LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG ATAU PEER REVIEW
KARYA ILMIAH : **PROSIDING DAN MAKALAH YANG DIPRESENTASIKAN**

Judul Prosiding : Analysis of Students Inquiry Skills in Senior High School Though Learning Based-on The Hierarchy of Inquiry Model

https://www.researchgate.net/publication/340302956_Analysis_of_Students_Inquiry_Skills_in

Penulis Prosiding : 1Evi Elisanti, **2Ratu Betta Rudibyani**, 3Sajidan, 4Baskoro Adi Prayitno 5Ryzal Perdana, 6K. F. Nuri Wulandari

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		Internasional	Nasional	Internasional	Nasional	Internasional	Nasional	
a	Orisinalitas (20%): (Memperlihatkan keaslian dan kebaruan gagasan)	3,0	2,0	2,0	1,0	1,0	0,6	3
b	Kedalaman Kajian (40%): (Melakukan analisis, eksplorasi, dan elaborasi terhadap masalah yang dibahas berdasarkan kaidah-kaidah ilmiah yang berlaku dalam penelitian dan pengkajian; mengandung kebenaran ilmiah, ketuntasan kajian, kesistematisan pembahasan, dan didukung dengan pustaka yang relevan)	6,0	4,0	4,0	2,0	2,0	1,2	5
c	Kebermanfaatan (10%): (Memberikan manfaat bagi kemajuan ilmu dan solusi bagi masalah yang dihadapi masyarakat)	1,5	1,0	1,0	0,5	0,5	0,3	1,5
d	Relevansi karya dengan keahlian (20%) (Memiliki keselarasan antara karya ilmiah dengan penelitian magister/ doktor dan bidang penugasannya)	3,0	2,0	2,0	1,0	1,0	0,6	3
e	Kelengkapan unsur Jurnal Ilmiah (10%) (Mencakup prakata, daftar isi, editor, ISSN, dan kelengkapan lain)	1,5	1,0	1,0	1,0	0,5	0,3	1,5
Total (100%)		15,0	10,0	10,0	0,5	5,0	3,0	14

Penilaian Kualitatif*)

Artikel tsb dapat dikembangkan karena sesuai dengan bidang penulis

$14 \times 0,4/5 = 1.12$

Nilai Pengusul = BP x NP = ... X ...../ ..... = ...

Ket : Bobot Peran (BP) : Sendiri = 1; Ketua = 0,6; Anggota = 0,4 dibagi jumlah anggota

Palangkaraya 14-9- 2020
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		Internasional	Nasional	Internasional	Nasional	Internasional	Nasional	
a	Orisinalitas (20%): (Memperlihatkan keaslian dan kebaruan gagasan)	3.0	2.0	2.0	1.0	1.0	0.6	2,70
b	Kedalaman Kajian (40%): (Melakukan analisis, eksplorasi, dan elaborasi terhadap masalah yang dibahas berdasarkan kaidah-kaidah ilmiah yang berlaku dalam penelitian dan pengkajian; mengandung kebenaran ilmiah, ketuntasan kajian, kesistematisan pembahasan, dan didukung dengan pustaka yang relevan)	6.0	4.0	4.0	2.0	2.0	1.2	5,40
c	Kebermanfaatan (10%): (Memberikan manfaat bagi kemajuan ilmu dan solusi bagi masalah yang dihadapi masyarakat)	1.5	1.0	1.0	0.5	0.5	0.3	1,35
d	Relevansi karya dengan keahlian (20%) (Memiliki keselarasan antara karya ilmiah dengan penelitian magister/ doktor dan bidang penugasannya)	3.0	2.0	2.0	1.0	1.0	0.6	2,70
e	Kelengkapan unsur Jurnal Ilmiah (10%) (Mencakup prakata, daftar Isi, editor, ISSN, dan kelengkapan lain)	1.5	1.0	1.0	1.0	0.5	0.3	1,35
	Total (100%)	15.0	10.0	10.0	0.5	5.0	3.0	13,50

Penilaian Kualitatif*)

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Nilai Pengusul = BP x NP = 0,4 X 13,50/ 5 = 1,08

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		Internasional	Nasional	Internasional	Nasional	Internasional	Nasional	
a	Orisinalitas (20%): (Memperlihatkan keaslian dan kebaruan gagasan)	3,0	2,0	2,0	1,0	1,0	0,6	2,8
b	Kedalaman Kajian (40%): (Melakukan analisis, eksplorasi, dan elaborasi terhadap masalah yang dibahas berdasarkan kaidah-kaidah ilmiah yang berlaku dalam penelitian dan pengkajian; mengandung kebenaran ilmiah, ketuntasan kajian, kesistematisan pembahasan, dan didukung dengan pustaka yang relevan)	6,0	4,0	4,0	2,0	2,0	1,2	5,4
c	Kebermanfaatan (10%): (Memberikan manfaat bagi kemajuan ilmu dan solusi bagi masalah yang dihadapi masyarakat)	1,5	1,0	1,0	0,5	0,5	0,3	1,2
d	Relevansi karya dengan keahlian (20%) (Memiliki keselarasan antara karya ilmiah dengan penelitian magister/ doktor dan bidang penugasannya)	3,0	2,0	2,0	1,0	1,0	0,6	2,6
e	Kelengkapan unsur Jurnal Ilmiah (10%) (Mencakup prakata, daftar Isi, editor, ISSN, dan kelengkapan lain)	1,5	1,0	1,0	1,0	0,5	0,3	1,3
	Total (100%)	15,0	10,0	10,0	0,5	5,0	3,0	13,3

Penilaian Kualitatif*)

Belum ditemukan kemiskan yang diperoleh dari penelitian kualitatif ini, sehingga fokusnya hanya pada - hasil saja.

Nilai Pengusul = BP x NP = ... X ...../ ..... = ... 1,064

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Analysis of Students Inquiry Skills in Senior High School Though Learning Based on the Hierarchy of Inquiry Model

By Ratu Betta

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Analysis of Students Inquiry Skills in Senior High School Though Learning Based on the Hierarchy of Inquiry Model

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Abstract—**The study aims to analyze students inquiry skills in senior high school through the learning based-on the Hierarchy of Inquiry Model. The research with purposive sampling technique. Participants in this study sample were grade XI students of the 2016-2017 Academic Year State High School. The subjects of this study sample were 234 students. The instruments used weretests level of inquiry and observation sheets of independent skills consisting of 40 questions. The results of this study indicate that discovery learning is 79.26% with criteria skilled, inteactive demonstration of 74.13% with criteria that are sufficiently skilled, inquiry lesson of 52.42% is less skilled, the inquiry laboratory consisting of the guided inquiry laboratory is 44.36%, bounded laboratory inquiry for 36.47%, free laboratory inquiry for 34.36% overall with less skilled skills, real work applications at 33.81%, less skilled, and hypotetical inquiry 30.55% with very poor skills. The conclusions of this study indicate that using the learning model of level of inquiry can train students' skills with the maximum ability to sharpen their skills and skills to reach that level in order to achieve better or higher criteria. This is very necessary so that students are accustomed to exploring the potential in high-level thinking because with accustomed to high-level thinking, students will have high cognitive skills and independence in student learning**

Keywords: analysis of students, inquiry skills, Hierarchy of Inquiry Model

I. INTRODUCTION

The process of learning science can increase curiosity, involve active learning, improve understanding through problem solving so that it encourages students to carry out scientific inquiry [23]. [2] States that biology is a science part of science contains the nature of science. Learning biology is a change in behavior of students who emphasize the nature of science built on scientific methods or processes, scientific products, scientific attitudes. Scientific method or process is a definite step in observing, investigating a problem. Scientific products include facts, principles, theory and law.

Biology as one of the science subjects that can be used as an excellent medium for nature to train various skills of students. Through scientific phenomena, students can practice skills and involve students in conducting investigations such as identifying problems, formulating questions and hypotheses, planning and carrying out experiments, collecting data, presenting results, and drawing conclusions on scientific phenomena [12], [18]. These skills have a positive impact on students on the scientific process, scientific attitudes in producing reconstruction of meaning, important scientific products in the competencies of students so that the development of students' potential can be explored, grown and formed well.

One effort in presenting Biology as a product and the process of discovery or investigation with an-based learning model inquiry. This is in line with the statement [13], [5], [11] which states that inquiry is a multifaceted activity involving observation and questions, examination of sources of information, searching and investigating to find out what seen and needed identification and used critical thinking, analytical as well as logical and considering alternative explanations based-on inquiry strategies combine questions and active involvement to learn students to use active, continuous, and based on one's knowledge skills involving exploration, questioning, making discoveries and testing of the invention to find a new understanding [20], [16].

The inquiry learning by Wenning (2005a) known as learning Hierarchy of inquiry. Level of learning activities inquiry sequentially based on the intelligence of the intellectual is also the controller. Thelevel inquiry is related to 1) learning discovery; 2) interactive demonstration; 3) inquiry lesson; 4) inquiry laboratory consists of guided inquiry laboratory, bounded inquiry laboratory, free inquiry laboratory; 5) real worllication application; 6) hypothetical inquiry [28]. There are six types of intellectual process skills found at each stage of Levels of Inquiry, namely rudimentary skills, basic skills, intermediate skills, integrated skills, culminating skills, and advanced [26]. The use of stages and series of levels of inquiry can apply inquiry exercises by training different intellectual abilities. So that students' mental skills can be improved [30], [20].

Students can explore skills and skills to develop thinking habits and critical reasoning skills, intellectual skills, actively engage and be effective in scientific processes, solve problems scientifically, question conventional wisdom, and be able to find strong evidence supporting their arguments [6], [21]. Students can formulate their own findings confidently with the learning model. Students' skills are expected to grow and develop and be more productive [9], [11]. This has until now been felt to make a big problem in biology learning. Biology learning in senior high schools is still emphasized mastery of concepts, not yet trained in the basic skills of science in students, for example the skills of self-reliance. The lack of inquiry skills can not be separated from the learning model used so far. Teachers still dominate in learning Biology. The reality of the problem description above shows that the Biology learning process has not been carried out optimally andsteps must be found that the rightto improve the biology learning process. Appropriate efforts to improve the learning process by applying learning models applying the learning model level of inquiry or the level of self-activity. Based on the above background it is necessary to conduct a study entitled analysis of students inquiry skills in senior high school through learning based-on the hierarchy of inquiry model.

II. METHODS

This research was conducted using qualitative descriptive method with purposive sampling technique. Participants in the study sample were all students of grade XI in one of the high schools in Kediri which amounted to 234 students. Porposive sampling technique. The instrument used was the test level of inquiry and the observation sheet of independent skills consisting of 40 questions. Students' skills are shown at each level level with student level inquiry grading instruments. Students' skills are interpreted according to categories with the criteria as shown in Table 1 as follows.

TABLE I. INTERPRETATION OF SKILLS INVOLVING STUDENTS

Category	Interpretation
0,00%-30,00%	Very less skiled
31,00%-54,00%	Less skilled
55,00%-74,00%	Sufficiently skilled
75,00-89,00%	Skilled
90,00-100,00%	Highly skilled

III. RESULTS AND DISCUSSION

Conducting tests of independent skills aims to find out how much students master the levels in the inquiry. Assessment instruments aslevel are inquiry students'used to assess the results of theskills test inquiry. The students 'self-sufficient skills are shown at each level with the 40 students' level of inquiry assessment instruments. The results of the analysis of students' self-test skills are presented in Table 1 and Figure 1 as follows.

TABLE II. RESULT OF ANALYSIS ON THE TEST OF STUDENTS INQUIRY SKILLS FOR GRADE XI IN SENIOR HIGH SCHOOL.

Hierarki of inquiry/ Level of inquiry	Persentase	Interprestasi
Discovery learning	79,26%	Skilled
Inteactive Demonstration	74,13%	Sufficiently skilled
Inquiry Lesson	52,42%	Less skilled
Inquiry Laboratory :		
Guided Inquiry Laboratory	44.36%	Less skilled
Bounded Inquiry Laboratory	36.47%	Less skilled
Free Inquiry Laboratory	34.36%	Less skilled
Real work applications	33.81%	Less skilled
Hypotetical inquiry	30.55%	Very less skilled

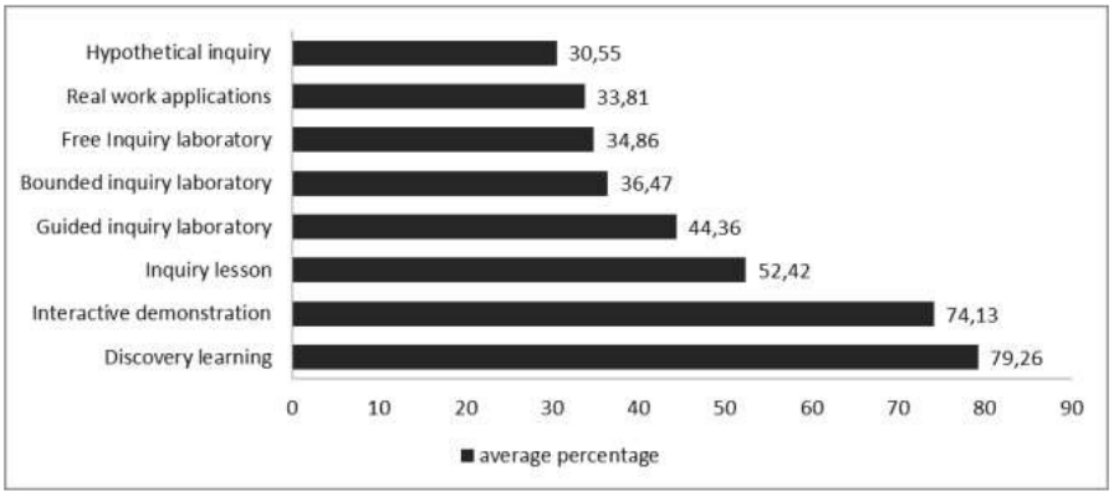

Fig. 1. Histogram result of of Analysis on the Test of Students Inquiry Skills for Grade XI in Senior High School.

Based on Table 1 and Figure 1 shows that the results of the independent skills test were given to one of the upper grade XI schools in Kediri. The results of percentage achievement are shown in each level with the following gains: 1) discovery learning at 79.26%, 2) inteactive demonstration at 74.13%, 3) inquiry lesson at 52.42%, 4) inquiry laboratory consisting of guided inquiry laboratory for 44.36%, bounded inquiry laboratory at 36.47%, free inquiry laboratory at 34.36%, 5) real work applications at 33.81% , 6) hypotetical inquiry 30.55%. Based on the results of students' inclined skill test, it can be seen that the results of level 1 discovery learning are skilled, level 2 inteactive demonstration is quite skilled, level 3 inquiry lesson has a less skilled level, level 4 inquiry laboratory consisting of guided inquiry laboratory, bounded inquiry laboratory and, free inquiry laboratory as a whole is less skilled, level 5 real work applications are less skilled and level 6 hypotetical inquiry is less skilled.

Level of inquiry learning intellectual intelligence that is owned is needed starting from discovery learning to hypothetical Inquiry because the thought process is needed to control an investigation. The involvement of the teacher controller to students. Learning discovery learning is almost entirelyactivities. inquiry within the control of teachers' Teachers dominate more learning activities.learning hypothetical inquiry where theactivities inquiry as a whole are submitted to students. Students dominate learning and the teacher as a companion, and oversee learning activities [11].

The all indicators of independent skills in each level are trained so that students have good abilities. This shows that students 'ability to emerge during the learning process using levels of inquiry is relatively good which has a positive impact on students' ability to reflect [11]. The ability of students to participate in the levels of inquiry that have the highest score is level discovery learning, at this level the teacher still provides material before the student conducts an investigation and the teacher still directs many students in carrying out the experiment. At this level students are still much guided by the teacher to conduct an investigation making it easier for students to know what they can do with instructions given by the teacher [14].

Skills related to students at the level of Discovery learning have the highest value, namely criteria skilled. This is because at the level of discovery learning, many teachers provide questions that are guiding and directing to guide students in constructing student knowledge. Students are much trained in inquiry skills observing, formulating concepts, interpreting or estimating, making conclusions, communicating results, and classifying results. Antisis students conduct investigations to look for relationships between variables that have been found from level discovery learning [28],[19]. Learning at the level Discovery learning peserta didik lebih focus terlibat aktif dalam Learning at the level of Discovery learning more focused learners are actively involved in developing knowledge, students can find concepts and connect facts that exist in science so that indirectly students' cognitive abilities will increase. Teachers using the Discovery learning model have reached this level well [26].

The skills associated with students at the Interactive demonstration level have a value that is not too high, which is quite skilled. This is because at the Interactive level the demonstration of students has been trained in independent skills predicting, explaining, estimating, collecting data and processing data, formulating and revising explanations based on logic and evidence and recognizing and analyzing alternative learning models. This happens because teachers experience difficulties in managing time so that the learning process at the interactive demonstration level is less than optimal. Interactive demonstration activities include demonstrations carried out by the teacher regarding experiments that take place interactively, predicting and explaining (how things can happen) from students [28]. Skills involving students at the Interactive level demonstration of students can develop cognitive abilities and problem solving students can develop through questions given by the teacher

based on the tools shown because the teacher's learning model determines the cognitive abilities and thinking skills of students. The level of interactive demonstration of students can be known by giving questions about the learning activities that have been carried out or used by the teacher in daily learning. Skills involving students at the Interactive level of demonstration are expected to reach a level well with the teacher providing the skills training to the fullest so that students are more highly skilled in thinking [15].

The skills associated with students at the Inquiry lesson level have a low value, which is less skilled. This is because at the Inquiry lesson level students are not trained in independent skills measuring, collecting and recording data, making tables of observations, planning experiments, using mathematics and technology and explaining relationships. Inquiry lesson level skills, student inquiry abilities have decreased. This is because students are less able to maximize their ability to act as the party that controls learning according to the provisions at the inquiry lesson level. In the measurements taken the results obtained 52.42%, which means the ability of students already meet the criteria of intermediate skills, so that teachers can use inquiry learning in accordance with the character of the material to be taught. Learning at the Inquiry level encourages students to act scientifically in the investigation of a phenomenon as well as a scientist. in inquiry studies students are asked to control and manipulate activities to achieve learning goals so that they indirectly play an important role in inquiry [28]. Students are asked to think hard to find learning goals with scientific inquiry and gather as much information as possible to draw conclusions and to be directed so that they can be applied in daily life [3], [4]. Learning inquiry lessons emphasizes thinking through scientific inquiry. The students' skills involved in the Inquiry lesson level are expected to reach a level that is good with the teacher giving the skills training to the fullest so that students are more skilled in thinking [15].

Students' skills at the Inquiry laboratory level have low scores, which are less skilled. This is due to the fact that at the laboratory level students are less trained in creative skills measuring with tools, building empirical laws on the basis of evidence, logic, designing experiments and doing. because the teacher reduces the intensity in giving questions guiding students in forming concepts, students have difficulty in carrying out investigative activities [27], [29]. Students' skills at the Inquiry laboratory level were divided into 3 types based on their level of ability and control, including guided inquiry laboratory at 44.36%, bounded inquiry laboratory at 36.47%, free inquiry laboratory at 34.36%, Skills involving students as a whole at the inquiry laboratory level. inferior ability is low, this is because the teacher reduces the intensity in giving questions guiding students in forming concepts, students have difficulty in carrying out investigative activities [6], [10]. Students are less independent in designing and developing experiments and can analyze data according to the investigation. Laboratory investigations here not only mean studying in the laboratory but also emphasizing how students can relate the concepts they already know to the results of their investigations [17],[7]. In laboratory investigations, students are faced with complex problems that require high mental processes but the fact is that students' overall skills in the Inquiry laboratory level are classified as less skilled [23], [1]. So that students are less able to solve problems in laboratory investigations students are less actively involved in the learning process. The skills associated with students at the inquiry laboratory level (guided inquiry laboratory, bounded inquiry laboratory , free inquiry laboratory) are expected to reach a level well with the teacher providing the skills training to the maximum so that the level of independence and inquiry skills of students can increase higher [25], [28].

Students with the lowest score of the real work applications level are less skilled. This is because at the level of real work applications students lack training in competent skills collecting, evaluating and interpreting data from various sources, communicating logical arguments based on evidence, scientific evidence, making and maintaining decisions. Real work applications that require high level skills in implementation, because at this level students are asked to solve real world problems, real-world applications are similar to project-based solutions [26], [27]. In the real world the application of locus of control is almost entirely played by students, because students organize and manipulate activities individually, while the role of the teacher here is an indirect guide to directing students [28]. The measurement results were 33.81% with less skilled interpretations which meant that students were unfamiliar and less skilled in using real world application models so that they still needed further training to reach that level.

Skills related to hypothetical inquiry levels are the highest level of the demand spectrum of by [28] at the advanced level students are required to conduct pure investigations which means that investigations are carried out to acquire new knowledge for themselves rather than focus on general knowledge. At this level, the teacher acts as a companion and the locus of control is fully held by students because students at this level are students who have high cognitive levels [28]. The skills associated with students who have the lowest score, namely the level of hypothetical inquiry, are very less skilled. This is because at the hypothetical inquiry level students lacking in trained skills synthesize complex hypothetical explanations, analyze and evaluate scientific arguments, generalize predictions through a process of deduction, revise hypotheses and predictions based on new evidence and solve real life problems [22], [24]. The role of the teacher in the learning process has been greatly reduced even here students are required to conduct investigations independently. Starting from designing experiments to be carried out to conducting experiments by students themselves [25], [28]. Students experience difficulties when designing experiments and students also experience difficulties when drawing a concept because there are differences between theories and the results of observations from the experiments conducted. At this level students need more time than previous levels. Students are not accustomed to using hypothetical inquiry level models so that they need to be trained more optimally to hone their skills and skills to reach that level in order to achieve better or higher criteria. This is very necessary so that students are accustomed to exploring the potential in high-level thinking because with accustomed to high-level thinking, students will have high cognitive abilities [27].

IV. CONCLUSION

The results of the study can be concluded that the analysis of students inquiry skills in senior high school through learning based-on the hierarchy of inquiry model. The result research of 1) discovery learning shows at 79.26%, 2) inteactive demonstration at 74.13%, 3) inquiry lesson is 52.42%, 4) inquiry laboratory consisting of guided inquiry laboratory of 44.36%, bounded inquiry laboratory of 36.47%, free inquiry laboratory of 34.36%, 5) real work applications of 33.81% , 6) hypotetical inquiry 30.55%. The use of the level of inquiry learning model can train students' full-fledged skills to hone their skills and skills to reach that level in order to achieve better or higher criteria. This is very necessary so that students are accustomed to exploring the potential in high-level thinking because with accustomed to high-level thinking, students will have high cognitive skills and independence in student learning.

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