

Analysis of Student Difficulties and Learning Outcomes with Guided Inquiry Learning Model

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Abstract

This study aims to analyzed the guided inquiry learning model of students' chemistry learning outcomes at SMA Negeri 8 Semarang. This research method used descriptive analysis. Data analysis techniques in this study were conducted with a literature review. Data collection methods were carried out by observation, questionnaire distribution, documentation, teacher interviews, and student interviews. This research instrument consists of observation sheets, questionnaires, and interview sheets. The results of the study showed that students still had difficulty in the chemical learning material, therefore the right learning model was needed to improve student learning outcomes, one of them was by applying the guided inquiry learning model. Based on the results of the study it can be concluded that the guided inquiry learning model can help overcome student learning difficulties in chemistry learning and could improve student learning outcomes in school.

Keywords: Guided Inquiry, Descriptive Analysis

1. Introduction

Chemistry was a part of Natural Sciences which includes understanding calculations. concepts and chemical Chemistry was a compulsory subject in high school and included in one of the subjects in the national exam. Chemistry subjects discuss material included the composition, structure, properties, changes in energy and the accompanying material. Chemistry lessons in high school aim to enable students to understand interrelated theories, principles, concepts and laws so that they can apply their knowledge in daily life (Hunnicutt, Grushow, & Whitnell, 2015). Chemistry was initially obtained and developed based on experiments but later developed based on theory (Jack, 2013).

The results of observations conducted at SMA Negeri 8 Semarang showed that chemistry learning was still dominated by discussion methods which it teacher-centered activities so that students became inactive. The results was low in the students learning outcomes which indicated by the average score of mid-semester repetition of class X in SMA Negeri 8 Semarang at 62 while the standard value was 75. The results of research conducted by Gumilar et al (2017) show that the low learning outcomes in chemistry learning was caused by students 'difficulties in solving problems in chemistry such as calculations and formulas so that students' learning interest is lacking. The material of chemistry lessons in senior high school contained by chemical reactions and calculations concept that were quite difficult for students to understand (Ural, 2016).

SMA Negeri 8 Semarang had applied 2013 Curriculum. The theme of the 2013 curriculum development was to produce productive, creative, innovative and affective Indonesian people through integrated attitudes, skills and knowledge (Roza, Satria, & Siregar, 2017; Susanto, 2014). The 2013 curriculum was structured with the aim of forming students who excellent in three domains of competence, it was attitudes, skills, and knowledge (Gunawan, 2017). The chemistry teacher at SMA Negeri 8 Semarang realized that learning in using the 2013 curriculum was still lacking, especially in teaching materials. Teaching material in the 2013 curriculum was much less because it used thematic (Muth'im, 2014). Teaching materials or teacher and student handbooks only refer to the books available in the library so that student learning activities were low.

The low level of student learning activities is partly because the learning process was less attractive (Ifeoma & Oge, 2013). The class atmosphere tends to be passive, teachers were more dominant than students. Assessment of learning outcomes could provide information to teachers ATLANTIS PRESS

about the progress of students in achieving learning goals through various learning activities (Setiawan, Sunarti, & Astriani, 2016). Student learning outcomes could be improved one of them by applying learning models that are in accordance with student circumstances (Zaini, 2016).

Based on these problems, a learning model is needed that can make students active in the learning process. The learning model used by the teacher plays a role in the objectives to be learning achieved (Azizmalayeri, Mirshahjafari, Sharif, Asgari, & Omidi, 2012). Selection of learning models must be adjusted to the conditions of students, school conditions, and learning needs (Bartos & Lederman, 2014). One learning model that can make students active in learning was the guided inquiry model (Sukma & Ibrahim. 2016). Research (Wardani, Nurhayati, & Safitri, 2016) states that the guided inquiry model can improve students' understanding of concepts and learning outcomes. The guided inquiry model is student-centered learning and makes students more active in the learning process (Pedaste et al., 2015). The guided inquiry learning model allows students to systematically analyze and solve learning (Villagonzalo, difficulties 2014). The difficulty of students in studying chemistry is one of the obstacles in the learning process (Hunnicutt et al., 2015). These difficulties can be overcome by using guided inquiry learning models (Gupta, Burke, Mehta, & Greenbowe, 2015). The purpose of this study was to analyze students' difficulties based on their learning outcomes with solutions using the guided inquiry learning model.

2. Method

The research method used in this research was a descriptive qualitative research method which was described and analyzed the data of the mid-semester students with qualitative explanatory sentences. This research was conducted on April 18, 2018 at SMA Negeri 8 Semarang in the even semester of 2017/2018 school year. The population of this study were all students of class X at SMA Negeri 8 Semarang. The sample of this study is one of class X in SMA Negeri 8 Semarang, namely class XE. The research instrument used in this study were a school state observation sheet, documentation, questionnaire for student responses to the learning process, teacher interview sheets, and student interview sheets. The research instrument was validated by the supervisor. In conducting observations, researchers are directly involved in data collection through interviews and documentation.

3. Result and Discussion

The results of observations at SMA Negeri 8 Semarang at the time of ongoing learning showed less interest and learning motivation because many did not pay attention when the teacher was teaching. Students tend to be less active so that teacher and student interactions were not going well. The chemical laboratory at SMA Negeri 8 Semarang was used as class XI due to lack of space. This caused a lack of chemical practicum activities at school. The arrangement and maintenance of chemical laboratories were not considered so that many laboratory equipments were seen which have been damaged and left alone. The use of laboratories needs to be maximized in schools, especially during lessons. The laboratory should not be used as a class so that the practicum can be carried out according to the schedule considering that the laboratory was one of the supports in chemistry learning (Gaddis & Schoffstall, 2007). Based on the results of the interview, students understand and understand the material taught through direct practice rather than theory.

Subject ·	Class									
	XA	XB	XC	XD	XE	XF	XG	XH	XI	
Average	65.4167	60,9722	61.3889	61.1111	59,444	60.1389	63.8889	63.8889	62.5	
S ¹	233.393	264.028	276.587	183.016	312.54	193.552	183.016	190,159	240.714	
\$	15.2772	16,2489	16.6309	13.5283	17.6788	13.9123	13.5283	13.7898	15515	
Score Min	20	20	20	25	20	35	25	35	25	
Score Max	85	85	85	80	90	90	- 90	90	90	

The results of interviews randomly with three students of grade X showed that students still lacked understanding of the concept of chemistry, especially in the calculation material. The teacher gave many formulas and memorization in chemistry lessons. The results of interviews with chemistry teachers at SMA Negeri 8 Semarang showed that teachers used the discourse and discussion learning model more often. Teachers wrote the material on the blackboard then asked students for discussion. Teachers sometimes used ppt media in teaching, but many students had not been able to understand the concept because the material taught was abstract and not practiced in the laboratory. We analyed of student learning outcomes to determine the level of difficulty experienced by students. It also aimed to describe the value of student learning outcomes before using a new learning model. The result of analyzed was students' cognitive based on observations at SMA Negeri 8 Semarang through the scores of the mid-semester students in the chemistry lessons contained in Table 1.

Table 1. Mid-Semester Results Value DataEven Grade X Students

Subject	Class										
	XA	XB	XC	XD	XE	XF	XG	XH	X		
Average	65.4167	60.9722	61.3889	61.1111	59.4444	60.1389	63.8889	63.8889	62		
S^2	233.393	264.028	276.587	183.016	312.54	193.552	183.016	190.159	240.		
S	15.2772	16.2489	16.6309	13.5283	17.6788	13.9123	13.5283	13.7898	15.:		
Score Min	20	20	20	25	20	35	25	35	2		
Score Max	85	85	85	80	90	90	90	90	9		

Based on the results of the average analysis the whole class of 62 was less than the student's KKM value of 75. The low learning outcomes of students at SMA Negeri 8 Semarang were caused by several factors. Analysis of factors influencing students' chemistry learning outcomes in SMA Negeri 8 Semarang were grouped into three main components. It were teacher, content or teaching material, and students. The interaction between the three components involved learning models, learning media, and structuring the learning environment.

The learning model applied by the teacher was not only discourse, discussions, and practice questions. Teachers could look for other learning models so that learning was not boring and students were enthusiastic in learning (Ku, Ho, Hau, & Lai, 2014). One of the learning model to improve student

learning outcomes was guided inquiry learning model. The guided inquiry learning model was a series of learning activities that involve maximally all the ability of students to search and investigate systematically, critically, logically, analytically, so that students could formulate their own knowlegde (Allen, with confidence Barker, Ramsden, Academy, & Point, 1986; Duran & Dökme, 2016). This learning model was essentially a process of discovery or investigation (Kimberlin & Yezierski, 2016). The main objective was to encourage students to develop thinking skills by giving questions and getting answers to students' curiosity (Suárez, Specht, Prinsen, Kalz, & Ternier, 2018). The learning process changes from teacher-centered to students-centered (Novilia & Iskandar, 2016).

Bilgin (2009) revealed that the guided inquiry learning model involved students in answering teacher questions. Students conducted investigations, while teachers guided students towards the right answers (Ifeoma & Oge, 2013). The guided inquiry learning model requires the teacher to have skills in providing guidance, called diagnosing students' difficulties and giving students assistance in solving problems. Students must be able to design an experiment or research, analyze results, to make conclusions (Sukma & Ibrahim, 2016). The learning process in guided inquiry includes five steps: formulating a problem, submitting a hypothesis, collecting data, testing hypotheses, and drawing conclusions (Banerjee, 2010).

The guided inquiry learning model aims to educate students to think logically, critically, rationally, and confidently in dealing with students' problems in the field of chemistry. Understanding, mastery of material and student learning outcomes were an indicator of the success of the chemical learning process. The higher the understanding and mastery of the material in students, the higher the learning outcomes were supported by the use of learning media.

Utilization of learning media at SMA Negeri 8 Semarang had not been maximized. The media used in the learning process in the form of student worksheets and chemical printed books for high schools were obtained in the library. The teacher used LCD only during a presentation by ppt. The teacher had not explained the video or illustration and did not use teaching aids as a medium to support learning. Learning media was a tool that carries messages to achieve learning goals (Rosadi, 2015). The use of learning media at SMA Negeri 8 Semarang must be improved and varied. Learning media could increase student motivation so that it influences the success of student learning outcomes along with teacher quality (Kapanadze, Bolte, Schneider, & Slovinsky, 2015).

The most dominant factor in influencing learning success was teacher quality. The teacher must have a good attitude and personality, knowledge base in education according to the field of study, mastery of teaching techniques, and the ability to understand the minds of each student (Bartos & Lederman, 2014). Sever & Güven's (2014) study states that teachers act as motivators, facilitators, innovators, and conductors in handling problems faced by students. The teacher also acts as a mediator who had an important role in achieving learning goals and greatly determines the success of the educational process (Pérez, 2016). In addition, students also influence the learning process (Koksal & Berberoglu, 2014). Each student had differences in intellectual abilities. physical abilities, family background, habits and relationships causing differences in the learning styles of each student (Azizmalayeri et al., 2012). Student learning difficulties were an obstacle in learning success, especially in chemistry subjects at SMA Negeri 8 Semarang. On this basis, the authors were interested in reviewing and analyzing the level of chemistry learning difficulties of students at SMA Negeri 8 Semarang to be able to improve their learning outcomes using the guided inquiry learning model.

4. Conclusions

Based on the results of observations at SMA Negeri 8 Semarang the students' learning outcomes in chemical materials were still low. Factors affecting the learning outcomes of chemistry in schools include three main components, they were the role of the teacher, learning material, and students. The interaction of the three components involves learning models, learning media, and learning environments. These factors greatly influence the success and learning outcomes of students in the learning process. One of the efforts to improve student learning outcomes in SMA Negeri 8 Semarang was by applying the guided inquiry learning model with accompanying learning media that are appropriate to students' interests. The guided inquiry learning model could make students more active in learning, so students could think critically, logically, and systematically in solving chemical problems. Further research is needed to determine the effect of the guided inquiry learning model assisted by learning media on students' chemistry learning outcomes at SMA Negeri 8 Semarang.

5. References

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