THE LEARNING METHODS OF PROBLEM SOLVING SKILLS IN ISLAMIC BOARDING SCHOOL: DISCUSSION, EXERCISE, AND MODELING

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ABSTRACT

The objective of this research describes the method of lecturers to teach problem-solving skills. Problem-solving skills is one of the skills needed in the 21st-century learning. Generally, Islamic boarding schools tend to use classic methods such as recitation, Bandongan, Sorogan. The study is survey research. It is a case study at the Islamic boarding school of Jagad 'Alimussirry in the second semester of the academic year 2016/2017. Students live in Islamic boarding schools every day. The data were obtained through questionnaires and observations. Questionnaires were consisting of 12 items with a statement of Rosenberg's self-esteem scale. It's given to the 46 students and five lecturers after learning. The respondents were randomly chosen. The study also conducted observations at the time of learning in 5 courses. Two observers made the observations. The results showed that the problem-solving skills had been taught with a "good enough" category. The learning method is discussion, exercise, and modeling. It is done with 5 phases of problem-solving. The findings are three methods to teach problem-solving skills in the Islamic boarding school. It is a discussion, exercise, and modeling with five problem-solving phases and six learning schemes. Therefore, this study can be used as consideration for education practitioners on how to teach problem-solving skills in Islamic boarding schools. Indonesia has 28 thousand Islamic boarding schools. In addition, this becomes a frequent correction to repair the learning of problem skills in Islamic boarding schools in Indonesia.

Keywords: *learning methods, problem-solving skills, Islamic boarding school, discussion, exercise, modeling.*

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Introduction

Learning at the college level boarding schools should train the students thinking skills that required in this century. Students in formal education are now required to have the thinking skills needed in the 21st century. Greenstein (2012: 22) states that one of the skills necessary for the 21st century was problem-solving skills. Problem-solving skills are required from primary to university, but the level of difficulty or complexity solving different problems.

One of the goals of education in Indonesia produces students who can analyze and solve complex problems. Learning gains of the graduates can assess the implications of the development and implementation of science to create a solution or idea. Graduates must be able to formulate procedural problem solving and be able to adapt to the situation faced in problem-solving and be able to guide in selecting various alternative solutions.

Problem-solving as an attempt to find a way out of a difficulty, and it was a high intellectual activity (Nur & Ibrahim, 2000). The problem-solving stage consisted of understanding the problem, brainstorming all alternative solutions, planning, executing the plan, and evaluating the results (Greenstein, 2012: 70-71). Problems occur when there is a gap between expectations with facts. The issue of international students when studying at Ural Federal University (Russia) is the lack of language skills, low information on cultural norms and values in Russia, and the difficulty of adapting to the learning environment on campus (Merenkov & Antonova, 2015: 122).

Partnership for 21st Century Skills (2008), explained that the problem-solving skills were one of the skills that were needed in the 21st century so that a country could participate and had high competitiveness in the global economy. All the workers in a company should be able to solve complex problems, multidisciplinary, or open-ended problems in all the daily work routines. The company expects its employees (at all levels of positions within the company) can identify problems, find solutions and alternative thinking, or explore new options. Therefore, it is essential to train the skills needed in the 21st century in boarding schools, especially problem-solving skills. Gredler (1991) said that problem-solving skills are one of the high-order thinking skills that students are taught to find answers or solve problems with guidance.

The facts show that problem-solving skills have not been taught in the lesson at boarding school. It is based on the results of a survey to students in a boarding school in Surabaya is known that the students tend to listen to the lecture the lecturer then understand the material presented. Learning takes place with a learning system that is a student center. The new knowledge obtained serves as the basis of students in problem-solving thinking and acting. It happens automatically in the minds of students without being taught by lecturers in learning at boarding school.

Students of undergraduate as an agent of change are expected to be more active in solving problems, especially problems related to the issues of living in the boarding school environment. Students should be more proactive in managing the environment around the boarding school. Students can provide practical solutions on the problem of waste, waste utilization, or entrepreneurship result of environmental management because the images of boarding school to be less clean. Therefore, the problem-solving skills need to be taught at the college level boarding school.

In 2016, Indonesia had 28 thousand Islamic boarding schools (Ministry of Religion, 2016). One of them is the Islamic Boarding School of *Jagad 'Alimussirry*. Islamic Boarding School of *Jagad 'Alimussirry* is a college boarding school. The college located in Surabaya, Indonesia. Students with multidiscipline inhabit it. It is very supportive in teaching problem-solving skills with the search for problem-solving solutions from various disciplines. The students with a multidisciplinary science were appropriate when shown with problem-based learning. The learning could improve problem-solving skills (Rakhmawati *et al.*, 2016: 51).

Learning methods are various ways that lecturers use to deliver their subject matter to students based on learning objectives (Dogru, 2015). Teaching methods are used to communicate ideas and skills to students. Many kinds of learning methods are case study, brainstorming, demonstration, debate, drill and practice, game, observation, fieldwork, field trip, discussion, presentation and lecture, role-playing, report, written and oral, recitation, and simulation (Petrina, 2007). Subhan (2012) explained that, in general, the learning system in schools, there are two methods: Bandongan and Sorogan. Bandongan method: students hear the lecturer that read, translate, explain, and review the book in Arabic, while students listen and take notes. The *Sorogan* method (tutorial method): the student reads a particular book in the presence of a lecturer, then the student gives a fundamental correction and offers instructions on how to read and understand

the text correctly according to Arabic structure. Another method is recitation. It is used to memorize verses of the Qur'an and classic books.

Research about the learning method to teach problem-solving skills in boarding school has not been done. It is different from Fatimah (2016) entitled problem-solving skills of students in the first year at Islamic boarding school. She found that students of the Islamic boarding school of as-Salam and Islamic boarding school of al-Muayyad were skilled in solving problems of friendship, obedience to rules and activities, but less proficient in solving adaptation issues. Choeriyah also conducted research related to 21st-century skills in boarding school. The study was conducted by developing the life skill-based talents and interests such as sewing skills, bead craft, calligraphy, and recitations (Choeriyah, 2009). UK distance education develops new methods of learning in the university through the use of technology (Goodfellow & Lea, 2007). The problem-solving approach to improve critical thinking skills (Sulistiono *et al.*, 2014) and conceptual understanding (Trisnowati & Firdaus, 2017).

The lecturer needs information about the learning method of problem-solving skills because it can be used as the basis to repair the learning in boarding school. Therefore, a research entitled "The Learning Methods of Problem Solving Skills in Islamic Boarding School." This study aims to describe the method of lecturers in teaching problem-solving skills at the boarding school students.

Research Methods

This research is a case study at the boarding school of Jagad 'Alimussirry, Indonesia. The study was conducted on the even semester of the academic year 2016/2017. It is survey research. The research data was obtained through two methods. It is a questionnaire and observation. The researcher did an observation and given questionnaires to the lecturers and students at the end of the learning. Students live in Islamic boarding schools every day (24 hours).

Questionnaire

Questionnaires are used to find out the learning methods used by lecturers. It's given to 46 students and five lecturers after learning. The respondents were randomly chosen. It's given to the lecturer to find out the learning in the boarding school in teaching problem-solving. Questionnaires are also provided to students to find out the validity of learning problem-solving skills

that have been done by lecturers. It is consists of 12 statement items with Rosenberg's self-esteem scale. Each item statement has four answer options i.e., never, rarely, often, or always.

Students and lecturers respond to each statement by selecting one of these options. Each option has a specific score on a scale of 1-4. Scores obtained from the respondents are calculated using a percentage formula.

$$\text{Percentage of item} = \frac{\text{total score on the item}}{\text{number of respondents}} \times 100\%$$

The percentage of the item is interpreted into the category of good less, good enough, good, and excellent.

Observation

Observation is used to find out the validity of the learning method. It's conducted during the learning in 5 courses. They are *Jalalain* interpretations, *Ahlussunnah Waljama'ah*, Islamic economics, educational problems, and the secret of the days. The observation was conducted three times in each course. Two observers do it. The observation sheet consists of 12 statements with two options, *i.e.*, do or not. If the lecturer does not know the learning phase, then get a zero score. Each opportunity (do) has a rating on a scale of 1-4. Scores obtained from the respondents are calculated using a percentage formula.

$$\text{Percentage of item} = \frac{\text{total score on the item}}{\text{number of respondents}} \times 100\%$$

The percentage of the item is interpreted into the category of good less, good enough, good, and excellent.

Result and Discussion

The results of this study indicate that problem-solving skills have been taught in Islamic Boarding School with a "good enough" category. The students have been taught defining the problem with "good" category (61,21%), predicting all alternative solutions with "good enough" category (55,89%), planning solutions with "good enough" category (47,63%), implementing solutions with "good enough" category (53,48 %), and evaluating problem-solving results with "good enough" category

(43,86%). But there has not been done maximally so that it needs development in learning problem-solving skills. Data on the phase of learning problem-solving skills can be seen in Table 1.

Table 1. The Learning Phase of Problem Solving Skills.

No	Aspect	Data 1* (%)	Data 2** (%)	Data 3*** (%)	Average (%)/ Category
1	Explaining the phase of problem-solving	47,83	53,33	43,33	48,16 good enough
2	Defining the problems	53,62	73,33	56,67	61,21 good
3	Predicting all alternative solutions	54,35	66,67	46,67	55,89 good enough
4	Planning the solutions	52,90	53,33	36,67	47,63 good enough
5	Implementing the solutions	47,10	66,67	46,67	53,48 good enough
6	Evaluating the problem-solving results	44,93	46,67	40,00	43,86 good enough
The average learning phase of problem-solving skills					51,71 good enough

Remarks:
* Data based on the questionnaire of students' responses after learning.
** Data based on the questionnaire of lecturers' responses after learning.
*** Data based on the observation at the time of learning.

Problem-solving skills are taught in an Islamic boarding school with a "good enough" category (Table 1), but there has not been done maximally so that it is necessary to improve the learning. Wismath *et al.* (2014: 1) explained that the teaching of problem-solving skills could not be maximally achieved in the classroom with traditional education. It requires a structured learning environment with active learning (facilitates the recognition, practice, and ultimately gained a deep understanding as a process of problem-solving). The problem-solving skills learned in knowledge can be transferred and done in a real environment. Problem-solving skills can be enhanced with the use of social media and e-collaboration tools (Lee *et al.*, 2016: 248).

The results of this study indicate that the quality of learning problem-solving skills in the Islamic Boarding School of Jagad 'Alimussirry is a "good enough" category (49.86%). The lecturers teach problem-solving skills with the third method. They are discussion, exercises, and modeling. In detail, the concept of learning are: a) linking subjects with good category problems every day (67.20%, b) discussing unfamiliar concepts to

formulate problems with "good enough" categories (51.69%), c) discussing strategies with " good less" category (29.28%), d) organizing exercises that allow students to make problem-solving plans with "good enough" categories (44.83%), e) directing modeling in day-to-day practice to solve problems with "good" category (64.69%), and f) providing exercise (new issues) that allow students to evaluate problem-solving with "good enough" category (41,50%). Data on the teaching method of problem-solving skills in boarding schools obtained in this research can be seen in Table 2.

Table 2. The Learning Method of Problem Solving Skill in Islamic Boarding School.

No	Aspect	Data 1* (%)	Data 2** (%)	Data 3*** (%)	Average (%)/ Category
1	Linking subjects with daily problems	61,59	73,33	66,67	67,20 good
2	Discussing unfamiliar concepts to formulate problems	38,41	73,33	43,33	51,69 good enough
3	Discussing strategies to solve problems	14,49	46,67	26,67	29,28 good less
4	Organizing exercises that allow students to make problem-solving plans	47,83	46,67	40,00	44,83 good enough
5	Directing modeling in day-to-day practice to solve problems	67,39	66,67	60,00	64,69 good
6	Providing exercises (new problems) that allow students to evaluate problem-solving	31,16	53,33	40,00	41,50 good enough
The average learning method of problem-solving skill					49,86 good enough

Remarks:
* Data based on the questionnaire of students' responses after learning.
** Data based on the questionnaire of lecturers' responses after learning.
*** Data based on the observation at the time of learning.

The results of this study also indicate that the quality of teaching problem-solving skills in Islamic Boarding School is "good enough" category (Table 2). Lecturers need to consider learning methods and learning schemes to teach problem-solving skills (Taylor, 2000). The strength of the learning method depends on the right aspects of motivation, the interconnectedness of knowledge, the relevance of learner activities, and self-monitoring (Biggs & Tang, 2007). The success of the learning method depends on the conditions in which it is used (Garland, 1951).

The Learning Methods of Problem-Solving Skill: Discussion, Exercise, and Modelling

This study explains that the lecturers teach problem-solving skills with three methods. They are discussion, exercises, and modeling. The schemes of learning are: 1) linking subjects with daily problems, 2) discussing unfamiliar concepts to formulate problems, 3) discussing useful troubleshooting strategies, 4) organizing exercises that allow students to plan for problem-solving, 5) providing a direct model in daily practice to solve problems, and 6) providing activities (new issues) that allow a student in evaluating problem-solving. It is following the research of Mukhopadhyay (2013: 21) that a lecturer could teach problem-solving by three methods. They are 1) providing facts and information, 2) encouraging students to process data to become meaningful knowledge, and 3) facilitating students to think original. It is different from Doulik, Eisenmann, Pribyl, and Skoda, 2016: 53) that heuristic methods are efficient in solving problems independently and creatively.

The first method to teach problem-solving skills is discussion. Gall & Gillett (1980) said that discussion is a very flexible method that can be used to help students develop problem-solving skills, to share opinions, and to achieve mastery of subject matter. Discussion methods have many advantages. These methods have more student participation, more effective learning, and students don't have to rely on memorization, every student gives opinion and exchange ideas (Sajjad, 2000). Discussions help students to stimulate imaginative and conceptual thinking, sharpen logical reasons, share ideas, knowledge, and information (Omatseye, 2007).

The lecturers discuss with students about the relevance of subject matter with daily problems in the boarding school. There are done by lecturers well (Table 2). This result is following the statement of Arend (1997) that the discussion method is used to share information or specific problems. The discussion method can overcome the problem so far because most of the problems discussed in the classroom are more abstract than the problems that exist in everyday life (Jonassen & Hung, 2008: 6). Bern & Ericson (2001) explained that students were taught a skill as the skill was used in a real-life context for the students to have a real-life perspective. Hudson & Whisler (2007: 54) explained that students were taught knowledge and skills by relating it to the situation of students in real-life. The problem posed was an authentic problem or a real-world problem (Hartings, 2001).

Lecturers also conduct discussion methods regarding the concept that has not been understood to formulate the problem. Lecturers do this with a "good enough" category (Table 2). This result is following the statement of Slavin (2006) that discussion methods are suitable for explaining a difficult concept or new concepts. The characteristics of the problem also affect the problem-solving strategy. Components of the problem consist of two kinds of abstraction and continuity (Jonassen & Hung, 2008: 8). Abstraction is the representation of the content and context of the problem to transfer analogies from one problem to another. Continuity is the extent to which the problem attributes remain the same or change over time. Therefore, the lecturer should pay attention to the characteristics of the problem in developing the problem. The existence of open and sufficient time issues encouraged students to create their problem-solving problems and strategies (Intaros et al., 2014: 4119). Discussion methods required considerable time distribution, exciting learning content, structured problem solving, cooperative atmosphere, scaffolding, and adequate evaluation (Chan, 2005a).

The discussion used to create problem-solving strategies to solve problems. Lecturer's activity in discussing problem-solving strategy on Islamic boarding school is a less good category (Table 2). That suggests that there needs to repair the learning to map all alternative solutions before choosing a final solution. Troubleshooters can use many approaches to create alternative solutions. Jin et al. (2017) said that the factors affecting the performance of Eastern students are aspects of finding solutions to a problem. Dogru (2008: 9) explained that environmental problem-solving strategies to achieve solutions are: 1) strategy 5W 1H, 2) bonefish diagram strategy, 3) strategy tends to target, 4) concept map strategy, 5) brainstorming strategy and 6) profit and loss strategies. The results of this study indicate that there is a need to improve learning in teaching problem-solving strategies to map out all alternative solutions before selecting the final settlement. It is in line with the findings of Choy et al. (2015: 49) that students needed to be trained in learning strategies so students could explore themselves and did not rely heavily on lecturer information. CPTP (2014), explained that a cautious policy in choosing solutions is to consider the pros and cons of the proposed alternatives. Assessing alternatives means using standard criteria or requirements that are important to select the best choice. A good option was an alternative that was consistent with purpose. The efficiency of solving a problem depends on the novelty of the problem, the new problem, or the old problem (Chan, 2005b). Discussion is used to provide students to express

their opinions and attitudes, to utilize what they know about the problem, to analyze the problem, to find the best solution, and to harmonize the differences (Garland, 1951).

The second method is the exercise method. The lecturers' activities in providing exercises that allow the students to make problem-solving plans are done fairly well (Table 2). Practice needs to be given by lecturers to make students more skilled in solving problems. Students do the exercises, and it's guided by the lecturer (Walberg, 1998). Caprioara (2015: 1859) explained that a high level of the student experience is required in the problem-solving process. Giving training is good given for students because it can prepare students to solve real problems faced in real life. The problem-solving exercise provided by the lecturer in the problem-solving process is not a matter of measuring basic knowledge but instead emphasizing the application of knowledge and reasoning (Gijbels *et al.*, 2005: 27). The training was given by lecturers to find out the difficulties of the student to solve the problem. Phonapichat *et al.* (2014: 3169) described the difficulties of the student to solve the problem. They are challenging to understand the keywords of a problem, to find information about the problem, and to dislike reading long problems.

The third method is modeling. The lecturers teach problem-solving skills through modeling in the real-life every day (Table 2). Practical learning is done by lecturers well. The active learning method is modeling because it covers the aspect of personality (Jacobson, Eggen & Kauchak, 2009). Lecturers are communicated through modeling. The modeling method is carried out by lecturers, where the lecturers show the desired behavior so that students can act independently (Walberg, 1998). This study based on the word of Allah on QS. Al-Ahzab verse 21, the Prophet as a model for Muslims in the world in terms of *fiqh*, *Muamalah*, or environmental hygiene.

QS. Al-Ahzab verse 21 can give an idea that learning can be done with a real example in everyday life. Bandura (1971) asserted that modeling is an indispensable aspect of learning and prominent figures that influence learning in everyday life. Education can be through observation. That makes clear that *Kiai* and lecturers can impact the success of teaching problem-solving skills in boarding school. An excellent example of everyday problems can be given by the lecturer when the lecturer has a good personality and has understood the core issues. Nor & Mahamod (2014: 207) found that personality factors of lecturers determined lecturers'

knowledge of matter and pedagogy. The understanding and appreciation of the lecturer make them easy to give modeling in daily problem-solving.

Conclusion

The results of this study indicate that problem-solving skills are taught in an Islamic boarding school with a "good enough" category (51.71%). Five phases of problem-solving teach problem-solving skills lecturers. This phase is defining stages of the problem, predicting all alternative solutions, planning solutions, implementing solutions, and evaluating problem-solving results. The learning method of problem-solving skills in the Islamic Boarding School of Jagad 'Alimussirry is a "good enough" category (49.86%). The lecturers teach problem-solving skills through three methods. They are discussion, exercise, and modeling. The schemes of learning are: a) linking subject matters with daily problems with "good" category (67.20%), b) discussing unfamiliar concepts to formulate problem with "good enough" category (51,69%), c) discussing problem-solving strategy with "less" category (29.28%), d) organizing exercises for students to make problem-solving plans with "good enough" category (44.83%), e) directing modeling to practice problem-solving skills every day with "good" category (64.69%), and f) providing new problems for students to evaluate problem-solving with "good enough" category (41,50%).

Acknowledgment

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