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Analysis of Student Habits of Mind After the Implementation of Inquiry Based Learning With Levels of Inquiry

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Abstract

In order to prepare teachers and next generation for twenty first century can act based on their higher order thinking skills, teacher, students need have relevant experience. In Biology instruction, it seems needed habits of higher order thinking in solving problem in processes such as inquiry based learning. Through inquiry, the students will be able to develop science and intellectual skills necessary to solve problem and find out the answer to fulfill their curiosity. A descriptive study was carried out to investigate students habits of mind after having experience in IBL in certain topics, among others were on Biodiversity topic. Habits of mind with 16 categories, meanwhile IBL with six levels of inquiry (discovery learning, interactive demonstration, inquiry lesson, inquiry lab, real world application and hypothetical inquiry). Qualitative method in this research was conducted with the use of questionnaire on Habits of mind and individual interview toward students. Research results show that students Habits of mind is in average category, the IBL can facilitate students higher order thinking experience, and most of the students agree to lengthen the implementation of the IBL for other Biology topics so as to be able to become good thinkers in near future.
Key words: *analysis, student'habit, inquiry based learning*

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INTRODUCTION

Today the world community has entered the 21st century, 21st century skills demands a variety of skills that must be mastered by teachers and students in order to compete in the development of learning in education. There are four learning pillars that include learning to know, learning to do, learning to be and learning to live together. These four principles support 4C 21st century skills that must be possessed by today teachers to empty the future of critical thinking, communication, collaboration and creativity.

The phrase "21st Century Skills" includes several interrelated issues including: life and career skills; learning and innovation skills; information, media, and technology skills; core mastery of concepts with interdisciplinary themes (Ledward, B. C., and D. Hirata. 2011). 21st century skills focus on mastery of processes such as goal setting, planning, organizing, prioritizing, memorizing, starting, shifting, and self-monitoring. Students academic success depends on students ability to organize their study time and prioritize materials and information, have innovative ideas and ideas, be able to accept flexible shifts in learning approaches and strategies, monitor their own progress and reflect learning outcomes. On the one hand, the role of teachers is critical in preparing future generations that are reliable and capable of high order thinking, teachers and students need to have an appropriate learning experiences (Meltzer, L 2007).

Biology is one field of science that emphasizes the science of scientific process skills in real, mastery of concepts based on rational findings and can be proven scientifically. In Biology learning requires high-order thinking habits to solve problems scientifically. High-order thinking is one of 21st century literacy competencies that is critical thinking. Field facts indicate the need for new innovations in science learning, especially biology that can

maximize student knowledge through inquiry. Inquiry based learning (IBL) should always be done continuously and comprehensively in learning activities. Inquiry skills can not happen instaneously, but gradually according to student experience. This requires the role of teachers who can to students through scientific application one of them with Levels of Inquiri learning. This requires the role of teachers who can facilitate students learning through scientific application with Level of Inquiri. Level of Inquiry (LoI) is the development of Inquiri Based Learning sorted by level of intellectual intelligence and the controller include discovery learning, interactive demonstration, inquiry lesson, lab inquiry, real world application, hypothetical inquiry (Wenning C J 2012). Levels of Inquiry is also a tool in improving the competence of literacy of the 21st century (Rustaman, N Y 2016) . The levels of inquiry approach is also used to facilitate teachers in gradually applying inquiry and continuing according to the intellectual ability of the students because it is very important to have the thoroughness and full understanding of the spectrum of questions oriented approach to teaching, so as to achieve a higher level of Levels of Inquiry (Wenning, C J and Khan, M.A, 2011)

The results of observations of researchers at several high schools in Bandung city there are teachers and students who have applied Levels of Inquiry learning. Improving the quality of inquiry learning can foster analytical thinking habits (Habits of mind). Cultural habits of thinking enhance students analytical skills in the face of the challenges of global competitiveness in the 21st century and long-term learning commitments so students become self reliant and professional (Laliberte, K.A. 2013). Habits of mind are the habits of student thinking that are contained in the learning process (Sriyati 2011) .The better the learning process, the changes in understanding the concepts, attitudes, and ways of thinking will also change to a better one (Costa, A.L. & Kallick, 2000). Habits of mind students are formed from several combinations of thinking skills, attitudes, and past experiences one of which is critical thinking habits

Based on this background, this study aims to reveal the students Habits of mind after inquiry based learning with Levels of Inquiry on biodiversity topic.

METHOD

A descriptive qualitative research method was used in this study with the involvement of 33 grade senior high school students in Bandung. Data were collected through the using of two questionnaires about Habits of mind and response after applied learning Inquiry Based Learning (IBL) with Levels of Inquiry. Questionnaires Habits of mind was adapted from (Ilma RI 2014) which has been validated by experts and adapted to Levels of Inquiry topic on biodiversity topic. Habits of mind is the habits of students thinking that is contained in the learning process using 16 categories developed (Ilma RI 2014) such as *persisting, managing impulsivity, striving for accuracy, thinking and communicating with clarity and precision, gathering data through all senses, questioning and posing problems, thinking about thinking (metacognition), listening with understanding and empathy, thinking flexibly, creating, imagining, innovating, finding humor, responding with wonderment and awe, applying past knowledge to new situasions, taking responsible risk, thinking interdependently, and remaining open to continuous learning*. Individual interview toward students are taken by purposive sampling (representing a number of 33 students). The results of the data obtained were analyzed by percentage (%) with frequently, rarely and never to see Habits of mind students after application of Level of Inquiry on biodiversity topic. Response after applied learning Inquiry Based Learning (IBL) with Levels of Inquiry consists of 11 questions tailored to on biodiversity topic and the Likert scale of 7 scales are strongly disagree, disagree, somewhat

disagree, neutral, somewhat agree, agree and strongly agree. For the category of Habits of mind score according to Arikunto 2003 in [9] as follows:

Categories	Range of scores
Very low	Less than 20
Low	20-40
Medium	40-70
High	70-90
Very high	90-100

Naskah ditulis dalam bahasa Indonesia dengan huruf Times New Roman 12pt, satu kolom, kerapatan baris 1 spasi, pada kertas A4. Mencantumkan metode atau teknik yang digunakan, dan alat-alat khusus yang diperlukan penelitian

RESULTS AND DISCUSSION

Research results show that analysis of student Habits of mind after the implementation of Inquiry Based Learning with Levels of Inquiry from 33 student. Based on table 1 result of Habits of mind research students after the application of Levels of Inquiry grade X that students answered rarely more than frequent and never, so in Habits of mind categorize students rarely with 40-70 score range categories.

Table 1. Students Habits of mind after application learning LoI grade X senior high school students in Bandung

	Precentage of		
16 Categories	**Frequently**	**Rarely**	**Never**
Persisting	70	30	-
Managing impulsity	27	58	5
Striving for Accuracy	43	54	3
Thinking and Communicating woth Clarity and Precision	27	60	3
Gathering Data Through All Senses	60	40	-
Questioning and Posing Problem	28	72	-
Thinking about Thinking (Metacognition)	25	75	-
Listening with understanding and empathy	57	42	-
Thinking flexibly	81	57	-
Creating, imagining, innovating	57	30	3
Finding Humor	15	63	2
Responding with Wonderment and Awe	78	18	4
Applying Past Knowledge to New Situations	54	46	-
Taking Responsible Risk	52	48	-
Thinking Interdependently	75	24	-
Remaining Open to Continous Learning	9	88	3

The results showed that students achieved high frequently scores in the persisting, flexibly thinking, responding with wonderment and awe, and thinking interdependently.This happens students understanding students after inquiry learning of material biodiversity is very high, supported by the sense of appreciating the opinions of friends and students increasingly admire the sign of the greatness of God. Loving nature is one of the characteristics of a scientist. Scientific scholars have an understanding of science, science as a process, and can draw evidence-based conclusions and provide information about their own environment and well-being (Wenning, C.J. 2012). Students achieve a moderate score is striving for accuracy, gathering data through all senses,

listening with understanding and empathy, applying past knowledge to new situations, taking responsible risk. This happens less students in biology subject activities, because collecting data through sensory devices and produce accurate data is a close part of daily practical activities. Lack of practicum in possible inquiry understanding is also lacking. inquiry is closely related to student practicum activities in schools.

Students answered rarely achieve the highest score is questioning and posing problems, thinking about thinking (metacognition), remaining open to continuous learning. In which case continuous inquiry is required. students need regular guidance so that the level of student inquiry can be embedded in their minds so that it will form good student thinking habits. Through inquiry students can develop the disciplines of Biology and the intellectual skills needed to solve problems and seek their own answers to fulfill their curiosity. Many science teachers, especially biologists around the world, take a different approach oriented to inquiry without having a comprehensive understanding of mutual relationships (Widiyarto,et al, 2021). The result is because the habits of thinking inquiry takes time and process to reach a deep level of understanding.This is because inquiry habits of thinking takes time and process to achieve a deep level of understanding. Levels of Inquiri provides a framework through the low-to-high level spectrum so that Inquiry Based learning is no longer considered to be a complicated and discontinuous process but systematically, regularly, and continuously so as to be said to be a hierarchical sequence. Students answers rarely reach a moderate grade managing impulsity, striving for accuracy, thinking and communicating woth clarity and precision, gathering data through all senses, listening with understanding and empathy, thinking flexibly, finding humor, applying past knowledge to new situations, taking responsible risk because many students reach the moderate category in this case very much needed special guidance to achieve the highest score. Guidance through inquiri as a solution in the process of teaching and learning in the classroom. Increasing levels of inquiry is done gradually and continuously by observing students intellectual abilities and is expected to be able to train students critical thinking skills.

This is proof that students academic ability also influences Habits of mind, so it is if students intellectual ability in good inquiry, then Habits of mind will also be good also based on the intelligence level spectrum so that Inquiry Based learning is no longer considered to be a complicated and discontinuous process but systematically, regularly, and continuously so as to be said to be a hierarchical sequence (Wenning, C J and Khan, M.A 2011). Increasing levels of inquiry is done gradually and continuously by observing students intellectual abilities and is expected to be able to train students critical thinking skills. This is proof that students academic ability also influences Habits of mind, so it is if students intellectual ability in good inquiry, then Habits of mind will also be good also based on the intelligence. Students stated were never highest in the category of managing impulsity and finding humor. Students are otherwise never the highest in the category manage disorder and find humor. This happens because students are less used to preparing and listing biological learning plans before they become less active in learning. the learning plan is so needed by the students that students have various questions during the inquiry learning. On time less biologically active biodiversity learning causes students to find less humor. Humor required students during the learning process so that activities are more fun and not monotonous, so that the levels of inquiry learning can be embedded in the minds of students. Student thinking habits are formed if students learn to be good and right through inquiry. Levels of Inquiry is also a tool in improving the competence of literacy of the 21st century. Because this competency is emphasized on the process not just the result. results as a result of the product process of the inquiry levels (Wenning C J 2012).

Research results show that students thinking in solving problems in the future after applied learning Levels of Inquiry from 33 student. Based on Table 2 of students thinking in solving future problems after applying the Levels of Inquiry study that most students agree with LoI learning regularly and continuously enables students to become future thinkers by providing critical solutions to build a nation.

Table 2. Response after applied learning Inquiry Based Learning (IBL) with Levels of Inquiry

	Precentage of	
Categories	**Agree**	**Disagree**
Inquiry learning with Inquiry levels of inquiry is applied in all biology subjects so as to be equipped to face future challenges and contribute problems in biology	73	27

Students agreed inquiry instruction applied to all biology subjects amounted to 73 percent and did not agree a number of 27 percent. 21st century demands are more emphasized in the learning process. This will be the basis of students in solving biological problems in the future. The levels of inquiry approach is also used to facilitate teachers in gradually and continuously applying inquiry in accordance with students intellectual abilities because it is important to have full accuracy and understanding of the spectrum of question oriented approaches to teaching, thus achieving a higher levels of Investigation (Rate Rustaman, N Y 2016).

CONCLUSION

The conclusion of this study is after the application of Levels of Inquiry, students habits of mind are categorized being and most students agree with the study of Levels of Inquiry regularly and continuously enables students to become future thinkers.

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