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### RESEARCH ARTICLE

#### SCIENCE PROBLEM SOLVING SKILL IN GUIDED INQUIRY LEARNING AT SCHOOL OF COFFEE PLANTATION SCHOOL AREA IN JEMBER, INDONESIA.

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Problem solving skill, guided inquiry, science, significant.

#### Abstract

This research is a comparative research which aims to examine the effect of student problem solving skills about coffee which is one of the locals (superior commodity) of the local population towards the learning with guided inquiry model. Data collection was done by observation of learning on problem solving skills during group discussion. The number of respondents in this research is 48 junior high school students in Coffee plantation area. This research instrument used problem solving skill instrument covering some aspects such as: understanding problem, making plan, executing plan, and re-checking answer. The data obtained were analyzed by qualitative and quantitative descriptive analysis and Mannova (*Multivariate Analysis of variance*) test with SPSS version 24 for windows. The result of data analysis indicated that there was significant influence of using guided inquiry model with problem solving skill.

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#### Introduction:-

The globalization era today demands the creation of a modern society. Education is a major factor that plays an important role in creating the progress of a nation to shape modern society. The characteristics of modern society are those who can think quickly, and precisely in any case, including in terms of solving problems in everyday life. Efforts to realize modern society who can solve problems in everyday life is done by improving the quality of education, so that future generations such as students can adapt and adapt to the development of an increasingly advanced era. One of the basic skills which can support the realization of modern society is problem solving skills (Cukurova, 2017). In line with the opinion (Memnun et al, 2012) which suggests that the main purpose and priority of education today is to train individuals in overcoming problems and competition faced during their lives. It shows that problem solving skills play an important role in Education and life.

Problem solving skills are one's basic ability to solve problems, involving critical, logical and systematic thinking. Problem solving skills are a method of thinking based on the theoretical understanding which they have for interpreting and testing the problem solving chosen by Oğuzkan (1993) in Güçlü (2003) in Tok (2013). Based on these statements then, problem solving skills can be used in everyday life (Rich et al, 2014). It is because, problem solving skills can hone the creativity of the individual in determining how to solve problems, encountered with appropriate and quick handling. The criteria for problem solving skills contain four indicators: Understand the problem or make a problem, Make a plan or plan, Carry out our plan or Look at the completed solution or review the answer (Polya, 1973).

One of improving quality factors of learning is paying attention to the learning process undertaken. It is because the learning process in schools includes several parts which are used. Selection of learning sections is an important thing in improving the quality of learning in accordance with the desired learning objectives. One part of the learning process that plays an important role during learning is the learning model. The learning model is the guideline for the implementation of the learning process that fits the purpose. The suitability of the chosen learning model, determines the achievement of the desired learning objectives. A learning model that can cover problem-solving skills is Guided inquiry learning. Guided inquiry learning is one of learning that provides an opportunity for students to find knowledge independently with teacher guidance or direction (Bell, 2005). The hope that the knowledge gained will be more meaningful and the creativity of thinking about the actions that students have to do can be honed to find alternative solutions or problem solving steps in finding knowledge. In other words, Guided inquiry learning is an open learning model that emphasizes the provision of experience directly to students. The direct experience is given by teacher guidance or direction. The function of guidance or teacher direction in question is to control the knowledge that should be obtained by students. Guided inquiry learning has 6 steps (ilmilah) with teacher guidance that is problem identification, statement preparation of research subject, data collection, data interpretation, conclusion development and replication (Orlich, 1988). Excess guided inquiry learning model, as follows:

1. Emphasize the development of cognitive, affective and psychomotor aspects in a balanced way, so that learning with this model is more meaningful.
2. Provide learners with practice space to learn to solve problems and build (find) knowledge based on scientific steps.
3. In accordance with the development of modern learning psychology because it relates to the experience that has been received previously.

Teacher guidance can be a matter of problems that can train students to whet their problem-solving skills.

Science is a subject which relateds with nature and not only learns abstract concepts, but also includes the nature of science, scientific practice, scientific inquiry, and the relationship of science, technology, and society (Hanson, 2009). The characteristics of the science cause science to be difficult to learn and requiring high thinking skills to understand them (Kean and Middlecamp, 1985). Therefore, science can form qualified individuals. One of the science materials related to everyday life and abstract is the inheritance of nature. In the material of inheritance the nature is discussed about the intersection of individuals related to gametes and is abstract because it cannot be seen by visible eyes.

Jember, is one of regency which has a potential environment for the cultivation of coffee crops. That great potential has some coffee productivity issues. Therefore, increased production of coffee through the inheritance of superior properties is consuct. One of the smallest ways which can be done is with an educative approach that utilizes the local environment of students (future generations) on good and true cultivation techniques to produce superior coffee products in Jember.

Based on the description of learning Indonesia and the surrounding environment, it is necessary to have a research which examines Science Problem Solving Skill in Guided Inquiry Learning at School of Coffee Plantation School Area in Jember, Indonesia.

#### **Research Method:-**

This study happens to be a comparative research. Comparative research is conducted to determine the effect of students' problem solving skill. Reseach object determination was engaging purposive sampling, means reseach location was deliberately selected due to the certain objectives. This study was carried out towards 48 middle school students at coffee plantation.

Learning model developed was being implemented through Pretest–Posttest non Equivalen Group Design. Trial design can be illustrated as follows:

$$O_1 - X - O_2$$

Details:

- O<sub>1</sub> : pre test results  
 O<sub>2</sub> : post test results  
 X : threatment (Wiersma, 1995).

This research was conducted in the middle school of coffee plantation area of Jember, Indonesia towards 48 respondents. Instruments utilized were problem solving skill observation sheets which comprised of 4 aspects namely: Understand the problem, plan establishment, plan implementation, and answers review. Problem solving assessment was obtained by observer's marking within learning process using problem solving indicators that had been developed. Each stage of problem solving skill measured has maximum score of 4, then overall score was accumulated with a certain formula as follows:

$$\text{Score} = \frac{\text{obtained score}}{\text{total score}} \times 100$$

Obtained score then converted into 0-100 scale with category (0-20) not suitable, (21-40) less suitable, (41-60) adequate suitable, (61-80) suitable, (81-100) very suitable. Problem solving skill data analysis engaged descriptive analysis of qualitative and quantitative of Manova (Multivariate Analysis of Variance) with assistance of SPSS version 24 for windows.

### Findings and Discussion:-

Problem solving score was employed to assess problem completion within learning process upon meeting 1 and 2. Recapitulation of problem solving skill assessment of meeting 1 and 2 is presented in Table 1.

**Table 1:-** Recapitulation of problem solving skill assessment of meeting 1 and 2

Aspek	Pertemuan 1 (kategori)	Pertemuan 2 (kategori)
Understand the problem	38 (less suitable)	61 (suitable)
Make a plan	43 (adequate suitable)	68 (suitable)
Carry out our plan	37 (less suitable)	65 (suitable)
Look back at the completed	30 (less suitable)	55 (adequate suitable)

According to the table above indicates that problem solving skill for understand the problem aspect of problem solving skill meeting 1 and 2 increases from less suitable to suitable category. Plan establishment aspect meeting 1 and 2 shows increase of problem solving skill, originally adequate suitable category to be suitable. Plan implementation aspect of problem solving skill meeting 1 and 2 indicates rise from less suitable to suitable category and answers review aspect meeting 1 and 2 also shows upsurge from less suitable category to adequate suitable.

Statistic analysis utilized was Multivariate Analysis of Variance (MANOVA). This formula was conducted to examine the effect of each aspect upon problem solving skill measured. Statistic analysis results of Multivariate Analysis of Variance can be observed on Table 2.

**Table 2:-** Multivariate Analysis of variance results

Multivariate Tests <sup>a</sup>								
Effect		Value	F	Hypothesis df	Error df	Sig.	Noncent. Parameter	Observed Power <sup>c</sup>
Pertemuan	Pillai's Trace	.335	11.453 <sup>b</sup>	4.000	91.000	.000	45.813	1.000
	Wilks' Lambda	.665	11.453 <sup>b</sup>	4.000	91.000	.000	45.813	1.000
	Hotelling's Trace	.503	11.453 <sup>b</sup>	4.000	91.000	.000	45.813	1.000
	Roy's Largest Root	.503	11.453 <sup>b</sup>	4.000	91.000	.000	45.813	1.000
a. Design: Intercept + Pertemuan								
b. Exact statistic								
c. Computed using alpha = .05								

According to table shows above can be noticed that sig. 0,0000 value shows  $\leq 0,05$ , thus it means there is a significant effect between independent and dependent variables. In order to determine the entire effect of variable upon one group, thus it had to carry out test of between-subject effect. Test of between-subject-effect can be seen in Table 3.

**Table 3:-**Test of between-subject-effect results

Tests of Between-Subjects Effects								
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Noncent. Parameter	Observed Power <sup>e</sup>
Pertemuan	Understan the problem	18.375	1	18.375	30.170	.000	30.170	1.000
	Make a plan	22.042	1	22.042	33.804	.000	33.804	1.000
	Carry out our plan	28.167	1	28.167	34.914	.000	34.914	1.000
	Look back at the completed	23.010	1	23.010	24.963	.000	24.963	.999
a. R Squared = .243 (Adjusted R Squared = .235)								
b. R Squared = .265 (Adjusted R Squared = .257)								
c. R Squared = .271 (Adjusted R Squared = .263)								
d. R Squared = .210 (Adjusted R Squared = .201)								
e. Computed using alpha = .05								

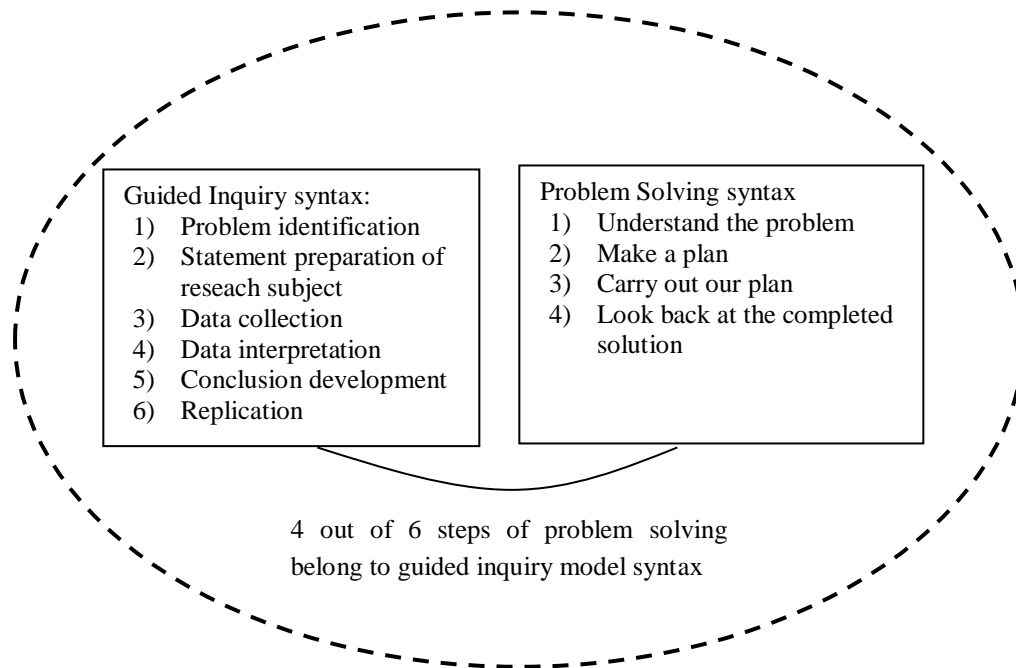
Based on table above, we may figure the significance relation between meetings and understand the problem aspect is 0,000; significance towards plan establishment is 0,00; significance of plan implementation is 0,00 and significance of answers review is also 0,00

### Discussion:-

Based on analysis results obtained, viewed from average score of students' problem solving skill in coffee plantation area, understand the problem, plan establishment, plan implementation, and answers review aspect in meeting 1 and 2 depict the upsurge of problem solving skill. This incline shows that guided inquiry learning affects students problem solving ability. Johnson & Johnson (in Suratno, 2017) argue that assessment can be defined as significant true if learning combination is explicitly measures learning objectives. This can be clarified upon students problem solving skill using Multivariate Analysis of variance analysis of SPSS 24 of windows. According to the analysis results, every significance aspect used test of between-subject effect SPSS version 24 for windows can be determined that all dependent variables tested were obtaining sig. 0.000 value, in which that means <0,05, thereby can be concluded as follows:

1. Meetings affected understand the problem aspect score significantly with P value 0,000, thus H0 rejected and H1 accepted.
2. Meetings affected plan establishment aspect score significantly with P Value 0,000, means H0 rejected and H1 accepted.
3. Meetings affected plan implementation aspect score significantly with P Value 0,000, means H0 rejected and H1 accepted.
4. Meetings affected answers review aspect score significantly with P Value 0,000, means H0 rejected and H1 accepted.

These results were due to guided inquiry learning syntax, which are comprised of problem identification, statement preparation of reseach subject, data collection, data interpretation, conclusion development, and replication which in line with problem solving steps as follows, understand the problem, plan establishment, plan implementation, and answers review. This relationship between guided inquiry learning and problem solving skill can be observed on Figure 1.



**Figure 1:-**Relation between guided inquiry learning syntax, STEM and problem solving skill

Thus, it can be seen that 4 out of 6 steps of problem solving belong to guided inquiry model syntax. These 6 steps of guided inquiry learning enhanced students to understand problem solving pattern. This results are supported by Piaget's that guided inquiry learning could assist students to accomodate and assimilate concepts that being examined, therefore knowlegde construction process may occur more decent.

### **Conclusion:-**

Based on the research results and discussion above, there was conclusion made, that is guided inquiry learning affects problem solving skill significantly. Thereby, guided inquiry learning model could possibly encourage students skill in problem solving at coffee plantation area.

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