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# THE EFFECT OF THE GUIDED INQUIRY LEARNING MODEL ON SCIENCE LEARNING OUTCOMES

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## ABSTRACT

This study aims to figure out the effect of Guided Inquiry Learning model on learning outcomes of students in science learning. This research is motivated by a lot of research on the effect of Guided Inquiry Learning on student learning outcomes. This research is an ex-post facto research with descriptive data analysis. The population in this study were all articles originating from indexed journals related to the effect of Guided Inquiri Learning on student learning outcomes. The sample used was 10 Scopus indexed articles and SINTA accredited. Based on the results of the analysis of the articles conducted, it was found that the Guided Inquiry Learning model had a positive influence on learning outcomes seen from the cognitive, affective, and psychomotor domains in the form of increasing student learning outcomes and activities in science learning.



**Keywords:** Students response, The effect of guided inquiry learning model, Science

## INTRODUCTION

Education is an effort that is carried out in a planned, structured and rational manner with the aim of guiding humans in the maturation process so that they can live the demands of life according to their needs (Yatimah, 2017). In the sense that the 21st century demands the quality of human resources, which is obtained from competently regulated agencies which will produce superior quality (Wijaya, 2016). Education is very necessary in order to have the skills to learn, innovate, operate technology as well information media to ensure students are able to work, and survive by utilizing skills for daily needs ( life skills) (Redhana, 2019). The transition to the learning system requires educational institutions to modify the learning approach teacher-centered becomes learner-centered due to the development of the current curriculum (Fanny, 2019).

The field of science that deals with how to find things about nature in a

structured manner, as a process of discovery and not just mastery a collection of knowledge in the form of facts, concepts, or principles alone is the definition of Natural Sciences (IPA) (BSNP, 2006). According to Daniah (2015) Science learning asks students to be able to describe objects and events, propose questions, get concept, construct explanations of natural phenomena, test explanations in various ways and communicate them to audiences.

Interaction Among participants students and the environment is a Thing that most importantly in the science learning process with the hope of helping students understand the learning and attitudes that are contained in students. More direct and guide students in the right direction / right (Sukma, 2016). As stated by Mulyasa (2011) in this guided inquiry learning, there is guidance from the teacher, namely through the use of scientific steps.

with identification problem, In the formulation of hypotheses, students review the information, data, facts needed, test hypotheses and draw conclusions about answers through delivery by studying something that is critical, analytical and argumentative searching. In line with Ibrahim's (2007) previous opinion, there are six syntaxes in learning inquiry guided, namely (1) formulating problems, (2) A set curriculum emphasize understanding skill that and making hypotheses, (3) planning activities, (4) carrying out activities, (5) collecting Character education, understanding the material actively by students during discussion and presentation activities and having high courtesy decision. Research data, (6) take previous about and discipline are the K-13 definitions (Devi, 2020). Currently, one of the causes for the lack of learning outcomes is the use of methods learning that less varied and in line with the character of the concept discussion. The results of discussions conducted with science educators at SMP N 16 Padang, the lecture method (direct leraning) tends to be used by teachers in providing learning materials. This makes students less active and innovative in the learning process and causes students to tend to be bored during the learning process.

Guided inquiry learning model is a learning model that focuses student discovery on concepts so as to improve student learning outcomes and make these concepts longer stored in students' memories. The active role of students is more prominent than teachers through guided inquiry learning, where the role of educators the influence of the use of the Guided Inquiry learning model (guided inquiry) carried out by researchers such as Laela Ngasarotur Risfiqi Khotimah (2015) with the title of the effect of guided inquiry learning models on science learning outcomes of class VIII SMP students being able to improve student science learning outcomes on vibration and wave material with The average indicator of learning success in the experimental class is 86.33% and the control class is equal to 76.67%. Another research was also conducted by Yusminah Hala (2017) with the title of the effect of guided inquiry learning models on the activities, motivation and learning outcomes of students of class VII SMP which were proven. Effective to Upgrade

activity (36%; very high category), motivation (100%; high category) and student learning outcomes (56%; high category).

Based on the description above, the number of studies with the same variable makes researchers want To do research by title "**Model Influence Guided Inquiry Learning Against Science Learning Inquiry Learning to the result Outcomes** ".

## METHOD

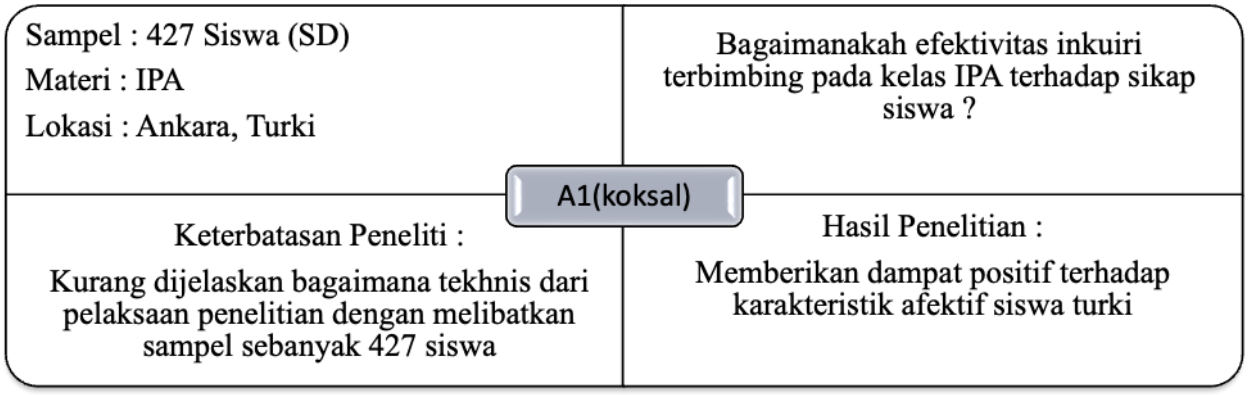
The type of research for the preparation of this thesis is ex post facto, The meaning is after the fact. ex-post facto is a research conducted on events that have occurred and are sequenced (Sugiyono, 2010). Research analysis use approach descriptive.

## RESULT AND DISCUSSION

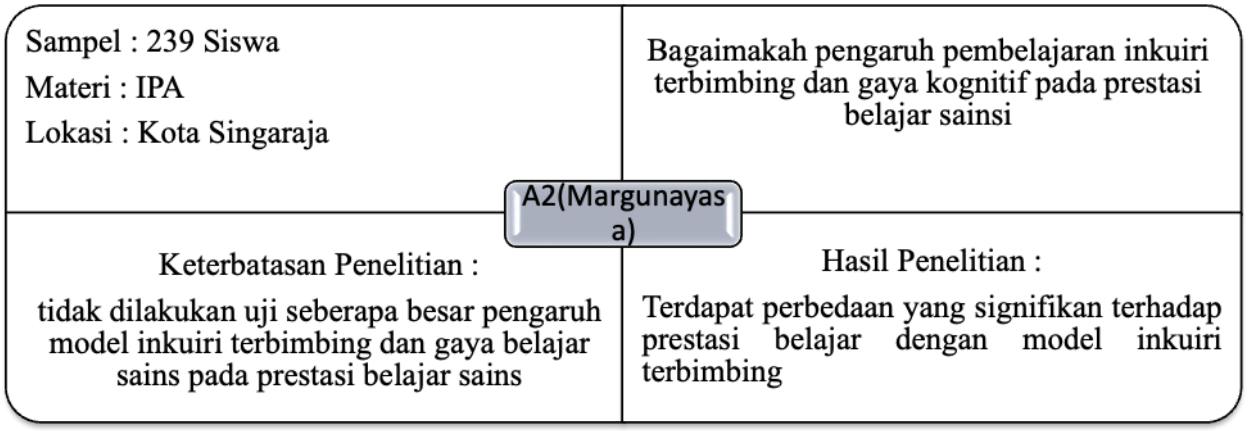
### Research result

The research aims to see the effect of the learning model Guided reduced again according to the criteria that the researcher needed so that 10 articles were obtained in accordance with the provisions of the researcher. need 10 article that obtained are articles that come from reputable journals, where 3 are indexed scopus and 7 indexed sinta. Figures 4.1 to 4.10 shows the results of data reduction which aim to facilitate the data collection process and summarize the required data.

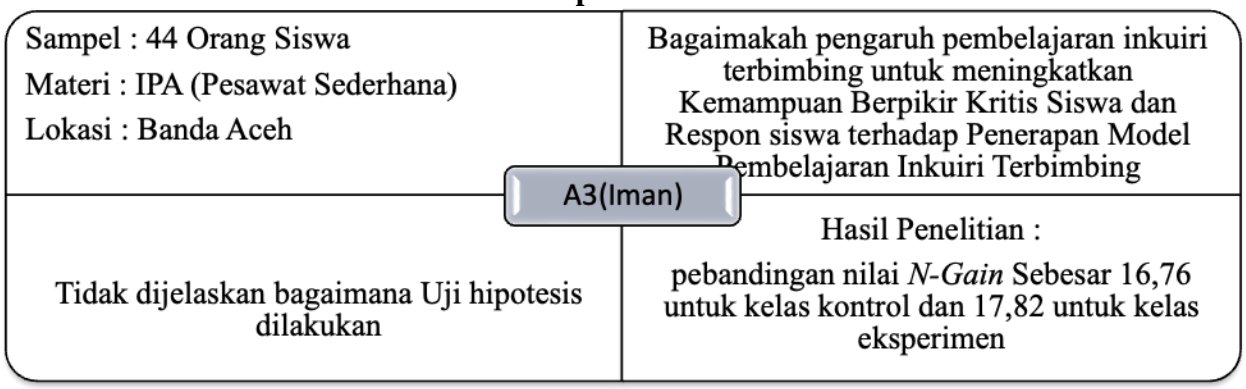
**Gambar 4.1 Rekapitulasi data analisis A1**



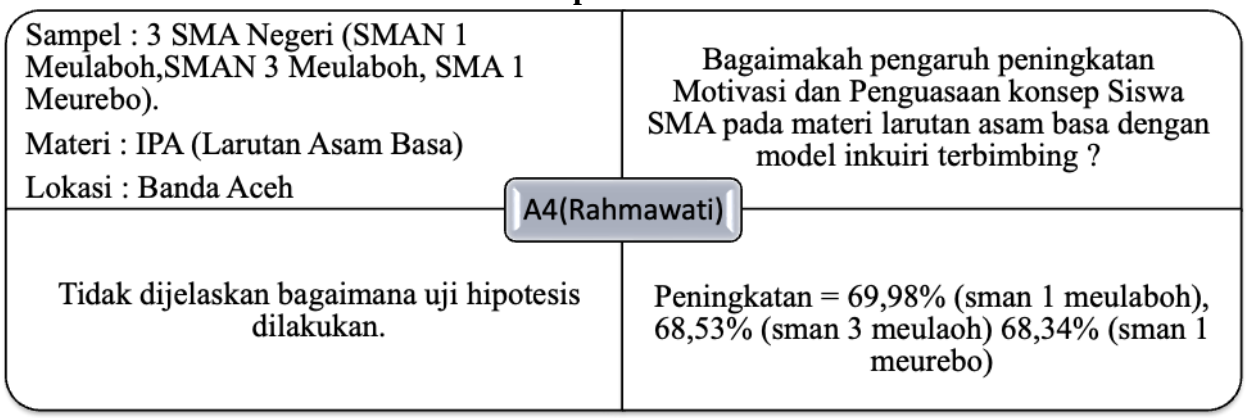

**Gambar 4.2 Rekapitulasi data Analisis A2**



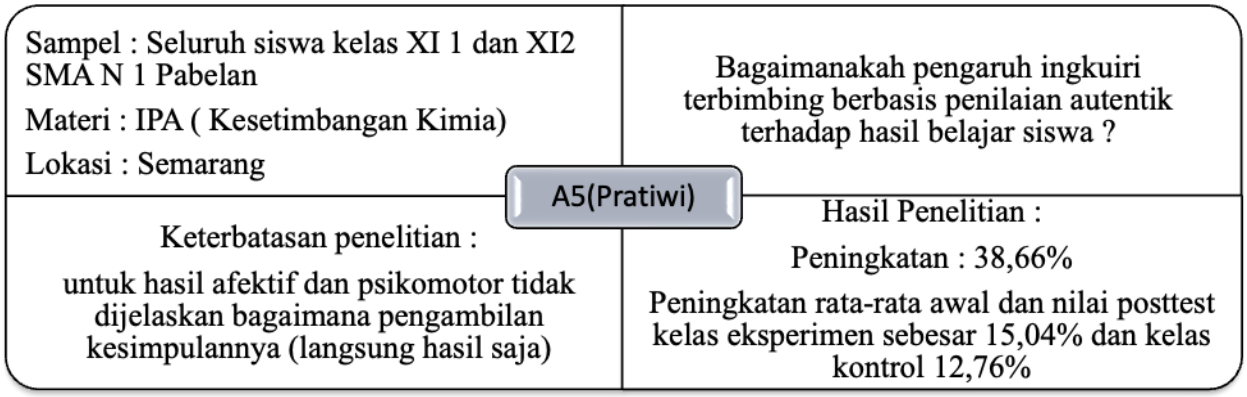
**Gambar 4.3 Rekapitulasi data Analisis A3**



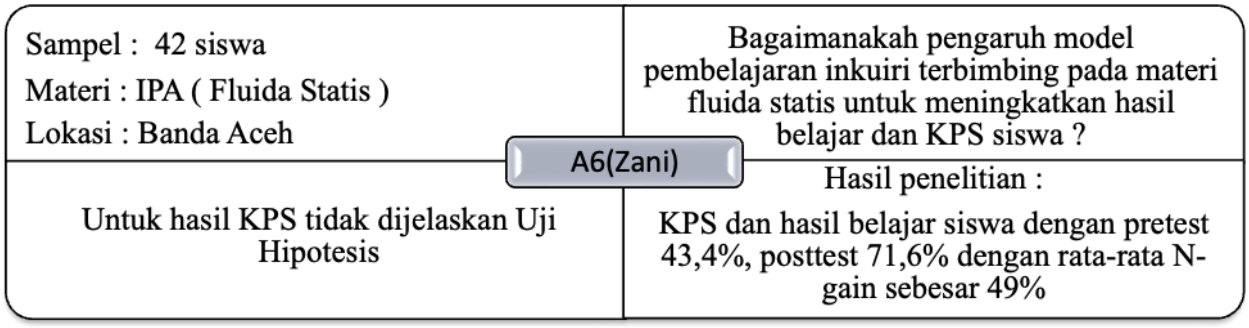

**Gambar 4.4 Rekapitulasi Data Analisis A4**



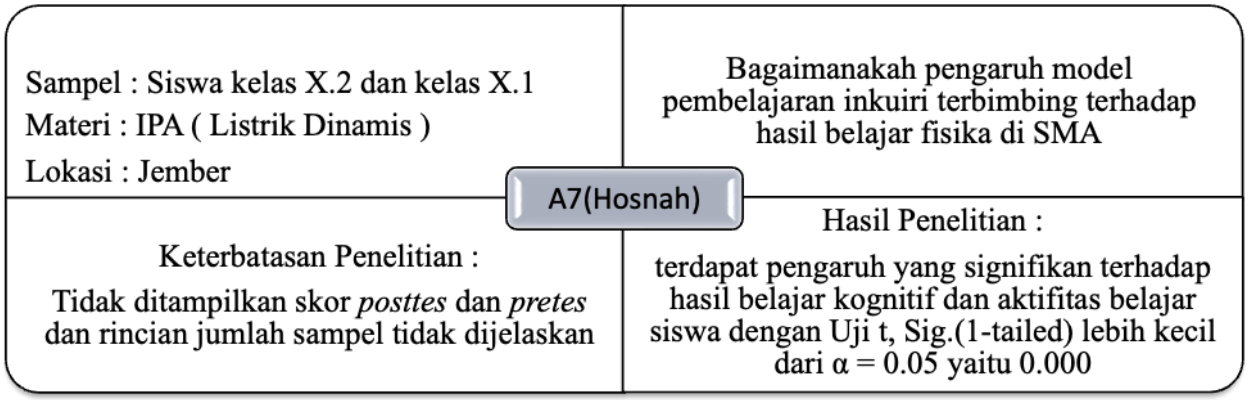

**Gambar 4.5 Rekapitulasi Data Analisis A5**



**Gambar 4.6 Rekapitulasi Data Analisis A6**

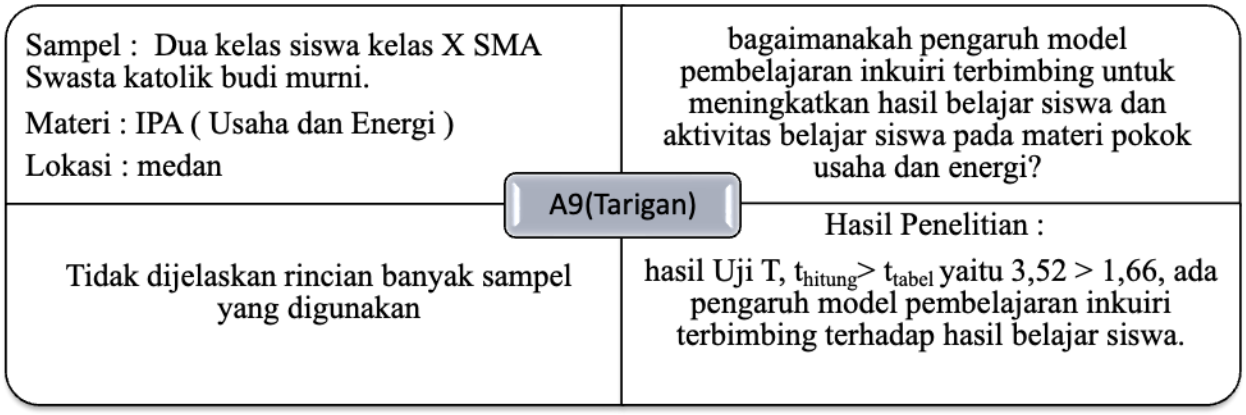



**Gambar 4.7 Rekapitulasi Data Analisis A7**




**Gamabr 4.8 rekapitulasi data analisis A8**

**Gambar 4.9 rekapitulasi data analisis A9**




**Gambar 4.10 rekapitulasi data analisis A10**

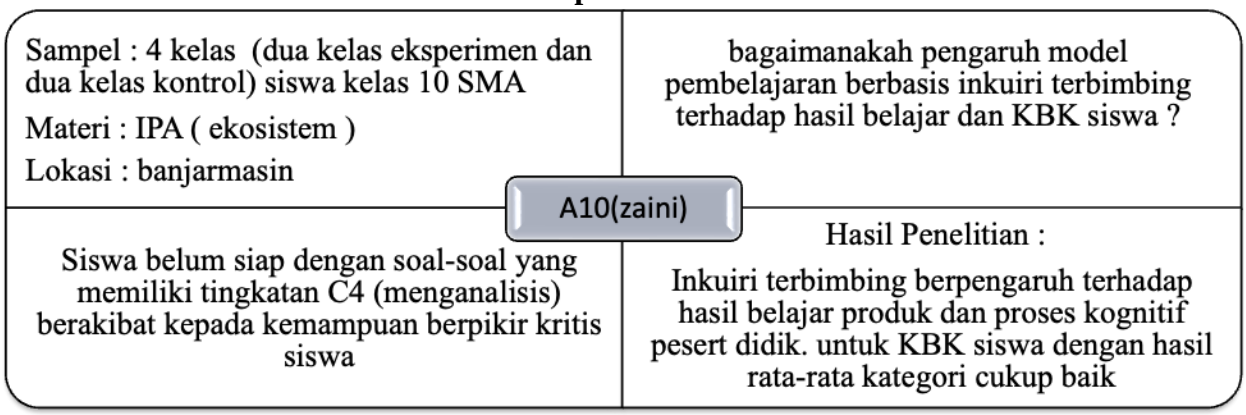



**Table 4.1 data on cognitive learning outcomes**

| code Article | Sample | Hypothesis testing | Types of Research |
|---|---|---|---|
| A2 | Experimental class (n= 132)<br>Control class (n = 107) | ANOVA result (F=13,27 and p<0,05) | Quasy experiment |
| A3 | 22 students (control class)<br>22 students (class experiment) | - | Quasy eksperiment |
| A4 | Students class XI IPA semester 2 | - | Quasy eksperiment |
| A5 | Class XI IPA 1 students (Eksperiment)<br>Class XI IPA 2 students (kontrol) | Test T, T count > table (1,728>0,622) | Quasy eksperiment |
| A6 | Class X1 MIA 1 students (22 orang siswa)<br>Class XI MIA 3 students (20 orang siswa) | Test t-count = 5,92 while t-table = 2,01<br>Tcount > Ttable | Quasy Eksperiment |

| code Article | Sample | Hypothesis testing | Types of Research |
|---|---|---|---|
| A7 | Class X 2 was the eksperimental class. Class X1 as the control class | T test, Sig.(1-tailed) is small than α = 0.05 yaitu 0.000 | Quasy Eksperiment |
| A9 | Student of class X SMA namely catholic medan (not specified number of sample) | Uji T, tcount> ttable yaitu 3,52 > 1,66 | Quasy Eksperiment |
| A10 | Student of class X SMA Negeri 1 Sungai Tabuk (not specified number of sample) | (F = 10,06; P = 0,0001). | Quasy Eksperiment |

Table 4.1 is data on learning outcomes or achievements (cognitive) students who were analyzed. According to Djamarah (1994). Measurement of cognitive, affective, and psychomotor factors is learning achievement obtained by students who are assessed using valid measuring instruments / valid.

**Table 4.2 Data on affective learning outcomes**

| Code article | Hypothesis Testing | Affective Aspect | Difference Analysis |
|---|---|---|---|
| A1 | F test, (F(1,302)=23.21 ; p<0.05 ; $\eta^2$ = 0,07 | Scientific Attitude | Significant |
| A5 | - | Attitude (student activity) | Very Good |
| A8 | Class comparison experiment control class 2 and control 1 (88.33≥81.90≥80,95) | Attitude | High |

Based on table 4.2 shows data on student learning outcomes in the affective aspect. There are four articles analyzed to see how the guided inquiry learning model influences the affective aspects of students with different subjects, namely student attitudes and student learning activities. However, the A5 article does not explain the test what hypothesis is used. From the results of the difference analysis, the four articles show enhancement that significant on the affective aspects of students using the model Guided Inquiry Learning.

**Table 4.3 Psychomotor Learning Outcomes**

| Code Article | Hypothesis Test Results | Amount Analyzed |
|---|---|---|
| A1 | F test, (F(1,302)=33.15 ; p<0.05 ; $\eta^2$ = 0,09 | 4 |
| A5 | - | |
| A6 | - | |

| | |
|---|---|
| A7 | T test, (sig.0.000 <0,05), |

Table 4.3 shows the effect of the guided inquiry learning model on learning outcomes in the psychomotor domain of students. Articles that discuss the effect of using the guided inquiry learning model are in articles with codes A1, A5, A6, A7. However, articles A5 and A6 do not explain the results of the hypothesis test used.

**Discussion**

The purpose of article analysis research aims to see how the effect of the project based learning model on cognitive, affective and psychomotor learning outcomes of students. Based on the articles that have been found, there are several articles that are in line with certain criteria for later analysis. Figures 4.1 to 4.10 show the articles analyzed and then reduced, which aim to simplify the data collection process and summarize the required data. In Figure 4.1, 4.10 is a grouping of articles based on the problem of the researcher, the limitations of the researcher and the results of the study.

The research sample used in the articles at the elementary, junior high and high school levels. Articles that use elementary students as the sample are articles with codes A1 and A2. Articles using junior high school students as samples are articles with code A3 and articles using high school students as samples, namely articles with codes A4 to A10.

Article A3 contains guided inquiry learning to improve students' critical thinking skills (CBC) by discussing simple planes. Based on the results of the post-test scores of the control and experimental classes, the scores were 455 (control) and 474 (experimental). This means that the experimental class is superior by 19 points compared to the control class. The results of the posttest value also had an effect on the N-gain value, which was 16.76 (control) and 17.82 (experimental), meaning that it had a difference of 1.06. From these results it can be seen that the CBC of students in the experimental class (guided inquiry learning model) is better than the control class (conventional learning model). The cause of the high value of the experimental class can be because students are not bored and easily absorb what is being learned because students are invited to be actively involved in class activities with the teaching methods used (Wachanga, 2012). In this guided inquiry learning method emphasizes students learning independently, providing assistance to get the concept of learning that is done by themselves. The achievement of learning objectives through this learning model includes meaning, organization, and structure of ideas or ideas, gradually so that students learn how to organize and conduct research. From this, of course this model can improve the results of students' critical thinking skills. Cano & Martinez in (Rosyida, 2016). said that the CBC is very important to empower because it can affect student cognitive learning outcomes.

Article A4 discusses increasing motivation and understanding of high school students with a guided inquiry learning model on the topic of acid-base solutions. Interestingly, from this study, the sample of this study used 3 high school schools in West Aceh. From the three schools, the guided inquiry learning model is applied. N-Gain analysis shows that, the average mastery of school concepts increases with the highest average by SMAN 1 Meulaboh 69.98%, then SMAN 3 Meulaboh 68.52% and SMAN 1 Meulaboh 68.34%. These results indicate that the mastery of the three schools' concepts has increased differently. In this study, it was not explained that the hypothesis testing was carried out. Indeed, the normality test and homogeneity test were carried out. The results of the three schools showed that it was normal and

homogeneous, but it was not explained how the hypothesis testing (parametric test) was used. However, from all the results of data analysis in the three schools, it is able to improve student learning outcomes. Another variable in this study is student learning motivation. Collecting data for student motivation using a motivation questionnaire using a Likert scale. The results of the analysis using N-gain showed that the average student motivation increased for the three schools, namely 69.98% at SMAN 1 Meulaboh, 50.48% at SMAN 3 Meulaboh and 40.52% at SMAN 1 Meurebo. Based on the recapitulation of the questionnaire results, it shows that the inquiry learning method can increase student learning motivation. but here also does not explain how hypothesis testing is carried out.

Article A2 discusses the effect of guided inquiry and cognitive learning styles on student science learning outcomes. In this study, to see students' science learning achievement using a test instrument and to see the student's learning style using the matching test instrument Familiar Figures Test (MFFT). The use of MFFT is to see the tendency of students' cognitive learning styles, whether reflective or impulsive. The results of the T-test showed that there were significant differences in science learning achievement between students who studied through guided inquiry learning models and those who studied with conventional models in those who had reflective cognitive learning styles ($t = 10.55$ and $p < 0.05$) and There is no significant difference in science learning achievement among students who use guided inquiry and conventional models who have impulsive cognitive styles ($t = 0.33$ and $p > 0.74$). Reflective learning style is a learning style by thinking more remembering structured information, reading by understanding interpreting texts and solving problems and making decisions, while impulsive learning styles students' way of learning to understand learning are often rushed to make decisions without examining concepts in depth (Santrock , 2010). When associated with science learning, inquiry learning provides students with opportunities to find concepts scientifically starting from identifying problems, formulating hypotheses, conducting and experimenting, negotiating results, drawing their own conclusions and communicating.

The article with Code A5 examines the effect of guided inquiry learning models based on authentic assessment on student learning outcomes. In this article, there was a significant increase in student cognitive outcomes, namely 38.66%. Based on the results of the posttest value of each class has increased, for the experimental class it has increased by 15.04%, while in the control class it is 12.76%. According to research by Pradita (2019), it is revealed that there is a positive influence on the use of guided inquiry learning models on student cognitive learning outcomes. In this article, an assessment of student psychomotor was also carried out, the assessment technique was carried out by making observations made by observers in the laboratory. The aspects of the assessment carried out were (1) readiness, (2) preparation of tools and materials, (3) skills in using tools and taking solutions, (4) accuracy in carrying out procedures, (5) filling in observation tables, (6) cooperation, (7) Time efficiency, (8) cleanliness and responsibility. From the results of the analysis in the experimental class, it was found that the very good category was 96% and the good category was 4%, the control class was classified as very good by about 52% and good by 48%. Based on this value, the skill aspect of the experimental class is better than the control class, but here it is not explained how the hypothesis testing is carried out. In this A5 article, an assessment of the affective

aspects of students was also carried out by obtaining 76% excellent categories and 24% categories for the experimental class and 36% excellent, 60% good and 4% quite good (control). From this it shows the affective learning outcomes of the experimental class are better than the control class.

Another article that also discusses the guided inquiry learning model is an article with code A6. The control variables in this study were students' learning achievement and science process skills (KPS). In this article, learning outcomes have increased in the cognitive domain by 4%. For comparison, the N-gain value in the control class is 42% (conventional) while in the experimental class it is 50% (guided inquiry). The results of the T test show the results of t-hi> t-tab with a value of 5.92> 2.01, this shows a significant explanation of the use of the guided inquiry learning model on student learning outcomes in the cognitive domain. Based on the results of the observation of the implementation of guided inquiry, most of the students were prepared not to care about the learning process in group work with their friends. The inquiry learning model demands an active role of students in the learning process because students are asked to find their own learning concepts through the teacher as the facilitator. To overcome this, the researcher in this article facilitates students with a hand-out in which there is a concept of discussion and student worksheet which is carried out in groups.

One of the other control variables in the article coded A6 is the students' Science Process Skills. For the assessment of student KPS there are 8 indicators that are used as an assessment, the results of the analysis indicate that KPS has increased the average KPS score before being given the treatment (experiment) by 63.50% and after treatment it is 71.59% with the conclusion that KPS is taught by inquiry guided gives good results. This is as stated by Ambarsari (2013), learning with this model has a significant effect on student KPS.

In the article with code A7 discusses the use of guided inquiry learning models for learning outcomes in high school physics. In this article, the control variable is the learning outcome. The results of the T test to test the significance of learning outcomes (cognitive) show results with a T value, (sig. 0.00 <0.05). This means that there is a significant influence on the results of using guided inquiry on student learning outcomes in the cognitive domain. Another control variable examined in this article is the student's psychomotor domain, which is about student learning activities. In this article, the indicators of learning activities observed are: visual activities; motor activities; writing activities; oral activities; listing activities; emotional activities. Based on the results of the analysis using the T test, the t test value was obtained (sig.0.000 <0.05). Which means that the guided inquiry learning model has a significant effect on student learning activities. based on the syntax of guided inquiry learning models that emphasize student activity, this of course has a positive impact on student activity. This is in line with the research conducted by the daughter (2016) that the guided inquiry model can increase the learning activities of class X as evidenced by the increase in the average value of student learning activities by 87.94%.

Another article that is also in line with article A7 is Article A9, which discusses the guided inquiry learning model towards improving student learning outcomes and learning activities. in this article there was an increase of 4.23% on student learning outcomes in the cognitive domain. The t test was conducted to determine differences in student learning outcomes, from the t test results obtained t count> t table, namely

3.52> 1.66 which means that there is a significant effect on the cognitive realm with guided inquiry. This is because the guided inquiry learning process has the advantage that students are directly involved in learning so that it motivates students to learn, students are also given the opportunity to directly participate actively where the teacher acts as a facilitator for students (Partono, 2013). Another control variable discussed in this article is student learning activities. The technique used in assessing student learning activities in this article is observation. Observations were made in meetings by observers, it was found that the average percentage of student learning activities was 80% which means active. The increase in student learning activities is due to getting used to using the guided inquiry model, students have been able to adapt to how to learn using this model, there is motivation that provides easy understanding by students so that it attracts learning (Rachman, 2012).

Another article that also discusses the influence of inquiry learning models on student cognitive outcomes is A10. In this article. For the cognitive domain, this article divides the assessment into cognitive product learning outcomes and cognitive process learning outcomes. To see how significant inquiry-based learning is on cognitive product outcomes, a covariance analysis was carried out with the results (F = 10.06; P = 0.0001) meaning that there was a significant effect. However, the increase was only 17%. This happens because the questions in the cognitive field have led to C4 (analyzing). However, in the study sample they were not ready to think at a higher cognitive level, the sample could only handle questions with levels C1 (remembering) and C2 (understanding). Another thing that is the cause is student learning facilities, students do not fully have text books. This causes students to have limited opportunities to learn the material. As stated by Jannah (2017), the fulfillment of learning facilities, the higher the level of learning achievement, meaning that an increase in the level of learning facilities is accompanied by an increase in the level of learning achievement. For learning outcomes in the cognitive process showed significant results with the value of covariance analysis (F = 20.63; P = 0.0001).

Furthermore, article A1 is an article with control variables regarding the affective and psychomotor aspects of students. The univariate test results showed a moderate category towards the attitude aspect (F (1.302) = 23.21; p <0.05; η2 = 0.07. Data collection using a questionnaire was carried out to assess aspects of attitudes towards science. Guided inquiry in this research is that previously students only used teacher-centered instructional techniques, the teacher as a moderator not as a facilitator, with the presence of a guided inquiry learning model it seemed to be effective in having a positive impact on student attitudes. Guided inquiry is a transition between activities centered on teacher and student-centered. In this study also conducted an assessment of the psychomotor aspects of students, namely science process skills, the univariate test results showed (F (1.302) = 33.15; p <0.05; η2 = 0.09. This shows that guided inquiry provides moderate impact on psychomotor outcomes, namely skills n process science.

One of the articles that also discusses the affective results of students with the guided inquiry learning model is A8. This article uses 3 classes at the time of the research, namely the experimental class, the replication class 1 and the replication class 2. The replication class also uses the same treatment as the experimental class, namely the guided inquiry model in the learning process. The results of the N-Gain pretest and posttest were from three classes, namely

the experimental class with the moderate increase category (0.66), the replication class 1 with the high category (0.72) and the replication class 2 with the high category (0.76). The indicators of attitude aspects assessed in this study are interest in science, evaluation of scientific inquiry questions and mental awareness. In this study also conducted an analysis of student responses to the use of guided inquiry learning models. The results showed that the experimental class was 85.92% in the very good category. This can happen because students like to solve problems through scientific investigation activities with the inquiry learning method, because students are given the opportunity to solve problems according to their respective abilities. For replication class 1, the average response rate was 81.00% (very good). In class 2 replication get an average of 80.50% (good).

Based on the articles that researchers have obtained, it shows that the guided inquiry learning learning model has a positive impact on the three domains of student learning outcomes. The results contained in the articles analyzed by researchers are in line with the theories found that the Guided Inquiry model provides benefits for students such as increasing learning achievement and in the steps of learning guided inquiry makes students active in the learning process.

## CONCLUSION

Based on the analysis of the articles that the researchers have done, it can be concluded that the guided inquiry learning model has a significant impact on student learning outcomes, both cognitive aspects (knowledge), affective aspects (attitudes), and psychomotor aspects (skills).

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