Enhancing Concept Understanding and Problem Solving Ability by Using Blended Learning System in Social Sciences Learning in Grade V SDN Tanjung III

Dadang Iskandar, Acep Roni Hamdani
Department of Primary School Education
Universitas Pasundan
Bandung, Indonesia
dang_isk@yahoo.com

Abstract—**This study is back grounded by students who had not maximally achieved concept understanding ability and problem solving ability in Social Sciences learning. Through this study, the solution to solve that problem is examined by applying learning which use Blended Learning system. Blended Learning is a learning system which integrate face-to-face learning with online learning. This study use quasi experiment conducted in SDN Tanjung III, Subang Regency. Experiment class use Blended Learning whereas control class use conventional face to face system. The instruments to conduct this study are: concept understanding and problem solving items derived from indicator of each variable and related to learning material of Social Sciences in Class V, teacher's activity observation and student's response sheet. The study result showed significant difference in concept understanding and problem solving ability between experiment class and control class, in which n-gain of Blended Learning system is better than the conventional face to face system, and there is increase in teacher activity and student's response to learning in experiment class.**

Keywords—*Blended Learning system; concept understanding ability; problem solving ability*

I. INTRODUCTION

Blended Learning emerges as one pedagogical concept which is popular in early of 2000s'. Because it is not supported by sophisticated technology, then this learning system is less developed. But, recently with the support of various technologies, learning system which is based on Blended Learning can develop, even it is predicted will increasingly popular [1]. Based on study conducted by Brent, using Blended Learning system resulted in better learning outcome, learning process become more active, and it can be made to become new model of learning [2].

Based on the result study of Stockwell, the majority of learning given to students only use lectures and rely on textbook as resource (teaching material), and students are assigned to read that book at home. It is considered not very effective, because students should bring the book anywhere they go, and learning is not interesting [2]. That ineffectiveness can be evidenced from two indicators, namely the first indicator based on analysis result done by the author toward learning outcome of Social Sciences hasn't good in the form of concept understanding and problem solving skill in SDN Tanjung III. The second indicator is in the accord with the study above, the result of interview done by the author as the form of preliminary study of students SDN Tanjung III showed that learning used lectures method and reading the book in class and at home tend to become boring and not interesting. As the result of that condition, students lack of concept understanding ability.

Concept understanding ability is very fundamental thing, because by concept understanding the procedural knowledge can be acquired. Concept understanding is systematical way in understanding and revealing something acquired [3]. Concept understanding has strategic position in learning ladder. In learning ladder, the level from bottom to upper are data, information, knowledge, understanding, insight, wisdom [3]. One is not able to achieve insight and wisdom level before passing through data, information, knowledge, and understanding level.

Learning taxonomy shows that concept understanding is on comprehension level according to Bloom taxonomy, verbal information according to Gagne taxonomy, meaningful learning according to Ausubel taxonomy, declarative knowledge according to Anderson taxonomy, remember paraphrased according to Merril taxonomy, and in understanding relationship level according to Reigeluth and Moore taxonomy [3]. It shows that concept understanding has crucial role in learning.

Concept understanding also is the basic to achieve learning outcome. High learning outcome shows high level of concept understanding possessed by students, and vice versa [4]. It is supported by Warpala that concept understanding is requisite to achieve knowledge and skill in higher level. It means that concept understanding is base foundation in learning process [4].

In addition of high concept understanding, problem solving ability also important as demanded by education of 21st century. This ability has strong relation to concept understanding ability. It is because students are not able to solve problem if they have not mastered concepts to solve problem. Problem solving is basic activity of humans in living their life because to survive and self-develop, humans always face problem. Education is expected can help students to possess good ability in problem solving skills in order to solve any problem and question which are related to subject in particular [5].

According to Rusman, problem can drive seriousness, inquiry and think with meaningful and powerful way [6]. It is in accord with Abidin that problem solving ability as one orientation of modern learning, broadly will equip students with ability in using wide range of reasons effectively, systematic thinking ability, ability in considering and taking decision, and ability in communicating and collaborating. Based on some problems above, and supported by change in era development, there should be change in education to be better, which can enhance concept understanding ability and problem solving ability. One approach which can be done is by using Blended Learning system. That learning capable to reduce the weakness of conventional learning. The weakness of learning approach so far which emphasize textbook and lectures, and presentation had opened the emergence of new method in the form of Blended Learning [7].

Blended Learning is an alternative because there are free learning medias such as Moodle, Edmodo, and MOOC as means to complete the material taught in classroom as alternative to enhance learning quality [8]. But, if the material is only learned at home without discussing that material, then it will not effective as one approach of new learning [7,8]. Blended Learning paradigm is a valuable tool which can complete traditional learning so far [7]. The tasks can be arranged more creative and innovative and attractive and can be completed with audiovisual instruction which increase their enthusiasm to follow learning [7]. Besides, with the rapid advance of information, communication and technology from time to time, it is implicating on development of Blended Learning [9].

Blended Learning is considered to have some strengths compared to traditional face-to-face, because Blended Learning has high flexibility and can be accessed to learn anywhere and anytime, without needing the present of someone physically in school setting [10,11]. With Blended Learning, all persons involved in this learning can interact together, between student and teacher, teacher and teacher, and student and another student. The description of clear and interrelated material structure, and also can be learned individually and independently anywhere and anytime without obstacle, so learning outcome become better [10].

Blended Learning enable students to do distance learning without attending class, so when they do face to face learning in class, they have learned the material and learning become more directed. In addition, by applying Blended Learning System, students have more time to gather with their family and play with their friends. It will reduce learning cost, teacher and student's communication increase, learning progress and task become clearer, learning schedule is not regulated tightly so when there is leisure time students open learning system, students can manage their time more effectively without losing time to play with their peers [12,13].

If it is done properly, Blended Learning will have double benefits. It can provide online learning and can develop social aspect, and richer experience to develop all competencies possessed by students in the form of face to face learning [11]. Blended Learning system has high flexibility but still oriented to policy that students must attend real class, because there are several things which can be accepted by students through online learning, so the weakness and strength of both learning system can be minimized [14]. Graham argued that as combination of traditional learning in the form of face to face and online, Blended Learning enable students to be more interactive and reflective in constructing knowledge [1]. Blended Learning enable learning with multiple format, document the discussion and topic discussed, teacher can act more as facilitator, and can use various resources properly [15]. Based on study conducted by Chen and Jones that Blended Learning is more effective and has high level of satisfaction compared to traditional learning in the form of face-to-face. In addition, with this learning system, learning instruction become clearer and directed, so this system is highly appreciated and students' analysis ability become better [16].

Studied students' perception on Blended Learning which is related to their learning style. They showed that students' perception on Blended Learning is more positive and in level 8.44 in scale 1 until 10, with 6 as the lowest score and 10 as the highest score [17]. Next, Chen conducted following study by comparing pure online class and pure traditional class [16]. The result showed that pure online class is not better than pure traditional class, even in students' perception, they prefer traditional class than pure online class [16,17].

One effort which had been done by government to develop learning system based on Blended Learning among other is by developing SPADA program. The SPADA is beneficial for university students as complementary of face-to-face learning, but limited to higher education which receive the SPADA Grant and it has not applied on elementary school level. In addition, the government had developed Online Teacher Learning Combined for in-service teachers as the effort to increase their Teacher's Competence Test score. However, it is very limited in scope and time, so teachers cannot access it continuously as learning system. But the government has not accommodated those efforts for elementary school level, therefore this study will become a prototype in developing Blended Learning System in elementary school. Based on some theories, preliminary study, and some studies above, the author is interested in conduct the study concerning Blended Learning system to enhance concept understanding ability and problem solving ability.

II. RESEARCH METHODS

This study use experiment method because it aims to reveal the contribution of applying Blended Learning system to enhance problem solving ability and concept understanding

among students compared to conventional learning. The experiment method used in this study is quasi experimental design because the subject studied are humans, in which they cannot be differentiated one with another such as getting treatment because their status as control group [18]. In this study, students of Grade V SDN Tanjung III become experiment class, whereas students of Grade VB SDN Tanjung III become control class. In experiment class, learning use Blended Learning system, whereas control class use conventional face-to-face learning. This study is planned for four sessions in each group. The activity comprise pretest, treatment and ended by posttest.

Population in this study is all students of Grade V SDN Tanjung III in 2016/2017 academic year with total of 50 students and distributed in two classes. The numbers of student in Grade VA SDN Tanjung III are 25. Whereas the numbers of students in Grade VB Tanjung III. This researcher selects this subject study because those two classes are located in one school which make the researcher conduct the study easily, and it can be assumed that those two classes are in the same level of competence. The object of this study is the influence of Blended Learning system on problem solving and concept understanding ability in Social Sciences subject in Grade V SDN Tanjung III in 2014/2015 academic year. In this study, independent variable is Blended Learning system and conventional learning, and dependent learning is problem solving ability and concept understanding. Whereas control variable in this study is additional learning in the form of private learning, learning time and learning style.

III. RESULTS AND DISCUSSION

Based on problem of this study, the researcher will explain the study result in experiment class by using Blended Learning system and control class by using conventional learning and see its influence on problem solving ability and concept understanding. As for study result consist as from observation test, concept understanding ability test, and problem solving ability test.

A. Problem Solving Ability Result

The mean of posttest is score mean obtained by students after given treatment. For experiment class using Blended Learning and for control class using conventional learning. The study result obtain data that the mean score of experiment class for problem solving ability is 77.50 value, whereas in control class the mean score is 68.75. But in pretest score, the two groups are enhanced. From the data, there is difference in posttest result in problem solving ability for two groups, namely 8.75. N-gain of problem solving ability test for experiment class is 0.61 whereas for control class is 0.48. Based on that data, it can be concluded that enhancement of experiment class is higher than control class. The categorization of n-gain score is in the same position, that is in medium category. There is difference in n-gain of 0.13 with experiment class get higher score. It is in accord with the study result of Means that Blended Learning has some advantages compared to traditional face-to-face, because Blended Learning has high flexibility and can be accessed to learn anywhere and anytime without needing the physical figure in school setting,

so student's ability in concept understanding become higher [10,11]. With Blended Learning, those who are involved in learning can interact together, student with student, teacher with teacher, and student with another student. The clear and interrelated description of material structure, and also students can learn individually and independently anywhere and anytime without obstacle [10].

It is corroborated by Kilzilcec that Blended Learning enable students to do distance learning without attending class, so when doing face-to-face learning in school, students had learned the material so learning become more directed. In addition, by applying Blended Learning, students have more time to gather with their family and play with their friends. It will reduce learning cost, increase teacher and student communication, learning progress and task become obvious, learning schedule is not regulated tightly, so in spare time students can access the learning system, students can manage their time effectively without losing their time to play with their [19]. If it is properly done, Blended Learning will have double benefit namely giving online learning and can develop social aspect and richer experience to develop students' competences. Blended Learning system has high flexibility but still oriented on policy so students must also attend real class, because there are several things which cannot be accepted by students through online learning, so the weakness and strength of both systems can be minimized [14].

It is corroborated by Graham that the combination of face-to-face traditional learning with online Blended Learning enable students to be more interactive and reflective in constructing knowledge [1]. Blended Learning enable learning with multiple formats, document discussion and discussed topics, teacher can act more as facilitator and can use a wide range of resources properly, so various skills can be developed among other is 21st century skill [15].

1) Statistic test of problem solving ability test result

a) Normality test of n-gain data for two groups: The researcher conduct normality test of n-gain data for two groups by using SPSS 21 program.

The study result give data that for experiment class, the score of Shapiro-Wilk significance is 0.000 which is less than 0.05 or P-value $< \alpha$ ($\alpha = 0.05$), so it can be concluded that data is not distributed normally. Whereas for control class, the score of Shapiro-Will is less than 0.05 or P-value $< \alpha$ ($\alpha = 0.05$) so it can be concluded that data is not distributed normally.

b) Homogeneity test: Homogeneity test is used to test whether or not the two of data groups the researcher use has variance which is relatively the same (homogenous). It means that the statistic test difference in this study is truly happened as the result of difference between groups of data, not because difference in groups of data. From the study result, it obtains data that for two classes of paired homogeneity test result (Levene's Test) is less than 0.05 or P-values $< \alpha$ ($\alpha = 0.05$), so it can be concluded that the data of two classes are not homogenous.

c) Hypothetical test of n-gain data for two groups: Hypothesis test is done by non-parametric statistic technique

(wilcoxon test). It is done because data of two groups have not fulfilled the assumptions of parametric statistic namely has normal distribution and homogeneous variance. This test aims to ensure whether the hypothesis proposed can be accepted or rejected. As for the form of hypothesis is as follow: Ha: There is significant difference in problem solving ability between experiment class and control class. Ho: There is no significant difference in problem solving ability between experiment class students and control class students.

The rule of hypothesis test by using wilcoxon in SPSS is as follow: if the statistic of calculation < 0.05 or P-value < α (α = 0.05) or P-value < α (α = 0.05). This shows that Ha is accepted, and it means that the result of problem solving test for experiment class is better significantly compared to control class. This finding is in accord with Brent who said that using Blended Learning system resulted in better learning outcome, learning process become more active, and it can be made to become new model for learning [2]. Blended Learning is a valuable tool which can complete traditional learning used so far [7]. The tasks can be arranged more creative, innovative and attractive and can be completed with audiovisual instruction which more increase their enthusiasm to follow learning, so their problem solving ability become better compare with before condition [20]. Besides, with the rapid advance of technology, information and communication from time to time, it implicates on development of Blended Learning and its accessibility level become higher [9].

It is corroborated by study result of Chen and Jones that Blended Learning is more effective and has higher satisfaction compared to face-to-face traditional learning. Besides, with this learning system learning instruction become more obvious and directed, so this system is highly appreciated and students' analysis ability become better [16]. Lopez-Perez conducted the study on 1431 students who participated in Blended Learning system and aimed to find out their perception on Blended Learning. The study result showed that Blended Learning decrease drop-out level among students and increase the numbers of student who passed the exam, and it can enhance 21st century skills [12].

Chandra & Fisher had conducted study about perception of Junior High School students who used Blended Learning system. The finding obtained was that web based-learning is comfortable, easily accessed, more individual freedom to learn, and it can create positive interaction between peers when doing web based-learning, learning is more obvious, easily followed and understood, but for complex discussion and long explanation, they consider that face-to-face is more suitable [21]. All these findings showed that learning in face-to-face form is considered as one important part of education, so it should be done to complete online learning process. From that result study, it can be concluded that by using Blended Learning system, the weakness of web-based learning can be compensated.

Smyth conducted qualitative study toward first-year postgraduate students in Nursing and Midwifery College in Ireland. The study was aimed to find the benefit and challenge of Blended Learning [22]. The study result showed that Blended Learning has high level of accessibility and flexibility and help them to learn and make learning plan by themselves [22]. The participants gave responses that by using Blended Learning system, the learning content they receive become richer, so their inquiry ability is enhanced [22]. From the study result, the expert's opinion, and earlier result studies, it can be concluded that Blended Learning system can enhance 21st century skill or ability and one of them is problem solving ability.

B. Concept Understanding Ability Result

To find out the effectiveness of Blended Learning system, posttest is administered. The mean score of posttest for concept understanding is useful to find out the enhancement after and before treatment. From the study result, data is obtained that the posttest mean score of students who use Blended Learning system is higher than the posttest mean score of students who are given face-to-face learning. Data from the result study showed that there is difference of 10 in scale 0 until 100 in two groups.

This mean score of posttest is obtained after students are given treatment in the form of Blended Learning system. Students understand a concept if they are able to relate initial knowledge to a new knowledge to acquire meaning [23]. From the data above, there is difference in n-gain between control class and experiment class both from its score and criteria aspects. n-gain score in control class is in low category, that is in n-gain < 0.3, whereas experiment class is in the different span, that is in 0.40 – 0.70 with medium category. It means that based on that criteria, there is difference in n-gain between experiment class and control class or in the other word, experiment class experience higher enhancement. It is in accord with the study result of Hughes which aimed to measure the effectiveness of Blended Learning to student's participation in their learning, their retention level and drop-out level. He conducted action research toward the third-year students of undergraduate program by using Blended Learning system. The finding in this study is students' proactive level in attending learning become higher and students' retention level is enhanced significantly without extra effort from teacher, and drop-out level in course become lower, so using this system can enhance the effectiveness of learning.

It is supported by the result study of So and Brush with subject were 48 students of postgraduate program. They studied level of satisfaction, social attendance and collaborative learning. In this study finding, using Blended Learning system increase collaboration among students, higher level of satisfaction, and better social attendance, so their level of retention and concept understanding ability become higher [24]. In this study, it is found that psychological and social interaction distance play important role in online collaborative learning. In general, the structure of program, emotional support and communication media are identified as the most important factor and related to student's perception. All of these should be built well in the form of encounter in real life, so learning in the form of Blended Learning must absolutely done [23,24].

1) Statistic test of concept understanding ability test result

a) Normality test of n-gain mean distribution: The researcher conduct Normality test by using SPSS 21 program. Data from the study result showed that for experiment class, the Shapiro-Wilk significance value is 0.314 which is bigger than 0.05 or P-value > α (α = 0,05), so it can be concluded that data is normal distributed, as for control class the Shapiro-Wilk value is 0.015 which is less than 0.05 or P-value < α (α = 0.05), so it can be concluded that data is not normal distributed.

b) Homogeneity test: Homogeneity test is used to test whether the two groups have variance which is relatively the same (homogenous). It means that if data is homogenous, then the difference in statistic test in this study is truly happened because of difference between groups of data, and not because of difference in groups of data. The data from the study result showed the test result of paired homogeneity (Levene's Test) which is more than 0.05 or P-value > α (α= 0.05), so it can have concluded that data of two classes is homogeneous.

c) Hypothesis test of concept understanding ability: Hypothesis test is done by non-parametric statistic technique (wilcoxon test), because the data of one group does not fulfill the assumptions of parametric statistic, that is nor-mal distributed and has homogeneous variance. The test is intended to ensure whether the hypothesis proposed can be accepted or rejected. As for the form of hypothesis as a follow: Ha: There is significant difference in concept under-standing ability between experiment class students and control class students. Ho: There is no significant difference in concept understanding ability between experiment class students and control class students. The data from study result showed that Wilcoxon test value is 0.012 or P-value < α (α = 0.05), so it can be concluded that there is significant difference in concept understanding ability between experiment and con-troll, in this case experiment class is better than control class.

The test result in concept understanding item showed that those two classes experience enhancement. The key to enhance concept understanding ability is Blended Learning system. It is in accord with the study result of [25]. He studied the effectiveness of Blended Learning which was measured through students' satisfaction and achievement. The design of study used quasi experimental which measured students score, level of satisfaction and teacher evaluation result. The study result showed that Blended Learning system is more satisfying compared to traditional class system, students score increased significantly in posttest, and evaluation result of all components showed that Blended Learning class is better that traditional class, so this system is very effective to be used [25].

This study was conducted on 44 students from computer and education instructional technology department in Ankara University. It was experimental study with pre and posttest for the system [26]. They measured students' critical thinking ability by Watson-Glaser Critical Thinking Appraisal Test for one time before the following five weeks used Blended Learning and one time after that. The study result showed that there was significant difference between pretest and posttest, so

it can be concluded that the use of Blended Learning system is very effective to enhance students' critical thinking skill which is developed from concept understanding ability [26].

Another supporting study conducted by Delialioglu which was aimed to compare the effectiveness of Blended Learning to traditional learning [27]. They used MOLTA model to design learning and follow-up evaluation toward students' achievement, knowledge retention, attitude and satisfaction in two learning environments both traditional and Blended Learning. So, it can be concluded that the use of Blended Learning system is very effective to be applied [27]. It is supported by El-Deghaidy who conducted the study on the use of Blended E-Learning Cooperative Approach (BelCA) system to pre-service teachers' achievement, attitude and cooperation level. They conducted quasi experimental study on pre-service teachers in twenty-five study programs in a university in Egypt [28]. Their finding showed that students achievement in Blended group is significantly better than students in control group. In addition, they found that student's attitude to Blended is significantly higher in traditional group. There is no significant difference found in two groups concerning students' attitude to cooperation. El-Deghaidy & Nouby concluded that Blended Learning system is very effective to enhance students' attitude and achievement [28].

Miyazoe and Anderson studied the effectiveness of forum, blog and wiki in English as Foreign Language (EFL) with Blended Learning system in one university in Tokyo, Japan. They conducted the study in three Blended Learning classes. To obtain students' perception, they used research instrument such as questionnaire, interview, and written assignment [29]. In quantitative analysis, it is found that student more preferred wiki to forum and blog. In qualitative analysis, it is found it is found that students have positive feeling to Blended Learning such as it is new, easy and fun so Blended Learning system is considered as the appropriate system for learning [29]. Woltering conducted a study which aimed to find out whether Blended Problem Solving Learning (BPSL) system in medicine education can enhance learning process and motivation and cooperation level among students. They used survey to compare traditional problem based-learning to Blended Problem Solving Learning (BPSL). This survey consisted of eight categories [30]. Their finding showed that among those categories, there is significant difference between groups in motivation, satisfaction and benefit of subjective learning. So, it can be concluded that Blended Problem Solving Learning (BPSL) system can enhance student motivation, satisfaction and subjective learning outcome [30].

From those various studies, it can be concluded in general that online learning is very fun, directed, more flexible, learning is more obvious, not limited in space and time. However, online learning has some weaknesses among others are there is no real psychological relation between student and teacher or student and student, so they are lack of social present. It is one reason why Blended Learning approach is very effective to be applied because it has learning benefit both online and face-to-face. It can be measured from level of satisfaction, motivation, achievement, attitude, cooperation, knowledge retention, critical thinking skill, and drop-out among students. The finding showed there is significant

difference in student's achievement between Blended Learning and traditional learning seen from variables of satisfaction, motivation, drop-out level, attitude and knowledge retention, and it is shown that Blended Learning is better than traditional learning.

IV. CONCLUSION AND IMPLICATION

Based on the result of study which had been conducted, it can be concluded as follow: 1) The score of problem solving ability test in Social Sciences learning by using Blended Learning system (experiment class) is significantly better compared to problem solving ability which use face-to-face conventional learning (control class). N-gain for experiment class is 0.61 and it is in medium category, whereas n-gain for control class is 0.48 and it is in medium category. The mean score of posttest for experiment class is 77.50, whereas for control class is 68.75. The summary from the data, problem solving ability in the class blended learning better with conventional learning; 2) The score of concept understanding test result by using Blended Learning system (experiment class) is significantly better compared to concept understanding ability of students who use face-to-face conventional learning (control class). n-gain for experiment class is 0.45 and it is in medium category, whereas n-gain for control class is 0.25 and it is in low category. The mean score of posttest for experiment class is 72.2, whereas for control class is 62.2. The summary from the data, concept understanding in the class blended learning better with conventional learning.

Based on those data above, it can be concluded that Blended Learning system can enhance concept understanding ability and problem solving ability in Social Sciences learning among students of Grade V SDN Tanjung III.

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