

The Effectiveness and Implementation of Guiding Practical Based Guided Inquiry to Improving Learning Outcomes on Animal Physiology

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Abstract - The aimed of this study was to define the effectiveness of Animal Physiology Practical guided book based on Guided Inquiry for students of biology education STKIP PGRI West Sumatra. This research is the development of 4-D development model which consists of four phases (define, design, develop and dessiminate) but this researched just done in develop stage in effectiveness. The subjects of this research were 65 students from 2017 section. The data analyzed using descriptive qualitative and quantitative analysis. The results showed that the Animal Physiology practical guided book based on guided inquiry for students of biology education STKIP PGRI West Sumatra is efectiveness to promote the motivation, activities, and learning outcomes.

Keywords - Effectiveness, Practical guided book, Guided Inquiry

I. INTRODUCTIONS

Animal physiology is compulsory subjects in Biology education courses STKIP PGRI West Sumatra. Close to the learning of the course demands a creative and active students find Knowledge independently in understanding concepts, theories, principles, mechanisms of physiological and regulasinya as well as parse, construct, compare and modify physiological processes in relation to fluctuations in environmental factors through practical activities. To realize the learning product, especially in the implementation of practical, needed a valid practical guide availability, practically and effectively used by students and professors. According to Subianto (2009:8) there are four primary reasons for the importance of the implementation of practical activities. First, practical learning motivation aroused students; Second, teaching basic skills to develop experiments; third, practical approach to learning learning probe into scientific; Fourth, the practical support the understanding of the subject matter.

Implementation of practical work on Animal Physiology course aims to give students a comprehensive basic knowledge about the differences and similarities in the

physiological processes of animals at the level of the selected phylogeny by emphasizing adaptive significance from the process of animal life as a consequence of the change lingkungan factor (Rever, 2002). For example students must develop questions and a hypothesis to test relationships between activities, changes in temperature and pulse and blood pressure in animal life and to answer the questions student groups should be able to do observation either in accounting or by using spigmomanometer '

These things need to be developed based on guiding teaching Animal Physiology gives students chance was directly involved in the activities of the laboratory-based experiments, using the strategy team to answer questions about physiological mechanism and process in the body hewanserta the factors that affected it. Based on the results of previous studies, it's been a guiding teaching Animal Physiology was obtained by a valid and viable (Widiana, Susanti and Susanti, 2017) as well as the implementation done well (Widiana, Sumarmin, Susanti and Susanti, 2018) in the implementation of student teaching activity courses Biology education STKIP PGRI West Sumatra. To see the effectiveness of their use and implementation in improving

learning outcomes teaching students then has done research on the analysis of the effectiveness and implementation of guiding teaching in improving results learning practical Biology education courses students STKIP PGRI West Sumatra.

Practical guide was developed based on the results of the needs analysis student (Widiana, Susanti and Susanti, 2017) and analysis of the curriculum (Widiana, Susanti and Susanti, 2017), the inquiry-based approach practical guiding social interactions on the eyes lectures on Animal Physiology. Besides guiding the development of the inquiry-based social interactions also refers to some of the results of previous studies, including the research of Rever (2002) that students majoring in biology, Loyola College in Maryland, Baltimore, Maryland taught with the approach of the inquiry better able to mengimplementasikan knowledge and skills of Physiology and biologinya compared to conventional learning, Na Li (2012) get that learning with a structured approach to inquiry achievements and motivation higher learning from pembelajaran with the approach and the development of traditional, manual-based teaching effective guided inquiry to optimize the ability of University Physics students on hand Muhammadiyah Purworejo 2013/2014 academic year (Arifah, Maftkhin and Farmaryanti, 2014), Bunterm et al. (2014) studied the effect of guided versus structured investigation on 239 middle school students in three schools in Thailand, the obtained results a greater increase in students with learning inquiry social interactions both in science content knowledge and science process skills. Worksheet students with social interactions on the material inquiry approach to environmental management in students 228 23 Purwokerto, effective in realizing the learning outcomes students with excellent (Nurhidayah, Rahayu and Martuti, 2014), categorized as the teaching process the digestion of animal-based guided inquiry Ruminantia, effectively enhance critical thinking skills and make learning high school student outcomes Ta'alumul Huda Islamic Bumiayu (Fatmasary and Supriyanto, 2015) and is categorized as inquiry-based social interactions on the material structure and function of the tissue in the Junior High School student, embody enable effective outcomes of classical learning and increase the value of Junior High School students ' affective N 11 Semarang (Selvina, Susanti and Iswari, 2016). IPA-based Practical Guide Inquiry for Junior High School students ' social interactions of Class VII Semester Even been valid, practical, and effective use in the SMP 25 fields (Syamsu, 2017)

Guided inquiry learning aims in order to make the students better understand the basic concepts and ideas, help

in using memory and transfer in learning situations that are new, encourages students to be active, think intuitif, working hard and formulating hypotheses independently and give satisfaction is intrinsic. Suaranda (2007) stated that through the learning models inquiry, students actively involved in the activities of observation, measurement and data collection to draw a conclusion. Assuming acceptance-based learning, students learn to solve real problems by asking questions, analyze problems, perform investigations, collect and analyze data, make interpretations, creating description and drawing conclusions (Marx et al. 2004). The process of filing the answer a lot of thinking and learning skills such as critical thinking, creative thinking, independent learning skills, Metacognition ability and communication skills (Almuntasheri, Gilles, 2016 and wright).

Characteristics of Guided Inquiry learning (Inquiry social interactions), among which are: 1. ability of learners from specific observations headed to inference or generalizations, 2. its purpose is to strengthen the process of testing event or object and then it came to the generalization that corresponds with the observations, 3. teachers control the learning process, data, material or object and acts as the leader of the class, 4. every learner react and try to build a meaningful pattern based on its own observations and others in the classroom, 5. the class serves as a learning laboratory and 6. teachers motivate learners to communicate the generalities that have it generates to classmates so that mutual benefit each student (Jufri, 2013). Steps of learning inquiry social interactions, which are: a) the identification and mapping of the scope of the problem, b) to plan and predict the outcome of the investigation, c) for data collection, data interpretation and d) developed the conclusions, and e) do the reflection (Kemendikbud, 2014).

Before implementing a practical guide in the process of testing needs to be done and associated use of the effectiveness of the practical guide was developed, then it would have been done based on the analysis of effectiveness against the practical guide Animal Physiology, developed by two professors of Physiology expert animal and Companion Animal Physiology teaching assistant. Analysis of effectiveness aims to see that Animal Physiology practical guide that is already valid and effective practical use by students and professors as well as can improve learning outcomes of students

II. RESEARCH METHODS

This study used a model of the development of Four-D developed by Thiagarajan, Semmel Semmel and (1974). 4-

D model consists of 4 stages of development, that is, Define, Design, Develop and Disseminate (Trianto, 2012:93). Research is conducted to develop and stage activities conducted at this stage is the analysis of effectiveness against students and professors. Respondents from the Group of students composed of 65 students from the Institute of Animal Physiology teaching participants the odd semester 2017/2018 on Biology education courses STKIP PGRI West Sumatra and the respondent lecturer consists of two people, i.e. lecturer Lecturer pengampu Animal Physiology course (Professor of Animal Physiology the Biology education courses STKIP PGRI West Sumatra and biology majors of engineering UNP). Analysis of the effectiveness of cover do practical work, and write down the results of the practical work, as well as the results of the study include the realm of attitudes, knowledge and skills.

Analysis of students' activities are processed using the formula the percentage (%) expressed Sudijono (2004), namely:

$$P = \frac{f}{n} \times 100\%$$

Description:

P = the percentage of the activity

f = the frequency of each activity

n = the number of frequency of student activities

To know the success rate of students' learning activities, Dimiyati and Mudjiono (1999) gives the criteria as shown in table 1.

Table 1. Success Criteria Of Student Learning Activities

Category	Success	Range Persentase
Less Good	Did not Work/not effective	1-25

Good enough	Less Successful/Less Effective	26-50
Good	Successful/Effective	51-75
Very Baik	Very Successful/Very Effective	76-100

Analysis of the results of the Study

Student learning outcomes is calculated based on individual mastery and the average grade obtained by the student. Assessment tasks and results of the graduation test. The value obtained is treated using the formula advanced by Arikunto (2012) and modified to be:

$$NA = \frac{2T + 3A}{5}$$

Description :

NA : The Final Value

T : The Value Assignment

H : The Value of Repeat Daily

Whereas the assessment standard used after modified to be:

81 - 100 A (Very effective)

66 - 80 B (effective)

56 - 65 C (Quite effectively))

46 - 55 D (less effective)

≤ 45 E (ineffective) (STKIP PGRI SUMBAR, 2015:113).

III. RESULTS AND DISCUSSION

Based on the observations the observer obtained the value of student activities at each meeting of the practical work, as shown in table 2.

Table 2. The average value of the activity (%) Each Indicator at each meeting.

Sessions	INDICATOR					
	Do a Lab Course		Average	Write the Results of The Practical		Average
	1st meeting	2 meetings		1st meeting	2 meetings	
2015 A	95,46	98,44	96,95	97,35	99,22	98,29
2015 B	98,24	97,85	98,05	95,89	99,22	97,56
Average	96,85	98,15	97,49	96,62	99,22	97,92
Average Effectiveness						98,03
Criteria						Very Effective

From table 2 it can be seen an average value of student activities in the implementation of practical work is 98.03 criteria very effectively. This shows that the inquiry approach-based practical guide social interactions on Animal Physiology courses effectively used to enhance student learning in practical activity. Effectiveness is seen from an increase in the value of the activity of the students from one meeting to the meeting two. This is because this practical tutorial using the inquiry approach that demands the mahasiswa untuk lebih banyak belajar sendiri, mengeksplorasi kreatifitasnya dalam menggali pengetahuan dan konsep untuk menyelesaikan masalah. Furthermore this condition with your own motivating student activity, because without the activity of students could not solve the problems and questions that were given in the activity of teaching. This is in accordance with expressed Bilgin (2009) that Guided inquiry can train the learners construct answers and think smart in finding alternative solutions to the various problems posed by educators, develop skills understanding the concept, build a sense of responsibility and training delivery process concept was found. Similar results were also obtained by Nengsi (2016) that guide teaching Biology-based social interactions in inquiry very effectively used to increase student activity STKIP activities in a practical, Payakumbuh Ariesta and Supartono (2011) device Basic Physics Laboratory activities lectures II Inquiry-based social interactions can increase students' scientific work as well as Kholida, Suprianto and Andi (2017) the basic physics practical guide 1-based guided inquiry against an increase in hard and soft skill skills of students.

The criteria of the average value of the activity on these two aspects are observed equally belongs is very effective,

but when seen in the figure, the average value of the activity write down the results of the practical, i.e., higher from 97.92 aspects do practical, i.e. 97.49 (table 2). More low average value of the activity of carrying out practical work, because students have a cognitive and psychomotor abilities that vary from low to high, so not all students are able to do practical work with correct and appropriate procedures which should be good, while the assessment of the practical aspects of conducting activities directly reflect the ability of each individual praktikan. In addition students are also unfamiliar with the work ilmiah and inquiry-based practical guide social interactions so that students feel burdened with so many activities to do on its own. Practical activities that put more emphasis on outcomes (products) and not on the process, so that very little chance given to students to experience himself, active and creative in solving melakukanusah ilmiah issues. This is the same as that obtained by (Minderhout and Loertscher, 2007), at the beginning of learning that students do not enjoy a guided inquiry-based learning, because of the many activities that they have to do it yourself though along with it Student skills, grow and be able to build his own. More to the high average value of activity from the aspect of writing down the results of the practical, because the results and conclusions rendered already obtained through the results of group discussions, so variations in the ability of a student not too influential.

The results of the assessment of the effectiveness of the use of guiding practical-based approach to inquiry social interactions on Animal Physiology courses towards students' affective values are presented in table 3.

Table 3. The average value of the students' Affective on each aspect of each meeting

Session	Affective aspects							
	Disipline and Meticulous			Average	Collaboration and Responsibility			Average
	P1	P2	P3		P1	P2	P3	
2015 A	74,20	79,97	83,16	79,11	80,20	81,71	84,13	82,01
2015 B	78,40	80,30	82,50	80,40	78,90	81,30	81,50	80,57
Average	76,30	80,14	82,83	79,76	79,55	81,51	82,82	81,29
The Average Value of The Attitude							80,52	
Criteria							Very Effective	

From table 3 can be seen the average value of the students ' affective in the implementation of practical Animal Physiology was 80.52 criteria very effectively. This indicates that inquiry-based practical guide social interactions on effective Animal Physiology courses used to improve students ' affective potential. Similar results were also obtained by Warandi, Nurhayati and Safitri (2016) that the module with the inquiry approach to effective social interactions are used to enhance the character of the students of Class XI SCIENCE high school. This is because the wizard-based approach to inquiry social interactions with the syntax that allows students to move step by step in applying the scientific method of identify the problem, define hypothesis, formulate the problem, gather data, verify the results, and further conclusion, generalization of skills to apply the scientific method to form a scientific attitude of college students. This is in accordance with expressed Massialas (1991 in Matthew et al., 2013) which defines the inquiry model is a model of social interactions taught that allows students to move step by step from identifying a problem, define hypothesis, formulate problems, collect data, verify the results, and generalizing the conclusion.

The average value of the affective aspect of cooperation and responsibility is 81.29 (very effective) higher than on discipline and meticulous aspects, namely 79.76 (effective) (table 3). More effective cooperation aspects of attitude formation and responsibilities due to the learning karenalangkah inquiry used in the guide was able to increase the interest of students in practical activities, develop kemampuaankerjasama in team and communication skills both spoken and written, so that students feel valued and have the opportunity to develop their potential. This is in accordance with expressed Rever (2002) the learning approach that inquiry was able to increase the interest of students in learning, develop oral and written communication skills, ability and skill in team cooperation science literacy and critical thinking.

The results of the assessment of the effectiveness of the use of guiding practical-based approach to inquiry social interactions on Animal Physiology courses towards students ' cognitive values are presented in table 4.

Table 4. The average Cognitive Value at each meeting

Session	The Value of the Test			Kuiz Value			
	Pre Test	Post Test	Average	P1	P2	P3	Average
2015 A	70,25	79,63	74,94	81,10	81,48	81,35	81,23
2015 B	70,33	77,59	73,96	81,03	81,41	81,68	81,35
Average	70,29	78,61	74,45	81,06	81,45	81,52	81,29
Final Value							77,87
Criteria							Good/effective

Description: P1 = 1st meeting; P2 = 2 meetings; P3 = 3rd meeting

From table 4 can be seen an average student in the cognitive value of the implementation of practical Physiology of animals is 74.55 criteria effectively. This indicates that inquiry-based practical guide social interactions on effective Animal Physiology courses used to improve students ' cognitive potential. This is because the inquiry learning model applied in this tutorial gives more ruangbagi students for more self study, explore kreatif dalam break kanmasalah. Students investigate the formulation of the problem presented Professor by using their own design procedures and mengkontruk as well as formulate conclusions from the results of their own investigation, so naturally they will easily understand concepts and concepts acquired in the form of long-term memory and this will indirectly increase the cognitive potential of the students. As expressed Bilgin (2009) that

guided inquiry is one of a kind of inquiry where students participating each other investigate any questions or problem formulation is presented based on the teacher's instruction inquiry social interactions within the Group small using a procedure designed his own students, so that they acquire learning meaningful. Students create social interaction among themselves in recognizing their ideas, share ideas and facilitate their understanding as well as a conceptual reconstruction and their attitude with the guidance of a teacher.

Similar results were also obtained Warandi, Nurhayati and Safiti (2015) that module with inquiry approach to effective social interactions are used to improve the knowledge of the concept of grade XI IPA SMA. Learning denganGilebih emphasis on the students to participate

actively in the learning process, the knowledge gained is the result of the student's own thoughts and discoveries so it is easier to remember, are longterm g, and optimal (A'yan used et Al., 2015).

In addition the use of a inquiry approach to social interactions, effectively guiding teaching to enhance students ' cognitive ability is also supported by its own practical guiding role. Such as posed Rahman et al. (2014) that practical work-based learning can improve learning outcomes and the ability of the scientific work of students. In addition, in the implementation of the model inquiry in learning is always associated with the activities of the investigation or experimentation to facilitate students in finding out and discovered it needed in mengkontruk his knowledge. This indicates the existence of a close link between the practical activities with the inquiry approach in improving student learning outcomes. Model inquiry forming ability of students in designing a theoretical problem solving procedures and practical activities to train

the ability of student's scientific work in implementing plans through direct interaction with physical objects and the real process to mengkontruk their knowledge independently. Thus, students will be more given what is done compared to what it instead, so capabilities of kognitifnya will also be better. The formation of knowledge can occur through the interaction of children with physical objects directly and the son of do it yourself. More students remember what he was doing through practical work, as opposed to just memorize it, because practical work to maximize the entire senses to work (Mardapi et al. 2011). Practical activities provides opportunities for students to find out and prove a theory with a scientific approach.

The results of the assessment of the effectiveness of the use of guiding practical-based approach to inquiry social interactions on Animal Physiology courses of psychomotor students presented at table 5.

Table 5. The average value of each aspect of the Psychomotor at each meeting

Session	Aspects of Skills							
	Systematics and Conformity			Average	The Completeness of The Contens of The Report			Average
	P1	P2	P3		P1	P2	P3	
2015 A	68,60	80,50	82,70	77,27	65,80	80,40	88,00	78,07
2015 B	77,00	81,40	83,30	80,57	77,10	81,30	83,70	80,70
Average	72,80	80,95	83,00	78,92	71,45	80,85	85,85	79,38
The Average value of The Skills								79,15
Criteria								Good/Effective

Description: P1 = 1st meeting; P2 = 2 meetings ; P3 = 3rd meeting

From table 5 can be seen on average value of psychomotor students in the implementation of practical Animal Physiology was 79.15 criteria effectively. This indicates that inquiry-based practical guide social interactions on effective Animal Physiology courses used to improve psychomotor potential students. This is because in the implementation of practical approach inquiry social interactions, students design and conduct independently all stages of the learning lab course start from formulating the problem, develop a hypothesis, test hypotheses, designing experiments, analyze data, interpret the data, concluded, presenting and compiling reports, so that they are more likely to feel a sense of ownership for every activity and their psychomotor competence slowly is formed. Mustapa and Trudel (2013) in learning with inquiry approach social

interactions, students are challenged to develop their ideas for observing natural phenomena and observe how the phenomenon works, practice the various components of the investigation and realize how scientists work in real life. In addition to this inquiry approach can also prevent the wastage of time and reduce the frustration of students on unexpected results (Trautmann, MaKinster, & Avery, 2004).

IV. COCLUSSION

Based on the results of the research that has been done, then it can be concluded that the implementation of guiding practical-based approach to inquiry social interactions on animal physiology course effective use in increasing student learning outcomes course Biology education in competence of affective, cognitive and psychomotor.

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