Effect Scientific Approach with Assistance of Student Worksheets based PBL towards Students' Biology Affective Competence in Bacterial Learning Material

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Abstract. Purpose this research to know effect scientific approach with assistance of student worksheets based PBL towards students' Biology affective competence. This research is quasi-experiment using randomized control posted only design. Students class X is population. Purposive sampling is the technique, X IPA 4 (experiment) while X IPA 3 (control). The observation sheet was used as an instrument. Mann Whitney U test as data analysis. The results showed that there was a significant difference between the biological affective competence of experimental and control students, namely the biological affective competence of experimental class students was higher than the control class. The average experimental score 3.35 (B) and control 2.95 (C). The conclusion of this research is scientific approach with assistance of student worksheet based PBL on students enable them to increase their affective competence.

1. Introduction
Education is needed as community because of its role in people’s lives. The quality of education can be seen from the teaching and learning process [14]. The quality of education in Indonesia is very low. Teacher is less creative in exploring the potential of students is one of the factors that influence. In 2013 curriculum requires students to be active in learning.

The approach used in 2013 curriculum is a scientific approach consisting of 5 activities; observation, asking questions, gathering information, associating and communicating [11,12]. Hosnan in [1] scientific approach serves to improve students' knowledge in problem solving, train them to communicate, and develop their character.

Teaching is someone's attempt to make others learn, and to create learning phenomena [16]. Teaching and learning is an effort to share teaching material information from teachers to students [31]. The process of individuals to change behavior in meeting their needs is called teaching and learning [33].

Biology learning aims to develop student competencies through discovery and hands-on experience [4, 21, 22]. The teacher's role is to provide material and make it easier for students to understand the concepts of independent study and also be able to link each concept together [9].

The observation and interview, it is known that teacher has not fully implemented scientific approach in learning process because of incompatibility of time and learning materials. Beside that, while group discussion is going, some students do not care about task of their group, do not participate in discussion, and give responsibility to finish the task to another group member who is active and smart. Beside that, students still depend on teacher's explanation. If it is seen from assessment done by teacher in SMAN 1 Pasaman, it still focuses only on cognitive aspect' while affective aspect has not
been done by teacher yet. Consequently, students' learning competence is still low. The low of students' involvement in learning process will influence learning quality \cite{7}.

To overcome the problems above, it needs to implement a learning model which involves active learning in order to give opportunity for students to participate in learning process and develop their affective. So, teacher needs to implement an appropriate learning model and suitable with scientific approach in order that students become more active in learning process and understand learning materials. It is in line with \cite{30} who state that to make students active in learning process, it needs a learning model which can be activate them in learning. The model is known as Active Learning model.

The active learning model is a learning model which involves students to think actively \cite{11, 13, 15}. Active learning is an instructional model which involves students in learning process to reach satisfactory achievements \cite{5, 8, 3, 25, 10, 18}. PBL is a learning model which emphasizes on student-centered based learning, in which it can make students to do observation and develop their affective in order to find a solution of a problem \cite{2, 19}.

In addition, Problem Based Learning can be combined with learning media. One of them is LKPD based PBL which can be used to orient students to a certain problem. According to Indonesian Ministry of Education in \cite{6}, the use of LKPD is more useful than the use of books. Based on this background, the writing of this article aims to determine the effect scientific approach with assistance of student worksheets based PBL towards students' Biology affective competence\cite{9}.

2. Method
Quasi-experimental research using randomized control posted only design. Class X IPA students of SMAN 1 Pasaman are the population in this study. Samples were taken using Purposive Sampling technique. X IPA 4 as experimental and X IPA 3 as control class. Instrument used observation sheet.

2.1 Data Analizing
The Mann Whitney U test was used for data analysis.
2.1.1 Hypothesis Test. If Sig value > 0.05 so $H_0$ is accepted and $H_1$ rejected and vice versa.

3. Results
Data obtained in the research are students’ affective competence in both experiment and control classes. To explain Table 1, it can view in Figure 1.

| No | Class    | Average Score | Predicate |
|----|----------|---------------|-----------|
| 1  | Experiment | 3.35          | B         |
| 2  | Control   | 2.95          | C         |

Figure 1. Students Score
| Hypothesis | Class       | Sig. | $\alpha$ | Result     |
|------------|-------------|------|----------|------------|
| Hypothesis | Experiment  | 0.000| 0.05     | $H_0$ rejected |

### 4. Discussion

Based on Figure 1 and Table 1 the average affective level of students in the experimental class is higher than the control that are 3.35 (good): 2.95 (enough). Table 2 describes the results of hypothesis testing. The purpose of this hypothesis is to determine the affective competence of students using a scientific approach with the help of PBL-based worksheets. The results of Table 2 explain the affective competence of students Sig 0.000 with a real degree ($\alpha = 0.05$). Which means the Significance value < 0.05 so that $H_0$ is rejected. It can be concluded that there is significant effect scientific approach with assistance of student worksheets based-PBL on student’s affective competency. Most of students in experimental class can work together in group discussion, appreciate others' opinions, show high curiosity, be enthusiastic, be active in group discussion, and share their ideas.

Meanwhile, overall, students' affective competence in control class is in “enough” category. Most of students can work together in group discussion, show high curiosity, be enthusiastic, be active in group discussion. Yet, they cannot appreciate someone's opinion which is different from theirs and there are some students who keep silent in group discussion. PBL based student worksheet gives positive effect and improvement on students' affective competence in learning Biology. It is because Active Learning in form of scientific approach assisted by PBL based student worksheet facilitates students in learning process.

In addition, it requires students to be active in learning process by constructing concepts, laws or principles and involves students' thinking process. It is in line with [32,24,27,28,29] who states that scientific approach is the golden point of cognitive, affective and psychomotor competence development. It can develop team work and social skills. In this approach, students are expected to be able to accept others’ opinions and increase their motivation in learning.

From the explanation above PBL based student worksheet can maximize students' affective competence. It gives different atmosphere in learning process because it demands students to be responsible and think critically in asking questions and giving response to them. Similar opinion is proposed by [20] that character education can internalize good behaviors so that students can understand whether it is good or not to do. Learning by using scientific approach involve students actively in learning process so that their affective competence can be better developed. It is in line with [17,16] who states that scientific approach can improve students’ affective competence and character because they understand, internalize and actualize it through learning process so that it will be more meaningful.

Active Learning in form of scientific approach assisted by PBL based student worksheet can make students active in observing, asking and answering questions, experimenting, collecting information, reasoning and communicating activities. In observing stage, they can raise their curiosity to find facts that there is a relation between observed objects to learning material. Furthermore, it is a sensing process activity. It is in line with [23], who proposes that students can build their conceptual understanding from what they see and experience. Besides that, learning which involves senses, physic and intellectual is an active learning process.

### 5. Conclusion

Implementing scientific approach with assistance of students worksheet based PBL affects significantly because it can improve their Biology affective competence in Bacterial Learning Material.

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