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The Effect of the Probing-Prompting Learning Model Assisted by Portfolio Assessment on Science Learning Outcomes of 3rd Grade Students

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This study aims to determine the effect of the Probing-Prompting learning model assisted by the portfolio assessment of science learning outcomes of third grade students in the elementary school in cluster XV Buleleng subdistrict in the 2018/2019 academic year. This type of research is quasi-experimental with a non-equivalent post-test only control group design. The population of this study was all third grade students of elementary school in Cluster XV, Buleleng subdistrict. The study sample consisted of two classes, namely, SDN 2 Anturan as the experimental class and SDN 3 Anturan as the control class. The method of data collection was done by an objective test method . The data obtained was analysed in two stages, namely, descriptive statistical analysis and inferential statistical analysis (t-test). Based on the results of the data analysis, the researchers found a significant difference in science learning outcomes between groups of students who were taught using the Probing-Prompting learning model assisted by portfolio assessment with groups of students who were taught using conventional learning that is obtained tcount = 8.89> t table = 2.00. Based on the explanation above, it can be concluded that learning using the Probing-Prompting learning model assisted by portfolio assessment influences the science learning outcomes of third grade students of elementary school in Cluster XV, Buleleng subdistrict.

Key words: *Science Learning Outcomes, Probing-Prompting, Portfolio Assessment.*

Introduction

Natural Sciences is one of the main subjects in the education curriculum in Indonesia which is taught in the elementary school level. "Natural" relates to nature, while "science" means knowledge (Bundu, 2006). Thus, Natural Science means knowledge that is related to nature. Science is a human effort to understand the universe through observation, the use of procedures, and explained by reasoning to get a conclusion (Nurdin, 2015). Science is a theoretical knowledge, based on observations and experiments on natural phenomena (Haswan & Nofri, 2017). Science is a knowledge that studies events occurring in nature that are closely related to living things (Mahendra, 2017). From the explanation of the nature of science above, it can be understood that science is a knowledge that studies natural phenomena through direct experience, namely, observation, discussion, and simple investigation to obtain a science concept.

Science learning can be classified into three parts, namely, natural science as a product, process, and attitude. 1) Science learning as a product is a collection of research results that scientists have conducted and have formed concepts that have been studied as empirical and analytical activities in the form of facts, laws, and science theories 2) Science learning as a process explores and understands natural knowledge in the form of skills from scientific process; and 3) Science learning as an attitude, namely, scientific attitudes that must be developed in science learning such as curiosity, cooperation, hopeful, introspection, responsibility, and discipline (Nurdin, 2015). Science learning emphasizes more on scientific inquiry, which is the direct giving of learning experiences through the use and development of scientific process and attitude skills (Astari *et al.*, 2018). This means that science learning is learning based on principles and processes that can foster students' scientific attitudes towards science concepts.

Science is one of the important subjects that is taught in elementary school. So far, science subjects in elementary school is in the low category. The results of the 2015 Program for International Student Assessment (PISA) study showed that Indonesia was ranked 62nd out of 72 countries that took the PISA test (Fathani, 2016). At present, there has been an increase from the previous rank, which was from 382 points in 2012 to 403 points in 2015. The results of the 2015 survey showed a significant increase in educational attainment in Indonesia, up to 22.1 points. These results placed Indonesia in fourth place in terms of increasing students' achievement, compared to the results of previous surveys in 2012 from 72 countries that took the PISA test. Through the ranking obtained in accordance with the 2015 PISA test, it appeared that science education in Indonesia is in the low category.

Based on the facts in the field after observations conducted on the 10th – 11th of January 2019 in Cluster XV, Buleleng Subdistrict, it appeared that the problems found were: 1) students'

learning resources were only in the form of information from the teacher, 2) students did not pay attention and lacked understanding of the material explained by the teacher, it could be seen when the teacher gave questions related to teaching material, students were not able to answer, 3) the teacher did not provide opportunities for all students to answer questions, 4) there was a lack of use of media, so learning was not attractive to students, and 5) the learning assessment done by the teachers was only in the form of tests and assignments without follow-up in the form of feedback, therefore students did not know the progress of their learning.

Interviews were also conducted with the 3rd grade teachers in Buleleng Subdistrict Cluster XV on the 10th – 11th of January 2019. The results of interviews were: 1) in delivering the material, the teachers did the talking mostly, 2) the teachers only used textbooks because there were limited books to support the learning, 3) the teacher did not use the media because of the limited media available in the school, 4) the teachers had difficulty in inviting the students to participate actively in learning process, and 5) the teachers had never used the portfolio in assessing student learning outcomes.

Completing the results of observations and interviews, a document study of students' learning outcomes in science subjects in Cluster XV Elementary Schools in Buleleng Subdistrict was carried out. From the results of the 3rd grade students' science final exam for each elementary school Cluster XV in Buleleng Subdistrict, it was found that out of 189 students, there were 146 students who scored below the average score. This indicated that the average score of the science final exam of the third-grade students in the first semester was still low. The findings obtained from observations, interviews, and document studies are needed to find a solution in order to overcome these problems. One solution is to apply the Probing-Prompting learning model. Probing-Prompting learning models are included in cooperative learning models (Suyanto, 2009).The Cooperative learning is a learning strategy with a number of students as members of small groups with different levels of ability in learning (Diartini and Ratnawuri, 2017). The Cooperative learning model is "group learning activities to work together to help construct concepts, solve problems or incur" (Yensy, 2012: 26). Through cooperative learning, students can exchange information, express opinions, and receive suggestions or obtain feedback from others.

The Probing-Prompting learning model is learning by the way the teacher presents a series of questions that are guided, so the students can process their thoughts and relate it with the knowledge they have just learned (Diartini & Ratnawuri, 2017). Probing-Prompting Learning provides opportunities for students to practice their abilities in solving problems, completing answers, thinking critically, and being active in the learning process to improve learning outcomes (Fauziyah, 2017; Suryasa *et al.,* 2019; Suwija *et al.,* 2019). Learning by giving questions can practice the students' ability to solve problems, think critically, increase motivation, and increase student activities in learning. This is supported by the results of

research conducted by Susanti (2017) which showed that the Probing-Prompting learning model is able to improve students' critical thinking skills. In addition, the results of Novena and Kriswandani's (2018) research showed that the use of the Probing-Prompting learning model in science subjects helps students to actively think and can discuss different opinions.

The Probing-Prompting learning model has seven steps in learning, namely, 1) the teacher exposes the students to new situations, for example by paying attention to learning media containing problems, 2) providing opportunities for students to look at learning media and look for additional information related to the problems contained in the media through small discussions, 3) the teacher gives problems to all students and directs students to form heterogeneous learning groups, 4) give times for a few moments to provide opportunities for students to form answers through group discussion, 5) appoint one student randomly to present the results of the group work in front of the class, 6) the teacher tests the students' comprehension through the problem questions that have been submitted, if the answer is right the teacher asks for responses to other students about the answers to ensure that all students are involved in ongoing activities. However, if the student are not able to answer, or give incorrect answer or keeps silent, the teacher asks other questions for which the answer is a solution to the original answer, 7) the students work on the evaluation test related to the material that has been learned (Swarjaya, 2013; Widana *et al.,* 2018; Maba, 2017). Thus, these seven stages can make students more active in the learning process in class.

Learning using the Probing-Prompting learning model is closely related to questions called probing questions. The question and answer process with probing question is done by pointing students randomly so that each student must actively participate, thus students can be always involved in the question and answer process (Kariani *et al.,* 2014). Students' attention to learning that is being studied tends to be more active and always on alert because students should always prepare answers if suddenly they are appointed by the teacher. Teachers who use the question and answer method can make students become more active. Learning with question and answer can create a tense atmosphere, so the teacher should give a series of questions accompanied by friendly faces, soothing sounds, and soft tones or turn them into games.

The Probing-Prompting learning model aims to determine the readiness of students in answering questions, so the wrong answers must be appreciated because being wrong is one of the ways that students learn. There are five objectives to be achieved in the Probing-Prompting learning, they are: (1) activating students in the learning process in class, (2) learning to understand a concept through questions, (3) focusing students on conducive learning situations, (4) learning by solving problem, and (5) collaborating and respecting each other (Fauziyah, 2017). In addition, the Probing-Prompting learning model has advantages, namely: (1) encouraging students to think actively, (2) giving students the opportunity to ask things that

are not clear so the teacher can explain it again, (3) the differences of opinion between students can be directed at a discussion, (4) the questions can attract and focus the students' attention, (5) reviewing past learning material, and (6) develop courage, student skills in answering, and expressing opinions (Nurjanah, 2013; Estevez *et al*., 2019; Widiastuti, 2018). The application of the Probing-Prompting learning model in science learning can accommodate students to be more active in learning so that learning outcomes can be improved.

Each learning process ends with an evaluation to measure the success of the learning process. There are several types of authentic assessments that can be used by teachers, one of which is portfolio assessment. Portfolio assessment is a learning that is conducted to collect the work of students in a certain time that can provide objective assessment information, which shows the activities carried out by students in a natural learning environment and atmosphere (Margunayasa *et al.,* 2017). The collection of students work in a portfolio assessment can show the progress in learning achievement. Portfolio assisted learning strategies can provide follow-up for a task that has been done by students so that teachers and students have the opportunity to develop their abilities (Murdiono, 2012). The expected follow-up is in the form of feedback or comments from the teacher after students take part in learning. In addition, storing documents from students' work from learning experiences can increase students' confidence and motivation so the students are more enthusiastic to participate actively in the learning process. This is supported by the results of research conducted by Fazilla (2011) that showed by collecting the students' work, it can make students motivated to improve learning outcomes.

Portfolio assessment aims as a formative and summative evaluation tool. Portfolio as a formative evaluation tool is used to monitor the students' progress day by day and encourage the students to do self reflection, while a portfolio, as a summative evaluation tool which is done at the end of the semester, is to give score in students' report cards that show the students' achievement in certain subjects (Sudrajat, 2017; Arjawa *et al*., 2018). In addition, portfolio assessment emphasizes the principles of process and outcome assessment. Portfolio assessment assesses the process of creating a product or student learning process such as daily behavior, learning attitude, and enthusiasm in attending a lesson, portfolio assessment must also assess the final results or product quality provided by the teacher.

Portfolio assessment as an evaluation technique has several advantages in conducting it in class including: 1) paradigm change in students assessment through self reflection, 2) teacher accountability as educators responsible for students, parents, and schools, 3) students as individuals who each have the characteristics and active role of students in the assessment process, 4) identification of programs and development of learning, 5) the involvement of parents and the community in achieving students' abilities, 6) self assessment, 7) flexible assessment depending on achievement indicators learning outcomes, 8) shared responsibility between teachers and students in designing and evaluating the learning process, 9) fairness

because portfolios are open to teachers and students, and 10) assessment criteria in accordance with the business of students (Setiamiharja, 2016). Through the advantages possessed in portfolio assessment, it can support the students-based learning process through self-assessment.

The Probing-Prompting learning model assisted portfolio assessment can be used as a solution to the problems in this study. Based on this explanation, the researchers have conducted a study entitled "The Effect of the Probing-Prompting Learning Model Assisted by Portfolio Assessment on science learning outcomes of the 3rd grade students Elementary School Students of Cluster XV in Buleleng Subdistrict 2018/2019".

Methods

This research was conducted at the Cluster XV Elementary Schools in Buleleng Subdistrict. The type of this research is quasi-experimental research, considering that not all variables or symptoms that appeared and the experimental conditions can be tightly regulated and controlled. This study used a nonequivalent post test only control group design. The selection of this design was because the researcher wanted to know the difference in learning outcomes between groups of students who are taught using the Probing-Prompting learning model assisted by portfolio assessment with the groups of students who are taught using conventional learning using the post-test method. The pre-test is usually used to measure equivalence or equalization of groups (Dantes, 2017: 18). Determination of research subjects is not randomized individually but through a process of randomization in whole classes.

Population is a generalization consisting of objects/subjects that have certain characteristics determined by the researcher to be studied and then the conclusion is taken (Sugiyono, 2017). The population in this study were third grade elementary school students Cluster XV in Buleleng Subdistrict with 189 students, divided into 7 elementary schools, namely (1) SD Negeri 2 Kalibukbuk with 25 students in the 3rd grade, (2) SD Negeri 3 Kalibukbuk with 21 students, (3) SD Negeri 4 Kalibuk with 33 students, (4) SD Negeri 1 Anturan with 31 students, (5) SD Negeri 2 Anturan with 30 students, (6) SD Negeri 3 Anturan with 27 students, and (7) SD Tria Merta Singaraja with 22 students.

The data of the first semester science exam score for the 3rd grade elementary school students was carried out by using equality test which was analyzed by one way Anava test (ANAVA A). Based on the results of the equality test using SPSS 20.0 for Windows application, the results of 0.068> 0.05 were obtained so that all 7 elementary schools Cluster XV in the Buleleng Subdistrict had equivalent or homogeneous in academic abilities. The next step is to determine the research sample using random sampling techniques for the entire population using lottery. All classes in Cluster XV of Buleleng Subdistrict were drawn to determine the

experimental class and the control class. The study was conducted by writing all the classes of grade 3 in Cluster XV Elementary Schools in Buleleng Subdistrict on small papers, then rolling them. The researchers then take the first paper roll that will be used as the experimental class and the second roll as the control class. The obtained samples of the study were grade 3 of SD Negeri 2 Anturan with to 30 students as an experimental group and grade 3 of SD Negeri 3 Anturan with 27 students as a control group.

The experimental group was taught using the Probing-Prompting learning model assisted by portfolio assessment, while the control group assessment was taught using conventional learning. This study used 2 variables, namely, the independent variable and the dependent variable. The independent variable was the Probing-Prompting learning model assisted by portfolio assessment and the dependent variable was science learning outcomes. This research was conducted for 8 meetings, with 7 times giving treatment using the Probing-Prompting learning model assisted by portfolio assessment and 1 post-test at the end of the meeting to measure the students' learning outcomes.

The data analyzed in this study are science learning outcomes in the cognitive domains collected through test method, namely the multiple choice test. The multiple choice test had been tested to find out which instruments are used well and meet the requirements. The result of the content validity test of the two judges/science experts obtained results from 40 items was 1.00. Thismeans that the validity of the content of the science learning outcomes test is classified as very high content validity. The results of the test validity of the items obtained 35 items were declared valid and 5 items were declared invalid, invalid questions were eliminated. The results of the differentiator test obtained 1 item with very good quality, 25 items with good quality, and 9 items with good enough qualifications, 5 items about poor quality. The test result of the difficulty level obtained was 31 items in which the difficulty level were classified as moderate, while the 9 items were classified as easy and the results of the test reliability test obtained reliability figures of 0.906 classified as having very high reliability so that the instrument was worthy of being used as a data collection tool. Based on the results of the trial of the instrument, the questions were revised then was given to the experimental class and control students as a post-test. Data on learning outcomes that have been collected were analyzed using descriptive statistics and inferential statistics through t-test (polled variance) which begins with a prerequisite analysis, namely test data distribution normality and homogeneity test.

Result and Discussion

The results of the descriptive analysis of science learning outcomes in the experimental group showed that the average score was 23.80 with a very high category and the control group science learning outcomes showed an average score of 14.11 with a moderate category. A

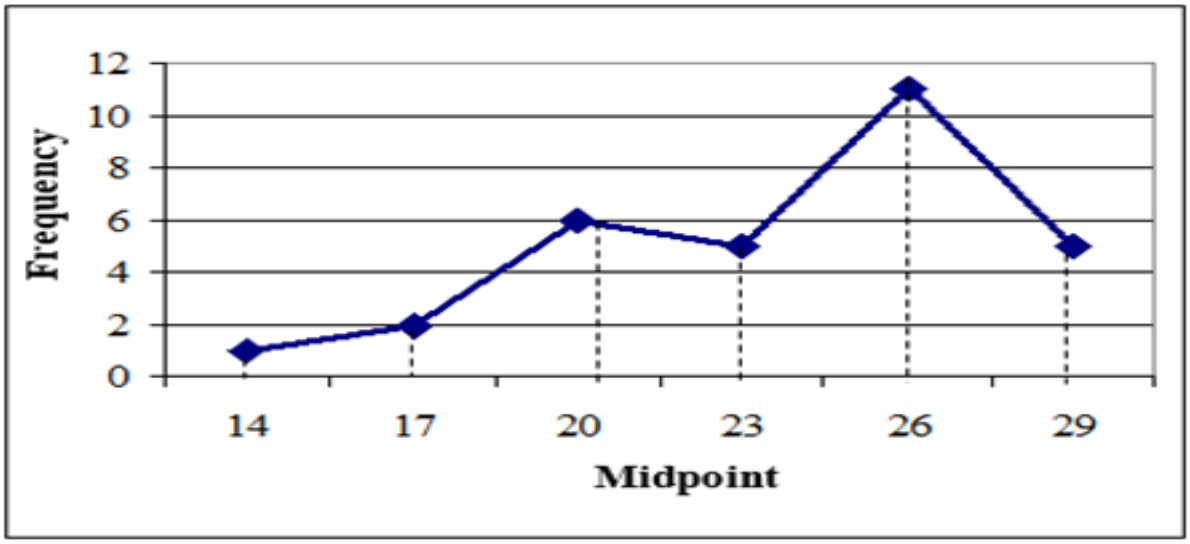
summary of the results of the description of science learning outcomes data in this study can be seen in Table 1.

Table 1: The results of the descriptive statistical analysis of the experimental and control groups

The Calculation Result	Experiment Group	Control Group
Mean	23.80	14.11
Median	24.77	13.67
Modus	26.00	13.36
Deviance Standard	14.87	18.99
Variance	3.86	4.36

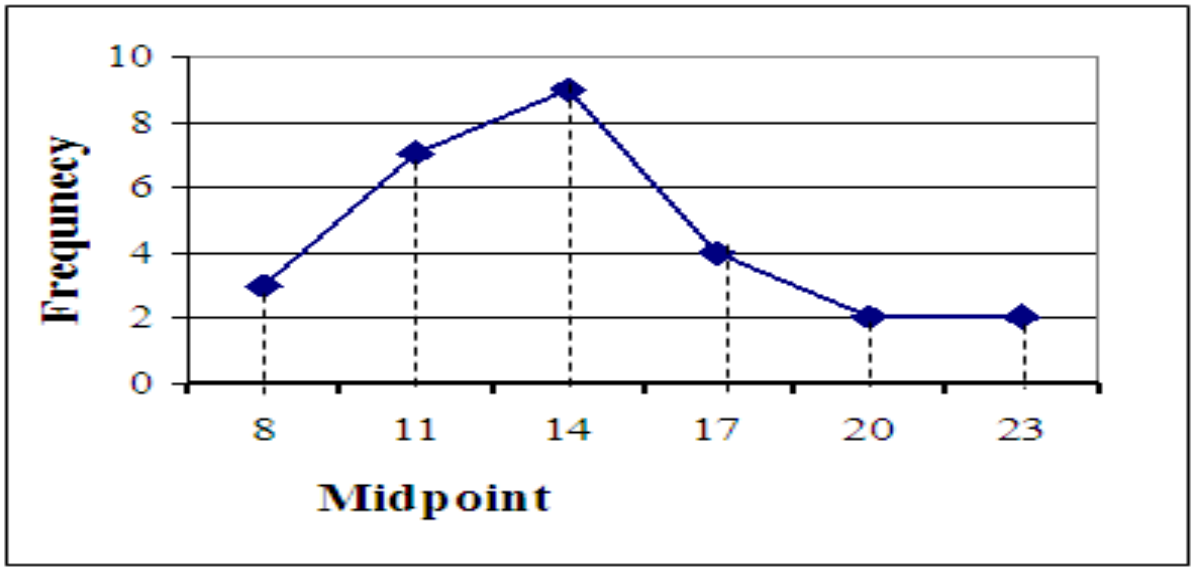
Data on learning outcomes obtained through giving post-tests to the experimental group can be presented in the form of polygon curves in Figure 1.

Figure 1. Polygon Curve of the Result of Experimental Group Learning



Mean (M), Median (Md), Mode (Mo) scores are depicted in the polygon graph. It appears that the data distribution curve of the experimental group taught by the Probing-Prompting learning model assisted by portfolio assessment is a negative squint because Mo> Md> M (26.00 > 24.77> 23.80). This shows that most of the group scores of students who are taught by the Probing-Prompting learning model assisted by portfolio assessment tend to be high. In contrast to the learning data obtained through post-test administration in the control group, it can be presented in the form of a polygon curve in Figure 2.

Figure 2. Polygon Curve of Control Group Learning Outcomes



Mean (M), Median (Md), Mode (Mo) scores are depicted in the polygon graph. It appears that the data distribution curve of the students taught using conventional learning is positive crossing because M> Md> Mo (14.11> 13.67> 13 , 36). This shows that most of the scores of students who are taught using conventional learning tend to be low. Before testing hypotheses to get conclusions, the prerequisites that must be met are data for each group with normal distribution and all must be homogeneous. The following is the description about the results of testing for normality and homogeneity of science learning outcomes score.

The normality test of the data was carried out on the science learning outcomes of the experimental and control classes. The data distribution normality test is done using Chi-Square (χ^2). Based on the results of calculations using the Chi-Quadratic formula, it was obtained χ^2 calculated science learning outcomes of the experimental group are 4,210 and χ^2 table is 7,815. Thus, this means that χ^2 calculated science learning outcomes of the experimental group is smaller than χ^2 table so that the experimental group learning outcome score data are normally distributed. While based on the results per count using the Chi-Quadratic formula, obtained χ^2 calculated learning outcomes of the control group is 2.676 and χ^2 table is 7.815. This means that χ^2 calculation of science learning outcomes of the control group is smaller than χ^2 table so the learning outcomes score data of the control group are normally distributed.

Homogeneity test using F-test analysis (Fisher) with homogeneous data criteria if $F_{count} < F_{table}$ and data is not homogeneous if $F_{count} > Ft_{able}$. The calculated learning outcomes of the experimental and control groups were 1.28, while F_{tables} at $db_{numerator} = 26$ and $db_{denominator} = 29$ with a significance level of 5% was 1.88 so $F_{count} < F_{table}$. This means that the variance of the science learning outcomes of the experimental and control groups is homogeneous.

After obtaining the results of the prerequisite test, the analysis was continued by testing the hypothesis with the t-test. The t-test formula used is polled variance, because the number of samples of the two groups is not the same. The test criteria are H_0 rejected if $t_{count} > t_{table}$ and H_1 are rejected if $t_{count} < t_{table}$, with t_{table} obtained from the distribution table t at a significance level of 5% with degrees of freedom db = n1 + n2 - 2. Based on the results of the t-test analysis $t_{count} = 8.89$ and $t_{table} = 2.00$ for db = 55 at the significance level of 5%. The results of these calculations indicated that $t_{count} > t_{table}$ (8.89 > 2.00) so that H_0 is rejected and H_1 is accepted. This means that there are significant differences in the learning outcomes of science between groups of students who are taught using the Probing-Prompting learning model assisted by portfolio assessment with groups of students who are taught using conventional learning. Therefore, it can be stated that the Probing-Prompting learning model assisted by portfolio assessment influenced the learning outcomes of grade 3 students at Cluster XV Elementary Schools in Buleleng Subdistrict in academic year 2018/2019.

In general, the results of the data analysis show that there was an influence of the Probing-Prompting learning model assisted by portfolio assessment of the third grade students' science learning outcomes in Cluster XV Elementary Schools in Buleleng Subdistrict academic year 2018/2019. The results are based on the average science learning outcomes of the groups of students who are taught by the Probing-Prompting learning model assisted by portfolio assessment which fell in very high category, while the average score of the science learning outcomes of the groups taught using conventional learning fell in moderate category. Differences in the learning outcomes between groups of students who were taught using the Probing-Prompting learning model assisted by portfolio assessment and the groups of students who were taught using conventional learning caused by several factors.

First, in learning process using the Probing-Prompting learning model, there are random questions given to students. This can be seen in the stage of testing the students' understanding. The teacher gives a series of questions randomly to students so that all students are ready to be appointed and answered the questions given. Through the questions given by the teacher, the students become more alert and focus on the learning process. Giving questions that are guided by the teacher can make students easily understand the materials which indirectly practice students to think creatively. This is in accordance with the opinion of Fauziyah (2017) in the application of the learning model Probing-Prompting the role of the teacher to help students understand the material by providing questions that can build students' curiosity and facilitate students in understanding the material. Purnamaningrum et al. (2012) stated that through being given problems, students were encouraged to express varied ideas, thereforethey were able to accommodate students' creative thinking abilities. In addition, Amsari (2016) stated that asking questions can dig up information and communicate what is already known and direct to unknown aspects.

Second, the Probing-Prompting learning model makes students more active in learning process. This can be seen at the stage of formulating answers and testing understanding. Students seemed active in solving problems given by the teacher in the group, besides giving questions that are exploring and guiding students' knowledge makes students more active in answering questions and are brave in expressing opinions. Students are required to think of answers to the questions given by the teacher. In addition to answering questions, students are also appointed to give opinions on answers given by other students. When students are able to answer questions and give opinions, it means that the students already understood the material. This is in accordance with the opinion of Dewi *et al.* (2019), in which a question and answer process conducted by randomly pointing students can increase students' active participation. Besides Mustika and Lindra (2017) believed that the Probing-Prompting learning model requires students to be active in thinking so students can solve the questions given by the teacher.

Third, the use of the portfolio assessment as an evaluation tool in learning can be used as a long-term assessment of students' progress. This can be seen at the stage of the new situation, namely, the teacher explains in advance the use of the portfolio as an assessment of learning outcomes, and at the stage of formulating the answers, the teacher directs students to work on portfolio assignments. The existence of feedback or comments on the work of students can help students to know the development of learning. In addition, storing documents produced by students from the results of their learning experiences can enhance self-confidence and motivation so students can make improvements to get better learning outcomes. This is in accordance with the opinion of Murdiono (2012) that portfolio-assisted learning can provide follow-up of a work that has been done by students so that teachers and students have the opportunity to develop their abilities. In addition Fazilla (2011) collected a the students' work that shows effort and progress in learning, so that the students can be motivated to improve their learning outcomes.

The students who were taught with the Probing-Prompting learning model assisted with portfolio assessment was different from the students who were taught with conventional learning. Students who were taught by conventional learning tended to be passive. Students only listen to the teacher's explanation so that learning became teacher-centered. The activities done by the students in the class were listening and taking notes of the material explained by the teacher. When the teacher gives questions, only a few students were able to answer the questions. The use of conventional learning makes the teacher's role more dominant than the role of students. This makes students only listen to the information provided by the teacher and do the assignments given.

The tasks given are collected without any follow-up in the form of feedback from the teacher. These findings proved that there are differences of students' learning outcomes between the

using of Probing-Prompting learning models assisted by portfolio assessment and conventional learning in the learning process.

The results of this study in accordance with the results of previous studies conducted by Sahayu (2018) showed that there was an effect of learning outcomes between groups of students who were taught with Probing-Prompting learning models assisted by simple media with groups of students who were taught with Probing-Prompting learning models assisted by simple media on science subjects. The results of Artawan et al. (2017) showed that there were significant differences regarding learning outcomes between groups of students given the Probing-Prompting learning model treatment with groups of students who were not given the Probing-Prompting learning model treatment in science subjects. The results of the Parvati study (2013) showed that there were significant differences in science learning outcomes between students who were taught with the Experimental Starter model based on portfolio and student assessment taught by conventional learning. Based on the findings in this study, it can be stated that the Probing-Prompting learning model assisted by portfolio assessment influenced the learning outcomes of third grade students of Cluster XV Elementary Schools in Buleleng Subdistrict in academic year 2018/2019.

Conclusion

Based on the formulation of the problem and the results of the study, it can be concluded that there is an effect of the Probing-Prompting learning model assisted by portfolio assessment of science learning outcomes of the 3rd grade students in Cluster XV Elementary Schools in Buleleng Subdistrict in academic year 2018/2019. This can be seen from the acquisition of the average score of the experimental group who were taught with the Probing-Prompting learning model assisted by portfolio assessment which was 23.80 with a very high category and the average score of the control group taught using conventional learning was 14.11 with the medium category.

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