to be able to realize theoretical natural sciences into real everyday life. Therefore, teacher skills are needed to plan the right learning process for students to achieve the expected learning objectives (Fatkhurrokhman et al., 2018). The achievement of learning objectives is inseparable from the lesson plan planned by the teacher (Amerstorfer & Freiin von Münster-Kistner, 2021). Starting from the selection of teaching topics, the accuracy of choosing learning models and teaching methods. Especially in the present. As previously stated, technology has provided many appropriate information about learning and learning that teachers and students can choose to achieve learning goals.

One of the lessons that can be applied in the process of learning science specifically for biology is the guided inquiry learning model. BaseSSd on research by Miftakhurrohmah et al. (2023), the guided inquiry learning model effectively improves students' science process skills in excretion system material. This is in line with Nisa & Astriani (2022), which concluded that the application of the guided inquiry learning model can improve the learning outcomes of class XI students at SMAN 1 Blangpegayon, Gayo Lues Regency in the subject of the human circulatory system. Other studies have also concluded that the application of guided inquiry methods can increase student learning activities and student attention (Widia et al., 2021).

Guided inquiry is a learning model in which there are scientific activities, starting from investigating topics in the form of phenomena or symptoms, explaining according to facts and conveying ideas. This learning model allows students to be actively involved using their own thinking processes to discover concepts and principles of material learned through teacher guidance. In other words, this guided inquiry model provides opportunities for students to be more creative and active in thinking in completing the tasks given. therefore the researcher is interested in conducting research entitled the application of the guided inquiry learning model to increase student creativity and learning activities in basic biology courses, in the biology education study program, Cenderawasih University. It is hoped that this guided inquiry learning model will allow students to develop their intellectual abilities, so that they can master learning but can also use their own potential.

Method

The research design is a Class Action Research (CAR) referred with the steps: planning, implementation, action and observation, reflection. Implemented in 2 cycles. Each cycle there are 3 meetings. And at the end of the meeting given an evaluation test. The subjects of this study were all students who took basic biology courses, namely 34 odd semester students for the 2022/2023 academic year. The techniques and instruments used are observation using the observation sheet to capture student activity creativity, as well as see the implementation of the guided inquiry model and test using an evaluation sheet. In addition, several students will be interviewed to confirm the data that has been obtained. Data analysis was carried out in a quantitative descriptive manner, and the results of the interviews will be explained according to the facts found. Furthermore, the indicator of the success of this research is that 75% of the guided inquiry model is carried out well and students complete it classically.

Result and Discussion

The results obtained from this study can be seen from several tables. The implementation of this research was carried out in 2 cycles and in each Cycle there were 3 meetings and 1 evaluation test. At the time of data collection, the researcher was assisted by 2 observers to collect data on student activity, creativity during the learning process and data on the implementation of the guided inquiry model.

Table 1. Data on aspects of student creativity in basic biology courses.

Observed indicators	Cycle I		Cycle II	
	Frequency	(%)	Frequency	(%)
Frequently ask weighty questions	16	47.05	30	88.23
Often submit ideas / ideas that are different from others (original)	18	52.94	29	85.29
Able to give birth to imagination (unusual things)	11	32.35	26	76.47
Able to solve problems / assignments given on time	20	58.82	32	94.12
Producing work from tasks given/assigned in the form (reports, teaching aids)	12	35.29	32	94.12

Table 2. Data on the practical aspects (skills) of students in basic biology courses

Completeness	Cycle I		Cycle II	
	Frequency	%	Frequency	%
Complete	19	55.88	32	94.12
Not finished	15	44.12	2	5.88

Table 3. Data on aspects of student activity in basic biology courses

Observed aspect	Cycle I		Cycle II	
	Frequency	%	Frequency	%
Dare to express opinions, ideas during discussions	15	44.12	29	85.29
Participate in finding answers in groups (giving answers yourself)	17	50	29	85.29
Participate in class discussions (ask and give an answer	12	35.29	31	91.17

Table 4. Data on aspects of student learning evaluation in basic biology courses

Completeness	Cycle I		Cycle II	
	Frequency	%	Frequency	%
Complete	18	52.94	32	94.12
Not finished	16	47.05	2	5.88

Table 5. Data on the results of the implementation of the guided inquiry learning model

Cycle	Meeting to	Percentage%	Category
I	i	70	Done enough
	ii	73	Done enough
	iii	86	well done
II	i	98	Very well done
	ii	88	well done
	iii	88	well done

Reflection on Cycle 1

The things that are the focus of action in cycle 1 reflection are: Application of the guided inquiry learning model that is not yet in accordance with the syntax. This is because the time used is not effective, and this learning model is still considered new for students, so that the implementation of the learning process is not effective. This can be seen from the results of this study where at the first meeting the implementation of the guided inquiry learning model was in the fairly implemented category. Student creativity, especially in the aspect of being able to give birth to imagination is only 11 people or only 32.35%. This is due to the lack of stimulus from lecturers in terms of providing guidance to students.

Student creativity, especially the aspect of producing works from the assignments given were only 12 students or 35.29%. This is because there are still many students who think that reports can be submitted later. Results of interviews with students it is known that students have not collected it on time by reason of forgetting and or not having finished doing assignments. Data on aspects of student practice were only 19 people or 55.88 students who completed this, this can be seen from the results of observations where there were still students who could not operate a microscope properly. starting from how to turn on, find the light, to find the object of observation Student activeness, especially participating in class discussions only 12 people or 35.29% of students participated. This happens because students are still awkward with the learning model and feel embarrassed to be active. The results of interviews with students found that they were embarrassed because they were afraid of being wrong with the questions or answers they would give.

6. Data from the evaluation results show that only 52.94% of students complete classically. The results of interviews with students found that they had difficulty learning because there were many assignments from other subjects.

Reflection on Cycle II

Cycle 2 was carried out to correct and complete the deficiencies results found in cycle I : Lecturers use time as efficiently as possible by preparing all teaching equipment one hour before class starts, and at the beginning of each lesson the lecturer explains the syntax of the guided inquiry learning model and explains what will be carried out at each meeting. In addition, the researcher also reminded students of the learning objectives at each meeting so that they could focus during group discussions. So that in cycle II the implementation of the guided inquiry learning model is in the average well-implemented category. Jufrida et al. (2021), suggests that this guided inquiry learning places the teacher not as a source of learning, but as a facilitator and motivator for student learning.

So with guidance and direction can foster students' self-confidence in completing the learning process (Robinson & Persky, 2020). In this study, researchers as well as lecturers acted as facilitators. Lecturers guide students by providing trigger questions at the beginning, and direct students to a discussion in groups. Furthermore, the lecturer actively provides guidance to students in the form of directions to arrive at the stages of problem solving from the questions previously given. By being oriented towards the guidance and direction of the lecturer, students get relevant answers to be raised in group discussions . Making it easier to solve problems to draw conclusions.

Student creativity in cycle II rose to 76.47% from cycle I which was only 32.35%. The main thing that lecturers do to improve student creativity in cycle II is to

increase motivation student learning. That is by providing more interesting trigger questions, either in the form of short videos at the beginning of learning, or presenting pictures to stimulate student curiosity. In addition, in the learning process, the lecturer gives appreciation to students who can answer or who can generate new ideas related to the material in the learning process (Magulod, 2018).

Appreciation is given in the form of comments or small gifts for the group that gets the highest score at the presentation and when submitting reports on time. By giving motivation and appreciation, it can increase student creativity (Mauliya et al., 2020). This was also supported by the results of interviews with students who stated that they felt challenged by the videos displayed by the lecturers, to find answers, as well as the appreciation from the lecturers that motivated them to continue to be creative. This is also in line with research conducted by Mauliya et al. (2020), which states that the driving factor for increasing children's creativity is by providing motivation when commenting on children's work, as well as giving appreciation to children's work in the form of praise or other comments.

Another thing that is also done by lecturers is to create a more enjoyable learning atmosphere by using several learning methods coupled with the guided inquiry model (Orosz et al., 2023). The methods used are demonstration methods and practicum carried out in the laboratory. In addition to methods, lecturers also give freedom to students to explore their answers. they can search via android or through books, modules, their answers. this is in accordance with Henriksen et al. (2020), asserting that the prerequisite for the emergence of creativity is psychological freedom supported by a safe and comfortable environment when learning.

This guided inquiry model can stimulate and encourage students to be able to think more creatively. Why is that, because the guided inquiry syntax is a series of activities to investigate systematically, critically, analytically, to arrive at their own conclusions with self-confidence. The results of this study, as previously stated in the first cycle of student creativity, especially in the aspect of being able to give birth to imagination, were only 32.35% to 76.47%. From this data it can be seen that there was an increase of 44.12% from cycle I to cycle II. Which means that this guided inquiry learning model can increase student creativity. Herayanti et al. (2023) also produced data on an average increase in creativity of 88%, through the application of inquiry. The main emphasis on guided inquiry learning is the creativity of students to find answers to the questions themselves.

Data on student practice scores in cycle II reached 94.12% with a frequency of 32 students completing their studies. The improvements made in cycle II are by providing longer guidance time. Where 15 minutes before making observations, the lecturer gave directions on how to use a microscope. Besides that, when observing the object, the lecturer continues to provide guidance to study groups. Also in cycle II the lecturer distributes practice guides 3 days before the practicum, so that students have more time to study the guides. Especially understanding work procedures when practicing. With more intense guidance, students are trained to be more skilled in laboratory work practices.

This guided inquiry model helps students to absorb knowledge more easily during practice (Suprianti et al., 2021). With the guidance of the lecturer, students are more focused and focused on observing, and carrying out practicums in accordance with the guidelines given. The results of the research by Gunawan et al. (2019) show that there is a significant difference in the learning outcomes of students who are taught using conventional methods and students who are taught using a laboratory-based guided inquiry model. Where the value of the experimental class taught by laboratory-based inquiry model is better than the class taught by conventional methods. The laboratory-based inquiry model significantly improves learning outcomes when students practice (Ernita et al., 2021).

The activeness of students in cycle II rose to 91.17% from cycle I, only 35.29% specifically for the active aspect of asking and giving answers during the teaching and learning process. The main thing that the lecturer did in cycle II was to be a motivator for students. Motivation is given either in the form of verbal statements or giving references in learning. Reference is given through the opportunity to think in the discussion. The verbal statement given was in the form of motivation to be equally involved in the discussion. The lecturer said that every student has the same opportunity to ask and answer questions, so they have the same opportunity to know or understand more about the material being taught.

This guided inquiry learning model encourages students to be actively involved in the learning process, for example actively asking questions and answering questions posed by lecturers or other students. This happens because each student is given the same opportunity to answer questions. In addition, students are also given a few minutes to be able to reason before giving answers to the questions asked. This process includes the inquiry process, which is giving the opportunity to absorb, understand and respond to every part of the material presented. This is in line with Bruner's opinion in Kurniashih et al. (2019), which states that in the guided inquiry model the teacher should provide opportunities for his students to become thinkers to solve problems. That way students will find things that are useful for themselves. Student activities are maximally encouraged to search and find. In the

sense that students are active learning subjects in the learning process, and the teacher is only a facilitator.

Student learning completeness in cycle II has increased. From 52.94% to 94.12%. The main thing that was done by the lecturer in the second cycle was to activate all students in the learning process. By guiding students step by step according to the syntax of the guided inquiry learning model to find conclusions from their assignments. Lecturers provide more specific topics and guide students from the material being taught. the guided inquiry model is a learner-centered learning model which certainly has a good impact on student cognitive success. Nurlaila & Lufri (2021), in their research also showed an increase in learning outcomes in the control class which was taught using the guided inquiry learning model.

The results of this study as a whole increase occurs in a classical manner by 80%. There was an overall increase in the aspects observed in this study because students were more active than in the previous cycle. In addition, they also carry out direct learning experiences during practice, discuss together, and complete assignments together. Lecturers also provide guidance to students patiently in completing assignments (Rotellar & Cain, 2016). Previously, students only memorized it, but with the guided inquiry model syntax, students observed more, looked for their own years, and explored their own answers, making it easier for students to understand in their own way of learning. Ismanto et al. (2019), says that the maximum use of the senses in learning will increase student understanding in learning a concept.

Conclusion

Based on the description of the results and discussion, it can be concluded that the guided inquiry learning model can increase creativity and student learning outcomes in basic biology courses. The recommendations from this study are based on the results obtained, namely Teachers can choose a guided inquiry learning model to increase students' creativity and learning outcomes, in applying the guided inquiry model, it is better to pay attention to each syntax of this model, by applying it systematically, the learning objectives can be achieved properly.

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