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IMPLEMENTATION OF GUIDED INQUIRY LEARNING MODEL ON THE TOPIC OF INVERTEBRATE TO ENHANCE STUDENT CURIOSITY AT GRADE X MIA

Alfi Ertando[1,✉], Baskoro Adi Prayitno [2], Harlita [3]

Department of Biology Education, Faculty of Teacher Training and Education, 57126, Universitas Sebelas Maret, Indonesia

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Abstract

The research aimed to enhance student's curiosity at grade X MIA by implementation of guided inquiry learning model on the topic of invertebrate. Research method was a Classroom Action Research based on the model developed by Lewin (1992). This research was performed within 3 cycles with implementation of guided inquiry learning model based on Kuhlthau (2010). The subject is grade X MIA consist of 17 men students and 22 women students. Data were obtained by questionnaire, interviews, documentation, and observation sheets of four aspects of curiosity developed by Daniel Berlyne (1960) consisted of epistemic curiosity, perceptual curiosity, specific curiosity, diversive curiosity. The result showed that the student's curiosity in precycle: epistemic curiosity at 21% with very low category, perceptual curiosity at 8% with very low category, specific curiosity at 12% with very low category, diversive curiosity at 23% with very low category. The student's curiosity in cycle I: epistemic curiosity at 22% with very low category, perceptual curiosity at 21% with very low category, specific curiosity at 28% with very low category, diversive curiosity at 28% with very low category. The student's curiosity in cycle II: epistemic curiosity at 32% with low category, perceptual curiosity at 24% with very low category, specific curiosity at 35% with low category, diversive curiosity at 39% with low category. The student's curiosity in cycle III: epistemic curiosity at 46% with medium category, perceptual curiosity at 42% with low category, specific curiosity at 42% with low category, diversive curiosity at 44% with medium category. The student's curiosity increased from very low category (16%) in precycle becomes low category (43,5%) in cycle III and meet the target research. Based on the results of research can be concluded that guided inquiry learning model can improve students' curiosity.

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✉Corresponding author:
Alfi Ertando
Department of Biology Education, Faculty of Teacher Training and Education, Universitas Sebelas Maret
Jl. Ir. Sutami 36 A, 57126, Surakarta, Indonesia
Email: alfiertando@student.uns.ac.id

INTRODUCTION

The times demanded that every human being has critical thinking skills, analytical, and creative. In this century, workers in all sectors of the economy should be able to find and analyze information from a variety of sources and use that information to make decisions and create new ideas (Silva, 2009). This is supported by the Trilling and Fadel (2009) which said that the skills most needed at this time is a skill in solving problems, creative and innovative thinking, communication, and collaboration. According to Silva (2009) one way to connect between the skill learning content is through education.

Education in Indonesia with the implementation of Curriculum 2013 trying print a younger generation who have entrepreneurial soul tough, resilient, creative, honest, and independent to establish Indonesia's economic growth in the future. It is also contained in Act No. 20 of the year 2003 on the national education system, which is the implementation of the mandate of the UUD 1945 (Kemendikbud, 2012). According to Rowson (2012), creative soul can be drilled with increasing curiosity learners as part of learning at school. Curiosity can also create effective feedback among learners with teachers so that the concept of student-centered learning is running optimally.

Based on the results of observation beginning the study of biology in class of X MIA 4, the learning process has not been a focus to students (student centered). More students to listen to explanations teacher, carry out if given the instruction of teachers, lack of curiosity of the students against the material, and many students who do not answer the question the teacher though the problem given in the book the student handbook. Problems arise can come from students and the learning process less effective. Learning that less effective among others due to less learning activities melatihkan the curiosity of students and lack of antarsiswa interaction during the learning process. Priority issues that must be resolved is the curiosity of students less. According to Sanjaya (2013), the knowledge possessed by the students become meaningful when based on curiosity in students.

Based on the results of further observations in class of X MIA 4 of 39 students look the liveliness and curiosity in the learning process that is still not the maximum. Based on the observations, the curiosity of students to obtain information and knowledge only 21% with a lower category. The curiosity of students to accommodate experience through the senses only 8% with a low category. The student's curiosity to know more in the knowledge that there is already a category with only 12% lower. Curiosity to explore knowledge and information only 23% with the low category. According to Kang et al. (2009), zoned high curiosity if you have a score or close between 57%-100%, categorized the medium if you have a score or close between 43%-57%, categorized if it has a low score or close between 30%-43% for each dimension of the curiosity that developed Berlyne (1954) in the Rowson (2012).

Curiosity is the desire of receiving new information and experience as motivation to learn or explore something (Litman, 2008). Curiosity refers to the tendency of a person to ask, investigate, and find out the new knowledge obtained against as a frame. A high curiosity of someone is one of the indicators to improve the skills of the process of Science (Binson, 2009).

Four dimensions of curiosity suggested by Daniel Berlyne (1954), the curiosity to obtain information and knowledge (epistemic curiosity), curiosity to accommodate experience through the senses (perceptual curiosity), curiosity know to know more in the knowledge that already exist (specific curiosity), curiosity to explore knowledge and information (diversive curiosity) (Rowson, 2012). Litman (2008) argues that curiosity involves two types of different reactions towards the new stuff, i.e. the pleasurable feelings of interest (interest) and a feeling of tension against the uncertainty of information (deprivation). Students with a high curiosity towards biology tend to learn the material seriously, interested in the practical activities, and vibrant solve problems exercise

because of an attraction that was obtained by study of biology.

The curiosity of students training with learning-based approaches to inquiry or problem based learning (Pluck & Johnson, 2011). Curiosity can be drilled through the inkuiri method. Students who learn the methods of inkuiri are more motivated to know more because students find their own knowledge, whereas in conventional learning methods students tend to be passive listening to the teacher. From the process of looking up to find will give the potential emergence of curiosity (Kuhlthau, 2010). The condition that it is possible to cause students to feel no need to find your own new concept and are likely to wait for the course teacher (Widiastuti & Santosa, 2014).

Guided Inquiry Learning is one of four levels of Inquiry Learning Model (Banchi & Bell, 2008). Stages of inquiry gave rise to social interactions and improve the attitude of curiosity in students. Guided Inquiry Learning consists of 7 stages, namely the exploration, selection, initiation, formulation, collection, presentation, and assessment. According to Pluck & Johnson (2011), the stage of initiation and selection gave rise to questions from students. The question stems from the curiosity of students against the objects that will be investigated. Curiosity pushes students to link between the facts of the investigation with the concept that there are already so obtained a new concept at this stage of exploration, formulation, and collections (Widiastuti & Santosa, 2014).

METHODS

The reserach is classroom action research based on a model developed by Lewin (1992) in Pardede (2014) consists of four stages, namely planning (planning), actions (acting), observation (observing), and reflection (the reflecting). Research conducted using at least two cycles of invertebrate material by applying a model of learning inkuiri social interactions in class of X MIA 4 with repeated action on all cycles. Prior to the implementation of actions, carried out pre action is referred to as pre-cycle. The subject of research is the grade X MIA 4 with the number of students as much as 39 students consisting of 17 students are male and 22 female students with heterogeneous skills. Test the validity of the data using the method of triangulation. Sugiyono (2013) according to the method of triangulation is a method of checking data from many different sources in many different ways and different time. Triangulation used in this research is the triangulation technique. Method of data collection used in the form of an interview, the now, and the observation sheets during learning activities. Technique of data analysis refers to models, Miles and Huberman (1994) in Sugiyono (2013) are done in three activities: the reduction of the data, the presentation of data, and the collection of the conclusion as well as verification. According to Kang et al. (2009), curiosity belongs to the high level if it has score 57%-100%, belongs to the medium level if it has score 43%-57%, and low level if it has score 30%-43%.

RESULTS AND DISCUSSION

Research results in the form of score four aspects of curiosity is backed by student's curiosity closed questionnaire and the formulation of the problem posed on the student worksheet in each action cycle.

1. Pre-cycle

Pre-cycle is carried out on the material of Fungi. Results score curiosity every aspect for each student at pre-cycle is showed in Figure 1.

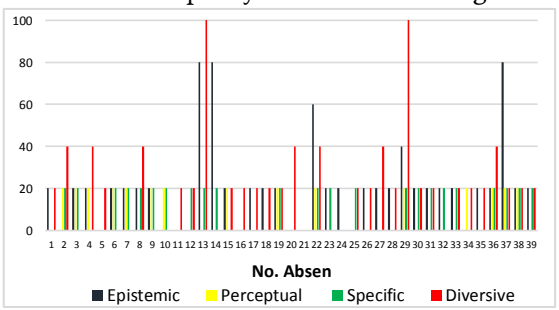

Figure 1. Graph product score of curiosity in pre-cycle every aspect

Figure 1 shows score of student's curiosity in the four aspects vary. Score of highest Epistemic curiosity was 80% as much as 3 students. While score of Epistemic curiosity

lowest is 0% as many as 10 students. Score of highest Perceptual curiosity is 20% as many as 15 students. While score of lowest Perceptual curiosity is 0% as many as 23 students. Score of highest Specific curiosity is 20% as many as 23 students. While score of Specific curiosity lowest is 0% as many as 16 students. Score of highest Diversive curiosity is 100% as much as 2 students. While score lowest Diversive curiosity is 0% as many as 10 students. Based on the results of observation in pre-cycle to do the actions in the activity of learning to improve students ' curiosity. Action in the form of the use of models of Guided Inquiry Learning on the material of invertebrates. Guided Inquiry Learning model places emphasis on the activity of social interactions students optimally for search and find. The teacher acts as a facilitator in supervising students to learn. The process of discovery begins the process of seeking. Search and find activities will provide the potential for the emergence of the curiosity of students (Sanjaya, 2013).

2. Cycle I

Cycle I was held on the topic of Invertebrate material characteristics and classification of phylum of invertebrate species. Results score curiosity every aspect to each student on the action cycle I is showed in Figure 2.

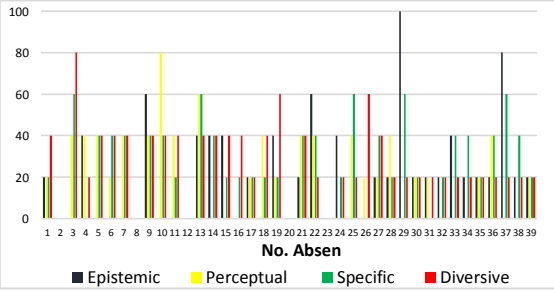

Figure 2. Graph product score of curiosity in cycle I every aspect

Figure 2 shows the close score students ' curiosity in the four aspects vary. Close score epistemic curiosity highest is 100% as much as 1 student. While the close score epistemic curiosity lowest is 0% as many as 15 students. Nothing much to score the highest are perceptual curiosity 80% as much as 1 student. While the close score perceptual curiosity lowest is 0% as many as 15 students. Close score specific highest 60% is a curiosity as much as 5 students. While the close score specific curiosity lowest is 0% as much as 8 students. Close score diversive curiosity highest was 80% as much as 1 student. While the close score diversive curiosity lowest is 0% as much as 5 students. Based on the results of the observation sheet to measure students ' curiosity in the observation of action cycle I gained an average of 24.75% with very low categories. Low curiosity of students is showed by the quantity formulation concerns students at the stage of initiation.

Table 1. Student's formulation of the problem in cycle I

No.	Formulation of the problem
1	How basic grouping of invertebrates?
2	How the classification and grouping of invertebrates?
3	What species are included in the groups of invertebrates?
4	Whether corals including the Animalia group of invertebrates?
5	What is the difference of invertebrate groups with other Animalia?
6	How to determine the species of invertebrate groups including or not?
7	What are the general characteristics of invertebrates?

3. Cycle II

Cycle II was held on the topic of Invertebrate with material anatomy and morphology of species. Results score curiosity every aspect to each student on the action cycle II is showed in Figure 3.

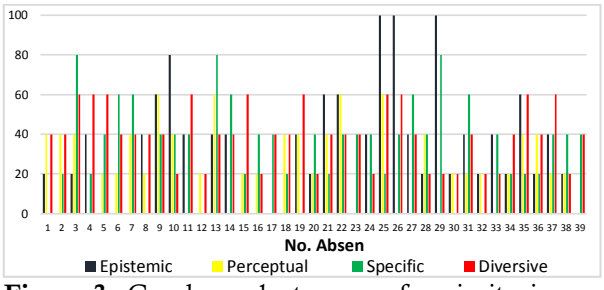

Figure 3. Graph product score of curiosity in cycle II every aspect

Figure 3 shows the close score students ' curiosity in the four aspects vary. Close score

epistemic curiosity highest is 100% as much as 3 students. While the close score epistemic curiosity lowest is 0% as many as 11 students. Highest score perceptual curiosity is 60% as much as 4 students. While the close score perceptual curiosity lowest is 0% as many as 11 students. Close score specific highest 80% is a curiosity as much as 3 students. While the close score specific curiosity lowest is 0% as much as 6 students. Close score diversive curiosity highest was 60% as much as 10 students. While the close score diversive curiosity lowest is 20% as much as 11 students. Based on the results of the observation sheet to measure student's curiosity in the observation of action cycle II gained an average of 32.5% with low categories. Low curiosity of students is showed by the quantity formulation concerns students at the stage of initiation.

Table 2. Student's formulation of the problem in cycle II

No.	Formulation of the problem
1	How does the structure of the morphology and anatomy of phylum Porifera?
2	What is the function of cavities and pores on the phylum Porifera?
3	How does the structure of the morphology of the anatomy of the phylum Cnidarians?
4	What causes the phylum Cnidaria coral-shaped substrate?
5	In the phylum Cnidaria, coral is an animal or not?
6	How does the structure of the morphology of the anatomy of the phylum Platyhelminthes?
7	Platyhelminthes very flattened, do have bones?
8	How does the structure of the morphology of the anatomy of the phylum Nemathelminthes
9	How does the structure of the morphology of the anatomy of the phylum Annelida?
10	Similarly cylindrical, what a difference the phylum Annelida and Nemathelminthes?
11	How does the structure of the morphology of the anatomy of the phylum Mollusca?
12	Whether the shell including the phylum Mollusca body parts?
13	The body of Mollusca is soft, but why there are shells?
14	How does the structure of the morphology of the anatomy of the phylum Arthropoda?
15	How does the structure of the morphology of the anatomy of the phylum Echinodermata?
16	Why do sea stars (starfish) that don't have thorns include Echinodermata?

4. Cycle III

Cycle III was held on the topic of Invertebrate with material reproduction and the role of the species. Results score curiosity every aspect to each student on the action cycle III is showed in Figure 4.

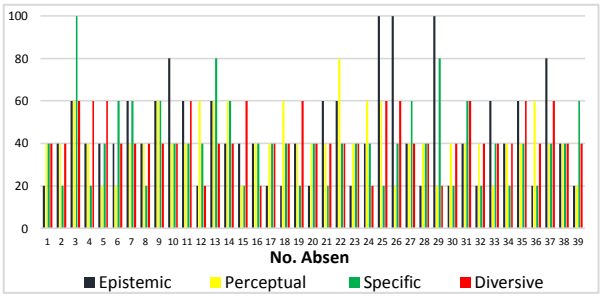

Figure 4. Graph product score of curiosity in cycle III every aspect

Figure 4 shows the close score students ' curiosity in the four aspects vary. Close score epistemic curiosity highest is 100% as much as 3 students. While the close score epistemic curiosity lowest is 20% as many as 11 students. Highest score perceptual curiosity is 80% as much as 1 student. While the close score perceptual curiosity lowest is 20% as many as 7 students. Close score specific highest 100% is a curiosity as much as 1 students. While the close score specific curiosity lowest is 20% as much as 11 students. Close score diversive curiosity highest was 60% as much as 11 students. While the close score diversive curiosity lowest is 20% as much as 4 students. Based on the results of the observation sheet to measure student's curiosity in the observation of action cycle III

gained an average of 43.5% with low categories. Low curiosity of students is showed by the quantity formulation concerns students at the stage of initiation.

Table 3. Student's formulation of the problem in cycle III

No.	Formulation of the problem
1	How reproduction of species in phylum Sponge?
2	What is the species of phylum reproduce asexually or sexually?
3	What is the type of reproduction of all species in the phylum Porifera is same?
4	What organs play a role in the formation of shoots on the Porifera?
5	Is there a male or female genital organ in the Porifera body?
6	How do species reproduce in the Cnidaria phylum?
7	Why is Medusa in Hydra sp called the sexual phase?
8	What is the reproduction of species in the Platyhelminthes phylum?
9	What are the factors that affect planar worm fragmentation?
10	Apa fungsi inang perantara dalam reproduksi seksual *Taenia saginata*?
11	What is the function of the intermediary host in sexual reproduction of *Taenia saginata*?
12	Are species in the Nemathelminthes phylum including hermaphrodites?
13	How do species reproduce in the Annelid phylum?
14	Why in sexual reproduction, earthworms do cross-breeding?
15	What is the reproduction of species in the Mollusca phylum?
16	How do genital organs species in phylum Mollusca?
17	How the reproduction of species in phylum Arthropods?
18	How parthenogenesis in asexual reproduction Arthropods?
19	How is the reproduction of species in phylum Echinodermata?

5. Comparison of Score Student's Curiosity Throughout The Cycle

Curiosity of the students analyzed based on the percentage score close to the average of the four aspects of the obtained by each student. Comparative score curiosity of students from pre-cycle to action cycle 3 is presented in Figure 5.

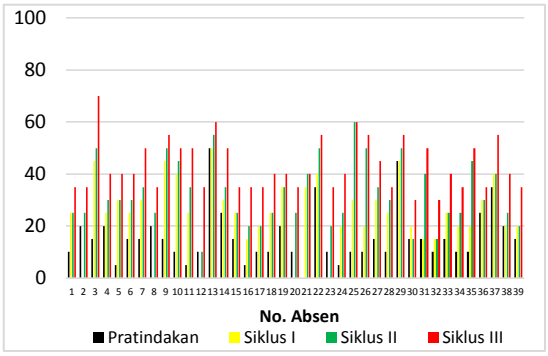

Figure 5. Comparison of score student's ' curiosity in the entire cycle

Figure 5 shows a comparison of the score student's curiosity in the entire cycle. The curiosity of students increased in every action cycle. The highest average was reached by the absent number 13 in pre-cycle and the cycle I, the absent number 25 in cycle II, and the absent number 3 in cycle III. The lowest average achieved by the number 21 on pre-cycle, the absent numbers 2, 8, 12, 20, and 23 in cycle I, the absent number 12 in cycle II, as well as the absent number 30 and 32 in cycle III. The average student's curiosity on the pre-cycle of 16%, the cycle I of 24.75%, cycle II of 32.5% and cycle III of 43.5%. Up to average cycle III the curiosity of students increased 27.5% from pre-cycle.

Increased curiosity in students caused a few things, namely: 1) syntax or the stages of the guided inquiry learning train four aspects of curiosity (Pluck & Johnson, 2011). The stage of initiation and selection gave rise to questions from students as an indicator of curiosity. Pedaste et al. (2015) added that the stages of exploration, formulation, and collections can train a curiosity; 2) grant of questions from teachers at initiation and presentation syntax. The question the teacher is one way to train your curiosity by growing curiosity and the challenge in students (Harrison, 2014); 3) motivation of teachers so that students are able to draw up a draft experiment on exploration activities. Research by Jaya, Sadia, & Arnyana

(2014) stated that curiosity can be trained and motivated to dig into knowledge by making a profound and pervasive question then seeking answers from a variety of sources of information; 4) the existence of a group discussion encourages students to actively and train student's curiosity. This is in line with the opinion of the Phillips (2014) stating that discussion provides the space to cultivate curiosity of students beginning with the onset of the curiosity in students.

Curiosity of the students in general has increased although average score student's curiosity is still low on cycle III. Based on the concept of ZPD (Zone of Proximal Development) from Vygotsky, when compared with pre-cycle student's curiosity on Diversive Curiosity has increased even though its increase is small (Nurkamilah, 2017). The large number of complicate the student teacher to guide the investigation of each group (Kurniawati, Wartono, & Diantoro, 2014). In addition, psychological factors influence on the learning motivation of students. Psychological factors involved such as pressure in the form of a sense of shame or worry cause lack of participation of students at initiation and presentation syntax (Dimyati & Mudjiono, 2013).

The curiosity of students can be trained and motivated to dig into knowledge by making a profound and pervasive question then seeking answers from different sources of information with the guidance of a teacher. Curiosity is increased if often trained, and will be on the wane in seldom or never trained (Jaya et al., 2014).

CONCLUSION

Based on the results of the research can be concluded that implementiation of the Guided Inquiry Learning Model can increase the curiosity of the students. The curiosity of students increased from Pre-cycle to Cycle III of 27.5%. Aspect of Epistemic curiosity increased 25% from pre-cycle 21% to 46% in Cycle III. Aspects of Perceptual curiosity increased 34% from pre-cycle 8% to 42% in Cycle III. Aspects of Specific curiosity increased 30% from pre-cycle 12% to 42% in Cycle III. Aspects of Diversive curiosity increased 21% from pre-cycle 23% to 44% in Cycle III.

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