

THE EFFECTIVENESS OF TRADITIONAL GAME-BASED COMMUNICATION LEARNING ACTIVITY FOR COGNITIVE PROCESS DIMENSION LEARNING ACHIEVEMENT

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Abstract: This paper aims at describing the effectiveness of traditional game in improving student's cognitive process through communication activity. The study was a quasi-experiment. The population consisted of 184 fourth grade students in Group III in Jembrana district. The sample consists of 27 of control class and experiment class. The data were collected from the cognitive process learning achievement which were collected with an essay test which consisted of 17 items. The hypothesis was tested by t-test inferential statistics. The result showed that there is a significant difference in the student's cognitive process between those who were taught with traditional game-based communication learning activity and those with the conventional teaching ($t_{obs.} = 7.50 > t_{c.v.} = 2.00$). This means that there is a positive effect from traditional game-based communication learning activity on the student's cognitive process learning achievement.

Keywords: *communication learning activity, traditional game*

EFEKTIVITAS AKTIVITAS PEMBELAJARAN MENGOMUNIKASIKAN BERBASIS PERMAINAN TRADISIONAL TERHADAP HASIL BELAJAR DIMENSI PROSES KOGNITIF

Abstrak: Penelitian ini bertujuan menggambarkan keefektifan permainan tradisional dalam meningkatkan proses kognitif siswa melalui aktivitas mengomunikasikan. Jenis penelitian ini adalah eksperimen semu. Populasi penelitian ini adalah 184 siswa kelas IV di Gugus III Kecamatan Jembrana. Sampel penelitian ini yaitu 27 siswa kelompok kontrol dan 27 siswa kelompok eksperimen. Data yang dikumpulkan adalah data hasil belajar proses kognitif siswa menggunakan tes essay yang berjumlah 17 butir. Hipotesis diuji dengan statistik inferensial uji t. Hasil penelitian menunjukkan bahwa terdapat perbedaan yang signifikan hasil belajar proses kognitif siswa antara kelompok siswa dengan aktivitas pembelajaran mengomunikasikan berbasis permainan tradisional dan siswa yang dibelajarkan pembelajaran konvensional ($t_{hitung} = 7,50 > t_{tabel} = 2,00$). Hal ini berarti terdapat berpengaruh positif aktivitas pembelajaran mengomunikasikan berbasis permainan tradisional terhadap hasil belajar proses kognitif siswa.

Kata Kunci: *aktivitas pembelajaran mengomunikasikan, permainan tradisional*

INTRODUCTION

There are still many teachers who express the students' learning achievement using the old version of Bloom's taxonomy. Actually, the categorization has been revised, but many have not understood which domain has been revised. Anderson and Kratwohl in the Revised Bloom's Taxonomy (2010) state that there are two dimensions of learning achievement, i.e., knowledge and cognitive process dimensions. The cognitive process dimension is divided into six categories: (1) Remembering: retrieving knowledge from the long term memory; (2)

Understanding : constructing meaning from the teaching material, including what is uttered, and drawn by the teacher; (3) Applying or using a procedure in a certain condition; ; (4) Analyzing : breaking material into its components and determining relations among the components and the relation between the components and the entire structure or the goal; (5) Evaluating : making a decision based on a criterion and / or standard; (6) Creating: integrating the parts to make a new and coherent entity or to make a new, coherent and original product.

The government actually has started an evaluation process by using the revised Bloom's taxonomy through the implementation of the 2013 Curriculum. The teaching according to the 2013 Curriculum uses the scientific approach with activities contained in it. Kurniasih (2014) explains that the 2013 Curriculum is a series of improvements made to the curriculum that was started in 2004 which was based on competence which was then continued to the 2006 Curriculum (School-Based Curriculum). The pattern used in the 2013 Curriculum is the teaching with the scientific approach. The teaching with the scientific approach requires the students to be active in every teaching activity. Wijayanti (11:2014) explains that the teaching with the scientific approach is a process of teaching that is designed in such a way in order the students actively construct concepts, laws or principles through the stages of observing (to identify or determine a problem), formulating a problem, proposing or formulating a hypothesis, collecting data with various techniques, analyzing the data, drawing a conclusion and communicating a concept, law, principle discovered. In line with this, Sutarto, Jaedun & Nuryadin (10:2017) explain that in the 2013 Curriculum the teaching process with the scientific approach is made to have five stages: observing, asking questions, collecting information, associating, and communicating.

The teaching in the scientific approach pays a special attention to the student's cognitive process. Cognition is an important aspect in the student's development that is related directly to the teaching process, and is very crucial in determining the student's success in school. In the child of the elementary school ages the mental activity is focused on the real objects or various events that he/she has ever experienced. This means that the elementary school child has got a thinking ability of cause and effect sequence. In understanding the nature that surrounding them, the children no longer rely on information coming from the five senses, since they have started to have an ability to differentiate what is seen from the reality.

A lesson at school has to be based on the competencies that the teacher want to achieve, the teaching activities have to be oriented toward the developing of children who are polite, responsible, honest, and having the characteristics

of other noble characters. To avoid boring school learning activities, the teacher needs to be creative and inovative in order the students are interested in following the teaching process. One of the ways is by using an appropriate teaching. The teaching process has to provide meaningful learning to make the students acquire an ability that is needed to solve a problem in such a way that they get an optimum learning achievement. The government and educational institutions expect that by having implemented the teaching with the scientific approach, the quality of teaching activities can increase so that the teaching becomes more meaningful for the students and can optimize their learning achievement and the process of achieving the knowledge.

Based on the result of observation made on 6th February, 2017, the teachers of elementary schools in Group III in Jembrana district have not run the teaching process according to what was stated by in Cagne, Briggs, dan Wager (9:1992) that teaching is a series of activities designed to make the students learn. This has the impact on a low students' learning achievement. Based on the result of observation and a document recording done for the fourth grade in the even semester in the academic year 2016/2017 it was found that the learning achievement of the fourth grade students of elementary schools in Group III in Jembrana district fell into a low category of achievement. This was seen from the mean score for the semester test which was still below the Criterion of Minimal Mastery Level, which can be seen in Table 1.

Some of the factors which caused the low students' learning achievement were as follows. *First*, the implementation of the scientific approach in the teaching in the classroom was still less than optimal, so that the teaching was still teacher centered. The most difficult stage taken by the teachers was the communicating stage. At this stage, the teachers had difficulties to make the students have the habit of reporting their findings during the process of observation. The students had not been in the habit of talking about and presenting scientifically what they had learned at that time. The difficulty in communicating in the children might be caused by various factors, for example, the internal factors such as being not brave and lack of self-confidence, while the external factor might be lack of opportunity given to the children to

Table 1. Mean Scores for Semester Test for the Fourth Grade Students in the Academic Year 2016/2017 in Elementary Schools in Group III in Jembrana District

Name of School	Mean in Subject Content				
	Indonesian	Pancasila and Civics Education	Science	Social Science	Art and Culture
SD N 1 Dauhwaru	63	64	56	49	55
SD N 2 Dauhwaru	68	67	69	60	60
SD N 3 Dauhwaru A	67	68	63	60	64
SD N 3 Dauhwaru B	66	66	63	62	63
SD N 4 Dauhwaru	67	66	63	60	60
SD N 5 Dauhwaru	66	66	61	58	61
SD N 6 Dauhwaru	60	64	61	62	62
SD Negeri Budeng	66	65	64	60	61
Minimal Mastery Level Criterion Score	70	75	65	60	62

interact and express their opinions (Lismawati, 11: 2015). In the activity of communicating, the teachers did not give the opportunities evenly to the students in expressing their opinions so that the communicating activity was dominated by the students who were really active from day to day, thus, the students' communicating skill was not optimal. Based on the observation made by the writer, the mean in communicating activity fell into a low category.

Secondly, the teaching tended to be boring since there were not games and media to motivate the students to learn. The media used by the teachers were still limited, and the teachers' creativity in making teaching media was still minimal. Apart from the teaching media, the teachers also had inadequate knowledge about games that could motivate the students to learn. *Thirdly*, the teachers did not adequately involve the students in the teaching and learning process so that the teaching and learning activity in the classroom tended to be low. The activities in the teaching and learning process was dominated by the teacher. The teachers played too much role in every stage of the scientific teaching. The teachers had not been in the habit of letting the students discover by themselves the knowledge that they were learning in the teaching and learning process.

Related to this fact, the teaching and learning process becomes a factor that affects the success or failure of an instruction. . Noviyanti and Setyaningtyas (2017) state that the teacher who manages the class well can educate the students effectively. The limited time allocated for teaching is not used up for conditioning the students, especially those who have problems with behaviors, so that the objectives of the lesson

cannot be reached optimally. As a teacher, one has to be able to manage the classroom as well as possible in order the objectives of the lesson can be fully attained and the students' cognitive process become better. Cognitive process is the way one acquires knowledge. Cognitive processes then are the processes followed by the students actively in the process of constructing meanings. Constructive teaching (meaningful learning) is seen as an important goal of education. Constructive teaching calls for a teaching which does not only communicate factual knowledge, it also requires giving assessment questions which require the students not only to remember or recognize factual knowledge (Anderson, 9: 2010).

In relation to the problem above, it is important to make an improvement in teaching. The teaching should be presented in a more innovative way and able to improve the student's activity and motivation. In this case, to make the teaching more innovative and the students more active, traditional games can be expected to solve the problems at school.

According to Mulyani (10:2016), "A traditional game is a game we inherit from our ancestors that we are obliged to preserve since it contains local wisdom values". Through the traditional games, we can improve the quality of various aspects of the children's development. On the other hand, according to Kurniati ((2016: 02), "a traditional game is a game activity that grows and develops in a certain region, which is full with cultural values and the community's life values and is taught from one generation to the next generation." the traditional games that from every region are thousands in number all over Indonesia are a form of Indonesia's cultural assets (Astiiti, 2017).

The development of a new era makes people ignore the traditional games, while the contemporary games cannot develop the aspects of children's development well. According to Muliawan (2009:35) the great difference between the contemporary games and the traditional games lies in the fact that in the past, the traditional games did not only train the mind, feeling and emotion, but they also keep the balance between body movement and agility. This is far different from the modern games. The modern (contemporary) games are mostly designed to train children's physical ability. Actually, the full range of educative elements have to include 5 elements: motor (physical motion), affect (feeling), cognitive (intelligence), spiritual (character), and balance (perfectness of life) (Muliawan, 2009:35). The lack of familiarity of the children with the traditional games can have an effect on their low level of cooperativeness (Ekawati, 10: 2015). In an effort to optimize children's learning activity of communicating it is important to develop it through the use of an innovative teaching media. The learning activity of communicating will be more interesting if a media that supports the teaching is used, thus the children will be more motivated in learning. Moreover, the elementary school children are characterized as children who learn while playing.

The result of study that is relevant to this study is from the study done by Putri (2015) entitled "Penerapan Metode Demonstrasi melalui Permainan Tradisional Juru Pencar dengan Media Visual untuk Meningkatkan Kemampuan Sosial Emosional Anak". This is supported also by a study done by Sri Wati (2013) who states that traditional games are useful as educational and teaching media. Apart from their function as a teaching media, it can also be used to preserve local cultures as stated by Tatjana (2011) in his study that "Traditional games are part of heritage and cultural tradition, but due to contemporary living conditions, passing them on to the younger generations ceases with time". This statement confirms that traditional games are a legacy and cultural tradition, however, since the contemporary living condition, the young generation start to forget them as the time passes.

This study investigated how a teaching activity which is based on traditional games

affects the students' cognitive process. The teachers can use the results of this study as references in enhancing a teaching activity into a more attractive, pleasant, and motivating one for the students in learning.

METHODS

This study used an experiment method. From the point of view of the focus of the problem and the relation between the variables, this study belonged to a quasi-experiment since in the process of study not all of the variables could be controlled well. In this study the variables tested were the effect of the traditional game-based learning activity of communicating in a group of students and that of conventional learning activity in the other group of students on the students' cognitive process learning achievement. This study was designed using Non-Equivalent Post-test Only Control Group Design. This study was conducted in SD Group III in Jembrana District with the total number of 175 students distributed into 7 schools: SD Negeri 1, SD Negeri 2, SD Negeri 3, SD Negeri 4, SD Negeri 5 and SD Negeri 6 Dauhwaru and SD Negeri Badung. The sample was determined by random sampling with the 7 class, size of 52 students, who were divided into two classes. The data collected in this study were the students' cognitive processes taken with an essay test that contains 19 items based on the basic competences under the theme of "My House" under the subthemes 2 and 3.

The test used in collecting the data had met the elements of basic competences based on the 2013 Curriculum. The test was also validated in terms of content validity by 2 experts in the field of measurement and the 2013 curriculum which was followed by empirical validation by a public test. The test of internal consistency of the 19 items yielded the results as follows: 17 items were valid and 2 items invalid. The analysis of discrimination power of the test items showed that 14 items had poor qualification and 3 fair qualification, An analysis of test item discrimination index showed that 3 test items had a fair qualification. The Analysis of the test level of difficulty showed that 3 test items met the criterion for an easy test, 12 met the criterion for a moderately difficult test, and 2 for a difficult test. The test of reliability analysis showed that the test has a high qualification (0.73). The data from the students' cognitive

learning achievement were taken by giving a posttest after the implementation the learning activity of communicating based on traditional games and the implementation of conventional teaching.

The hypothesis in this study was analyzed by using the t-test with pooled variance. The ideal mean and the ideal standard deviation criteria can be seen in Table 2.

Table 2. Criteria of Ideal Mean and Ideal Standard Deviation

Real Score Range	Category
$50.95 \leq X \leq 67.9$	Very high
$39.65 \leq X < 50.95$	High
$28.35 \leq X < 39.65$	Medium
$17.05 \leq X < 28.35$	Low
$0.1 \leq X < 17.05$	Very low

RESULTS AND DISCUSSION

Results

The data in this study consisted of the posttest scores for the students' cognitive process in the team: My House in subthemes 2 and 3 for the sixth grade students, as the effect of the treatment of traditional game-based learning activity of communicating in SDN 6 Dauhwaru as the experiment group and SDN 4 Dauhwaru as the control group. The following is the description of data in cognitive process in the two groups. This study found that in the experiment group the result in the student cognitive process, after being given the treatment of learning activity of communicating based on traditional game can be seen in Table 4 as follows.

Table 3 Descriptive Analysis Result

No	Category	Percentage of achievement	
		Experiment	Control
1	Very high	84%	33.33%
2	High	16%	14.81%
3	Medium	0%	14.81%
4	Low	0%	29.6%
5	Very Low	0%	7.40%

Based on the percentage it can be concluded that in the experiment group the data of the students' learning achievement tended to obtain scores in high category and very high category, while in the control group, the data distribution of learning achievement showed scores in very low to very high category. In a

more detailed way, the posttest result of 25 students in the experiment group and 27 students in the control group can be seen in table 2 above in the section Method.

Based on a five scale criterion and according to data analysis mean score in cognitive process in experiment group given treatment with learning activity of communicating based on traditional game was 60.67 (falling into very high category), while the mean in control group taught with conventional teaching was 35.88 (falling into medium category). This proves that the mean score for cognitive process mastery in the experiment group was higher than that in the control group. The data of the average of standard deviation for the posttest for the two group are presented in Table 3.

Table 4. Means and Standard Deviation of Data of the Result of Posttest for Experiment Group and Control Group

Variable	Experiment Group		Control Group	
	Mean	Standard Deviation	Mean	Standard Deviation
Post-test	60.67	5.27	35.88	1.57

Before doing the hypothesis testing by using T-Test, first requisite tests which consisted of normality test and variance homogeneity test were submitted.

The data normality test was done for the posttest data on cognitive process mastery of the experiment group and the control group based on the data analysis done, the result of the normality test of the distribution of data for the posttest in cognitive process mastery for experiment group and control group are presented in Table 4.

Table 5. Recap of the Result of Normality Test of the Distribution of Data of Cognitive Process Mastery

No	Data Group	Total Sample	$x^2_{obs.}$	$x^2_{c.v.}$
1.	Experiment Post-test	25	4.689	7.815
2.	Control Post-test	27	7.426	7.815

This shows that $x^2_{obs.}$ for cognitive process mastery was smaller than $x^2_{c.v.}$ ($x^2_{obs.} < x^2_{c.v.}$), so

that the data on cognitive process mastery of the experiment group had a normal distribution. This shows that $x^2_{obs.}$ for cognitive process mastery was smaller than $x^2_{c.v.}$ ($x^2_{obs.} < x^2_{c.v.}$), so that the data of the scores of cognitive process mastery of the control group had a normal distribution.

Homogeneity test was done to the paired variances between the experiment group and the control group. The test used was F-test with the criterion of homogeneous data of $F^2_{obs.} < F^2_{c.v.}$. The following is the presentation of the recap of the result of variance homogeneity test between the experimnt group and the control group in Table 5.

Table 6. Recap of Results of Variance Homogeneity Test with F-Test.

Sample	$F_{obs.}$	$F_{c.v.}$	Conclusion
Experiment Group	0.11	1.94	$F_{obs.} < F_{c.v.}$
Control Group			

Based on the table above, it can be concluded that $F^2_{obs.} < F^2_{c.v.}$, thus, H_0 is accepted, which means that the variance of the data of the cognitive process mastery of the experiment group, and that of the control group is homogeneous.

The research hypothesis tested was there is a difference in the cognitive process mastery between the students who were taught in learning activity of communicating based on traditional games and those taught in a conventional teaching. To test the hypothesis that was proposed the noncorrelational t-test or independent t-test was used. Table 6 shows that the variance is homogeneous and the number of students in each class is the same, so that this noncorrelated t-test was used with the formula of polled variance. The recap of the result of the noncorrelated t-test is presented in Table 6.

Hence, it can be interpreted that there is a significant difference in the students' cognitive process between the students who were taught using the learning activity of communicating based on the traditional games in the scientific approach and those who were taught using

conventional teaching model for the sixth grade students in elementary schools in Group III, Jembrana District in the school year 2016/2017 in Jembrana district in the academic year 2016/2017.

Discussion

Based on the hypothesis testing it was found that $t_{obs.} = 7.50$ and the $t_{c.v.}$ with discrimination index $= (n_1 + n_2) - 2 = 49$ at the 5% level of significance, $\alpha = 0.05$, is 2.00. This means that $t_{obs.}$ is greater than $t_{c.v.}$ ($t_{obs.} > t_{c.v.}$), thus H_0 is rejected and H_{1is} accepted. Therefore, it can be interpreted that there is a significant effect on cognitive process in the group of students who learned by using traditional game-based learning activity of communicating based on traditional game in the scientific approach and in the group of students who did not learn by using traditional game-based learning activity in the scientific approach.

This study showed that an innovative teaching can improve student's activity, motivation, and cognitive process. The cognitive processes are the ways an individual uses in acquiring knowledge. They are used to construct meanings. Constructive teaching (meaningful learning) is seen as an important educational goal. Constructive teaching requires more than communicating factual knowledge. It requires asking questions to assess the students, thus the students do not only remember or recognize factual knowledge (Anderson, 98: 2010).

This study has proven that the traditional game-based learning activity of communicating is effective in improving student's activity and motivation in the classroom in following the lesson. A traditional game-based learning activity of communicating is very suitable with the character of the elementary school students in general, since at this stage the elementary school age children are very fond of playing no wonder that the children are very noisy even when the teacher is teaching. Some of them even disturb their friends. This finding is supported by the study conducted by Noviyanti and Setyaningtyas (9 : 2017) who state that less conducive environment will hinder the

Table 7. Recap of the Data of Hypothesis Test Results

Group	N	df.	$t_{obs.}$	$T_{c.v.}$	Conclusion
Experiment	25	49	7.50	2.00	$t_{obs.} > t_{c.v.}$ Ha is accepted
Control Group	27				

development of student's discipline (misbehavior). The child's negative behavior will not only disturb their friends in the classroom, but also lower down other students' attention to follow the lesson. Disturbing other friends will not only have a physical impact, but it will also have a psychological impact on the children. Thus, in this case traditional games are very effective to be implemented in teaching.

Traditional games make the classroom condition lively. The teaching environment that is conducive will be able to improve the students' learning motivation. Taro (11:1999) explains that traditional games play a role in the children's world. Traditional games are cultural activities that function as the media to educate the sense of solidarity (democracy, sensitiveness to other's feeling, respect for differences, and shared agreement, cohesiveness, and mutual help), heroism (struggling to reach one's dream, meeting the desire for independence, responsible, defending one's right, never giving up), physical endurance, (regular and measurable movement to improve body organs functions). The development of personality (honest, sportive, responsible, self control, not prioritizing one's personal interest, tolerant and loving) disciplined (conforming to regulations, norms and values), and pride for the *bhineka tunggal ika* culture (unity and diversity). In this case, traditional games, in addition to being used as teaching media, they can also be made into character education. Parallel to this, the same was also stated by Haerani that traditional games which are also Indonesia's national culture has been proven capable of developing positive character in the children.

By inserting traditional games in the teaching process it can help preserve cultural legacy for the next generation, since as it has already been known, in today's age with the progress in technology which becomes increasingly advanced and sophisticated, not limited to a certain age, children of today have started to follow the development of the age, for example by using gadgets that have become so numerous that they have an effect on the local traditional games. In this case, in addition to being useful for character education, the insertion of traditional games into the teaching process is very effective as the means to preserve traditional games of the archipelago.

Teaching with traditional games is also capable of improving the activity of communicating in the students. The students who were initially passive in learning and tend to be afraid to express their opinions, after being given traditional games in the activity of communicating become very enthusiastic in following the lesson and have started to be active in learning. Joyful learning is presented in the teaching activities which include *kiat-kiat*, directions, strategies and all learning processes which can sharpen memories, and make learning as a joyful, useful, and meaningful process. Hence, the students understand the material given better and are able to apply it in the daily life. This agrees with Fatoni's opinion (Fatoni, 2015) that shows that students' understanding of the length measurement can be stimulated by using the traditional game of *batok kelapa* as the context. This is proven by the traditional games such as the games of box office, dragon, Pancasila the Five Principles, *ngengkebang batu*, and *nyen durine* can improve the student's activity in following the lesson.

In the teaching which used the game of box office, the activity of communicating becomes very effective and optimal since the game of box office in the activity of teaching can make the classroom atmosphere become joyful and the students become more focused. In the game of dragon like in the game of box office, the activity of communicating becomes very effective and optimal since the game of box office in the teaching activity is able to make the classroom atmosphere more joyful and the students become more focused, this game is also able to make the students more focused. In the game of dragon, like in the game of post office box, this game is also able to make the students more active and in the activity of communicating and they become more brave in communicating or expressing their opinions. This is parallel with Koswara's opinion (Koswara, 2014) that states that teaching will be more meaningful and permanent if the students are given the chance to be active for developing their own knowledge, to develop knowledge by themselves to get a change into a completely new behavior as the result of experience in interacting with the environment. A joyful and meaningful learning is capable of influencing the students' cognitive process so that the fourth grade students have

already been able to answer c1 and c6 problems, i.e., remembering, understanding, applying, analyzing, evaluating, and creating in the revised Bloom's cognitive process taxonomy.

In this study the traditional game of *Pancasila Lima Dasar* was used. By using the game of *Pancasila Lima Dasar* in the teaching process, in addition to making teaching more joyful, this game can also educate nationalism and this is important today since many people have forgotten the basic principles of their country, so that this game is very effective to be applied in teaching.

This study also used 2 Balinese traditional Balinese games, namely *ngengkebang batu* and *nyen durine*. By incorporating the games, in addition to their function as media in education, they also introduce traditional games which come from the culture itself, since most of the students do not know games which come from their own culture. The game of *ngengkebang batu* and *nyen durine* became the learning activity of communicating became joyful.

In addition to make learning more joyful, the traditional games used in this study also make the students more active and more enthusiastic in following the lesson. The traditional games make learning more meaningful, so that the learning the students get from the teacher is retained longer by the students and will have a positive impact on the students' activity and cognitive process.

This study was a follow-up from Sri Wati (2013) entitled "*Pengaruh Model Pembelajaran TPS Berbantuan Media Permainan Tradisional Bali terhadap Pemahaman Konsep IPA Siswa Kelas IV SD Gugus IV Sawan*". The results of the study showed that there was a significant difference in understanding science concept understanding between the students who learned from the teaching that used traditional Balinese game media-based teaching model and those who learned from the conventional teaching model. This study is also supported by a study conducted by Untari (2013) entitled "*Keefektifan Pendekatan Pembelajaran Pendidikan Matematika Realistik Indonesia (PMRI) Berbantu Permainan Tradisional Dhakon Terhadap Kemampuan Berhitung Perkalian Siswa Kelas II*". The study concluded that there is a difference in the mean in the ability to multiply, that is, the ability to multiply in the experiment group is better than

that in the control group. The study conducted by Tatjana (2011) entitled "Traditional Games and Pupils' Violent Behaviour in Elementary Education." The result states that The results of this research indicate that traditional games could be a quality and efficient model for preventing violent behavior among pupils in elementary education. It means that this study shows that traditional game can become an efficient model to prevent violence among the students in the elementary school students.

Some studies above have proven that traditional game can increase the students' cognitive process. In addition to its use as media in teaching, traditional games can also be used as media for character education to achieve the goal of education, as stated by Widiana (2017) that the goal of education has to be achieved, one of the ways is through the implementation of character education curriculum.

Based on the cognitive process analysis of the *post-test* given in the form of an essay test with 17 items with the criteria of c1-c6, it was found that most of the students could only answer up to c2 (understanding). Based on this finding, it is suggested to the teachers to start teaching the students with problems within the c1- c6 scope so that their cognitive process becomes more optimally developed.

The activity of communicating is one of the activities in the scientific approach and this activity is an important one, because by communicating the teacher can find out which students are able to understand the extent to which the students are able to understand the teaching material. In this study, traditional games can be used as media to help improve the students' activities of communicating, the students had not felt afraid to report the result of a discussion or to express their opinions any longer. In this case, there was an increase in the role of the students in the teaching process and it had conformed to the scientific approach. The teaching that uses the scientific approach is a teaching that uses science approach and inquiry, in which the students have a direct role both individually and collectively in the group to explore concepts and principles during the course of learning activity, while the role of the teacher is to direct the students' learning process and to correct students' mistakes in principles and concepts (Marjan, 11: 2014).

This study found out that the learning activity of communicating based on traditional games has a positive effect on the cognitive process of the fourth grade students in the even semester in SD's of Group III of Jembrana district. This study also showed that the learning activity of communicating based on traditional games has a positive effect on the tendency of most of the students' high scores because of some factors such as the use of an innovative and joyful teaching, the conducive learning condition to the elementary school children in general, and the increasingly more directed speaking ability

CONCLUSION

Based on the result of the calculation of the t-test, it was obtained that $t_{obs.} = 7.50$. While $t_{c.v.}$ at $df = (n_1 + n_2) - 2 = 49$ and the 5% level of significance, $\alpha = 0.05$ was 2.00. This means that $t_{obs.}$ was greater than $t_{c.v.}$ ($t_{obs.} > t_{c.v.}$), thus, H_0 was rejected and H_1 was accepted. This means that there is a difference between the group of students who learned with the learning activity of communicating based on traditional games in the scientific approach and those who learned with conventional teaching model in the fourth grade in the even semester in the academic year 2016/2017 in SD's in Group III in Jembrana district. There is a difference in the students' learning achievement which shows that the implementation of the scientific approach in the learning activity of communicating based on traditional games has a positive effect on the learning achievement of the fourth grade students of elementary school in the even semester in the academic year 2016/2017 in SD's in Group III in Jembrana district.

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ANALISIS MISKONSEPSI SISWA PADA KONSEP GEOMETRI MENGGUNAKAN *THREE-TIER DIAGNOSTIC TEST*

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Abstrak: Penelitian ini bertujuan untuk mengetahui: (1) hasil analisis miskonsepsi siswa pada mata pelajaran matematika pada konsep geometri bidang, dan (2) mengetahui besar persentase siswa yang mengalami miskonsepsi pada konsep geometri bidang menggunakan *Three-Tier Test*. Subjek penelitian adalah siswa SMA MIPA kelas X sejumlah 43 orang. Instrumen pengumpulan data meliputi pedoman wawancara dan soal *Three-Tier Test*. Analisis data dilakukan secara deskriptif kuantitatif. Hasil penelitian menunjukkan bahwa 24,1% siswa menguasai konsep, sedangkan sisanya 6,2% siswa menebak atau tidak percaya diri atas jawaban, 22,2% siswa tidak paham konsep dan 47,5% siswa mengalami miskonsepsi. Siswa mengalami miskonsepsi terendah pada subkonsep menyelesaikan masalah dalil segitiga dan segmen garis 36,5% dan miskonsepsi tertinggi yang dialami siswa pada subkonsep menjelaskan kesimetrian dan sudut 59,5%. Urutan ketiga kategori miskonsepsi tertinggi hingga terendah pada konsep Geometri Bidang yang terjadi adalah sebagai berikut: miskonsepsi murni (22%), *false positive* (17,9%), dan *false negative* (7,6%).

Kata Kunci: *miskonsepsi, three-tier test, false positive, false negative*

ANALYSIS OF STUDENT MISCONCEPTION ON GEOMETRY CONCEPTS USING *THREE-TIER DIAGNOSTIC TEST*

Abstract: This study aims to determine (1) the results of students misconception analysis on mathematics subjects on the concept of geometry fields, (2) know the percentage of students who misconception on the concept of geometry using *Three-Tier Test*. Data collection testicles include interview guides and *Three-Tier Test* questions. Data analysis was done descriptively quantitative. The results showed that 24.1% of students mastered the concept, while the remaining 6.2% of students guessed or did not believe in the answers, 22.2% of students did not understand the concept and 47.5% of students experienced misconceptions. Students experiencing the lowest misconception on the subconscious solve the problem of triangle proposition and line segment 36,5% and the highest misconception experienced by the student on subconcept describes symmetry and angle 59,5%. While the sequence of the third category of misconception highest to lowest on the concept of Geometry Field that occurred is as follows: pure misconception (22%), *false positive* (17.9%), and *false negative* (7.6%).

Keywords: *misconception, three-tier test, false positive, false negative*

PENDAHULUAN

Matematika adalah salah satu mata pelajaran yang diajarkan diberbagai jenjang pendidikan, mulai dari jenjang pendidikan dasar sampai dengan jenjang pendidikan lanjutan pada tingkat sekolah menengah atas atau sederajat. Hal ini menunjukkan betapa pentingnya peranan matematika dalam dunia pendidikan dan perkembangan teknologi sekarang ini, mengingat pentingnya peranan matematika maka siswa selalu diarahkan untuk memahami materi dengan sebaik-baiknya sehingga apa yang dipela-

jari oleh siswa dapat diaplikasikan untuk menyelesaikan masalah dalam kehidupan sehari-hari (Karim, 2011).

Akan tetapi faktanya selama proses pembelajaran tidak selalu siswa dapat menyerap informasi yang diberikan oleh guru secara utuh, siswa merasa kesulitan dalam memahami berbagai konsep terlebih lagi pada mata pelajaran matematika yang memuat banyak konsep yang bersifat kompleks dan abstrak. Dalam memahami sebuah konsep yang kompleks siswa harus bisa mengaitkan konsep satu dengan konsep

yang lainnya secara benar dan begitupun juga dalam memahami konsep-konsep yang abstrak, siswa dituntut untuk dapat berfikir lebih keras lagi dalam memecahkan masalah-masalah yang tidak dapat diamati secara langsung.

Berdasarkan studi awal yang dilakukan di SMAN I Babakan, pada kelas X MIPA pada materi Geometri Bidang, ditemukan bahwa sekitar 72,78% siswa belum memahami konsep-konsep yang tersusun pada materi geometri bidang yang terdiri atas konsep-konsep kesimetrian, sudut, dalil pada segitiga dan dalil segmen garis yang digunakan dalam penelitian ini (Kurnia & Sharma, 2013). Belum pahamnya siswa pada materi tersebut disebabkan oleh karena kesalahan siswa sendiri, seperti kesalahan menghitung, adanya kesalahan konsep dan menjawab tidak sesuai dengan prosedur yang akan mengakibatkan miskonsepsi pada siswa (Suwito, 2015).

Miskonsepsi yang terjadi pada siswa tidak akan pernah lepas dari adanya penyebab dari ketidaksesuaian konsep tersebut. Suparno (2013) mengemukakan bahwa penyebab miskonsepsi yang dimiliki oleh siswa dapat berasal dari pengetahuan awal (prakonsepsi) yang salah yang mereka miliki sebelumnya melalui pengalaman hidup mereka sendiri, yang terbentuk karena kurang lengkapnya suatu informasi yang mereka terima sebelumnya (Ausubel, 2000). Hal ini menjadi dasar yang buruk bagi siswa dalam mengkonstruksi pemahaman dalam struktur kognitifnya yang harus segera diatasi (Posner, Strike, Hewson, & Gertzog, 1982). Mengingat, miskonsepsi sendiri bersifat mengakar dan sulit untuk dihilangkan (Dahar, 2011), analisis miskonsepsi siswa melalui penelitian sering dilakukan oleh para pendidik dan peneliti. Hal ini penting agar dapat menjadi sumber informasi bagi para pendidik dan peneliti dalam mengupayakan pengembangan pembelajaran di kelas untuk mengatasi dan memperbaiki miskonsepsi.

Salah satu cara yang dipandang efektif dalam mengatasi dan memperbaiki miskonsepsi yang dialami siswa adalah dengan pemberian tes diagnostik yang dapat mengukur kesalahpahaman atau miskonsepsi yang dimiliki siswa sehingga dengan demikian maka hal tersebut akan segera ditindak lanjuti melalui penanganan yang tepat (Arikunto, 2013). Adapun berbagai bentuk alat deteksi yang sering digunakan oleh para peneliti dan guru yang dapat mengungkapkan kesalahpahaman atau miskonsepsi pada siswa menurut Su-

parno (Suparno, 2013) antara lain peta konsep, tes multiple choice dengan reasoning terbuka, tes esai tertulis, wawancara diagnosis, diskusi dalam kelas dan praktikum dengan tanya jawab. Kirbulut (2014) mengemukakan bahwa berbagai jenis penilaian sebagai tes diagnostik yang populer yang digunakan dalam pendidikan sains untuk menganalisis miskonsepsi siswa antara lain wawancara (Osborne, 1980), peta konsep (Kaya, 2008), dan multiple choice test (Tamir, 1971). Beberapa peneliti telah berhasil mengembangkan instrumen tes diagnostik dalam mengungkapkan kesalahpahaman atau miskonsepsi pada siswa yang hasilnya dapat diketahui dengan cepat dan akurat, diantaranya CRI (Saleem Hasan, Diola Bagayoko, & Ella L Kelley, 1999), pilihan ganda bertingkat dua (*two tier*) (Treagust, 1988), pilihan ganda bertingkat tiga (*three tier*) (Eryilmaz & Sürmeli, 2002).

Instrumen diagnostik tes yang dikembangkan oleh Eryilmaz & Sürmeli (2002) adalah lanjutan pengembangan *Two-tier Multiple Choice* yang dikembangkan oleh Treagust (Treagust, 1988), dapat mengungkapkan kesalahpahaman atau miskonsepsi pada siswa lebih baik dibandingkan dengan tes diagnostik *one tier* atau *two tier* (Arslan, Cigdemoglu, & Moseley, 2012). Dalam perkembangannya *Three-Tier Test* yang dikembangkan oleh Pesman & Eryilmaz (2010) menjelaskan bahwa tes dalam bentuk *Three-Tier Test* adalah tes perpaduan dari *two-tier* dan CRI, dan tes ini sangat mudah untuk digunakan oleh guru SMA karena tes ini sangat cocok dan akurat dalam mengukur miskonsepsi yang terjadi pada siswa, tes ini juga dapat memantau kemajuan dari keberhasilan pembelajaran siswa karena nilai yang dihasilkan dalam tes ini valid dan reliabel sehingga tes ini dapat mengukur persentase dari tingkat pemahaman siswa. Dalam tes ini juga dapat membedakan antara siswa yang mengalami miskonsepsi dan tidak paham konsep (*lack of knowledge*) dengan ditambahkan soal dua tahap (*two-tier*) sebelumnya. Tes ini juga dapat membedakan antara kondisi *false positive* dan *false negative*.

Kondisi *false positive* adalah siswa menjawab benar pada *tier* pertama dan salah pada *tier* kedua atau dapat diartikan bahwa pada kondisi ini siswa kurang paham (*deficiency understanding*) dengan suatu konsep, kurang pahamnya siswa yang mengindikasikan terjadinya miskonsepsi pada kondisi ini sangat sulit untuk dihilangkan

bahkan tidak dapat dihilangkan sama sekali. Sedangkan pada kondisi *false negative*, siswa menjawab salah pada *tier* pertama dan menjawab benar pada *tier* kedua atau dapat diartikan bahwa dalam kondisi ini sedikitnya informasi (*less informasi*) yang diperoleh siswa, miskonsepsi pada kondisi ini dianggap tidak bermasalah karena hal itu disebabkan oleh kecerobohan siswa dalam memberikan jawaban (Hestenes & Halloun, 1995). Oleh karena itu, dengan menggunakan *three-tier test* dalam menganalisis miskonsepsi siswa akan memberikan gambaran kepada guru dalam membedakan antara siswa yang paham konsep, miskonsepsi, tidak paham konsep dan kecerobohan siswa dalam menjawab soal, sehingga dapat memperbaiki miskonsepsi yang mereka miliki dengan perubahan konsep yang salah menuju konsep yang benar.

Penelitian yang relevan dan telah menggunakan instrumen *three tier test* adalah Cetin-Dindar dan Geban (2011) menyimpulkan bahwa *three tier test* adalah instrumen yang baik dalam menilai pemahaman siswa dibandingkan dengan tes konvensional pilihan ganda biasa, karena dengan menggunakan *Three-tier Test* juga dapat membedakan konsep alternatif siswa dari kurangnya pemahaman siswa terhadap materi melalui menganalisis tingkatan. Taslider (2016) dalam penelitiannya menyimpulkan bahwa *three-tier tes* yang dikembangkannya adalah alat ukur yang reliabel dan valid untuk menginvestigasi pemahaman konseptual dan miskonsepsi siswa.

Penelitian ini bertujuan untuk mengetahui besar persentase dan hasil analisis miskonsepsi yang bersumber dari dalam diri siswa pada materi geometri bidang dengan menggunakan instrumen diagnostik *three tier test*. Hasil penelitian diharapkan dapat memberikan wawasan dan pengetahuan baru bagi penulis dan bagi pendidik guna mengatasi dan menindaklanjuti miskonsepsi yang terjadi pada siswa pada setiap konsep geometri bidang dengan cara pertimbangan dalam memilih dan merancang strategi pembelajaran yang tepat agar kesalahpahaman konsep (miskonsepsi) dapat diminimalisirkan atau bahkan dihilangkan. Oleh karena itu, peneliti menganggap bahwa perlu dilakukannya analisis miskonsepsi siswa pada konsep geometri dengan menggunakan *three tier diagnostic test*.

METODE

Prosedur yang digunakan dalam penelitian ini menyesuaikan alur yang dikembangkan oleh Kutluay (2005) Istanbul. *While developing the test, interviews and open-ended tests were used to collect data to create the three-tier test. An interview questionnaire was developed based on the literature review. 15 11th grade students were interviewed by this questionnaire. Then, an open-ended test was created based on the interview results and also the literature review. It was applied to 114 11th grade science students. The responses of the students for each item were categorized considering the frequencies. Then, these categories were used in the development of the Three-tier Geometric Optic Misconception Test (TTGOMT, Pesman dan Eryilmaz (2010), dan Treagust (1988). Adapun secara garis di antaranya sebagai berikut: 1) mengidentifikasi konten, 2) mendapatkan informasi tentang miskonsepsi siswa, 3) melakukan wawancara untuk mengeksplorasi miskonsepsi yang dialami oleh siswa, 4) melakukan tes open ended sehingga respon siswa dijadikan distracters pada tingkat kedua, dan 5) mengembangkan produk dengan menggunakan hasil dari wawancara dan pertanyaan terbuka.*

Mengidentifikasi konten ditentukan berdasarkan kurikulum matematika dan buku teks yang digunakan disekolah yang diperiksa dan divalidasi konten dilakukan oleh dua dosen pembimbing dan satu guru mata pelajaran matematika. Melakukan wawancara terstruktur dan tes *open ended* untuk yang berujuan untuk mendapatkan sebanyak-banyaknya informasi tentang miskonsepsi siswa. Dari hasil pertimbangan dosen pembimbing dan guru bidang studi matematika didapatkan 15 pertanyaan yang digunakan untuk wawancara klinikal, yang kemudian respon para siswa dalam wawancara kemudian dianalisis untuk dijadikan pilihan jawaban pada pertanyaan tingkat pertama pada soal *three-tier test*. Selanjutnya pada tes *open ended* didapat 36 soal yang kemudian dianalisis untuk dijadikan pilihan jawaban pada pertanyaan tingkat kedua pada soal *three-tier test*, setelah *Two-tier Test* dibuat, peneliti kemudian menambahkan tingkatan ketiga (*tier 3*) dengan memberikan tingkat keyakinan (*confident level*) terhadap soal tingkat pertama dan soal tingkat kedua. Pemberian dua tingkat keyakinan yaitu yakin dan tidak yakin pada setiap soal yang telah dibuat. *Two-tier test*

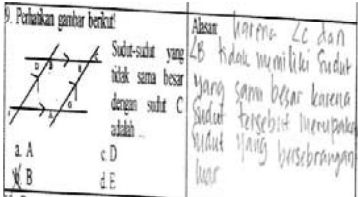
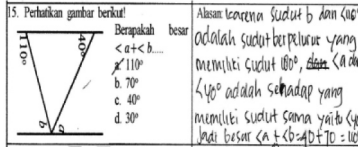
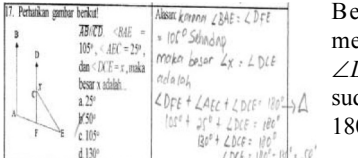
yang dikombinasikan dengan tingkat keyakinan (*confident level*) ini selanjutnya dinamakan *Three-tier Test*.

Instrumen diagnostik berbentuk *three tier test* terdiri atas 20 soal. Setiap soal terdiri atas tiga tingkatan, yaitu tingkat pertama berupa pilihan ganda konvensional, pada tingkat kedua berupa (*two tier*) yang terdiri dari satu set pilihan alasan untuk menjawab pertanyaan pada tingkat pertama, dimana siswa harus memilih alasan atas jawaban yang mereka pilih pada pertanyaan tingkat pertama. Ruang kosong juga disediakan bagi siswa untuk memilih alasan lain pada pertanyaan tingkat kedua dan pada tingkat ketiga (*three-tier*) siswa dapat memilih sebuah keyakinan atas jawaban yang mereka pilih pada tingkat pertama dan kedua (Kaltakci & Didis, 2007). Delapan kemungkinan kombinasi jawaban siswa dan pedoman pengkategorian jawaban

untuk soal penguasaan konsep *three tier* dapat dilihat di tabel 3.

Validitas dan reabilitas instrumen *three tier test* juga ditentukan. Uji validitas terdiri dari Validitas isi yang diperoleh dari dua dosen pembimbing dan satu guru mata pelajaran matematika. Validitas konstruk dan Validitas Korelasi antara Tingkat Kepercayaan (*confident level*) dan skor 2 ditentukan melalui uji coba instrumen pada 42 siswa SMA yang telah menerima materi geometri bidang. Reliabilitas instrumen diperoleh sebesar 0,780 yang termasuk kategori dapat diterima (George & Mallery, 2003). Instrumen diagnostik *three tier test* yang digunakan telah memenuhi syarat untuk dapat digunakan dalam penelitian. Pada Tabel 1 disajikan konsep dan miskonsepsi jawaban siswa pada tahap wawancara dan *tes open ended*.

Tabel 1. Konsep dan Miskonsepsi Jawaban Siswa pada Tahap Wawancara dan Test Openended

Konsep yang terkait	Miskonsepsi	Nomor butir soal
Menyebutkan Konsep Kesimetrian dan Sudut	<p>Bangun datar dikatakan memiliki simetri lipat karena bangun tersebut dibagi oleh garis diagonal, yaitu garis yang dapat menghubungkan dua titik sudut yang saling berhadapan.</p> <p>Dari dua garis lurus sejajar yang dipotong oleh garis lurus lainnya akan terbentuk sudut saling bertolak belakang, sudut simetri, sudut siku-siku, sudut tumpul, sudut lancip dan sudut yang saling berhimpit, sudut saling berpotongan, sudut sepihak luar yang sama besar dan sepihak dalam yang memiliki besar sudut sama besar juga</p>	1, 2
Menjelaskan Kesimetrian dan Sudut	<p>Belah ketupat menyerupai bentuk seperti bujur sangkar yang memiliki empat simetri lipat</p> <p>Belah ketupat memiliki bentuk sama dengan persegi yang memiliki sisi sama panjang dan memiliki empat simetri lipat dan simetri putar yang apabila diputar sebesar 90°</p>  <p>Sudut yang memiliki besar tidak sama dengan sudut C adalah sudut B karena sudut B saling berseberangan luar dengan sudut C</p>	3, 4, 5
Memahami Teknik Penyelesaian Kesimetrian dan Sudut	<p>Oval memiliki simetri putar sebanyak dua apabila diputar dengan sudut putar 90°</p>  <p>$\angle a + \angle b$ adalah 110°, karena $\angle b$ berpelurus dengan 110° dan $\angle a$ sehadap dengan 40°</p>  <p>Besar sudut x adalah 50°, mereka menganggap bahwa ketiga sudut yaitu $\angle DFE$, $\angle AEC$ dan $\angle DCE$ membentuk sudut segitiga yang memiliki besar sudut 180°.</p>	6, 7, 8, 9

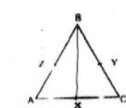
Menyelesaikan Masalah Kesimetrian dan Sudut

11. Pak Samud adalah seorang pemahat. Ia membuat tanah di suatu daerah dengan ukuran 10×10 m. Jika las tanah tersebut akan dipasang batako berbentuk segi enam beraturan. Maka berapa banyaknya simetri lipat yang terbentuk dari batako tersebut?

a. 1 c. 4
b. 2 d. 6

Alasan: Berapa 2 Simetri Lipat dan Simetri Sumbu

Siswa menganggap bahwa batako yang berbentuk segienam beraturan memiliki simetri lipat sebanyak 2 karena terdapat dua sumbu simetri yaitu kearah vertikal dan horizontal.



Segitiga sama sisi memiliki satu simetri lipat dan satu sumbu simetri, \overline{AB} akan berhimpit dengan

20. Perhatikan bidang berikut!

Berapa banyaknya simetri putar pada bidang datar tersebut yang memiliki sisi-sisi yang saling beraturan...

a. 1 c. 4
b. 2 d. 6

Alasan: karena bidang tersebut simetri putar 2 simetri putar jadi dapat diputar 180°
 $\frac{360}{2} = 180^\circ$

Siswa menganggap bahwa terdapat dua simetri putar dengan sudut putarnya sebesar 180° .

10, 11, 12, 13

22. Perhatikan gambar berikut!

$\overline{AB} \parallel \overline{CD}$ dan $\overline{AD} \parallel \overline{BC}$.
Jika $\angle EAC = 40^\circ$,
 $\angle FDG = 55^\circ$ dan $\angle HAB = x^\circ$ maka besar x adalah...

a. 165°
b. 55°
c. 50°
d. 85°

Alasan: Karena $\angle EAC$ dan $\angle HDG$ beraturan maka

Siswa menganggap bahwa besar sudut memiliki besar sudut sama dengan $\angle FDG$ yaitu 55° karena saling berseberangan luar dengan $\angle FDG$.

Menyebutkan bunyi Dalil Segitiga dan Segmen Garis

25. Jika terdapat dua garis atau lebih yang sejajar kemudian dipotong oleh kedua garis yang saling berpotongan maka besar rasio dari ruas garis perpotongan pertama adalah...

a. Sama dengan rasio dari ruas garis perpotongan kedua
b. Perbandingan rasio dari kedua ruas garis yang saling berpotongan bernilai satu
c. 2 kali rasio dari ruas garis perpotongan kedua
d. $\frac{1}{2}$ kali rasio dari ruas garis perpotongan kedua

Alasan: karena menggunakan dalil Intersep

Siswa menganggap bahwa bunyi dalil intersep adalah jika terdapat dua garis atau lebih yang sejajar kemudian dipotong oleh kedua garis yang saling berpotongan maka perbandingan rasio dari kedua ruas garis yang saling berpotongan bernilai satu

14, 15

1. Pernyataan yang benar adalah...

1. Melalui dua titik yang diberikan dapat dibuat satu garis.
2. Dua garis tidak berpotongan pada lebih dari dua titik.
3. Melalui satu titik pada satu garis dapat dibuat dua garis yang tegak lurus terhadap garis tersebut.
4. Jarak terpendek antara dua titik adalah panjang ruas garis yang menghubungkan titik-titik tersebut.

Alasan: karena Dalil 5

Siswa menganggap bahwa jika terdapat sebuah titik pada suatu garis dapat dibentuk dua garis yang saling tegak lurus hal itu sesuai dengan dalil lima segmen garis

Menjelaskan Dalil Segitiga dan Segmen Garis

29. Jika di ketahui panjang $\overline{AB} = 6$ cm dan panjang $\overline{BC} = 8$ cm. Maka panjang x dari gambar segitiga disamping adalah...

a. 5 cm c. 10 cm
b. 7,5 cm d. 60 cm

Alasan: $AC = \sqrt{AB^2 + BC^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10$
AC sejajar dengan x maka panjang x sama dengan AC = 10 cm

Siswa menganggap bahwa x memiliki panjang 10 cm, karena x sejajar dengan \overline{AC}

16, 17

32. Perhatikan gambar!

Jika $\overline{AD} \parallel \overline{BE}$, maka pernyataan yang benar adalah...

a. $\overline{AE} \parallel \overline{DE}$ c. $\overline{AD} \parallel \overline{DE}$
b. $\overline{AE} \parallel \overline{DE}$ d. $\overline{AB} \parallel \overline{DE}$

Alasan: Karena $\overline{AD} \parallel \overline{BE}$, yaitu $\overline{AD} + \overline{DE} = \overline{AE}$ dan $\overline{BE} + \overline{DE} = \overline{AE}$ maka $\overline{AD} + \overline{DE} = \overline{BE} + \overline{DE}$

Siswa menganggap bahwa pernyataan yang benar adalah $\overline{AB} \parallel \overline{DE}$, karena $\overline{AD} \parallel \overline{BE}$ maka $\overline{AD} + \overline{DE} = \overline{BE} + \overline{DE}$

Menyelesaikan Masalah Dalil Segitiga dan Segmen Garis

Perhatikan gambar berikut!

Jika diketahui panjang $\overline{EC} = 10$ cm, $\overline{ED} = 10$ cm, $\overline{AD} = 10$ cm, dan $\overline{AE} \parallel \overline{BC}$, $\overline{AB} \parallel \overline{DC}$, maka panjang \overline{EF} adalah...

a. 4 cm c. 8 cm
b. 5 cm d. 10 cm

Alasan: $EF = 10$ cm
Karena \overline{EF} sejajar dengan \overline{BC} , jadi besarnya sama yaitu 10 cm

Siswa menganggap bahwa panjang $\overline{EF} = 10$ cm karena sejajar dengan \overline{BC}

18, 19, 20

36. Jika $\overline{RT} \parallel \overline{RS}$, $\overline{DR} = \frac{1}{2} \overline{RT}$ dan $\overline{RE} = \frac{1}{2} \overline{RS}$, maka pernyataan yang benar adalah...

a. $\overline{DR} \parallel \overline{RE}$ c. $\overline{DR} \parallel \overline{TE}$
b. $\overline{RE} \parallel \overline{RT}$ d. $\overline{TD} \parallel \overline{RS}$

Alasan: Yes Open end

Siswa menganggap bahwa pernyataan yang benar adalah $\overline{DR} \parallel \overline{TE}$ karena Karena $\overline{RT} \parallel \overline{RS}$

Tabel 2. Penilaian Skor Tingkat 3

Tingkat Pertama	Tingkat Kedua	Skor 2	Tingkat Ketiga	Skor 3
Benar (1)	Benar (1)	1	Yakin (1)	1
Benar (1)	Benar (1)	1	Tidak Yakin (0)	0
Benar (1)	salah (0)	0	Tidak Yakin (0)	0
Benar (1)	salah (0)	0	Yakin (1)	0
Salah (0)	salah (0)	0	Tidak Yakin (0)	0
Salah (0)	Benar (1)	0	Tidak Yakin (0)	0
Salah (0)	Benar (1)	0	Yakin (1)	0
Salah (0)	salah (0)	0	Yakin (1)	0

Tabel 3. Kategori Jawaban *Three Tier Test*

Tingkat pertama	Tingkat kedua	Tingkat ketiga	Kategori
Benar	Benar	Yakin	Paham Konsep
Benar	Salah	Yakin	Miskonsepsi (<i>False Positive</i>)
Salah	Benar	Yakin	Miskonsepsi (<i>False Negative</i>)
Salah	Salah	Yakin	Miskonsepsi
Benar	Benar	Tidak Yakin	Menebak, Tidak percaya diri
Benar	Salah	Tidak Yakin	Tidak Paham Konsep
Salah	Benar	Tidak Yakin	Tidak Paham Konsep
Salah	Salah	Tidak Yakin	Tidak Paham Konsep

(Arslan et al., 2012)

Setelah data terkumpul dari hasil pengumpulan data dengan menggunakan *three-tier test*. Selanjutnya menghitung skor pada soal *three-tier diagnostic test*, peneliti mengadopsi teknik penskoran berdasarkan skor yang ditetapkan pada jurnal yang ditulis oleh Haki Pesman dan Eryilmaz (Pesman & Eryilmaz, 2010). Adapun kriteria penskoran berdasarkan tingkat pertama, kedua dan ketiga tertera pada Tabel 2.

Perhitungan ini memiliki tujuan pengategorian untuk menempatkan individu kedalam kelompok terpisah secara berjenjang berdasarkan variabel yang diukur menurut tingkatannya dalam menentukan siswa yang mengalami miskonsepsi, tidak tahu konsep (*lack of knowledge*), menebak atau tidak percaya diri atas jawaban yang telah diberikan dan yang paham konsep. Adapun dalam menghitung presentase tingkat pemahaman siswa dengan menggunakan rumus sebagai berikut.

$$\text{persentase} = \frac{(\text{jumlah skor konsepsi})}{(\text{jumlah skor maksimal})} \times 100\%$$

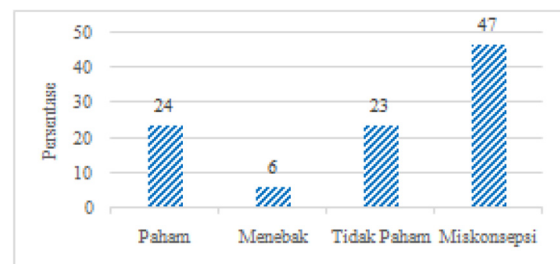
(Kusairi, & Zulaikah, 2017)

HASIL DAN PEMBAHASAN

Analisis Konsepsi Siswa secara Keseluruhan Konsep dalam Instrumen Diagnostik

Hasil analisis data dari instrumen diagnostik *three tier test* siswa terhadap sejumlah siswa

(43 orang) yang menjadi subjek penelitian, hasilnya ditunjukkan pada Gambar 1.

**Gambar 1. Analisis Pengelompokan Jawaban Siswa**

Secara garis besar siswa mengalami miskonsepsi lebih tinggi dua kali lipat dibanding siswa yang paham konsep, tidak paham konsep dan menebak atau tidak yakin dalam menjawab. Tingginya persentase miskonsepsi yang terjadi pada siswa kelas X MIPA 3 SMAN I Babakan menunjukkan bahwa siswa kurang paham atau sedikitnya informasi yang mereka peroleh dalam proses pembelajaran pada konsep geometri bidang. Kurang atau sedikitnya informasi yang diperoleh siswa disebabkan karena siswa sendiri.

Selanjutnya miskonsepsi yang terjadi pada siswa dibagi menjadi menjadi tiga kategori yang mengacu pada penelitian yang dilakukan oleh Arslan, Cigdemoglu dan Moseley (Arslan et al., 2012). Pengkategorian ini didasari pada jawaban siswa yang memunculkan miskonsepsi pada ka-

tegori miskonsepsi pada kondisi *false negative*, *false positive* dan miskonsepsi murni. Dari ketiga kategori tersebut didapat berdasarkan Tabel 4 rata-rata total kategori miskonsepsi pada kondisi *false negative* sebesar (7,6%), miskonsepsi pada kondisi *false positive* sebesar (17,9%) dan kategori miskonsepsi murni sebesar (22%). Berdasarkan Gambar 1 dan Tabel 4 dapat disimpulkan bahwa hampir sebagian siswa dikelas X MIPA 3 SMAN I Babakan mengalami miskonsepsi dengan persentase miskonsepsi murni lebih tinggi dibanding kategori miskonsepsi lainnya.

Tabel 4. Persentase Kategori Jawaban Miskonsepsi Siswa

No. Soal	Kategori Jawaban Siswa (%)		
	False Negatif	False Positif	Miskonsepsi
1	7,1	21,4	9,5
2	9,5	9,5	21,4
3	16,7	31,0	33,3
4	7,1	28,6	19,0
5	0,0	21,4	21,4
6	7,1	11,9	14,3
7	19,0	19,0	14,3
8	9,5	9,5	7,1
9	7,1	14,3	35,7
10	0,0	4,8	33,3
11	9,5	9,5	16,7
12	2,4	38,1	23,8
13	7,1	21,4	16,7
15	7,1	7,1	40,5
14	7,1	9,5	38,1
16	7,1	31,0	21,4
17	2,4	33,3	9,5
18	7,1	19,0	19,0
19	19,0	9,5	7,1
20	0,0	11,9	16,7
Mean	7,6%	18,1%	21,0%

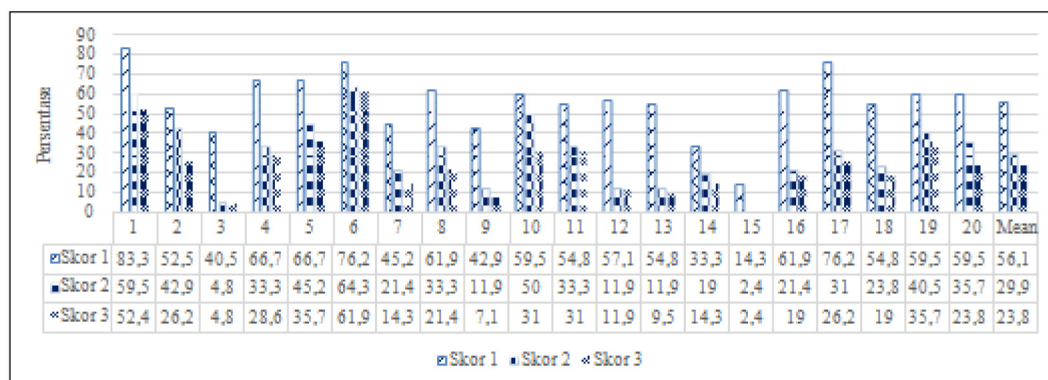
Analisis Jawaban Siswa Berdasarkan Skor

Perbandingan skor 1 diperoleh dari tingkat pertama (pilihan ganda), skor 2 diperoleh dari tingkat pertama dan kedua serta skor 3 diperoleh dari tingkat pertama, kedua dan tingkat keyakinan. Hasil rekapitulasi skor 1, skor 2 dan skor 3 dapat dilihat pada Gambar 2.

Pada skor 1 siswa umumnya menjawab benar paling tinggi yaitu sebesar 56,1% itu artinya, pada tingkat pertama (pilihan ganda) dikategorikan bahwa tingkat pertama memiliki tingkat kesulitan rendah. Semakin naik tingkatannya maka jawaban benar siswa semakin rendah karena tingkat kesulitan semakin tinggi, walaupun tingkat kedua dan ketiga memiliki persentase yang tidak jauh berbeda jika dibandingkan skor 1. Dengan demikian, dapat dinyatakan bahwa dengan mengerjakan soal bentuk *Three-Tier Test* siswa lebih tinggi mengalami miskonsepsi dari pada paham konsep setelah diberikan konsep geometri bidang pada proses belajar dan pembelajaran. Bentuk soal *Three-Tier Test* memiliki perbedaan dengan tes pada umumnya karena tes ini memiliki tiga tingkat proses, akibatnya dibutuhkan pemikiran dan pemahaman lebih dalam lagi sehingga waktu pengerjaan lebih lama.

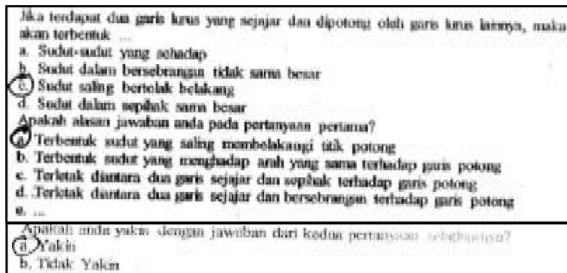
Konsepsi Siswa tentang Menyebutkan Konsep Kesimetrian dan Sudut

Butir soal untuk mengungkapkan konsepsi siswa tentang menyebutkan konsep kesimetrian dan sudut disajikan pada soal nomor 2. Jawaban yang tepat dari pernyataan tersebut pada *tier* pertama adalah A dan pada *tier* kedua adalah B. Berdasarkan data tersebut tampak bahwa persentase siswa mengalami miskonsepsi sebesar 40,4% hanya 26,2% siswa yang memahami konsep, 16,7% siswa tidak paham konsep dan 16,7% siswa menebak jawaban yang telah



Gambar 2. Grafik Persentase Perbandingan Skor Jawaban Siswa

diberikan. Persentase siswa mengalami miskonsepsi murni lebih tinggi yaitu sebesar 21,4% dengan pilihan jawaban terbanyak siswa mengalami miskonsepsi murni pada pilihan C-A-A sebesar 44,4%.



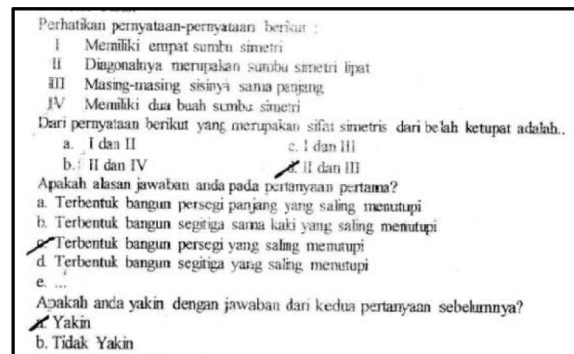
Miskonsepsi siswa pada indikator ini sudah ditemukan pada penyusunan soal *Three-Tier Test* tahap pertama yaitu wawancara, siswa menganggap bahwa sudut-sudut pada dua garis sejajar yang dipotong oleh garis lainnya akan terbentuk sudut-sudut saling bertolak belakang, dan pada tahap kedua yaitu tes *open ended* siswa menganggap bahwa sudut-sudut pada dua garis sejajar yang dipotong oleh garis lainnya akan terbentuk sudut-sudut saling bertolak belakang yang membelakangi titik potongnya.

Kesalahan atau miskonsepsi murni yang terjadi pada siswa dikarenakan siswa salah dalam memberikan jawaban pada kedua tingkat sebelumnya dan yakin atas jawaban yang telah diberikan, sehingga miskonsepsi disebabkan oleh perkembangan kognitif siswa yang tidak sesuai dengan apa yang sudah dipelajari, biasanya terjadi pada bahan yang abstrak sehingga siswa sulit menangkap dan sering salah mengerti tentang konsep (Suparno, 2013).

Konsep Siswa tentang Menjelaskan Konsep Kesimetrian dan Sudut

Butir soal untuk mengungkapkan konsepsi siswa tentang menyebutkan konsep kesimetrian dan sudut disajikan pada soal nomor 3. Jawaban yang tepat dari pernyataan tersebut pada *tier* pertama adalah B dan pada *tier* kedua adalah B. Berdasarkan data tersebut tampak bahwa persentase siswa mengalami miskonsepsi sebesar 80%, hanya 4,8% siswa memahami konsep dan 14,3% siswa tidak paham konsep. Persentase siswa mengalami miskonsepsi murni lebih besar yaitu 33,3% dibandingkan dengan miskonsepsi pada kondisi *false negative* dan *false positive*. Siswa mengalami miskonsepsi murni, dengan pilihan

jawaban terbanyak siswa terjadi pada pilihan D-C-A sebesar 42,8%.



Pada indikator ini sebelumnya sudah ditemukan pada saat penyusunan soal *Three-Tier Test* tahap pertama yaitu wawancara, siswa menganggap bahwa belah ketupat sama dengan persegi yang memiliki sisi sama panjang dan memiliki empat simetri lipat, sedangkan pada tahap kedua yaitu tes *open ended* siswa menganggap bahwa belah ketupat menyerupai bentuk seperti bujur sangkar (persegi) yang memiliki empat simetri lipat, belah ketupat memiliki dua simetri lipat yang jika di tarik garis akan membentuk bangun segitiga sama sisi karena masing-masing sisinya sama panjang dan yang lain menganggap bahwa belah ketupat memiliki satu simetri lipat yang masing-masing sisinya tidak sama panjang.

Miskonsepsi terjadi karena siswa menjawab salah pada tingkat pertama dan tingkat kedua dengan yakin terhadap kedua tingkat sebelumnya. Miskonsepsi yang terjadi pada siswa pada indikator soal nomor tiga merupakan miskonsepsi yang terjadi disebabkan oleh pemikiran asosiatif siswa, siswa menganggap bahwa belah ketupat ketika dilipat akan membentuk bangun persegi karena belah ketupat memiliki bentuk yang sama dengan persegi karena keduanya memiliki sisi sama panjang.

Konsep Siswa tentang Memahami Teknik Penyelesaian Kesimetrian dan Sudut

Butir soal untuk mengungkapkan konsepsi siswa tentang menyebutkan konsep kesimetrian dan sudut disajikan pada soal nomor 9. Jawaban yang tepat dari pernyataan tersebut pada *tier* pertama adalah D dan pada *tier* kedua adalah D. Berdasarkan data tersebut tampak bahwa persentase siswa mengalami miskonsepsi sebesar 57,1%, hanya 7,1% siswa memahami kon-

sep, 4,8% siswa menebak dalam menjawab soal, dan 31% siswa tidak paham konsep. Persentase siswa mengalami miskonsepsi murni lebih besar yaitu 35,7% dengan pilihan jawaban terbanyak siswa mengalami miskonsepsi murni pada pilihan C-A-A sebesar 26,7%. Siswa yang mengalami miskonsepsi murni menganggap bahwa besar $\angle DCE$ adalah 105° jawaban salah yang diberikan pada tingkat pertama dengan alasan yang tidak sesuai pada tingkat kedua, bahwasanya $\angle DCE$ memiliki hubungan saling sehadap dengan $\angle BAF$ serta meyakini jawaban yang telah diberikan pada kedua tingkat sebelumnya.

Perhatikan gambar berikut!

$AB \parallel CD$, $\angle BAE = 105^\circ$, $\angle AEC = 25^\circ$, dan $\angle DCE = x$, maka besar x adalah...

a. 25°
 b. 50°
 c. 105°
 d. 130°

Apakah alasan jawaban anda pada pertanyaan pertama?

a. $\angle DCE$ sehadap dengan $\angle BAF$
 b. $\angle DCE$ berseberangan dalam dengan $\angle FEC$
 c. $\angle DCE$ bertolak belakang dengan $\angle ECF$
 d. $\angle DCE$ saling berpelurus dengan $\angle ECF$
 e. ...

Apakah anda yakin dengan jawaban dari kedua pertanyaan sebelumnya?

a. Yakin
 b. Tidak yakin

Pada tahap sebelumnya miskonsepsi ini juga sudah ditemukan pada tahap kedua pembuatan soal *Three-Tier Test*, yaitu tes *open ended* siswa menganggap bahwa besar sudut x adalah 50° karena $\angle DFE$, $\angle AEC$ dan $\angle DCE$ membentuk sudut segitiga yang memiliki besar sudut 180° . Kesalahan atau miskonsepsi murni yang terjadi pada siswa disebabkan oleh penalaran siswa yang tidak lengkap atau salah. Akibatnya siswa salah dalam menarik kesimpulan dan menggeneralisasikan pengetahuannya (Suparno, 2013).

Konsep Siswa tentang Memecahkan Masalah Kesimetrian dan Sudut

Butir soal untuk mengungkapkan konsep siswa tentang menyebutkan konsep kesimetrian dan sudut disajikan pada soal nomor 10. Jawaban yang tepat dari pernyataan tersebut pada *tier* pertama adalah D dan pada *tier* kedua adalah D. Berdasarkan data tersebut tampak bahwa persentase siswa mengalami miskonsepsi sebesar 38,1%, siswa memahami konsep sebesar 31%, siswa menebak dalam menjawab soal sebesar 19%, dan siswa tidak paham konsep sebesar 11,9%. Persentase siswa mengalami miskonsepsi murni lebih besar yaitu 33,3% dengan pilihan jawaban terbanyak siswa mengalami miskonsepsi murni pada pilihan B-B-A sebesar 42,8%. Siswa yang

mengalami miskonsepsi murni menganggap bahwa batako yang memiliki sisi saling beraturan memiliki 2 sumbu simetri B-salah dengan alasan bahwa bidang tersebut memiliki simetri putar tingkat dua pilihan jawaban B-salah.

Pak Sunar adalah seorang pengusaha, ia membeli tanah di suatu daerah dengan ukuran 10×10 m. Jika luas tanah tersebut akan dipasang batako berbentuk segi enam beraturan. Maka berapa banyakkah simetri lipat yang terbentuk dari batako tersebut?

a. 1
 b. 2
 c. 4
 d. 6

Apakah alasan jawaban anda pada pertanyaan pertama?

a. Memiliki sumbu simetri sebanyak satu
 b. Memiliki sumbu simetri sebanyak dua
 c. Memiliki sumbu simetri sebanyak empat
 d. Memiliki sumbu simetri sebanyak enam
 e. ...

Apakah anda yakin dengan jawaban dari kedua pertanyaan sebelumnya?

a. Yakin
 b. Tidak yakin

Miskonsepsi ini juga sudah ditemukan pada tahap kedua pembuatan soal *Three-Tier Test*, yaitu tes *open ended* siswa menganggap bahwa batako yang berbentuk segienam beraturan memiliki simetri lipat sebanyak 1 lipatan karena hanya dapat dilipat sebanyak satu kali. Kesalahan atau miskonsepsi murni terjadi karena prakonsep atau konsep awal saat membaca dan memahami soal. Miskonsepsi yang dialami siswa diperoleh dari pengalaman hidup mereka sendiri, yang setiap hari melihat dan mengamati secara langsung bentuk dari batako yang memiliki sisi saling beraturan (Suparno, 2013).

Konsep Siswa tentang Menyebutkan Bunyi Dalil Segitiga dan Segmen Garis

Butir soal untuk mengungkapkan konsep siswa tentang menyebutkan konsep kesimetrian dan sudut disajikan pada soal nomor 14. Jawaban yang tepat dari pernyataan tersebut pada *tier* pertama adalah D dan pada *tier* kedua adalah A. Berdasarkan data tersebut tampak bahwa persentase siswa mengalami miskonsepsi sebesar 54,7%, hanya 14,3% siswa memahami konsep, 4,8% siswa menebak dalam menjawab soal, dan 26,2% siswa tidak paham konsep. Persentase siswa mengalami miskonsepsi murni lebih besar yaitu 40,5% dibanding dua miskonsepsi lainnya. Siswa mengalami miskonsepsi murni dengan pilihan jawaban terbanyak siswa mengalami miskonsepsi murni pada pilihan C-C-A sebesar 52,9%. Miskonsepsi ini juga sudah ditemukan pada tahap pertama yaitu wawancara, siswa menganggap bahwa bunyi dalil intersep adalah apabila terdapat dua ruas garis yang saling berpotong kemudian dipotong oleh dua garis yang saling sejajar maka rasionya satu. Pada tahap kedua pembuatan soal *Three-Tier Test*, yaitu

tes *open ended* siswa menganggap bahwa bunyi dalil intersep adalah jika terdapat dua garis atau lebih yang sejajar kemudian dipotong oleh kedua garis yang saling berpotongan maka perbandingan rasio dari kedua ruas garis yang saling berpotongan bernilai satu.

Jika terdapat dua garis atau lebih yang sejajar kemudian dipotong oleh kedua garis yang saling berpotongan maka besar rasio dari ruas garis perpotongan pertama adalah...

- Sama dengan rasio dari ruas garis perpotongan kedua
- Perbandingan rasio dari kedua ruas garis yang saling berpotongan Bernilai satu
- 2 kali rasio dari ruas garis perpotongan kedua
- rasio kuadrat sisi miring (hipotenusa) sama dengan jumlah kuadrat dua sisi yang lainnya

Apakah alasan jawaban anda pada pertanyaan pertama?

- Sesuai dengan dalil de ceva
- Sesuai dengan dalil phytagoras
- Sesuai dengan dalil titik tengah
- Sesuai dengan dalil intersep
- ...

Apakah anda yakin dengan jawaban dari kedua pertanyaan sebelumnya?

- Yakin
- Tidak yakin

Siswa mengalami miskonsepsi intuisi yang salah yaitu miskonsepsi yang berasal dari perasaan diri seseorang, yang terjadi secara spontan mengungkapkan sikap atau gagasan (Suparno, 2013). Siswa menganggap bahwa jika ada dua garis atau lebih yang sejajar kemudian dipotong oleh kedua garis yang saling berpotongan maka besar rasio dari ruas garis perpotongan pertama dua kali dari rasio ruas garis perpotongan pertama jawaban C-salah, siswa menganggap bahwa hal itu merupakan bunyi dari dalil titik tengah segitiga jawaban C-salah.

Konsepsi Siswa tentang Menjelaskan Dalil Segitiga dan Segmen Garis

Butir soal untuk mengungkapkan konsepsi siswa tentang menyebutkan konsep kesimetrian dan sudu disajikan pada soal nomor 16. Jawaban yang tepat dari pernyataan tersebut pada *tier* pertama adalah A dan pada *tier* kedua adalah B. Berdasarkan data tersebut tampak bahwa persentase siswa mengalami miskonsepsi sebesar 59,5%, hanya 19% siswa memahami konsep, 2,4% siswa menebak dalam menjawab soal, dan 19% siswa tidak paham konsep. Pada indikator soal nomor enambelas siswa mengalami miskonsepsi *false positive* pada indikator soal nomor enambelas menjawab A-A-A sebanyak 76,9%.

Jika diketahui panjang $AB = 6$ cm dan panjang $BC = 8$ cm. Maka panjang x dari bidang tersebut adalah ...

- 5 cm
- 7,5 cm
- 10 cm
- 60 cm

Apakah alasan jawaban anda pada pertanyaan pertama?

- Sesuai dengan dalil phytagoras
- Sesuai dengan dalil titik tengah
- Sesuai dengan dalil intersep
- Sesuai dengan dalil de ceva
- ...

Apakah anda yakin dengan jawaban dari kedua pertanyaan sebelumnya?

- Yakin
- Tidak yakin

Sebelumnya miskonsepsi siswa pada indikator ini sudah ditemukan pada saat penyusunan soal *Three-Tier Test* tahap pertama yaitu wawancara, siswa menganggap bahwa panjang x adalah 5 cm untuk mencari panjang x mereka menggunakan perhitungan dalil phytagoras. Pada tahap kedua penyusunan soal *Three-Tier Test* yaitu pertanyaan terbuka mereka menganggap panjang x adalah 10 cm untuk mencari panjang x mereka menggunakan perhitungan dalil phytagoras. Siswa mengalami miskonsepsi intuisi yang salah yaitu miskonsepsi yang berasal dari perasaan diri seseorang, yang terjadi secara spontan mengungkapkan sikap atau gagasan (Suparno, 2013). Siswa meyakini bahwa panjang x adalah 5 cm jawaban A-benar karena menggunakan perhitungan dalil phytagoras jawaban A-salah.

Konsepsi Siswa tentang Menelesaikan Masalah Dalil Segitiga dan Segmen Garis

Butir soal untuk mengungkapkan konsepsi siswa tentang menyebutkan konsep kesimetrian dan sudu disajikan pada soal nomor 18. Jawaban yang tepat dari pernyataan tersebut pada *tier* pertama adalah B dan pada *tier* kedua adalah A. Berdasarkan data tersebut tampak bahwa persentase siswa mengalami miskonsepsi sebesar 45,1%, hanya 19% siswa memahami konsep, 4,8% siswa menebak dalam menjawab soal, dan 31% siswa tidak paham konsep.

Perhatikan gambar berikut!

Jika diketahui panjang $BC = 10$ cm, $AD = DE$, dan $AE = EC$, $AB \parallel FC$, dengan $FC = 4$ cm. AC adalah garis lurus. Maka panjang EF adalah...

- 4 cm
- 5 cm
- 8 cm
- 10 cm

Apakah alasan jawaban anda pada pertanyaan pertama?

- $\triangle EAD \cong \triangle ECF$ maka panjang EF adalah $\frac{1}{2}$ dari panjang BC
- $AB \parallel FC$ dan panjang $BC \parallel DE$ maka panjang $EF =$ panjang BC
- $AB \parallel FC$ maka panjang $EF =$ panjang FC
- $BD \parallel FC$ dan $BD = 2$ kali panjang AB maka panjang $EF = 2$ kali panjang BD
- ...

Apakah anda yakin dengan jawaban dari kedua pertanyaan sebelumnya?

- Yakin
- Tidak yakin

Pada indikator soal nomor delapanbelas siswa mengalami miskonsepsi pada kategori *false positive* dan miskonsepsi murni sebesar

19%. Miskonsepsi pada kondisi *false positive* dan miskonsepsi murni pada indikator soal nomor delapan belas dengan menjawab B-D-A dan C-C-A masing-masing sebesar 44,4% dan 33,3%. Sebelumnya miskonsepsi siswa pada indikator ini sudah ditemukan pada saat penyusunan soal *Three-Tier Test* tahap kedua penyusunan soal *Three-Tier Test* yaitu pertanyaan terbuka mereka menganggap bahwa pernyataan yang benar adalah $\overline{AB} \cong \overline{DE}$, karena $\overline{AD} \cong \overline{BE}$ maka $\overline{AD} + \overline{DE} = \overline{EB} + \overline{DE}$.

Berdasarkan gambar 1 diperoleh rendahnya rerata pemahaman siswa yaitu sebesar 24%. Siswa dikatakan telah memahami konsep apabila ia dapat membedakan contoh dan bukan contoh dari konsep itu, persamaan dan bukan persamaan dari konsep tersebut serta menggunakannya dalam berbagai situasi (Krismanto, 2003). Siswa yang memahami konsep tidak akan mengingat konsep yang telah mereka pelajari, akan tetapi mereka dapat menggunakan dan menjelaskan konsep tersebut dengan bahasanya sendiri sesuai dengan pilihan jawaban yang telah disediakan.

Tidak paham konsep terjadi apabila tingkat pertama memiliki persentase lebih tinggi dibanding tingkat kedua dengan persentase keyakinan dibawah 69% (Lestari, 2015). Rerata persentase tidak paham siswa sebesar 23%, Siswa yang tidak memahami konsep mungkin saja disebabkan karena pengetahuan yang diperoleh siswa kurang membantu dalam memahami konsep geometri bidang atau konsep tersebut asing bagi mereka sehingga siswa merasa kesulitan dalam mengabstraksikan konsep tersebut (Tunc, Kubra Cam, & Dokme, 2012) *non - scientific beliefs, naive theories, mixed conceptions, or conceptual misundestandings* (Driver & Easley, 1978; Viennot, 1979; Caramazza, Closkey & Green, 1981; Eryu0131lmaz & Tatlu0131, 1999; Gu00fcl\u00e7i\u00e7ek & Ya\u011fban, 2004; Demirci & \u00c7irkino\u011flu, 2004. Kesulitan yang dialami siswa juga diduga karena pelajaran yang disampaikan guru tidak tersampaikan dengan baik sehingga siswa tidak memahami konsep. Kemungkinan yang menyebabkan hal ini dapat terjadi adalah karena siswa tidak mendengarkan penjelasan yang guru sampaikan dengan baik atau pengaruh dari kemampuan menyerap pelajaran yang berbeda-beda pada siswa dalam satu kelas. Mereka yang tidak mendengarkan penjelasan dari guru dengan baik kemungkinannya adalah mereka yang tidak berminat

atau membenci mata pelajaran tersebut. Siswa dikatakan tidak memiliki minat dalam pelajaran matematika apabila mereka salah dalam memahami pelajaran tersebut dan tidak berminat untuk mengetahui mana konsep yang benar dan salah. Akibatnya, ia akan semakin menumpuk kesalahan yang dibangun berdasarkan miskonsepsi tersebut (Suparno, 2013). Siswa yang tidak memahami konsep mengindikasikan bahwa mereka tidak mampu menjelaskan kembali konsep yang telah mereka pelajari sebelumnya. Mereka juga akan memberikan respon yang tidak jelas ketika dihadapkan pada sebuah pertanyaan (Abraham, Grzybowski, Renner, & Marek, 1992). Respon tidak jelas ini adalah situasi dimana rendahnya keyakinan siswa atas jawaban yang mereka berikan pada kedua tingkat sebelumnya, terlepas jawaban itu benar atau salah pada tingkat pertama dan/atau tingkat kedua (Hasan et al., 1999).

Rendahnya keyakinan siswa juga mengindikasikan bahwa jawaban siswa termasuk kedalam kategori menebak (*lack of confidence*). Ketidakpercayaan diri siswa atau menebak dalam menjawab soal disebabkan karena minimnya pemahaman siswa terhadap konsep geometri bidang sehingga siswa merasa tidak yakin atas jawaban mereka yang sudah benar. Adapun rerata persentase miskonsepsi siswa tertinggi yaitu sebesar 47,5% dengan urutan subkonsep dengan miskonsepsi tertinggi hingga terendah pada konsep geometri bidang yang terjadi adalah sebagai berikut:

1. Menjelaskan Kesimetrian dan Sudut (59,5%)
2. Menyebutkan bunyi Dalil Segitiga dan Segmen Garis (54,8%)
3. Menjelaskan Dalil Segitiga dan Segmen Garis (52,4%)
4. Menyelesaikan Masalah Kesimetrian dan Sudut (47,6%)
5. Memahami Teknik Penyelesaian Kesimetrian dan Sudut (42,3%)
6. Menyebutkan Konsep Kesimetrian dan Sudut (39,3%)
7. Menyelesaikan Masalah Dalil Segitiga dan Segmen Garis (36,5%)

Persentase jawaban siswa pada kondisi *false positive* (Tabel 4) memiliki persentase lebih besar dibandingkan dengan persentase *false negative*. Hal ini dikarenakan kondisi *false positive* sangat sulit atau bahkan tidak bisa dihilangkan sama sekali. Soal pilihan ganda memiliki persentase 20% kemungkinan terjadinya *false*

positive, hal ini disebabkan karena siswa memiliki kesempatan untuk memberikan jawaban secara acak pada tes pilihan ganda. Selain itu, pengecoh yang kuat akan memunculkan *false positive* pada siswa (Hestenes & Halloun, 1995). Rerata siswa mengalami miskonsepsi *false negative* sebesar 7,9% lebih rendah dari persentase miskonsepsi *false positive*. Pada kondisi *false negative*, siswa menjawab salah pada *tier* pertama dan menjawab benar pada *tier* kedua atau dapat diartikan bahwa dalam kondisi ini sedikitnya informasi (*less informasi*) yang diperoleh siswa, miskonsepsi pada kondisi ini dianggap tidak bermasalah karena hal itu disebabkan oleh kecerobohan siswa dalam memberikan jawaban. Hal itu menunjukkan bahwa *false negative* digunakan sebagai alat untuk siswa yang tidak teliti atau ceroboh (Hestenes & Halloun, 1995).

Perbandingan persentase rata-rata yang diperoleh siswa antara skor 1 dan skor 2 (Gambar 2) adalah 26,2% dan perbandingan antara skor 2 dan skor 3 adalah 6,1%. Perbandingan persentase yang diperoleh dapat dikatakan bahwa soal memiliki pengecoh yang kuat. Hal itu juga dapat membuktikan bahwa instrumen *three tier test* dapat mengungkapkan kesalahpahaman atau miskonsepsi pada siswa lebih baik dibanding dengan tes diagnostik *one tier* atau *two tier* (Arslan et al., 2012). Karena semakin naik tingkatannya, jawaban benar siswa semakin rendah dan tingkat kesulitan semakin tinggi, penjelasan diatas membuktikan *Three-Tier Test* efektif dalam mengungkapkan miskonsepsi dan tidak paham konsep.

SIMPULAN

Berdasarkan paparan hasil dan pembahasan sebagaimana telah diuraikan, dapat disimpulkan bahwa konsep-konsep dasar terkait konsep geometri bidang yang meliputi kesimetrian, sifat-sifat sudut, dalil segitiga dan dalil segmen garis merupakan konsep yang cukup sulit dipahami oleh siswa, mereka masih mengalami kesulitan dalam memecahkan soal penguasaan konsep yang dilandasi konsep-konsep tersebut.

Dari analisis data diagnostik *Three-Tier Test* siswa menunjukkan bahwa dari 42 siswa kelas X MIPA-3 SMAN I Babakan yang menjadi objek penelitian, 24,1% termasuk kriteria menguasai konsep, sedangkan sisanya 6,2% menebak atau tidak percaya diri atas jawaban, 22,2% tidak paham konsep dan 47,5% mengala-

mi miskonsepsi. Hal ini disebabkan oleh, siswa telah menerima pembelajaran yang membahas konsep-konsep yang diujikan namun siswa kesulitan dalam mengabstraksikan konsep tersebut dengan tepat sehingga intuisi pada pengetahuan awal siswa pada konsep awal yang mereka terima sebelumnya masih tetap bertahan dalam struktur kognitifnya.

Adapun urutan subkonsep dengan miskonsepsi tertinggi hingga terendah pada konsep geometri bidang yang terjadi adalah sebagai berikut: menjelaskan kesimetrian dan sudut (59,5%), menyebutkan bunyi dalil segitiga dan segmen garis (54,8%), menjelaskan dalil segitiga dan segmen garis (52,4%), menyelesaikan masalah kesimetrian dan sudut (47,6%), memahami teknik penyelesaian kesimetrian dan sudut (42,3%), menyebutkan konsep kesimetrian dan sudut (39,3%), menyelesaikan masalah dalil segitiga dan segmen garis (36,5%). Sedangkan urutan ketiga kategori miskonsepsi tertinggi hingga terendah pada konsep Geometri Bidang yang terjadi adalah sebagai berikut: miskonsepsi murni (22%), *false positive* (17,9%), dan *false negative* (7,6%).

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THE EFFECTIVENESS OF SUBJECT SPECIFIC PEDAGOGY BASED ON PROBLEM-BASED LEARNING TO EMPOWER STUDENT'S ECOLOGICAL LITERACY

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Abstract: This study aims to examine the effectiveness of Subject Specific Pedagogy (SSP) based Problem-Based Learning (PBL) to facilitate the students' ecological literacy. This research involved in a Biology Education Program of a Faculty of Teaching and Learning Science in a public university in Indonesia. The research used a posttest-only control design. The participants were undergraduate students who had learned or were learning Ecology, as many as 46 students in the experiment class and 57 students in the control class. The posttest score of the ecological literacy for the experimental class was 80.77% while the control class was 68.14%. Using an independent t-test, it was indicated that the sig value = 0,00, therefore it might be said that there is difference of ecological literacy between experiment class and control class. Accordingly, it is concluded that the PBL-based SSP affects the ecological literacy of biology education students.

Keywords: *Subject Specific Pedagogy, Problem-Based Learning, effectiveness, Ecological Literacy*

KEEFETIFAN SUBJECT SPECIFIC PEDAGOGY BERBASIS PROBLEM-BASED LEARNING UNTUK MEMBERDAYAKAN ECOLOGICAL LITERACY MAHASISWA

Abstrak: Penelitian ini bertujuan untuk menguji keefektifan *Subject Specific Pedagogy* (SSP) berbasis *Problem-Based Learning* (PBL) untuk memberdayakan literasi ekologi mahasiswa. Penelitian ini dilaksanakan pada Program Studi Pendidikan Biologi di Fakultas Keguruan dan Ilmu Pendidikan di sebuah universitas negeri di Indonesia. Desain penelitian yang digunakan adalah *posttest-only control design*. Sampel penelitian terdiri atas mahasiswa yang sudah atau sedang mempelajari Ekologi, yaitu sejumlah 46 di kelas eksperimen dan sejumlah 57 di kelas kontrol. Pada kelas eksperimen, mahasiswa belajar menggunakan pendekatan SSP berbasis PBL, sedangkan di kelas kontrol siswa mengikuti perkuliahan dengan pendekatan ceramah (tradisional). Didapatkan skor *posttest* literasi ekologi untuk kelas eksperimen sebesar 80,77% sedangkan kelas kontrol sebesar 68,14%. Menggunakan *independent t-test*, diperoleh $t(df)=value$, $sig=0,00$, sehingga dikatakan terdapat perbedaan literasi ekologi antara kelas eksperimen dan kelas kontrol. Oleh sebab itu, pendekatan SSP berbasis PBL disimpulkan efektif untuk memfasilitasi literasi ekologi pada mahasiswa pendidikan biologi.

Kata Kunci: *Subject Specific Pedagogy, Problem-Based Learning, Keefektifan, Literasi Ekologi*

INTRODUCTION

The UI GreenMetric is a world ranking to measure the university's ability to maintain a sustainable campus environment and its surroundings (Team, 2016). One of the UI GreenMetric objectives was to see the contributions of the academic discourse on sustainability of education and campus greening programs including the application of

environment-based curriculum in each subject as well as creating an environmentally friendly campus. A total of 28 universities in Indonesia have participated in UI GreenMetric in maintaining a sustainable campus environment through the Green Campus program.

Green Campus is a place to implement eco-friendly practices by combining the role of education to promote sustainability programs

in campus environment (NEEATeam). Campus residents can examine environmental issues and provide solutions through the Green Campus activity (UNS, 2014). Sebelas Maret University (UNS) is ranked 76th in the world and ranked 5th nationally with a value of 5,960 (Rizki, 2016). Sebelas Maret University and 6 other universities were selected as pilot projects to implement the Green Campus program under the guidance of the Ministry of Environment (UNS, 2014). The implementation of the Green Campus program can be supported by using an environment-based curriculum given in the course. According to Roy (2008) the environment-based curriculum can be applied to environmental issues on campus and its surroundings to reduce waste and energy consumption. Environmental-based education if managed well can be beneficial to improve eco-friendly behavior (Cheang, So, & Zhan, 2017; Li & Lang, 2015) two of the most important sources of influence, on views of the human-nature relationship (HNR).

Environmental-based education builds on environmental knowledge; about the causes and consequences of ecological disasters, ecological security, and concepts of human positions in nature (Kallas, Solovjeva, & Minakova, 2015). IUCN (2002) added solutions for environmental improvement through education which had been formulated in the design of agenda 21. One of the formulas contained in agenda 21 states that education plays an important role in realizing sustainable development (UNESCO-UNEP, 1996). UI GreenMetric recognizes the important role of higher education in addressing environmental issues because as a basic step of raising awareness through education for sustainable development (Team, 2016). The concrete steps of Agenda 21 are formulated in Education for Sustainable Development (*EfSD*).

Education for Sustainable Development (*EfSD*) is a type of teaching approach based on the ideals and principles underlying sustainable development and concerning with all levels and types of education. Education for sustainable development allows one to develop knowledge, values and skills in taking decisions on making a better quality of life in the future (Hooi, Hassan, & Mat, 2012). Ecological science is an environment-based education that can be used to decide on various actions to be taken related to environmental issues (Kiker, Bridges, Varghese, Seager, & Linkov, 2005).

Utilization of ecological science for the internalization of environmental cares can be done through a study of related literature on ecological. The literature on ecological literacy today emphasizes the role of scientific knowledge and ecological thought to enable better decision making (McBride B., Brewer, Berkowitz, & Borrie, 2013). McGinn (2014) defines ecological literacy as one's own knowledge of the ecological system, the urge to know it, not only knowing about the system but also feeling responsible for the ecological situation and ultimately acting on his/her knowledge and responsibilities. Orr (1992) states that to know the ecological literacy, one must understand the basic knowledge of ecological and its sustainability beside his/ her eagerness to solve an environmental problem.

In relation to differences of the definition of Ecological literacy, Al-Dajeh (2012) found there are three components behind the same definition. Components of Ecological literacy according to Al-Dajeh include: Knowledge, Attitude, and Concern. Each component has several aspects that support the goal to determine the level of one's Ecological literacy. Knowledge component using the aspect expressed by Lewinsohn (2015) aims to facilitate the level of student knowledge related to the concept of ecological. The second dimension is attitude using the scale of the assessment of NEP (New Ecological Paradigm). Instruments for attitude components use NEP instruments that have been validated and have been applied in several countries (Ogunbonde, 2013). While the third component is the concern which is a form of concern or action of every human being in preserving the environment (Eurobarometer, 2008).

Biology FKIP UNS students' preliminary data of ecological literacy ability showed relatively low results in one component of ecological literacy. The results of ecological literacy ability of FKIP UNS Biology Education students of 2014 viewed from each dimension are as follows; a). ecological knowledge is 57.10%, b). ecological concerns is 71.74%, and c). NEP is 62.83%. The average ability of ecological literacy of Biology Education students is still relatively low so it must be followed up to increase students' awareness in maintaining the environment around the campus and to succeed the Green Campus program at Sebelas Maret University.

The study of environmental materials can motivate the students to enhance ecological literacy. Ecological literacy can be improved in simple ways, such as providing information that is easy to understand. The ecological literacy of students in formal education can be enhanced through the provision of courses relevant to ecological (McBride B. B., Brewer, Berkowitz, & Borrie, 2013). Ecological learning in lectures can provide knowledge for students as a special experience that forms attitudes and behavioral habits (Irham & Wiyani, 2013). Selection of appropriate approaches, strategies and learning models can determine the effectiveness of learning (School Education Department of Education & Training, 2005). Specific learning designs according to field of study will maximize learning activities that produce better knowledge along with the formation of attitudes and behavioral habits.

Prayitno & Wangid (2005) states that Subject Specific Pedagogy which is developed specifically for character and knowledge is proven to be able to improve students' character and knowledge. Hartati, et al. (2009) states that several components of SSP tool includes: RPS, teaching materials, learning media, and evaluation. Learning that refers to specific learning tools on ecological materials is one effective way and is expected to improve students' ecological literacy.

Subject Specific Pedagogy is included in the development field that has an output product in the form of semester learning plan (RPS), teaching materials, learning media and evaluation instruments. Development of Subject Specific Pedagogy is packaged in a set of whole lessons, including the learning model used. According to Sujarwo (2011) each learning model has specific characteristics. According to Rustaman (2005) learning konstruktivisme emphasizes the active role of students to interact with teachers and other students to improve the development of concepts and skills of critical thinking. One model of constructivism learning that can facilitate students to improve the ability of ecological literacy is Problem-Based Learning (PBL).

Problem-Based Learning is part of the experimental learning that provides meaningful learning experiences for students (Hmelo-Silver C. E., 2004). Barrows & Tamblyn (1980) states

that in PBL students learn by solving problems and reflecting on their experiences. According to Barrows (1993) one of the goals of PBL learning is to develop knowledge flexibly and to use skills in solving problems effectively. Problem-Based Learning can facilitate every concept and method used as needed in the process of developing a solution to a particular problem (Lewinsohn, Attayde, Fonseca, Ganade, & Jorge, 2015). The purpose of Problem-Based Learning can facilitate students to improve their skills and knowledge in developing the students' ecological literacy skills.

METHOD

The students' ecological literacy data Intake uses ecological literacy questionnaire instrument consisting of three components, namely: knowledge, concern, and attitude. The instrument rubric of the knowledge component is based on the ecological concept according to Lewinsohn (2015). He states that ecological concept has 10 aspects including ecosystem resilience, productivity, nutrient cycling, functional redundancy, trophic cascade, habitat fragmentation, community assembly, dispersal, population control, ecophysiological adaptation, and one additional aspect of anti-anthropocentrism, the development of it is in corresponding to knowledge and cognitive dimensions according to Taxonomy Bloom which has been revised by Anderson (2014).

Instruments for attitude components use NEP (New Ecological Paradigm) instruments that have been validated and have been applied in several countries (Ogunbonde, 2013). The NEP has five aspects including the fragility of nature's balance, the reality of limits to growth, the possibility of an eco-crisis, anti-anthropocentrism, rejection of exceptionalism (Ogunbonde, 2013; Dunlap, 1978). Currently, NEP instruments have been enhanced and developed into fifteen statements with 5 points Likert scale (Kopnina, 2011; Dunlap R. E., 2000; Hawcroft & Milfont, 2010).

Instrument of concern component is developed to measure the students' readiness in eco-friendly behaving. Furthermore, it is arranged with three aspects including the basic concept that covers 22 questions, the frequency with 15 questions, and the eagerness of acts with 15 questions. Preparation of an instrument

of concern for each aspect uses a questionnaire containing question and statement with 5 point Likert scale assessment.

Student sample taking is done by using propotionate stratified random sampling technique toward Biology Education student at Sebelas Maret University. The research design uses posttest-only control design with two classes: control class and experimental class. The control class were 7th semester students with 69 population but only 57 students who participated in filling the questionnaires. Meanwhile, the experimental class were 6th semester students with 46 students.

The analysis of the results of the study used independent t-test to find differences in ecological literacy between the control class and the experimental class. The t test is also conducted to find the difference of average score of each component of ecological literacy between the control class and the experimental class.

RESULT AND DISCUSSION

Result

The application of ecological literacy instrument is applied on biology students of 6th semester to know the effect of SSP product based on PBL towards students' ecological literacy capability. The result of posttest of ecological literacy instrument on biology students of 6th semester can be seen in Table 1. Below:

Table 1. Ecological experimental class literacy results

Literacy Ecological	Score (%)
Knowledge	71,01
Concern	87,39
Attitude	83,93

The application of ecological literacy instruments in the control class of 7th semester students of biology resulted differently compared to experimental class. The highest average value of ecological literacy is on components of concern which is about 87.39% while the

Table 3. The Posttest Ecological Literacy Scores of the Eksperimental and Control Class

Class Group	Score	Range	Minimum Score	Maximum Score	Mean	Std. Deviation (S.D)
Eksperimental	Posttest	12,90	66,15	79,05	71,67	3,36
Control	Posttest	19,21	55,72	74,93	68,14	4,11

knowledge component has the lowest score of 71.01%. The average posttest result of the application of ecological literacy instrument to 7th semester students of biology can be seen in Table 2. Below:

Table 2. Ecological control class literacy results

Literacy Ecological	Score (%)
Knowledge	61,61
Concern	75,89
Attitude	66,92

Based on the data in Table 2, it can be seen that the ecological literacy score of control class has the highest value in the concern component of 75.89% while the lowest value in the knowledge component of 61.61%. The comparison of the mean score of each ecological literacy component in the experimental and control class can be presented in Figure 1. as follow:

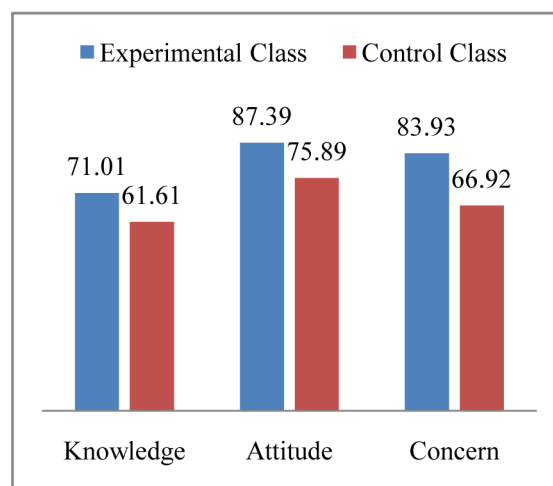


Figure 1. Average Score of each Ecological literacy Component of Experimental Class and Control Class

The descriptive analysis result of posttest ecological literacy score in eksperimental and control class groups are presented in Table 3 below:

Table 4. Summary of Prerequisite Test

Test Prerequisite	Sig.	Conclusion
a. Normality test		
Control Class	0,20	Ho received, Normal
Experimental Class	0,20	
b. Homogeneity test	0,42	Ho accepted, Homogeneous

Based on Tabel 3, it can be seen the average score posttest in eksperimental class and control class is different, the average score of posttest eksperimental class is higher than the control class, where the posttest score average of eksperimental class is 71,67 with S.D is 3,36 and the posttest score average of control class is 68,14 with S.D 4,11.

Posttest results from the experimental and control class were then analyzed using independent t-test to test the effectiveness of Subject Specific Pedagogy based on Problem-Based Learning on Conservation Ecological material preceded by preliminary statistical parametric test that was normality test and homogeneity test as in Table 4.

Based on Table 4 it can be seen that the value of homogeneity and reliability is eligible for t test. Homogeneity value is 0,420 so Ho is accepted. The reliability value for the experimental class and the control class is 0,200 so Ho is accepted and the data is normally distributed. The average test result of the ecological literacy component between the control class and the experimental class is listed in Table 5.

Table 5. Ecological literacy Test Results

T test	Sig.	Conclusion	Decision
Ecological literacy	0,00	Sig <0,05	Ho Denied There is a difference

Through the result of t-test of ecological literacy using independent t-test, it is obtained significance value of 0,00 (<0,05) so that Ho is rejected and there are differences in ecological literacy between experimental class and control class. The t test results for each average ecological literacy component can be seen in Table 6.

Table 6. T-test Result of Ecological literacy Components

T test	Sig.	Conclusion	Decision
Knowledge	0,00	Sig <0,05	Ho Reject- ed, There is a difference
Concern	0,03	Sig <0,05	
Attitude	0,00	Sig <0,05	

Based on the result of t test in Table 6, it can be seen for each component of ecological literacy that Ho is rejected. In the other word, there is a difference in each component of ecological literacy between the control class and the experimental class.

Discussion

The result of t test shows that Subject Specific Pedagogy based on Problem-Based Learning on Conservation Ecological subject is effective in increasing students' ecological literacy. The results obtained from the t test which is to determine whether there is aecological literacy difference between the control class and the experimental class that apply the SSP based on PBL produce sig = 0,000 (<0,05), so Ho is rejected and it can be concluded that there is a difference between the ecological literacy in the control class and experimental class. The t-test results can conclude that the subject- Specific Pedagogy based on Problem-Based Learning produces different values of ecological literacy toward biology education students.

The effectiveness of Subject Specific Pedagogy based on Problem-Based Learning on Conservation Ecological is also explained by the difference of ecological literacy posttest score of students' in control class (7th semester) and experimental class (6th semester). The average score of posttest of control class is 68,14% while the average score of posttest of experimental class is 71,67%.

Based on the results of t-test on the ecological literacy ability of biology education students, it can be assumed that Subject Specific Pedagogy based on Problem-Based Learning is

effective in increasing the students' ecological literacy. According to Hart (1978) the insertion of ecological concepts on learning can be the best predictor of improving eco-friendly attitudes and behavior. Additionally, Lewinsohn (2015) explores the importance of understanding one's ecology concept towards one's ecological literacy ability, ecology concept is crucial to the ability of ecological literacy because it can support a person to facilitate decision-making on environmental issues and take action to choose the right solution. The concept of ecological must be in accordance with the curriculum applicable in educational institutions, the curriculum used must promote environment-based learning (Maknun, 2011). The development of curriculum by inserting ecological concepts about environmental issues is needed to prepare students to think about active and effective role in protecting the environment in the future (Ugulu, Aydin, Yorek, & Dogan, 2008).

The effectiveness of Subject Specific Pedagogy based on Problem-Based Learning is better than the conventional learning tool in courses in order to increase students' ecological literacy because PBL-based SSP has learning subject achievement, graduated learning achievement, the material, as well as clear and specific learning method in relation to the ecological literacy component that includes knowledge, concern, and attitude. One part of the SSP development which is in the form of Semester Learning Plan with the addition of ecological literacy component is proven to have the potential to increase students' ecological literacy according to the expected goal. Subject Specific Pedagogy based on Problem-Based Learning has steps of learning activities that are related to subject learning as well as graduate learning achievements, and student characteristics and models used, so it can support the development of students' ecological literacy.

Learning activities included in Subject Specific Pedagogy based on Problem Based Learning consists of finding and analyzing problems, finding solutions through independent discussion activities and groups, presenting the results of discussions, and linking solutions to other sciences and summarizing them. Problem-based learning can increase the high curiosity of the students that leads them to find solutions to the problems encountered. This statement is

supported by Lewinsohn (2015) who states that problem-based learning (PBL) can facilitate every concept and method used as needed in the process of developing solutions to a particular problem. Problem-Based Learning is one of the intracutive-centered approaches that empowers students to research, integrate theory and practice, and apply knowledge and skills to develop feasible solutions to problems faced (Savery, 2006).

Problem-based learning (PBL) is part of an experiential learning tradition that requires students to solve problems using their existing experience (Barrows & Tamblyn, 1980). Problem-based learning is perfect for helping students to become active learners because of learning the real-world problems and getting students responsible for their learning. Those can make students develop strategies and skills to build knowledge or concepts (Collins, Brown, & Newman, 1989).

The activity of Subject Specific Pedagogy based on Problem-Based Learning consists of identifying the characteristics of a problem well. This stage allows students to grow a flexible and open way of thinking in addressing a problem. Problems encountered let students evaluate the effectiveness of their knowledge, reasoning, and strategies to create a solution so that it can solve a problem (Koschmann, Myers, Feltovich, & Barrows, 1994). Furthermore, problems that have been identified is to be sought their solution immediately. Finding solutions from a problem faced by students is done independently or in groups (Salomon, 1993). The search for solutions to problem solving is done in groups to enable students to distribute cognitive loads among group members and let the whole group solve problems. According to Brown (1995), group discussion in the PBL stage can improve high-level thinking and encourage the development of students' knowledge.

The last stage of the learning activities is a reflection activity that aims to help students understand the relationship between learning objectives and problem-solving activities. Reflection helps students to connect new knowledge gained with prior understanding, and understand how learning strategies and problem solving to reapply (Hmelo-Silver C. E., 2004).

The t test is also conducted to find out that there is a significant difference in each ecological

literacy component between the control class and the experimental class. The average score of ecological knowledge of control class is 61,61% while the mean score of the experimental class is 71,01%. The average score of ecological knowledge has increased due to PBL based SSP tools on Conservation Ecological materials. The result of t test is used to know whether there is difference of ecological knowledge score between control class and experiment class. The t test shows that there is a difference between the control class and the experimental class using the PBL based SSP with the value of sig = 0,00 (<0,05) so that Ho is rejected and it can be concluded that there is a difference between ecological knowledge in Biology Education Study Program Faculty of Teacher Training and Education Science SebelasMaret University Surakarta with the application of Subject Specific Pedagogy based on Problem-Based Learning.

The score of ecological knowledge is improved because problem-based learning can stimulate students' knowledge to be more flexible and open to identify problems and to find solutions to any problems (Hmelo-Silver, 2004). One of the goals of problem-based learning is to require students to build a broad and flexible knowledge in learning a fact. According to Kolodner (1993), the knowledge of students will be increasing and growing when applying the knowledge they have on various situations and problems. The score of ecological knowledge is increasing because Subject Specific Pedagogy which is developed specifically for specific purposes will yield the results in accordance with expectations, in this study the SSP is specifically focused on improving the concept of ecological or components of student knowledge. Prayitno & Wangid (2005) in his research stated that the SSP developed specifically to develop student knowledge is able to increase students' knowledge.

The results are in line with expectation because the development of PBL based SSP on Conservation Ecology materials focuses on the component of ecological knowledge. Besides, through the preliminary analysis, it is known that the ecological knowledge of students is at low category. The development of indicators in the semester learning plan is focused on improving the ecological knowledge component by including indicators of knowledge that include

ecosystem resilience, productivity, nutrient cycling, functional redundancy, trophic cascade, habitat fragmentation, community assembly, dispersal, population control, ecophysiological adaptaion and anti anthropocentrise. These results, theoretically, can influence the behavior formed but according to Fisher & Fisher (1992) the knowledge, although needed, is not enough to form eco-friendly behavior. Knowledge can work best to influence behavior when combined with mutual motivation through emerging behavioral skills. This opinion is supported by the research of Ajzen et al. (2011) and Fisher et al. (1994) who claim that knowledge does not consistently affect behavior, when the effect is relatively small and must be mediated through one's skills they possessed.

The average score of ecological concern of control class is 75,89%, while the average score of the experimental class is 87,39%. The average score of ecological concerns has increased and the t test results show the same thing, hence it can be concluded that the Subject Specific Pedagogy based on Problem-Based Learning on Conservation Ecological material can effectively increase the students' ecological literacy. The results obtained from the t test is to determine whether there is a difference of ecological concern between the control class and the experimental class using PBL based SSP which is resulted sig = 0,03 (<0,05) so that Ho is rejected, therefore it can be concluded that there is difference of ecological concern of the student Biology Education Studies Faculty of Teacher Training and Education Sebelas Maret University Surakarta with the application of Subject Specific Pedagogy based on Problem-Based Learning.

The score of ecological concern is increasing because the ecological concepts gained from problem-based learning can support students' awareness in protecting the environment. Awareness is one form of human behavior that arises when having a concept of good knowledge. Knowledge possesses can increase one's awareness in protecting the environment (Ajzen, Joyce, Sheikh, & Cote, 2011). This is in line with the wrong outcome of the learning process that aims to improve the behavior of learners. A person's awareness will increase when a problem presented to them and urge them to make decisions and take action;

from environmental problems occurred, someone will raise awareness to protect the environment better. However, according to DeChano (2006), the level of ones' concern is not influenced by the knowledge they have. This behavior is strongly influenced by existing attitudes such as research that has been done by Hye-Eun (2007) who states that there is a strong correlation between attitudes and person's behavior. The score of ecological concern shows high results which means that there is readiness to behave from students to be more environmentally friendly (Ajzen, Joyce, Sheikh, & Cote, 2011).

The average score of ecological attitude is increasing in control class which is 66,92% while the mean score of ecological attitude of the experimental class is 83,93%. The average score of ecological attitude is increasing considerably and the result of t test shows that Subject Specific Pedagogy based on Problem-Based Learning on Conservation Ecological was effective in increasing the students' ecological literacy. The results obtained from the t test is to determine whether there are differences in ecological attitude between the control class and experimental class that apply the PBL based SSP which results $\text{sig} = 0,00 (<0,05)$ so that H_0 is rejected and it can be concluded that there are differences in student ecological attitude Biology Education Studies Program Teacher Training Faculty and Education Sebelas Maret University Surakarta with the application of Subject Specific Pedagogy based on Problem-Based Learning.

Ecological attitude results have increased because the concept of ecological owned by students through learning using PBL-based SSP gives a good influence on attitudes that are formed on students. According to Shamuganathan & Karpundewan (2015), one solution in teaching ecological literacy is by giving a problem on environmental issues because by that, one will behave more responsibly in protecting the environment. Their attitudes then can be more eco-friendly as described by Fishbein and Ajzen (1980) in the research that has been conducted. According to Vining & Ebreo (1992), the attitudes of environmental care owned also refers to the amount of awareness of the environment. Readiness to behave is influenced by attitudes possessed to perform a particular action and apply subjective norms. (Ajzen et al., 2011).

Another thing that affects the formation of attitude according to Stutzman & Green (1982) is a factual knowledge that becomes a prerequisite for any desired attitude.

According to Kollmus & Agyeman (2002), there are several opinions that knowledge can influence attitudes and will ultimately shape environmentally responsible behaviors. It turns out to be less precise because there is a large and unexplained gap between attitudes and behavior. Shamuganathan & Karpudewan (2015) stated that there has been an attempt to address this gap in Fishbein & Ajzen (1974) research through the theory of reasoned action and theory of planned behavior according to Ajzen (1985). According to Fishbein & Ajzen (1980) as a matter of fact that there is a correlation between attitudes and behaviors yet attitudes do not have a direct effect on behavior, but only affect the readiness to behave and in turn determine the behavior that is formed.

Based on the results of each component of ecological literacy above, it can be concluded that the development of Subject Specific Pedagogy based on Problem-Based learning is proven effective to increase student's ecological literacy. Zverev (1995) considers that integrated ecological education using a model can develop person permanently to be directed to the formation of knowledge and practical scientific skills, valuable orientation, as well as moral and aesthetic relationships that give someone the ecological responsibility to protect the environment sustainably.

CONCLUSION

The effectiveness of Subject Specific Pedagogy based on Problem-Based Learning on Conservation Ecological by using t test on the average score of ecological literacy shows a good significance value between the control class and the experimental class. Result of t test show $\text{sig} = 0,00 (<0,05)$ so that there is difference of average score of ecological literacy between control class and experiment class using SSP based on PBL. The value of t test is also different in each ecological literacy component between the control class and the experimental class. The t test for each ecological literacy component has $\text{sig} <0,05$ so that there is difference in each component of ecological literacy between control class and experiment class.

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PENGEMBANGAN MODEL PEMBELAJARAN BERLATAR ISU KONTROVERSIAL SEBAGAI PENGUATAN WATAK KEWARGA NEGARAAN MAHASISWA

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Abstrak: Tujuan penelitian ini adalah untuk (1) mengembangkan model pembelajaran berlatar isu-isu kontroversial yang layak untuk penguatan watak kewarga negaraan mahasiswa, dan (2) membuktikan efektivitas model pembelajaran berlatar isu-isu kontroversial yang dikembangkan untuk penguatan watak kewarga negaraan mahasiswa. Penelitian ini menggunakan metode *Research and Development*, dengan lokasi penelitian di Universitas Nusantara PGRI Kediri. Subjek penelitian mahasiswa program studi Pendidikan Biologi, Manajemen, Keperawatan, dan Sistem Informasi yang sedang menempuh mata kuliah PKN. Hasil penelitian pada tahap studi pendahuluan berhasil mengidentifikasi tujuh unsur kompetensi watak kewarga negaraan yang harus dikembangkan dalam masyarakat demokratis yang multikultur, yaitu kesopanan, empati, kepemimpinan, perspektif, hubungan masyarakat, peran dalam masyarakat, dan sikap terhadap masyarakat multikultur. Tahap pengembangan model berhasil menemukan model hipotetik dilakukan lewat uji lapangan dengan teknik quasi eksperimental. Data diperoleh lewat tes dan dianalisis dengan teknik uji beda mean (t-tes). Hasil uji model dapat membuktikan efektivitas model pembelajaran yang dikembangkan, yaitu dengan nilai $t_{hitung} = 3,253$ dengan signifikansi (P) = 0,003.

Kata Kunci: *isu-isu, kontroversial, watak kewarganegaraan*

THE DEVELOPMENT OF LEARNING MODEL BASED ON CONTROVERSIAL ISSUES TO STRENGTHENED THE CHARACTER OF CIVIC DISPOSITION

Abstract: The objectives of this study are (1) to develop a model of learning based on controversy issues that are appropriate for strengthening the citizenship character of student. (2) to prove the effectiveness of the learning model is based on controversy issues developed for strengthening the citizenship character of student. This research used Research and Development method, the place at Universitas Nusantara PGRI Kediri with research subjects are Biology, Management, Nursing, and Information System students who are taking the course of PKN. The results of the study in the preliminary study phase identified seven elements of citizenship competence that should be developed in a multicultural democratic society which are politeness, empathy, leadership, perspectives, community relations, role in society, and attitudes toward the society of multicultural. The development phase of the model succeeded in finding the hypothetical model, and validation of the model proved that learning model based on controversy issues is effective. The statistical test result, $t = 3.253$, significance (P) = 0.003.

Keywords: *issues, controversial, civic disposition*

PENDAHULUAN

Mata kuliah Pendidikan Kewargaan Negara (PKN) di perguruan tinggi ditetapkan berdasarkan Surat Keputusan Dirjen Dikti No. 43 tahun 2006, tentang Rambu-rambu Pelaksanaan Matakuliah Pengembangan Kepribadian (MPK) di Perguruan Tinggi. Berdasarkan SK tersebut matakuliah PKN menjadi matakuliah wajib di dalam kurikulum perguruan tinggi. Tujuan matakuliah PKN menurut surat keputusan tersebut

adalah membentuk mahasiswa menjadi ilmuwan dan profesional yang memiliki rasa kebangsaan dan cinta tanah air, demokratis berkeadaban, menjadi warga negara yang memiliki daya saing, berdisiplin, dan berpartisipasi aktif dalam membangun kehidupan damai berdasarkan sistem nilai Pancasila.

PKN pada hakikatnya adalah pendidikan nilai dan pendidikan karakter bangsa. Baik secara teoretis filosofis maupun pedagogis PKN

bertujuan memfasilitasi dan membentuk peserta didik menjadi warga negara yang baik, sesuai dengan kondisi dan dinamika masyarakat Indonesia yang demokratis dan multikultural, melalui pemahaman nilai-nilai luhur ketuhanan, kemanusiaan, persatuan, kerakyatan, dan keadilan sebagaimana terkandung dalam Pancasila. Winatapura (2014:12) menyatakan bahwa PKN dapat dilihat sebagai suatu *integrated knowledge system*, yang di dalamnya terkandung kecerdasan, partisipasi, dan tanggungjawab kewarga negaraan warga negara Indonesia yang berdasarkan Pancasila. PKN adalah pendidikan karakter yang bersifat multidimensional. PKN sebagai *citizenship education* mengemban visi dan misi yang utuh dalam mengembangkan kompetensi kewarga negaraan.

Berdasarkan uraian tersebut, PKN secara konseptual telah memasuki paradigma baru, sebagaimana ditegaskan Depdiknas (2007:43), yaitu bahwa paradigma baru PKN mengemban tiga fungsi pokok, yakni mengembangkan kecerdasan warga negara (*civic intelligence*), membina tanggung jawab warga negara (*civic responsibility*), dan mendorong partisipasi warga negara (*civic participation*). Paradigma tersebut oleh Winatapura (2014:12) disebut sebagai *Citizenship Education*. Lebih lanjut dikatakan bahwa paradigma baru tersebut diperlukan untuk menghasilkan *civic intelligence, civic participation, and civic responsibility* dalam konteks demokrasi konstitusional Indonesia.

Sebagai perwujudan *citizenship education*, pembelajaran PKN di perguruan tinggi menerapkan pendekatan berbasis proses keilmuan (*epistemological/scientific approach*), yang menekankan pada strategi dasar pembelajaran. Semua itu pada akhirnya harus bermuara pada internalisasi dan personalisasi nilai moral dalam konteks keindonesiaan, kemanusiaan, dan peradaban universal (Winatapura: 2014: 4). Penilaiannya harus bersifat utuh, menyeluruh, holistik, dan dilaksanakan secara terpadu berkelanjutan dengan alat tes dan *non tes* yang menitik beratkan pada penilaian nilai moral dalam kehidupan sehari-hari.

Isu kontroversial adalah semua hal yang menimbulkan perbedaan pandangan, pendapat dan tanggapan berbeda (Stradling, 1984:2). Isu kontroversial selalu berkaitan dengan hal-hal yang sensitif, dapat berdampak politis, sosial atau pribadi, yang berkaitan dengan perasaan

dan pertanyaan tentang nilai atau keyakinan, yang membutuhkan pemahaman secara menyeluruh.

Manfaat pembelajaran isu-isu kontroversial dikemukakan Perry (1999:57), Oxfam (2006:3) dan R. Wiriaatmadja (2001:2) untuk melatih siswa menghadapi kehidupan sosial yang kompleks, dengan kemampuan komunikasi, menanamkan rasa empati, toleran, mampu mempengaruhi orang lain, dan kerjasama. Mars (2008:149) mengemukakan bahwa pembelajaran isu-isu kontroversial penting untuk mencegah terjadinya kesenjangan dan salah paham, yang dapat menjurus pada terjadinya konflik.

Pembelajaran isu-isu kontroversial juga dimaksudkan untuk mempersiapkan mahasiswa sebagai warga negara demokratis yang siap berpartisipasi dalam masyarakat majemuk. Melalui diskusi isu-isu kontroversial, mahasiswa akan mengembangkan keterampilan berpikir kritis. Mahasiswa juga mendapatkan pengertian yang mendalam dari informasi mengenai isu yang dibicarakan. Selain itu, pembelajaran isu-isu kontroversial juga dapat mengembangkan keterampilan interpersonal, belajar berkomunikasi secara santun, mendengar, berempati, dan toleran terhadap pandangan orang lain yang berbeda.

Alasan *epistemology* pengembangan model pembelajaran berlatar isu-isu kontroversial adalah agar pembelajaran PKN beranjak dari tradisi *citizenship transmission*, menjadi *reflective inquiry*. Harus diakui memang hingga saat ini pembelajaran PKN masih belum dapat memenuhi harapan tersebut. Kritik terhadap pembelajaran PKN dikemukakan Djahiri (2006:54) yang menyatakan bahwa pembelajaran PKN belum utuh (*kaffah*) dalam hal tuntutan pembelajaran (*substantial, procedural, dan output orientation*). Senada dengan Djahiri, Somantri (2001:245) menyatakan bahwa pembelajaran PKN kurang bermakna karena masih indoktrinatif dan dominan *narrative technique*. Demikian pula dengan Winatapura (2014:3) menyatakan bahwa harus diakui bahwa PKN di Indonesia saat ini bersifat minimalis seyogyanya dikembangkan menjadi PKN yang *moderate*, sehingga berubah dari paradigma *education about democracy* menjadi *education in democracy*.

Watak kewarganegaraan secara umum diartikan sebagai pedoman bagaimana menjadi warga negara yang membantu mengembangkan kepercayaan diri untuk dapat berpartisipasi dalam

pemerintahan, dan memahami peran, hak, dan tanggung jawab yang terkait dengan pemerintah, serta menunjukkan cara bersikap terbuka, toleran, dan bertanggung jawab dalam menjalankan hak dan tanggung jawab sebagai warga negara. Watak kewarganegaraan juga mengandung sifat-sifat atau karakter yang harus dimiliki oleh setiap warga negara, khususnya warga negara muda, untuk mendukung efektivitas partisipasi politik, mendukung berfungsinya sistem politik yang sehat, serta pengembangan martabat dan harga diri bangsa. Hal itu terlihat pada penelitian Murdiono (2014:356) yang mengidentifikasi sikap dan nilai yang harus dikembangkan melalui PKN untuk membangun wawasan global warga negara muda meliputi harga diri, empati, komitmen terhadap keadilan sosial, menghormati keragaman, dan keyakinan bahwa antar orang terdapat perbedaan.

Watak kewarganegaraan merupakan salah satu kompetensi kewarganegaraan yang penting, di samping pengetahuan kewarganegaraan dan keterampilan kewarganegaraan. Patrick (2006:143) menyebutkan unsur-unsur watak kewarganegaraan meliputi: (a) *promoting the common good*; (b) *affirming the common and equal humanity and dignity of each person*; (c) *respecting, protecting, and using rights processed equally by each person*; (d) *participating responsibility in the political/civic life of the community*; (e) *respecting, protecting, and practicing government by consent of the people*; (f) *supporting and practicing civic virtues*.

Kompetensi watak kewarganegaraan yang penting dikembangkan sesuai dengan kondisi dan dinamika masyarakat Indonesia saat ini antara lain adalah perspektif, hubungan masyarakat, peran serta dalam masyarakat, dan sikap positif terhadap perbedaan dalam masyarakat heterogen atau multikultural. Hal tersebut dalam rangka membentuk karakter warga negara muda sebagai *participative and responsible citizens* atau warga negara yang cerdas dan baik.

Kemampuan berpikir kritis terhadap perbedaan yang sering menjadi penyebab munculnya isu-isu kontroversial juga merupakan salah satu indikator penting watak atau karakter yang selayaknya dikuasai mahasiswa sebagai warga negara muda. Sebagaimana harapan yang dikemukakan oleh banyak pihak agar keterampilan berpikir kritis diperhatikan dalam proses pembelajaran atau dalam bidang studi atau matakuliah

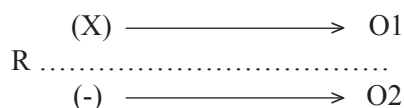
(Haris, 2013:444). Hasil penelitian Widiarini (2013:6) menyimpulkan terdapat pengaruh penggunaan model pembelajaran isu-isu kontroversial kebijakan publik terhadap keterampilan berpikir kritis. Dengan demikian, penguatan watak kewarganegaraan mahasiswa tidak dapat dilepaskan juga dengan upaya meningkatkan dan melatih kemampuan berpikir kritis dalam menanggapi perbedaan yang ada di masyarakat heterogen dan multikultural yang potensial berkembang menjadi isu kontroversial.

Berdasarkan uraian tersebut, tujuan penelitian ini adalah untuk (1) mengembangkan model pembelajaran berlatar isu-isu kontroversial yang layak sebagai penguatan watak kewarganegaraan mahasiswa; dan (2) mengetahui efektivitas model pembelajaran berlatar isu-isu kontroversial sebagai penguatan watak kewarganegaraan mahasiswa.

METODE

Penelitian ini menggunakan jenis penelitian dan pengembangan dengan model penelitian dan pengembangan pendidikan yang dikembangkan oleh Borg dan Gall (1993:773). Lokasi penelitian di Universitas Nusantara PGRI Kediri, dengan subjek penelitian mahasiswa yang sedang menempuh matakuliah PKN dari program studi Pendidikan Biologi Fakultas Keguruan, Manajemen fakultas Ekonomi, Keperawatan fakultas Ilmu Kesehatan, dan Sistem Informasi fakultas Teknik yang ditetapkan secara *purposive*.

Secara umum, tahapan penelitian ini dibagi menjadi tiga, yaitu studi pendahuluan, pengembangan model, dan validasi model. Studi pendahuluan dilaksanakan dengan studi literatur, analisis deskriptif terhadap dokumen perangkat pembelajaran, dan wawancara. Pengembangan model dilaksanakan melalui FGD, berdasarkan data hasil observasi dan lembar penilaian. Validasi model dilaksanakan dengan uji coba lapangan dengan teknik kuasi eksperimen. Data diperoleh lewat tes dan dianalisis dengan teknik statistik uji beda (t-tes). Kriteria efektivitas model yang dikembangkan mengacu pada hasil analisis statistik dengan uji beda mean tersebut dengan signifikansi 0,05. Model pembelajaran yang dikembangkan dikatakan efektif jika ada perbedaan yang signifikan antara mahasiswa kelompok eksperimen dengan kelompok kontrol ($p \leq 0,05$).



Keterangan: (X) = perlakuan
 (-) = tanpa perlakuan
 R = Randomisasi
 O = hasil pengukuran

Gambar 1. Desain Eksperimen Validasi Model

HASIL DAN PEMBAHASAN

Studi Pendahuluan

Studi pendahuluan menghasilkan dua hal, yaitu (1) analisis kebutuhan pengembangan model pembelajaran berlatar isu-isu kontroversial sebagai penguatan watak kewarga negaraan mahasiswa, dan (2) deskripsi profil model pembelajaran berlatar isu-isu kontroversial sebagai penguatan watak kewarga negaraan mahasiswa.

Analisis kebutuhan menghasilkan empat hal, yaitu analisis isi/kompetensi mata kuliah, analisis karakter mahasiswa, analisis dokumen perangkat pembelajaran, dan analisis kesiapan dosen. Kesimpulan pokok hasil analisis kebutuhan pengembangan model pembelajaran berlatar isu-isu kontroversial sebagai penguatan watak kewarganegaraan mahasiswa, adalah perlu adanya integrasi semua komponen pembelajaran melalui penerapan model pembelajaran yang dirancang khusus, yang sesuai dengan karakteristik matakuliah PKN.

Deskripsi profil model pembelajaran berlatar isu-isu kontroversial menghasilkan: (1) desain perencanaan, sintagmatik, dan desain evaluasi proses dan hasil pembelajaran. Pengembangan desain perencanaan, sintagmatik, dan desain evaluasi berdasarkan pada embrio model yang diadopsi dari model pembelajaran IKKP "Isu-isu Kontroversial Kebijakan Publik" (Suryanto, 2011:143). Model ini dikembangkan dengan diinspirasi oleh tiga model, yaitu: model *Jurisprudential Inquiry* (D Oliver, Shaver), model *Project Citizens* (CCE), dan model *Values Analysis* (Fraenkel).

Model *Jurisprudential Inquiry* adalah model yang dimaksudkan untuk membantu siswa belajar berpikir secara sistematis mengenai isu-isu kontemporer. *Project Citizens* adalah suatu *instructional treatment* yang berbasis masalah untuk mengembangkan pengetahuan, kecakapan, dan watak kewarga negaraan demokratis

yang memungkinkan dan mendorong keikutsertaan dalam pemerintahan dan masyarakat sipil. Pendekatan analisis nilai merupakan model pendekatan pendidikan nilai, yang memberikan penekanan pada perkembangan kemampuan siswa untuk berpikir logis, dengan cara menganalisis masalah yang berhubungan dengan nilai-nilai sosial.

Desain awal perencanaan model pembelajaran berlatar isu-isu kontroversial pada prinsipnya fleksibel, dan mengacu pada kebiasaan yang selama ini sudah dilakukan dosen di Universitas Nusantara PGRI Kediri. Draft awal evaluasi pembelajaran pada dasarnya mengacu pada evaluasi proses dan hasil. Oleh karena itu, pengembangan evaluasi pembelajaran menggunakan prosedur dan teknik nontes. Evaluasi pembelajaran yang digunakan dalam pembelajaran isu-isu kontroversial tidak hanya diorientasikan untuk keberhasilan penguasaan materi, melainkan terdapat juga aspek-aspek lain, yaitu pengembangan kemampuan dasar, pengembangan sikap, dan pengembangan keterampilan terkait isu-isu kontroversial.

Pengembangan Model

Berdasarkan draft model yang telah disusun, selanjutnya dilakukan pengujian model terbatas yang terdiri atas tiga bagian, yaitu (1) uji validasi ahli/praktisi, (2) uji lapangan terbatas, dan (3) uji lapangan perluasan.

Uji validasi ahli/praktisi dimaksudkan untuk menguji kelayakan teoritik dan metodologik draft model. Penilaian diutamakan pada rumusan tujuan, sintagmatik, dan prosedur evaluasi. Hasil uji validasi ahli/praktisi pada dasarnya menyatakan model pembelajaran berlatar isu-isu kontroversial dapat digunakan untuk penguatan watak kewarganegaraan mahasiswa. Namun terdapat catatan yang perlu diperhatikan, yaitu pada sistem evaluasinya. Mengingat aspek yang dinilai adalah aspek nonkognitif, maka disarankan penilaian benar-benar tepat, menggunakan alat penilaian non-tes yang sesuai.

Deskripsi sintagmatik Model Pembelajaran berlatar isu-isu Kontroversial secara singkat sebagai berikut.

Model ini ditujukan untuk membantu siswa dalam menanggapi isu-isu kontroversial yang berkembang di masyarakat, mengembangkan kemampuan persepsi, emosi, komunikasi, berpikir kritis, sikap positif dan keyakinan terhadap

suatu isu, serta untuk mencegah berkembangnya sikap dan tindakan anarkhis.

Asumsi dasar pengembangan modelnya karena siswa adalah warga negara muda yang harus dipersiapkan menjadi warga negara dan warga dunia yang demokratis, siap dan tanggap dalam menghadapi tantangan sesuai dinamika tuntutan perkembangan dan kondisi zaman.

Langkah-langkah pembelajarannya meliputi enam tahap, yaitu tahap 1: orientasi isu; tahap 2: identifikasi (nilai); tahap 3: eksplorasi (nilai-sikap); tahap 4: mempertentangkan (nilai); tahap 5: ekspresikan (perasaan); dan tahap 6: refleksi.

Sistem sosial model ini adalah adanya keterlibatan mahasiswa secara fisik dan psikis dalam pembelajaran, merangsang keaktifan mahasiswa dan saling berkomunikasi timbal balik, melatih keterampilan berbicara dan menyampaikan pendapat, dan melatih keterampilan berfikir kritis/kreatif.

Sistem pendukung model ini tidak memerlukan peralatan dan sarana pembelajaran yang khusus. Prinsip reaksinya dosen/guru harus dapat menciptakan dan menjaga suasana pembelajaran yang demokratis, menyenangkan, dan dinamis, namun tetap fokus pada pencapaian tujuan.

Dampak instruksionalnya adalah untuk menguatkan watak kewarganegaraan, dengan indikator yaitu (1) kesopanan, (2) empati, (3) kepemimpinan, (4) perspektif, (5) hubungan masyarakat, (6) peran dalam hubungan masyarakat, dan (7) sikap multikultur. Dampak pengiringnya mahasiswa memiliki kemampuan persepsi, emosi, komunikasi, berpikir kritis, sikap positif dan keyakinan terhadap suatu isu, serta kemampuan mencegah berkembangnya sikap dan tindakan anarkhis.

Uji lapangan terbatas dimaksudkan untuk mengembangkan draft awal model, terutama aspek keterlaksanaan langkah-langkah pembelajaran yang bertujuan untuk menyempurnakan kegiatan setiap tahapan atau langkah-langkah pembelajaran dan membiasakan dosen dengan tahapan tersebut. Uji lapangan terbatas dilaksanakan sebanyak dua kali, dengan sasaran mahasiswa berbeda, yaitu pada prodi Keperawatan dan Sistem Informasi. Setiap selesai satu tahapan dilakukan perbaikan dan modifikasi hal-hal yang perlu dilakukan perbaikan.

Kesimpulan dari hasil uji lapangan terbatas adalah draft model dapat dilaksanakan sesuai tahapan dan sintakmatik, namun perlu diper-

hatikan beberapa hal, yaitu: pertama, kesiapan mahasiswa sangat menentukan kelancaran proses pembelajaran, karena model ini mensyaratkan peran aktif pada mahasiswa. Kedua, dosen harus dapat menciptakan dan menjaga suasana pembelajaran yang demokratis, untuk memberi kesempatan mahasiswa menyampaikan ekspresi perasaan secara bebas, karena ekspresi perasaan ini akan menjadi indikator penting watak kewarganegaraan mahasiswa. Ketiga, untuk mendukung kelancaran setiap tahapan pembelajaran, dibutuhkan sarana pendukung berupa LKS (*student worksheets*).

Pengembangan LKS dilakukan dengan memperhatikan langkah-langkah pembelajaran. LKS dibuat dalam dua bentuk, LKS yang dikerjakan secara kelompok dan individu. LKS kelompok dimaksudkan untuk mengakomodasi prinsip-prinsip pembelajaran kooperatif, sedangkan LKS individual dimaksudkan untuk mengakomodasi kebutuhan belajar individual. Tujuan utama penggunaan LKS adalah untuk merangsang keaktifan mahasiswa, dan membatasi dominasi guru atau dosen. Melalui LKS, setiap tahapan pembelajaran sudah ditentukan kegiatan yang harus dilakukan mahasiswa, sehingga pembelajaran lebih fokus dan terarah. Dengan adanya LKS, dosen juga tidak perlu lagi menjelaskan, sehingga tidak ada kesan dosen mendominasi kelas.

Uji lapangan perluasan dilakukan pada mahasiswa FKIP prodi Pendidikan Biologi, dengan dua kali observasi dengan materi Negara dan Konstitusi. Berikut ini hasil observasi watak kewarganegaraan mahasiswa, sebagaimana disajikan dalam tabel 1.

Nilai rata-rata hasil observasi watak kewarganegaraan kesatu dan kedua menunjukkan hasil relatif baik, yaitu 71,59 dan 71,76, reratanya: 71,67.

Tabel 1. Hasil Observasi Watak Kewarganegaraan Uji Luas

Indikator Observasi	Uji coba		Rerata
	Ke-1	Ke-2	
Kesopanan	77.8	44.4	61.1
Empati	88.9	88.9	88.9
Kepemimp.	77.8	77.8	77.8
Perspektif	83.3	66.7	75.0
Hub. Masyarakat	66.7	77.8	72.25
Peran dlm. Masy.	33.3	66.7	50.0
Sikap multikultur	73.3	80.0	76.65
Rerata	71.59	71.75	71.67

Tabel 3. Hasil uji beda Mean

t-test for Equality of Means						
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
3.253	26	.003	16.91429	5.19974	6.22607	27.60250
3.253	18.905	.004	16.91429	5.19974	6.02739	27.80118

Validasi Model

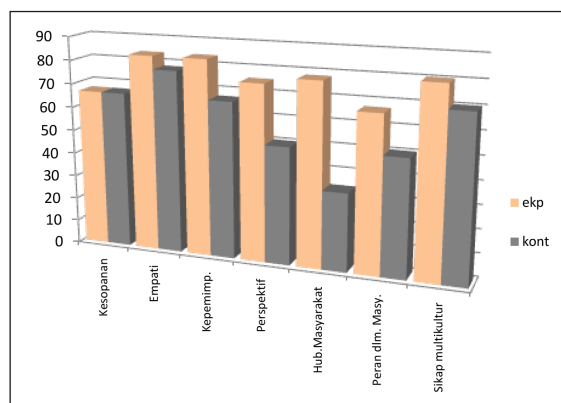
Uji validasi dilakukan menggunakan desain eksperimen *posttest-only control design*, dengan subyek mahasiswa di empat program studi, yaitu Pendidikan Biologi, dan Manajemen sebagai kelompok eksperimen, prodi Keperawatan dan prodi Sistem Informasi sebagai kelompok kontrol. Sebelum dilakukan eksperimen terlebih dahulu dilakukan randomisasi untuk meyakinkan bahwa kedua kelompok memiliki karakteristik yang tidak berbeda.

Eksperimen dilakukan dengan materi Hak Asasi Manusia & Hak Kewajiban Warga negara Indonesia. Observasi watak kewarga negaraan dilakukan selama pembelajaran berlangsung. Data statistika deskriptif hasil observasi watak kewarga negaraan kedua kelompok disajikan pada Tabel 2. Perbandingan skor hasil observasi watak kewarganegaraan mahasiswa disajikan pada Gambar 2.

Tabel 2. Data Deskriptif Watak Kewarganegaraan

	Klp. Eksp.	Klp. Kont.
Mean	76.1286	59.2143
Median	77.8000	66.7000
Mode	66.70	66.70
Std. Deviation	8.56230	17.47023
Variance	73.313	305.209
Range	22.20	44.50
Sum	1065.80	829.00

Untuk membuktikan efektivitasnya selanjutnya dilakukan uji beda mean, dengan rumus uji-t antar kelompok, sebagaimana disajikan pada Tabel 3. Hasilnya diketahui nilai signifikansi (p) = 0.003 yang berarti signifikan. Artinya model pembelajaran berlatar isu-isu kontroversial terbukti efektif untuk penguatan watak kewarga negaraan mahasiswa.

**Gambar 2. Perbandingan Watak Kewarganegaraan Mahasiswa**

Pembahasan

Hakikat paradigma baru Pendidikan Kewarga negaraan sebagaimana telah dikemukakan sebelumnya, sesungguhnya juga memfokuskan pada pembentukan peserta didik memiliki kesadaran menjadi *civil society*, atau masyarakat madani, dengan cara memberdayakan warga negara melalui pendidikan agar berpartisipasi aktif dalam pemerintahan yang demokratis. Termasuk didalamnya adalah mengembangkan watak atau karakter kewarga negaraan, di samping pengetahuan dan keterampilan kewarga negaraan.

Model pembelajaran berlatar isu-isu kontroversial yang diimplementasikan pada matakuliah PKN terbukti efektif sebagai penguatan watak kewarga negaraan mahasiswa. Watak kewarga negaraan merupakan salah satu unsur kompetensi kewarga negaraan multikultural, yang menggambarkan karakter kewarganegaraan seseorang dalam konteks masyarakat demokratis, heterogin dan multikultur. Watak kewarga negaraan adalah karakter publik maupun privat yang penting bagi pemeliharaan dan pengembangan demokrasi konstitusional (Branson, 1998:16). Quigley (1991:11) watak kewarga negaraan adalah sikap dan kebiasaan berpikir warga negara yang menopang fungsi sosial yang sehat dan jaminan kepentingan umum dari sistem demokrasi.

Kompetensi watak kewarga negaraan yang harus dikembangkan pada mahasiswa sesuai dengan hasil studi pendahuluan penelitian ini adalah: keadaban (*civility*), empati, sikap kepemimpinan, perspektif/ pandangan, hubungan masyarakat, peran dalam masyarakat, serta sikap positif terhadap masyarakat heterogin dan multikultur. Tujuh kompetensi tersebut dalam pengembangannya harus merupakan satu keutuhan, dan saling melengkapi.

Keadaban atau *civility* adalah ketinggian tingkat kecerdasan lahir batin, kesopansantunan atau dapat diartikan kebaikan budi pekerti. Pengembangan kompetensi keadaban pada mahasiswa saat ini memiliki alasan normatif yang semakin kuat. Indikasi melemahnya pemahaman dan pengamalan nilai-nilai luhur bangsa pada generasi muda semakin hari semakin terasa.

Empati adalah kemauan menolong orang lain, atau merasakan emosi yang dirasakan orang lain. Kompetensi ini penting dikembangkan karena modernisasi saat ini telah terbukti menjadikan hubungan antar manusia semakin transaksional. Modernisasi kini telah menghasilkan pribadi-pribadi yang individualis, tidak peduli dan acuh terhadap sesama.

Sikap kepemimpinan adalah cara dalam mempengaruhi orang lain, atau anggapan pemimpin terhadap yang dipimpin. Kompetensi ini mengajarkan untuk memahami kondisi dan karakteristik masyarakat Indonesia yang heterogin dan multikultur. Sifat-sifat kepemimpinan harus dikembangkan berdasar nilai-nilai yang menjunjung tinggi perbedaan dalam semangat persatuan dalam keberagaman tersebut.

Pandangan atau perspektif adalah sudut pandang atau cara pandang terhadap masyarakat, bangsa dan negaranya. Kompetensi ini mengajarkan cara pandang terhadap bangsa Indonesia, baik secara fisik maupun sosialnya. Pandangan terhadap diri dan lingkungannya, sebagaimana diajarkan dalam konsepsi Wawasan Nusantara.

Hubungan masyarakat adalah kemampuan memahami, dapat menerima kenyataan, dan kesadaran untuk melakukan hubungan dengan masyarakat. Kompetensi ini melatih dan membimbing mahasiswa untuk bersikap tanggap, kritis, peduli dan memiliki kepekaan terhadap masalah-masalah yang ada di masyarakatnya. Kompetensi ini juga akan menghindarkan mahasiswa sebagai generasi muda dari sikap apatis,

acuh, dan tidak peduli terhadap permasalahan yang ada di masyarakat dan bangsanya.

Peran serta dalam masyarakat adalah kemauan dan keaktifan untuk berperanserta dalam dinamika dan permasalahan yang ada di masyarakatnya. Kompetensi ini akan menjadikan mahasiswa tidak saja menjadi pengamat, melainkan menjadi pelaku, dinamisator dan fasilitator kemajuan dalam masyarakatnya.

Sikap terhadap masyarakat heterogin dan multikultural adalah pandangan terhadap kenyataan, keberadaan, dan dinamika masyarakat yang majemuk. Kompetensi ini akan membimbing mahasiswa menyadari betapa kesadaran akan perbedaan itu menjadi hal yang biasa dalam masyarakat heterogin dan multikultur. Mahasiswa akan memiliki kesadaran bahwa keragaman adalah suatu kenyataan, namun didalam keragaman tuga tersimpan potensi kerawanan.

Hal tersebut sesuai dengan harapan dan paradigma transformasi pendidikan dalam perspektif multikultural untuk solusi konflik. Sebagaimana dikemukakan Unwanullah (2012:54) tujuan pendidikan multikultural dalam konteks meminimalkan konflik adalah untuk membantu peserta didik: (1) memahami latar belakang diri dan kelompok dalam masyarakat; (2) menghormati dan mengappresiasi kebhinekaan budaya dan sosiohistorik etnik; (3) menyelesaikan sikap etnosentik dan penuh prasangka (*prejudice*); (4) memahami faktor-faktor social, ekonomi, psikologi, dan historis yang menyebabkan terjadinya polarisasi etnik, ketimpangan dan keterasingan; (5) meningkatkan kemampuan menganalisis secara kritis masalah-masalah rutin dan isu-isu melalui proses yang demokratis; (6) mengembangkan jatidiri yang bermakna bagi semua orang.

Hasil penelitian ini sejalan dengan simpulan penelitian Samsuri dan Marzuki (2016: 31) bahwa pembinaan karakter kewargaan multikultural dalam program kurikuler di MA tampak ditekankan pada matapelajaran Pendidikan Kewarganegaraan sesuai kurikulum 2006, serta Pendidikan Pancasila dan Kewarganegaraan sesuai kurikulum 2013. Hasil penelitian Ahmad Muhibbin dan Sumardjoko (2016:9) menyimpulkan bahwa model pembelajaran PKn berbasis isu kontroversial di media massa yang dimodifikasi dengan *active learning* terbukti sangat strategis meningkatkan sikap demokrasi mahasiswa dan implikasinya bagi masyarakat madani. Sikap

demokratis maknanya sama dengan sikap positif terhadap masyarakat heterogin. Hal tersebut semakin menemukan alasan yang dapat diyakinkan dengan maraknya berita bohong (*hoax*) yang sering dan sangaja disebarkan melalui media sosial akhir-akhir ini. Membiasakan dan melatih mahasiswa untuk berpikir kritis terhadap sumber, merupakan kompetensi watak kewarga negaraan yang juga dikembangkan melalui model pembelajaran isu-isu kontroversial.

Model pembelajaran isu kontroversial juga memenuhi sebagai pembelajaran untuk pembangunan watak bangsa (*nation and character building*). Pemilihan materi atau topik yang menjadi isu kontroversial mencerminkan kepekaan dan kepedulian mahasiswa terhadap kenyataan yang terjadi di masyarakat, bangsanya, bahkan dunia. Kemampuan untuk melihat dan mendekati masalah sebagai anggota masyarakat global merupakan salahsatu kompetensi warga negara multidimensional sebagaimana dikemukakan Cogan & Derricot (1998:2-3).

Watak kewarga negaraan mengandung unsur perspektif hubungan masyarakat dan partisipasi atau peran serta dalam masyarakat terutama dalam masyarakat Indonesia yang heterogin dan multikultur. Untuk itu diperlukan kemampuan mengembangkan empati terhadap berbagai pandangan di masyarakat yang rawan memicu konflik. Model pembelajaran berlatar isu-isu kontroversial secara teoritis memiliki tiga keunggulan, yaitu (1) melatih pemecahan masalah-masalah sosial kontroversial, terutama yang potensial memicu terjadinya konflik, (2) melatih berpikir kritis, mempertimbangkan berbagai resiko atas sebuah kontroversi, dan (3) lebih mengutamakan proses daripada hasil, karena pembelajaran isu kontroversial dirancang sebagai pembelajaran pendidikan nilai.

Kompetensi sikap terhadap masyarakat multikultural dapat juga dilakukan melalui pendidikan multikultural. Dengan pendidikan multikultural, lembaga pendidikan menjadi lahan untuk menghapus prasangka, dan sekaligus untuk melatih dan membangun karakter peserta didik agar mampu bersikap demokratis, humanis dan pluralis. Ada dua hal yang perlu dilakukan dalam pembangunan pendidikan multikultural di sekolah, yaitu; pertama, melakukan dialog dengan menempatkan setiap peradaban dan kebudayaan yang ada pada posisi sejajar. Kedua,

mengembangkan toleransi untuk memberikan kesempatan masing-masing kebudayaan saling memahami. Toleransi di sini tidak hanya pada tataran konseptual, melainkan juga pada teknik operasionalnya. Pendidikan multikultur bahkan diperlukan di tingkat lokal dan daerah, untuk mengembangkan kearifan lokal, tenggangrasa, saling menghargai, kerukunan, dan toleransi, demi keutuhan kebangsaan Indonesia, serta mencegah terjadinya konflik antar budaya (Amirin, 2012:15).

Dampak pengiring model pembelajaran isu kontroversial yaitu mahasiswa memiliki kemampuan persepsi, emosi, komunikasi, berpikir kritis, sikap positif dan keyakinan terhadap suatu isu, serta kemampuan mencegah berkembangnya sikap dan tindakan anarkhis. Persepsi adalah anggapan positif bahwa perbedaan adalah hal biasa dalam masyarakat demokratis yang heterogin. Emosi adalah kemampuan mengendalikan perasaan, sikap dan tindakan terhadap perbedaan pandangan dan pendapat yang selalu terjadi di masyarakat. Etika komunikasi adalah kemampuan menyampaikan gagasan, ide, pendapat dengan cara-cara yang santun. Berpikir kritis adalah kemampuan untuk menelaah suatu masalah dari berbagai sudut pandang, tidak hanya dari perspektif pribadi melainkan dari sudut pandang orang lain yang lebih luas. Sikap positif dan keyakinan terhadap suatu isu, adalah pemahaman mahasiswa atas sebuah isu, yang tidak harus ditanggapi secara berlebihan dan emosional. Kemampuan mencegah berkembangnya sikap dan tindakan anarkhis adalah kemampuan mahasiswa untuk mengendalikan emosi dan tindakan yang dapat mengarah terjadinya konflik dan bentrok fisik yang disebabkan perbedaan pandangan atas sebuah isu.

Model pembelajaran inovatif untuk penguatan watak kewarga negaraan semakin memiliki makna strategis pada saat ini karena faktanya isu-isu kontroversial berlatar sukuisme, agama, ras, dan antar golongan (SARA) yang berkembang melalui media sosial akhir-akhir ini semakin nyata menjadi penyebab intoleransi, keretakan hubungan antar warga negara, dan bahkan dapat menjadi pemicu disintegrasai bangsa. Sebagaimana hasil penelitian Suud (2011:8) menyatakan bahwa kecenderungan menggunakan isu kontroversial dalam kelas dilakukan karena topiknya aktual (34%); menarik (34%); relevan (30%). Manfaatnya pembelajaran menjadi lebih

kontekstual (33%); berpotensi meningkatkan partisipasi siswa (19%); pembahasan berpotensi lebih menarik dan tidak jenuh (17%); berpotensi mengembangkan semangat toleransi dan saling pengertian (16%), dan berpotensi mengembangkan dialog (15%). Simpulan hasil penelitian Hanurawan (2012:135) menyatakan bahwa mahasiswa memiliki sikap *favourable* atau setuju terhadap penggunaan metode diskusi isu-isu kontroversial dalam perkuliahan. Sikap tersebut didasarkan atas evaluasi subyektif mahasiswa terhadap pengetahuan tentang isu-isu kontroversial, pengembangan kemampuan berpikir kritis, dan manfaat diskusi isu-isu kontroversial, yang dapat memicu timbulnya konflik, bahkan kekerasan.

Jika model pembelajaran isu kontroversial dianggap sebagai model pembelajaran nilai, maka saat ini terbukti adanya fakta yang menguatkan akan pentingnya pendidikan berbasis nilai (*value based*). Sebagaimana dikemukakan Stahl (2008:3), bahwa pembelajaran akan bermakna jika berbasis nilai, sudah terjawab dengan model pembelajaran isu kontroversial. Kenyataannya di masyarakat saat ini sering terjadi paradoks yaitu kesenjangan antara muatan nilai dalam aturan-aturan normatif formal konstitusional dengan realitas sosial, budaya, politik, ideologi, bahkan agama. Melalui pendidikan berbasis nilai dampak paradok tersebut yang cenderung mengarah menjadi konflik dan kekerasan fisik setidaknya dapat diminimalkan.

PENUTUP

Penelitian ini berhasil mengembangkan model pembelajaran berlatar isu-isu kontroversial untuk penguatan watak kewarga negaraan mahasiswa. Pada tahap studi pendahuluan berhasil mengidentifikasi tujuh unsur kompetensi watak kewarga negaraan yang harus dikembangkan dalam masyarakat demokratis yang multikultur, yaitu: kesopanan, empati, kepemimpinan, perspektif, hubungan masyarakat, peran dalam masyarakat, dan sikap terhadap masyarakat multikultur. Pada tahap validasi model dapat membuktikan efektivitas model pembelajaran yang dikembangkan berdasarkan hasil uji statistik dengan nilai $t_{hitung} = 3.253$, dengan signifikansi $(P) = 0.003$.

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PENGEMBANGAN TES DIAGNOSTIK MISKONSEPSI EMPAT TAHAP TENTANG KINEMATIKA

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Abstrak: Penelitian ini bertujuan untuk mengembangkan instrumen Tes Diagnostik Miskonsepsi Empat Tahap Tentang Kinematika (TDMET-K) yang dapat mendeskripsikan profil miskonsepsi guru fisika SMA dengan kriteria baik. Penelitian menggunakan metode penelitian & pengembangan dengan guru fisika SMA di Surakarta sebagai subjek penelitian. Tahapan penelitian terdiri atas kajian literatur untuk menyusun draf awal; uji validitas secara kualitatif oleh dua ahli; uji validitas isi secara kuantitatif menggunakan formula Lawshe; uji coba lapangan awal (6 subjek); uji coba lapangan utama (30 subjek) sebagai bahan untuk menguji reliabilitas menggunakan formula Alpha Cronbach. Hasil uji menjadi bahan revisi sehingga dihasilkan TDMET-K final. Instrumen pengambilan data yang digunakan berupa angket. Analisis data dilakukan secara kuantitatif dan deskriptif kualitatif. Hasil uji kuantitatif menunjukkan bahwa baik item maupun instrumen memenuhi kriteria validitas isi yang baik dan reliabilitas instrumen termasuk kategori tinggi. Penelitian ini telah berhasil mengembangkan instrumen TDMET-K sebanyak 30 butir yang dapat mendeskripsikan profil miskonsepsi guru fisika SMA dengan kriteria baik.

Kata Kunci: *empat tahap, tes diagnostik, profil miskonsepsi*

DEVELOPING FOUR TIER MISCONCEPTION DIAGNOSTIC TEST ABOUT KINEMATICS

Abstract: This study aimed to develop a valid Four Tier Misconception Diagnostic Test about Kinematics that is intended to describe high school physics teacher's misconception profile. This research and development study involved high school physics teachers in Surakarta as the research subjects. The research was conducted in the following stages: literature review to prepare initial draft; qualitative test of validity by two experts; a quantitative test of the content validity using the Lawshe formula; an initial field trial (6 subjects); and a main field trial (30 subjects) to explore the reliability of the test using the Cronbach Alpha formula. The result from the try out was subsequently revised to create the final product. A questionnaire was used to collect the data. Both quantitative and qualitative descriptive analyses were performed. The quantitative test results indicated that both the items and instruments meet the criteria of good content validity and high reliability. This research has developed an instrument consisting of 30 items that can be used to describe high school physics teacher's misconception.

Keywords: *four tier, diagnostic test, misconception profile*

PENDAHULUAN

Pembelajaran Fisika menurut Kurikulum 2013 memiliki tujuan diantaranya ialah agar peserta didik memiliki kemampuan menguasai konsep dan prinsip Fisika serta mempunyai keterampilan mengembangkan pengetahuan, dan sikap percaya diri sebagai bekal untuk melanjutkan pendidikan pada jenjang yang lebih tinggi serta mengembangkan ilmu pengetahuan dan teknologi (Suharto, 2015). Berdasarkan pengalaman empiris, Fisika adalah mata pelajaran

yang dianggap menakutkan. Angell, Guttersrud, Henriksen, & Isnes (2004) meneliti bahwa fisika tampak sulit karena memerlukan pemahaman seseorang untuk mengatasi berbagai bentuk representasi yang berbeda (eksperimen, grafik, simbol matematika, deskripsi verbal, dll) secara simultan dan harus mengelola transformasi antara representasi yang berbeda ini. Alhasil, ketidaktuntasan dalam mata pelajaran Fisika kerap terjadi di lingkungan pendidikan formal sehingga menyebabkan tidak tercapainya tujuan pembela-

jaran Fisika seperti yang telah diungkapkan di atas.

Rendahnya kemampuan sains tersebut di atas dimungkinkan erat kaitannya dengan miskonsepsi yang dapat diakibatkan oleh lima hal yaitu: siswa, guru, buku teks, konteks, dan metode mengajar (Suparno, 2005). Dari sini dapat dilihat bahwa guru juga berperan dalam terjadinya miskonsepsi pada siswa bahkan tidak menutup kemungkinan guru itu sendiri yang mengalami miskonsepsi.

Van den Berg (1991, p. 10) menyatakan, "Konsepsi yang berbeda atau bertentangan dengan konsepsi para ahli disebut sebagai miskonsepsi." Senada dengan Van den Berg, disimpulkan oleh Hammer dalam Pesman (2010), miskonsepsi adalah struktur kognitif yang secara kuat tertanam tetapi tidak konsisten dengan konsep saintifik. Namun, definisi menurut Hammer tersebut dapat diartikan bahwa bukan hanya tidak konsisten dengan konsep saintifik, sebuah miskonsepsi pun secara kuat didukung oleh individu tersebut.

Hal tersebut akan lebih sulit untuk diluruskan jika terjadi pada guru yang tidak menyadari bahwa guru tersebut mengalami miskonsepsi. Untuk keperluan ini, dibutuhkan tes diagnostik miskonsepsi untuk guru.

"Istilah diagnostik dapat diuraikan dari asal katanya yaitu diagnosis yang berarti mengidentifikasi penyakit dari gejala-gejala yang ditimbulkannya" (Depdiknas, 2007, p. 2). Mardapi menerangkan bahwa hasil dari tes diagnostik memberikan informasi tentang konsep-konsep yang belum dan telah dipahami, termasuk kesalahan konsep, oleh karenanya tes diagnostik mengandung materi yang dirasa sulit namun tingkat kesulitan tes ini cenderung rendah (2012, p.111). Mehrens & Lehmann (Suwanto, 2013, p.114) menyatakan, "Tes diagnostik yang baik dapat memberikan gambaran akurat tentang miskonsepsi yang dimiliki siswa berdasarkan informasi kesalahan yang dibuatnya."

Tes diagnostik miskonsepsi sendiri dapat disajikan dalam berbagai metode. Sebuah penelitian yang meneliti artikel ilmiah tentang tes diagnostik dengan tahun terbit antara 1980-2014 di Inggris mengungkapkan bahwa dari 273 artikel yang diteliti, 53% menggunakan metode wawancara, 34% tes jawaban terbuka, 32% pilihan ganda, 13% tes pilihan ganda bertahap, dan 9% dengan metode lain-lain (Gurel, Eryilmaz,

& McDermott, 2015). Setiap metode memiliki kekurangan dan kelebihan, namun Reynolds dalam Caleon & Subramaniam (2009) menyatakan bahwa tes pilihan ganda memiliki kelebihan serba guna, efisien, objektif, mudah digunakan, dan lebih sedikit terpengaruh oleh tendensi seseorang dalam menjawab pilihan ganda dengan cara tertentu. Pilihan ganda lebih mudah digunakan daripada metode lainnya terutama jika ingin diujikan pada sebuah populasi. Di lain sisi juga dijelaskan bahwa pilihan ganda memiliki satu kelemahan utama, yaitu tidak bisa membedakan jawaban benar sebab alasan yang benar atau alasan yang salah (Caleon & Subramaniam, 2009). Alhasil tes pilihan multi tahap dikembangkan dengan tujuan mengimbangi kekurangan dari tes pilihan ganda umumnya dalam mendiagnosis miskonsepsi siswa.

Secara umum, tes dua tahap adalah instrumen tes diagnosis seperti pilihan ganda umumnya sebagai tahap pertama, dan di tahap kedua berisi prinsip-prinsip yang relevan yang membenarkan respons pada tahap pertama (Caleon & Subramaniam, 2009). Kelemahan dari tes ini dijelaskan oleh Tamir bahwa pilihan jawaban yang disediakan pada tes dua tahap memberikan petunjuk pada jawaban yang benar yang belum tentu dipikirkan oleh peserta tes ketika peserta tersebut dites dengan jawaban terbuka ataupun wawancara (Gurel et al, 2015). Tes dua tahap belum bisa membedakan salah yang disebabkan karena belum paham konsep atau mengalami miskonsepsi, dan tes tersebut belum bisa membedakan jawaban benar yang disebabkan paham konsep atau tebakan (Gurel et al, 2015). Penambahan tahap diharapkan dapat menjadi jalan keluar permasalahan ini.

Tes tiga tahap sama seperti tes dua tahap yang ditambahkan tahap ketiga berisi pertanyaan mengenai keyakinan peserta tes dengan jawaban yang telah diberikan pada tahap pertama dan kedua. Turgut, Gurbuz, & Turgut (2011) menerangkan bahwa keadaan miskonsepsi pada tes tiga tahap adalah ketika seorang peserta yakin pada jawaban dan alasan yang salah di tahap pertama dan kedua. Namun, kelemahan tes tiga tahap terjadi sebab peserta ditanya mengenai keyakinan pada tahap pertama dan kedua pada saat yang bersamaan. Tidak jelas apakah peserta tes memiliki tingkat keyakinan yang berbeda antara tahap pertama dan kedua (Caleon & Subramaniam, 2009). Dengan demikian dimung-

kinkan tes tiga tahap ini menaksir terlalu rendah proporsi belum paham konsep dan menaksir terlalu tinggi skor peserta paham konsep (Gurel et al, 2015). Oleh karena itu, dewasa ini tes empat tahap dikembangkan. Pada tes empat tahap tingkat keyakinan ditanya pada jawaban dan alasan secara terpisah.

Tes empat tahap merupakan salah satu jenis tes diagnostik pilihan ganda multi tahap. Pada tahap pertama terdiri dari pertanyaan dan pilihan jawaban seperti pada tes pilihan ganda pada umumnya. Pada tahap kedua berisi tingkat keyakinan mengenai jawaban di tahap pertama. Pada tahap ketiga berisi prinsip-prinsip yang relevan yang membenarkan respons pada tahap pertama, sedangkan pada tahap keempat berisi tingkat keyakinan mengenai jawaban di tahap ketiga.

Kinematika merupakan materi yang fenomenanya banyak dijumpai dalam kehidupan sehari-hari mengundang banyak miskonsepsi. Beberapa hasil penelitian miskonsepsi Kinematika dijelaskan berikut. Hasil studi Trowbridge & McDermott (1980) mengatakan bahwa mahasiswa Fisika Pengantar University of Washington yang dapat mendefinisikan kecepatan belum tentu dapat menentukan jika dan kapan dua objek memiliki kecepatan yang sama. Banyak mahasiswa juga masih kesulitan dalam menggambar dan menginterpretasikan grafik (McDermott, Rosenquist, & van Zee, 1987). Temuan yang dihasilkan dari penelitian Bunawan (2015, p. 266) menyatakan, "Pengembangan tes diagnostik pilihan ganda tiga tingkat terhadap mahasiswa calon guru fisika membuka fakta bahwa penguasaan kemampuan representasi grafik berdasarkan level grafik fungsi masih kurang memadai." Hasil studi-studi terdahulu demikian kemudian menjadi dasar pengembangan tes diagnostik untuk guru ini.

Tujuan penelitian ini adalah mengembangkan instrumen Tes Diagnostik Miskonsepsi Empat Tahap Tentang Kinematika (TDMET-K) yang dapat digunakan untuk mendeskripsikan profil miskonsepsi guru Fisika SMA pada materi Kinematika.

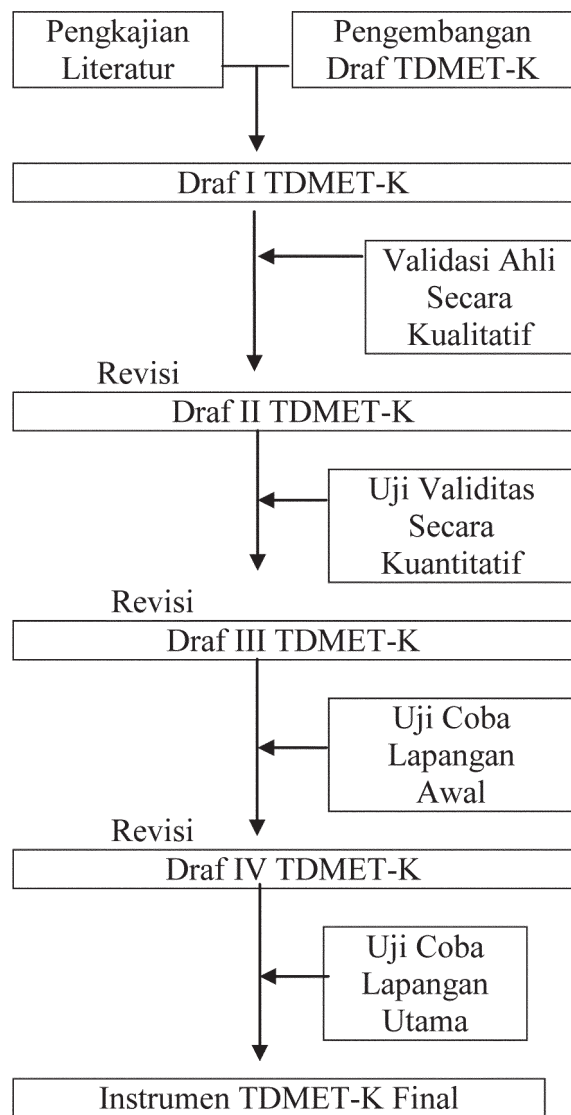
METODE

Penelitian dilaksanakan pada bulan Februari sampai dengan November 2017. Metode penelitian yang digunakan adalah penelitian pengembangan atau *Research and Develop-*

ment (R&D) yang bertujuan untuk merumuskan, memperbaiki, mengembangkan, menghasilkan, menguji keefektifan produk, model, metode/strategi/cara, jasa, prosedur tertentu yang lebih unggul, baru, efektif, efisien, produktif, dan bermakna (Putra, 2012: 67). Dalam hal ini, penelitian ini bertujuan untuk mengembangkan produk berupa instrumen Tes Diagnostik Miskonsepsi Empat Tahap pada materi Kinematika (TDMET-K) yang memenuhi kriteria baik. Subjek penelitian adalah guru SMA di Surakarta. Total subjek berjumlah 36 guru dengan rincian 6 guru pada uji coba lapangan awal (2 laki-laki dan 4 perempuan) dan 30 guru pada uji coba lapangan utama (4 laki-laki dan 26 perempuan). Subjek penelitian dipilih secara acak. Penelitian ini menggunakan metode *Research and Development*, dengan langkah-langkah sebagai berikut: (1) penelitian pendahuluan dan perencanaan; (2) pengembangan produk; (3) uji coba lapangan awal; (4) revisi produk utama; (5) uji coba lapangan utama; dan (6) revisi produk operasional.

Produk dari penelitian ini adalah instrumen TDMET-K yang dapat digunakan untuk mendeskripsikan profil miskonsepsi guru Fisika SMA pada materi Kinematika. Instrumen tes miskonsepsi yang dikembangkan termasuk tipe empat tahap. Pada tahap pertama adalah pertanyaan pengetahuan tentang materi Kinematika, tahap kedua adalah pertanyaan tentang keyakinan atau *confidence rating* atas jawaban pada tingkat pertama, tahap ketiga adalah penyajian alasan jawaban pada tahap pertama, dan tahap keempat adalah pertanyaan tentang keyakinan (*confidence rating*) atas alasan jawaban pada tingkat ketiga. Dalam hal ini terdiri dari 30 butir soal dengan alokasi waktu 90 menit. Setiap butir tes yang dikembangkan berawal dari forum *Focus Group Discussion* (FGD) yang mengkaji literatur penelitian terdahulu tentang miskonsepsi pada materi Kinematika. Adapun bagan alir prosedur penelitiannya disajikan pada Gambar 1.

Berdasarkan bagan Gambar 1 selanjutnya dapat dijelaskan sebagai berikut. Tahap awal pengembangan adalah dilakukan kajian literatur yang selanjutnya dibahas lebih lanjut dalam FGD sehingga menghasilkan draf I TDMET-K. Draf I tersebut selanjutnya divalidasi secara kualitatif oleh duadosen ahli yang meliputi aspek materi, konstruksi dan bahasa (Depdiknas, 2008) seperti ditunjukkan pada Tabel 1.



Gambar 1. Bagan Alir Prosedur Penelitian

Setelah melewati validasi ahli, selanjutnya instrumen direvisi dan menjadi draft II TDMET-K. Kemudian draft II divalidasi isi oleh 7 panelis. Pada instrumen validasi isi digunakan 4 kategori, yaitu 0: tidak terkait sama sekali dengan isi; 1: agak terkait dengan isi; 2: cukup terkait dengan isi; dan 3: sangat terkait dengan isi. Hasil validasi tersebut dinyatakan sebagai draft III TDMET-K. Hasil tersebut selanjutnya diuji cobakan pada 6 guru Fisika SMA sebagai tahap uji coba lapangan awal untuk diketahui keterbacaannya. Hasil dari uji tersebut kemudian menjadi bahan revisi, menghasilkan draft IV TDMET-K. Selanjutnya dilakukan uji coba lapangan utama, pada subjek sejumlah 30 guru Fisika SMA. Hasil uji coba tersebut menjadi bahan untuk menguji reliabilitas instrumen dengan menggunakan formula *Cronbach Alpha*. Menurut pendapat Supahar, Rosana, Ramadani, & Dewi (2017), dapat disimpulkan bahwa instrumen dikatakan konsisten (reliabel) apabila instrumen dilakukan dari waktu ke waktu tetapi memiliki nilai yang sama. Setelah reliabilitas diuji dan instrumen telah memenuhi kriteria reliabel, selanjutnya akan dihasilkan produk instrumen TDMET-K final.

Data pada penelitian ini berupa data kualitatif dan kuantitatif. Data kualitatif yaitu terdiri dari hasil validasi ahli sebelum uji coba dan masukan dari guru subjek penelitian. Sedangkan data kuantitatif berupa hasil instrumen validasi isi dan hasil uji coba subjek penelitian pada uji coba lapangan utama. Data uji coba lapangan utama tersebut digunakan untuk mengukur reli-

Tabel 1. Kriteria Penelaahan Butir Instrumen (Depdiknas, 2008, p.6)

Aspek	Kriteria Penelaahan
Materi	1. Soal sesuai dengan indikator.
	2. Pilihan jawaban harus homogen dan logis
	3. Pilihan alasan harus homogen dan logis
	4. Isi materi sesuai dengan jenjang, jenis sekolah dan tingkatan kelas
Kontruksi	5. Pokok soal dirumuskan dengan singkat, jelas dan tegas
	6. Pilihan jawaban dirumuskan dengan singkat dan jelas.
	7. Rumusan pokok soal dan pilihan jawaban merupakan pernyataan yang diperlukan.
	8. Pilihan alasan dirumuskan dengan singkat dan jelas.
	9. Pokok soal tidak mengandung pernyataan yang bersifat negatif ganda
	10. Panjang pilihan jawaban relatif sama.
	11. Panjang pilihan alasan relatif sama
	12. Pasangan pilihan jawaban dan alasan mengindikasikan adanya alternatif terjadinya miskonsepsi
	13. Gambar, bagan, sejenisnya disajikan secara jelas
Bahasa	14. Kalimat menggunakan bahasa yang sesuai dengan kaidah bahasa Indonesia
	15. Menggunakan bahasa yang komunikatif, sehingga mudah dimengerti.
	16. Tidak menggunakan bahasa yang berlaku setempat
	17. Pilihan jawaban tidak mengulang kata atau frase yang terdapat pada pokok soal.

abilitas instrumen tes. Teknik analisis data yang digunakan adalah teknik analisis kuantitatif dan deskriptif kualitatif. Analisis kuantitatif meliputi uji validitas isi dari 7 panelis (2 ahli dan 5 praktisi) dan reliabilitas instrumen tes berdasarkan data yang diperoleh dari hasil uji coba lapangan utama.

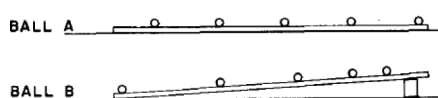
HASIL DAN PEMBAHASAN

Hasil

Pada pengembangan instrumen tes diagnostik *four-tier* ini sebanyak tiga puluh butir TDMET-K telah dikembangkan yang berfungsi untuk mendeskripsikan profil miskonsepsi yang dialami guru Fisika SMA pada materi Kinematika. Pengembangan TDMET-K tersebut telah melewati beberapa tahapan yang akan dijelaskan sebagai berikut.

Tahap Penelitian Pendahuluan dan Perencanaan

Pada tahap ini, penelitian awal dilakukan dengan diskusi forum FGD yang mengkaji literatur pendukung perlunya dilakukan pengembangan TDMET-K. Terdapat beberapa literatur yang dikaji mengenai analisis materi Kinematika dan miskonsepsi yang terjadi pada bidang Kinematika, di antaranya adalah penelitian oleh Trowbridge dan McDermott (1980 dan 1981). Hasil dari kajian literatur ini, diketahui bahwa sering terjadi miskonsepsi di bidang Kinematika, di antaranya pada konsep kecepatan seperti ditunjukkan pada Gambar 2.

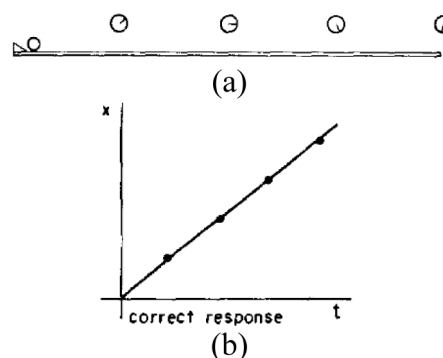


Gambar 2. Soal Perbandingan Laju (Bergerak dari Kiri ke Kanan)

(Sumber: Trowbridge & McDermott, 1987)

Subjek penelitian dalam penelitian Trowbridge dan McDermott (1987) diwawancara mengenai Gambar 2, yaitu rekam jejak 2 bola yang menggelinding dari arah kiri ke kanan. Subjek ditanya, “Apakah bola A dan B sempat memiliki laju yang sama?” Salah seorang subjek penelitian mengungkapkan bahwa dua bola yang mencapai posisi yang sama maka akan memiliki kecepatan yang sama. Subjek lain pun menyebutkan bahwa ketika salah satu bola telah berhasil menyusul bola lain, maka pada momen

itu dua bola memiliki kecepatan yang sama. Hal tersebut kurang tepat. Dua atau lebih benda yang berada di posisi yang sama tidak selalu memiliki kecepatan yang sama. Pada Gambar 2, bola A mengalami gerak dengan kecepatan konstan, dan bola B mengalami gerak yang diperlambat, ketika berpapasan di posisi yang sama dapat memiliki kecepatan yang berbeda.

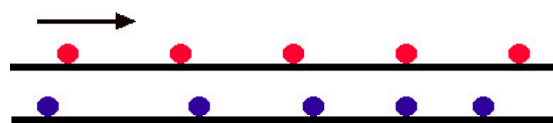


Gambar 3a. Bola Bergerak Lurus Beraturan dari Kiri ke Kanan

b. Grafik Posisi-Waktu dari Gerak Bola

(Sumber : McDermott et al., 1987)

Atas dasar penelitian Trowbridge dan McDermott (1980 dan 1981), McDermott, et al (1987), dan beberapa studi lain mengenai konsep Kinematika, Jurusan Fisika Universitas Montana mengembangkan soal-soal tentang miskonsepsi pada Kinematika yang dipublikasikan secara umum di halaman website Pusat Informasi Kesulitan Siswa dalam Fisika. Di halaman tersebut dikaji fenomena-fenomena miskonsepsi di bidang Kinematika dan beberapa bidang lain. Di antaranya seperti yang diilustrasikan Gambar 4.



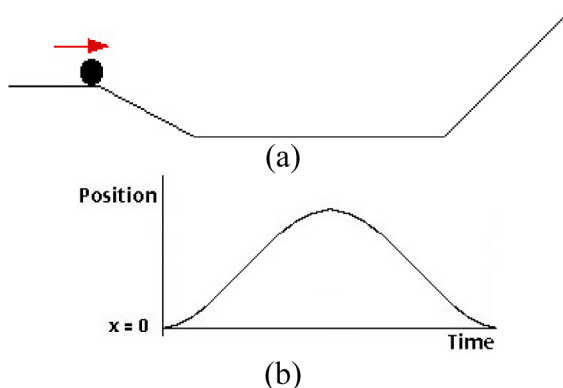
Gambar 4. Rekam Jejak Dua Bola

(Sumber: Physics Department, Montana University, 2012)

Pengunjung *website* diminta menentukan di mana kedua bola memiliki kecepatan yang sama. Pengunjung yang mengalami miskonsepsi kemungkinan akan menjawab pada rekam jejak ke-4 (ketika bola merah tepat di atas bola biru). Hal tersebut tidak tepat. Dapat diperhatikan secara kualitatif bahwa bola merah mengalami Gerak Lurus Beraturan (GLB), sedangkan bola biru mengalami Gerak Lurus Berubah Beraturan

(GLBB) diperlambat. Kedua bola memiliki kecepatan yang sama ketika di antara rekam jejak kedua dan ketiga. Hal ini ditandai dengan kedua bola memiliki jarak yang sama pada selang waktu rekam jejak kedua dan ketiga.

Contoh lain pembahasan yang terdapat di halaman website tersebut adalah pembahasan mengenai Gambar 5. Pengunjung diminta untuk menggambar sketsa grafik posisi terhadap waktu dari gerak bola yang meluncur pada suatu lintasan seperti yang ditunjukkan pada Gambar 5a. Pengunjung website yang mengalami miskonsepsi kemungkinan besar akan menggambar grafik dengan bentuk serupa lintasan yang ditempuh dari bola tersebut. Hal ini tidak tepat. Pada awal gerak, bola mengalami percepatan, sehingga kemiringan dari grafik adalah positif. Sedangkan di akhir gerak, bola mengalami perlambatan seiring dengan lintasan yang menanjak, maka kemiringan dari akhir grafik adalah negatif. Sketsa grafik yang tepat akan menyerupai sebuah parabola, seperti yang diilustrasikan pada Gambar 5b.



Gambar 5a. Ilustrasi Bola yang Meluncur pada Suatu Lintasan, b. Sketsa Grafik Posisi terhadap Waktu dari Gerak Bola

(Sumber: Physics Department, Montana University, 2012)

Pembahasan mengenai Gambar 4, Gambar 5, dan pembahasan-pembahasan lainnya di halaman *website* Jurusan Fisika Universitas Montana tersebut dikaji oleh penelitian ini melalui FGD, kemudian diterjemahkan dan/atau dimodifikasi atau dikembangkan sehingga terbentuklah draf I instrumen TDMET-K.

Adapun perencanaan penyusunan draf instrumen TDMET-K dilakukan dengan mengkaji literatur mengenai tes empat tahap dan analisisnya. Literatur yang dijadikan dasar kajian di antaranya penelitian oleh Caleon & Subramaniam (2009), Kaltacki (2012), Ismail et al. (2015),

dan Gurel et al. (2015). Penelitian Gurel menjadi dasar pengambilan keputusan pada tes empat tahap yang digunakan dalam penelitian ini. Kriteria pengambilan keputusan pada penelitian ini diilustrasikan pada Tabel 2.

Tabel 2. Kriteria Pengambilan Keputusan pada TDMET-K (Gurel et al., 2015)

Tahap				Keputusan
I	II	III	IV	
B	Y	B	Y	Paham
B	Y	B	TY	Belum Paham
B	TY	B	Y	Belum Paham
B	TY	B	TY	Belum Paham
B	Y	S	Y	Miskonsepsi
B	Y	S	TY	Belum Paham
B	TY	S	Y	Belum Paham
B	TY	S	TY	Belum Paham
S	Y	B	Y	Belum Paham
S	Y	B	TY	Belum Paham
S	TY	B	Y	Belum Paham
S	TY	B	TY	Belum Paham
S	Y	S	Y	Miskonsepsi
S	Y	S	TY	Belum Paham
S	TY	S	Y	Belum Paham
S	TY	S	TY	Belum Paham

B: Benar; S: Salah; Y: Yakin; TY: Tidak Yakin

Di lain sisi, penelitian pengembangan instrumen tes diagnostik untuk evaluasi diri guru masih sangat minim dijumpai. Hal tersebut mendorong dibuatnya TDMET-K.

Tahap Pengembangan Produk Awal

Setelah literatur dikaji, draf I instrumen TDMET-K mulai disusun melalui forum FGD. Draf I instrumen TDMET-K awalnya disusun antara tim peneliti dan melibatkan sejumlah mahasiswa program studi Pendidikan Fisika UNS untuk mendapat masukan. Sejumlah mahasiswa diminta mengerjakan draf awal tersebut dengan bentuk *open ended test*.

Open ended test adalah soal pilihan ganda seperti pada umumnya, namun peserta diminta menuliskan alasan yang melatarbelakangi peserta tersebut memilih jawaban yang dipilih. Jawaban bebas dari mahasiswa tersebut menjadi penyempurna opsi pada tahap ketiga (tahap alasan) TDMET-K yang sebelumnya telah disusun dari kajian literatur. Alhasil tersusunlah draf I instrumen TDMET-K. Adapun distribusi sub konsep pada TDMET-K dapat dilihat di Tabel 3.

Tiga puluh butir soal TDMET-K selanjutnya divalidasi ahli. Proses validasi instrumen tes

diagnostik meliputi tiga bidang kriteria penelaahan, yaitu materi, konstruksi, dan bahasa, seperti ditunjukkan pada Tabel 3.

Adapun ringkasan hasil validasi instrumen tes diagnostik oleh Validator adalah sebagai berikut:

Dari 30 soal yang divalidasi oleh validator pertama, sebanyak 10 item soal diterima tanpa revisi dan 20 item soal diterima dengan revisi dengan rincian pada Tabel 4. Soal paling banyak mengalami revisi pada bagian keterangan yang kurang dicantumkan pada soal yang terdapat gambar di dalamnya. Serta terdapat pula soal yang di dalamnya mengandung persepsi ganda. Catatan/saran yang diberikan oleh validator pertama antara lain:

- 1) Soal yang kalimatnya mengandung pernyataan yang bermakna ganda maka kalimat tersebut diperbaiki dan redaksi kalimat tersebut dibuat lebih jelas seperti pada nomor 3, 10, 11, 12, 13, & 26.
- 2) Soal yang penyajian gambarnya kurang jelas maka gambarnya dibuat lebih jelas lagi dengan menyertakan keterangan yang dibutuhkan seperti pada nomor 5, 6, 7, 18, 20, 22, & 24.
- 3) Soal dengan angka perhitungan yang keliru maka diperbaiki sesuai dengan perhitungan yang benar, seperti pada nomor 9.
- 4) Soal-soal yang memerlukan keterangan, maka perlu ditambahkan informasi pendukung seperti pada nomor 4 & 8.

- 5) Soal yang antarpilihan panjangnya terlalu timpang agar direvisi seperti pada nomor 14, 15, 23, & 28.

Contoh soal yang direvisi dengan arahan dari validator pertama dapat dilihat di Tabel 5. Pada tabel tersebut diperlihatkan butir nomor 4 dan nomor 9 sebelum dan setelah divalidasi. Pada nomor 4, Validator pertama menyarankan agar diberi penjelasan yang menyatakan bahwa Hendra memiliki laju yang sama dengan mobil biru. Jika besar kecepatan keduanya tidak sama, maka tidak akan terbentuk sudut 45° seperti yang diharapkan pada opsi (1). Alhasil ilustrasi Hendra yang semula dilambangkan dengan orang berjalan diganti dengan mobil oranye, dengan diberi kalimat penegas, “jika laju kedua mobil sama besar”. Dengan laju yang sama besar, maka jawaban yang benar untuk tahap pertama adalah pilihan (1).

Sedangkan pada nomor 9, ketika informasi yang ada pada nomor 9 dimasukkan ke dalam rumus GLBB, hasil yang didapat tidak sesuai dengan pilihan yang ada. Setelah diusut, barulah disadari bahwa anak tersebut tidak memiliki jarak awal dari titik acu yaitu bangku taman ($s_0 = 0$). Alhasil, didiskusikan kembali angka yang tepat yang sesuai dengan ilustrasi agar didapatkan kombinasi yang tepat antara soal dan jawaban.

Dari 30 soal yang divalidasi oleh validator kedua, sebanyak 11 diterima tanpa revisi dan 19 butir diterima dengan revisi. Sama halnya de-

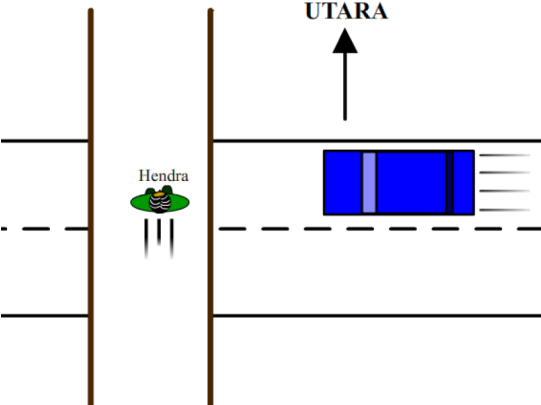
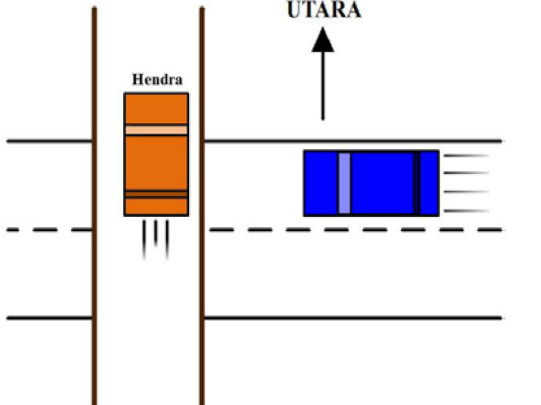




Tabel 3. Distribusi Sub Konsep TDMET-K

No.	Sub Konsep	No. Soal
1	Perpindahan & Jarak	1, 2
2	Kecepatan	3, 4
3	Hubungan Posisi & Kelajuan	5, 6, 7
4	Kelajuan & Kecepatan Rata-Rata	8, 9
5	Perlajuan Rata-Rata & Percepatan	9, 10, 11, 12, 13, 25
6	Hubungan Kecepatan dan Percepatan	11, 12, 14, 15, 16
7	Grafik Posisi sebagai Fungsi Waktu	17, 18, 19, 20
8	Grafik Kecepatan sebagai Fungsi Waktu	21, 22, 23
9	Grafik Kelajuan sebagai Fungsi Waktu	24
10	GLB	18, 6
11	GLBB	5, 9, 16, 21, 25
12	Gerak Jatuh Bebas	21, 24, 26, 27, 28
13	Gerak Melingkar	11, 12, 29, 30

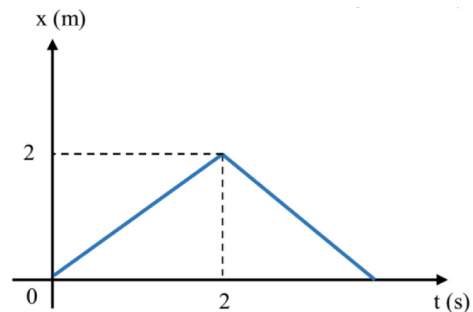
Tabel 4. Ringkasan Hasil Validasi

	Validator 1	Validator 2
Soal Diterima Tanpa Revisi	1, 2, 16, 17, 19, 21, 25, 27, 29, 30	1, 2, 11, 12, 14, 17, 19, 21, 23, 27, 29
Soal Diterima Dengan Revisi	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 18, 20, 22, 23, 24, 26, 28	3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 15, 16, 18, 20, 22, 24, 25, 26, 30

Tabel 5. Butir Nomor 4 Setelah dan Sebelum Divalidasi

Sebelum Revisi	Sesudah Revisi
<p>4. Hendra berjalan ke arah Utara pada sebuah jembatan penyeberangan. Sebuah mobil bergerak di bawah jembatan tersebut ke arah Barat, seperti terlihat pada gambar berikut.</p>  <p style="text-align: center;">UTARA</p>	<p>4. Hendra mengendarai mobil ke arah Utara pada sebuah jembatan <i>fly over</i>. Sebuah mobil biru bergerak di bawah <i>fly over</i> tersebut ke arah Barat, seperti terlihat pada gambar berikut.</p>  <p style="text-align: center;">UTARA</p>
<p>Bagaimanakah vektor kecepatan mobil yang dilihat oleh Hendra?</p> <p><i>Jawaban:</i> (1)  (2) </p>	<p>Jika laju kedua mobil sama besar, bagaimanakah vektor kecepatan mobil biru yang dilihat oleh Hendra?</p> <p><i>Jawaban:</i> (1)  (2) </p>
<p>9. Seorang anak yang mula-mula diam, bergerak meninggalkan sebuah kursi taman. Dia bergerak lurus dipercepat beraturan. Selama detik pertama, dia berjalan sepanjang 1 m. Selama detik kedua, dia berlari sepanjang 2 m. Dan selama detik ketiga, dia berlari sepanjang 3 m. Berapakah kelajuan rata-rata dan besarnya percepatan anak itu?</p> <p><i>Jawaban:</i> (1) Kelajuan rata-rata = 2 m/s ; besarnya percepatan = 1m/s² (2) Kelajuan rata-rata = 1 m/s ; besarnya percepatan = 1m/s²</p>	<p>9. Seorang anak yang mula-mula diam, bergerak meninggalkan sebuah kursi taman. Dia bergerak lurus dipercepat beraturan. Selama detik pertama dia berjalan sepanjang m. Selama detik kedua dia berlari sepanjang 2 m. Dan selama detik ketiga dia berlari sepanjang m. Berapakah kelajuan rata-rata dan besarnya percepatan anak itu?</p> <p><i>Jawaban:</i> (1) Kelajuan rata-rata = 2 m/s ; besarnya percepatan = 1m/s² (2) Kelajuan rata-rata = 1 m/s ; besarnya percepatan = 1m/s²</p>

ngan validator pertama, mayoritas soal yang direvisi disebabkan karena kurangnya keterangan yang dicantumkan di dalam soal tersebut, seperti nomor 18 pada Gambar 6. Walaupun grafik terlihat simetris, seharusnya ada informasi tambahan setelah detik kedua, yaitu besar detik ketika kurva menyentuh sumbu *x*. Jika tidak diberi informasi tambahan, maka peserta terpaksa harus menebak nilai pada grafik. Selain itu, catatan/saran yang diberikan oleh validator kedua antara lain memperbaiki redaksi kalimat dari soal yang belum sesuai kalimatnya atau belum memiliki hubungan yang jelas seperti pada nomor 3 dan 19.



Gambar 6. Grafik pada Nomor 18 Sebelum Direvisi

Selain mengenai redaksi soal TDMET-K, Validator pertama pun menyoroti redaksi petunjuk pengerjaan TDMET-K. Petunjuk pengerjaan

Tabel 6. Petunjuk Pengerjaan Sebelum dan Sesudah Direvisi

Sebelum revisi
5. Berilah tanda silang (X) pada salah satu pilihan jawaban (1) atau (2) sebagai jawaban yang anda anggap benar.
6. Berilah tanda silang (X) pada pilihan (1) apabila anda YAKIN atau (0) apabila anda TIDAK YAKIN, sebagai pernyataan tingkat keyakinan anda menjawab.
7. Berilah tanda silang (X) pada (A), (B) atau (C) sebagai alasan dari pernyataan yang anda anggap paling benar.
8. Berilah tanda silang (X) pada pilihan (1) apabila anda YAKIN atau (0) apabila anda TIDAK YAKIN, sebagai pernyataan tingkat keyakinan anda memberi alasan.
Sesudah revisi
5. Berilah tanda silang (X) pada salah satu pilihan jawaban (1) atau (2) sebagai jawaban yang anda anggap benar.
6. Berilah tanda silang (X) pada salah satu pilihan keyakinan memilih jawaban (1) apabila anda YAKIN atau (0) apabila anda TIDAK YAKIN, sebagai pernyataan tingkat keyakinan anda menjawab.
7. Berilah tanda silang (X) pada salah satu pilihan alasan (A), (B) atau (C) sebagai alasan dari pernyataan yang anda anggap paling benar.
8. Berilah tanda silang (X) pada salah satu pilihan keyakinan memilih alasan (1) apabila anda YAKIN atau (0) apabila anda TIDAK YAKIN, sebagai pernyataan tingkat keyakinan anda memberi alasan.

diberi penekanan dengan dipertebal dan diberi keterangan tambahan yang memperjelas petunjuk pengerjaan. Pada Tabel 6 ditunjukkan petunjuk pengerjaan nomor 5 sampai dengan nomor 8 sebelum dan sesudah direvisi.

Berdasarkan hasil validasi oleh validator tersebut, dilakukan revisi terhadap instrumen TDMET-K dan dihasilkan draf II instrumen TDMET-K. Selanjutnya draf instrumen tersebut diuji validitas isinya oleh 7 orang panelis yang terdiri atas 2 ahli dan 5 praktisi. Hasil uji dengan formula Lawshe dengan Ms. Excel menunjukkan bahwa validitas isi item sebanyak 30 butir item semuanya memiliki nilai koefisien V di atas 0,75. Sedangkan validitas instrumen diperoleh nilai koefisien V sebesar 0,88. Dengan demikian validitas item dan instrumen TDMET-K dikatakan valid karena lebih besar dari 0,75. Dengan demikian tidak ada butir draf II instrumen TDMET-K yang ditolak dan dapat dilanjutkan ke tahap selanjutnya, yaitu tahap uji coba lapangan awal kepada guru yang menjadi subjek penelitian. Hasil analisis tersebut dinyatakan sebagai draf III instrumen TDMET-K.

Tahap Uji Coba Lapangan Awal

Tahap uji coba lapangan awal dilakukan pada 6 guru Fisika SMA di Surakarta. Tahap uji coba ini dilakukan untuk mengetahui tingkat keterbacaan dari draf III instrumen TDMET-K yang telah disusun. Secara menyeluruh hasil uji coba lapangan awal ini dapat disimpulkan bahwa seluruh butir tes diagnostik sudah dapat dipahami. Hal tersebut menunjukkan bahwa tingkat keterbacaan draf III instrumen TDMET-K sudah baik. Meskipun demikian untuk lebih menyempurna-

kan instrumen tersebut ada sejumlah catatan dan saran yang diberikan, salah satu contoh masukan adalah terdapat beberapa ketidaksesuaian tata letak gambar dengan teks, seperti kata “gambar di atas” padahal gambar terletak di bawah teks seperti pada nomor 24. Selain itu, masukan lainnya juga diberikan pada nomor 19 seperti yang ditunjukkan pada Tabel 7.

Tahap Revisi Produk Utama

Revisi produk utama dilakukan berdasarkan catatan/saran pada uji coba lapangan awal untuk menyempurnakan struktur butir draf II instrumen TDMET-K tersebut. Revisi dilakukan sesuai yang disarankan oleh subjek uji coba lapangan awal.

Sebelum direvisi, butir nomor 19 menimbulkan kebingungan pada guru yang mengerjakan uji coba lapangan awal. Opsi (2) yang berisi “Selama 4 sekon sepeda menempuh jarak 10 m” mengindikasikan bahwa sepeda terus bergerak selama interval waktu 4 sekon. Padahal sepeda hanya bergerak selama 2 detik awal. Hal tersebut dirasa menjadikan opsi (2) tidak cocok dengan alasan (C) yang merupakan kunci jawaban paham konsep untuk nomor 19.

Alhasil, kalimat pada pilihan (2) direvisi menjadi: Selama 6 sekon sepeda menempuh jarak 10 m. Adanya revisi tersebut diubah menjadi 6 dan bukan 2 sekon, sebab butir soal nomor 19 ini sengaja ingin mengetahui pemahaman peserta bahwa sepeda hanya bergerak di 2 detik pertama dan selebihnya berhenti. Dipilihnya 6 sekon adalah sebab angka 6 telah tertera pada gambar, sedangkan informasi 4 sekon tidak tertera.

Hasil dari revisi disebut sebagai draf IV instrumen TDMET-K dan selanjutnya diuji kembali pada tahap uji coba lapangan utama.

Tahap Uji Coba Lapangan Utama

Draf IV Instrumen TDMET-K kembali diujikan kepada guru yang berbeda dengan jumlah keseluruhan 30 guru Fisika SMA di Surakarta. Uji coba yang dilakukan serupa dengan uji coba lapangan awal.

Selanjutnya dari hasil uji coba lapangan utama dihitung koefisien reliabilitasnya. Hasil perhitungan dengan formula *Cronbach Alpha* menggunakan Ms. Excel diperoleh besarnya koefisien reliabilitas instrumen tes adalah 0,70. Nilai tersebut diinterpretasikan bahwa instrumen TDMET-K memiliki koefisien reliabilitas tinggi (Sudiyono, 2008).

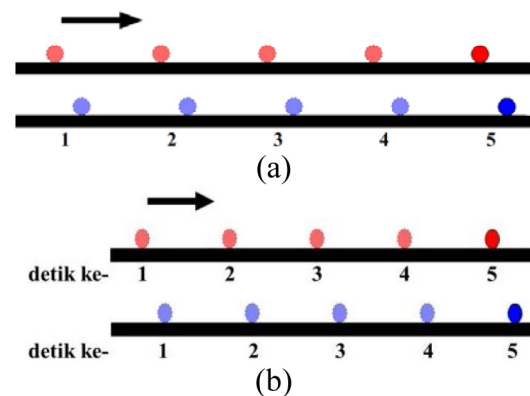
Tahap Revisi Produk Operasional

Revisi dilakukan sesuai catatan dan saran dari keseluruhan guru pada uji coba lapangan utama, di antaranya adalah:

- Perlu diperbaiki pada beberapa kata yang salah ketik dan membingungkan.
- Perlu direvisi pada petunjuk (26 butir soal diganti dengan 30 butir).

Perlu tambahan keterangan pada redaksi soal, seperti pada soal rekam jejak bola yang menggelinding lebih baik diberikan keterangan jarak (nomor 5, 6, dan 7).

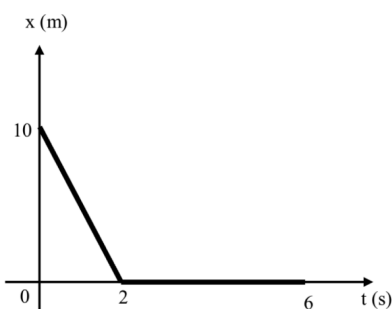
Saran a dan b dijadikan bahan revisi. Adapun saran c tidak dilaksanakan karena grup riset merasa jarak antarbola sudah cukup signifikan, terutama dengan telah ditambahkannya informasi “detik ke-“ pada gambar sesuai hasil validasi, seperti yang ditunjukkan pada Gambar 7. Penambahan keterangan jarak ditakutkan akan membuat peserta tes TDMET-K kurang dalam menganalisis permasalahan yang ada dalam ilustrasi yang diberikan.



Gambar 7a. Ilustrasi Nomor 6 Sebelum Direvisi, b. Setelah Direvisi

Tabel 7. Soal Nomor 19 Sebelum Direvisi

Perhatikan gambar grafik di bawah ini!



Gerak sepeda yang grafiknya menyerupai gambar di atas adalah ...

Jawaban:

- Sepeda meluncur pada bidang miring dan datar.
- Selama 4 sekon sepeda menempuh jarak 10 m.

Apakah Anda yakin akan jawaban tersebut?

- (1) Ya (2) Tidak

Alasan:

- Sepeda dipercepat selama 2 sekon kemudian bergerak dengan kecepatan konstan.
- Sepeda diperlambat selama 2 sekon kemudian berhenti.
- Sepeda bergerak menuju titik acuan selama 2 sekon kemudian berhenti.

Apakah Anda yakin akan jawaban tersebut?

- (1) Ya (2) Tidak

Tabel 8. Tes Diagnostik Empat Tahap pada Bidang Sains

Bidang	Tes Diagnostik Empat Tahap	Referensi
Fisika	<i>Four Tier Wave Diagnostic Instrument (4WADI)</i> <i>Four Tier Geometrical Test (FTGOT)</i>	Caleon & Subramaniam (2009) Gurel (2012)
Kimia	Thermodynamics Diagnostic Instrument (THEDI)	Sreenivasulu & Subramaniam (2013)
Biologi	<i>Diffusion and Osmosis Diagnostic Test (DOTD)</i>	Odom & Barrow (2007)

Pembahasan

Miskonsepsi telah menyorot perhatian banyak peneliti dari dulu hingga saat ini. Banyak penelitian telah dilakukan untuk mengidentifikasi miskonsepsi, diantaranya dilakukan oleh Hale (1996) yang meneliti konsepsi dan miskonsepsi mengenai grafik-grafik Kinematika, Turgut, et al. (2011) yang meneliti miskonsepsi mengenai rangkaian listrik pada siswa kelas X, Zulfiani, Junaengsih, Suwarna, & Mulama (2014) yang meneliti miskonsepsi di bidang biologi, kimia, dan fisika pada mahasiswa pendidikan IPA UIN Syarif Hidayatullah Jakarta. Kesemuanya menunjukkan hasil bahwa miskonsepsi jelas terjadi. Sedangkan peneliti yang mengembangkan tes diagnostik empat tahap untuk mendiagnosis miskonsepsi dapat dilihat pada Tabel 8. Dari penelitian-penelitian tersebut, tes diagnostik empat tahap terbukti dapat membaca lebih baik pemahaman peserta ujian karena dapat membedakan paham konsep, kurang paham konsep, miskonsepsi, *false positive*, *false negative*, dan juga *mistake*. Pada 4WADI dan FTGOT yang terdapat di Tabel 8, keduanya menggunakan skala Likert 4 skala dan 6 skala pada tahap *confidence rating*. Namun pada TDMET-K ini hanya menggunakan dua tahap, yaitu: Yakin atau Tidak Yakin. Hal tersebut memiliki keunggulan lebih minimalis dan merujuk pada tes diagnostik yang dikembangkan Kanli (2014); Korur(2015); Arslan, et al.(2012); dan Pesman & Erylmaz (2010).

SIMPULAN

Instrumen Tes Diagnostik Miskonsepsi Empat Tahap Tentang Kinematika (TDMET-K) merupakan tes diagnostik yang terdiri atas 30 butir, dengan tahap pertama adalah soal dengan dua opsi, tahap ketiga adalah alasan dengan tiga opsi, serta tahap kedua dan keempat merupakan pertanyaan mengenai keyakinan peserta dalam menjawab. TDMET-K telah divalidasi oleh ahli, dengan hasil sebanyak 10 item soal diterima tanpa revisi dan 20 item soal diterima dengan revisi dari validator pertama. Sedangkan oleh validator kedua, sebanyak 11 diterima

tanpa revisi dan 19 butir diterima dengan revisi. TDMET-K kemudian dihitung validitas isinya, dan didapatkan nilai koefisien reliabilitas 0,88 (valid). Selanjutnya instrumen diujikan kepada guru dalam beberapa tahap uji dan kemudian direvisi sesuai saran validasi empirik tersebut. Selain itu, dihitung pula kereliabilitasan instrumen dan didapatkan bahwa TDMET-K adalah instrumen yang reliabel. Alhasil, telah berhasil dikembangkan instrumen TDMET-K yang memenuhi kriteria baik. Langkah-langkah penelitian yang telah dilakukan adalah: (1) diskusi dalam forum FGD yang mengkaji literatur penelitian terdahulu tentang miskonsepsi pada materi Kinematika dan tentang tes empat tahap sehingga menjadi draf I instrumen TDMET-K, (2) draf I divalidasi oleh 2 ahli dan selanjutnya direvisi sehingga menghasilkan draf II TDMET-K, (3) draf II TDMET-K diujikan pada 6 guru Fisika SMA dalam uji coba lapangan awal, (4) revisi berdasarkan hasil uji coba sehingga dihasilkan draf III TDMET-K, (5) draf III TDMET-K diuji coba lapangan utama pada 30 guru Fisika SMA, dan (6) revisi berdasarkan hasil uji coba sehingga dihasilkan produk TDMET-K final.

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MODEL OF CIVIC EDUCATION LEARNING BASED ON THE LOCAL WISDOM FOR REVITALIZING VALUES OF PANCASILA

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Abstract: The objectives of this study are to describe the existing civic education learning, develop the model of civic education learning, and measure the effectiveness of the model of civic education learning based on the local wisdom. This research and development study was carried out in three stages, i.e., preliminary study, development, and model effectiveness test. The data in this study were collected through interview and observation. The results of the research are, *first*, there are strength, weaknesses, chances, and obstacles in civic education learning. *Second*, the development of the model of civic education learning based on the local wisdom is presented in the form of the syntax of learning model through the practice of cooperative learning of Problem Based Learning and Value Clarification. *Third*, the model of civic education learning can be categorized as “effective” based on the criteria of validity, practicality, and effectiveness. The model of civic education learning based on the local wisdom is able to improve the score of character and nation identity by 80% and the mastery learning at least 75%.

Keywords: *effectiveness of learning model, local wisdom, civics learning*

MODEL OF CIVIC EDUCATION LEARNING BASED ON THE LOCAL WISDOM FOR REVITALIZING VALUES OF PANCASILA (bahasa Indonesia)

Abstrak: Tujuan penulisan ini untuk mendeskripsikan pematangan pembelajaran PKn yang tengah berlangsung selama ini, pengembangan model pembelajaran PKn, dan efektivitas model pembelajaran PKn berbasis kearifan lokal. Data diperoleh melalui penelitian pengembangan, dimulai dari studi pendahuluan, pengembangan, dan uji efektivitas model. Hasil penelitian sebagai berikut, *pertama*, dalam pembelajaran PKn terdapat kekuatan, kelemahan, peluang, dan ancaman. *Kedua*, pengembangan model pembelajaran PKn berbasis kearifan lokal dikemas dalam sintak model pembelajaran, melalui praktik pembelajaran kooperatif *Problem Based Learning* dan *Value Clarification*. *Ketiga*, model pembelajaran PKn tergolong efektif berdasarkan kriteria kevalidan, kepraktisan, dan keefektifan. Model pembelajaran PKn berbasis kearifan lokal mampu meningkatkan skor karakter dan jati diri bangsa sebesar 80% serta ketuntasan belajar sekurang-kurangnya 75%.

Kata kunci: *efektivitas model pembelajaran, kearifan lokal, pembelajaran PKn*

INTRODUCTION

The Law of National Education System of the Republic of Indonesia Number 20 of 2003 article 3 states that “National education has a function to develop the capability and form the character and civilization of the dignified nation in order to educate the nation’s life, aiming to develop the potency of learner to being a human, who has a belief and fear to the Almighty God, noble, healthy, knowledgeable, capable, creative, independent, and become a democratic and responsible citizen”. Civic education is one of the instruments to achieve those objectives of national education.

Civic education teaches learners to be good and responsible citizens based on the values and foundations of Pancasila. Thus, civic education is essentially the praxis education of Pancasila. Epistemologically, Civic education and Pancasila is an integrated knowledge system, which has a mission to foster the potency of learners to have “civic intelligence”, “civic participation”, and “civic responsibility” (Winatapura, 2001). This means that the Civic education has a function to advance as well as form a good Indonesian citizen, particularly in the context of the character and civilization building of Indonesian based on the values of Pancasila.

Pancasila is the foundation of the state and the nation's way of life. Therefore, the study of the implementation of Pancasila through civic education learning becomes important. There are several reasons; *first*, Pancasila is a systematic value, which requires its implementation in the daily life. *Second*, the implementation of Pancasila could be done through various ways; one of them is through education. *Third*, the content of Pancasila, which is socialized to the citizens, could be used to establish the national identity. *Fourth*, the content of Pancasila in civic education still faces weaknesses in terms of learning methods. *Fifth*, Pancasila, which has various status, meaning, and interpretation, requires a clear structuration and organization as a material of civic education. Winarno (2017) stated there is no current specific study that analyzes and formulates the material of Pancasila in civic education, in which Pancasila is imparted as the core of civic education.

The systemic framework of civic education in Indonesia is built based on a paradigm that the civic education curricular is designed as a learning subject that aims to develop the potency of individuals to become Indonesian citizens who have a noble character, intelligent, participative, and responsible. Therefore, the study of civic education can be done theoretically and programmatically (Budimansyah, 2008). Theoretically, civic education is designed as a learning subject that contains cognitive, affective, and psychomotor dimensions, which are confluent or mutually penetrating and integrated with the context of the objectives, values, concepts, and morals of Pancasila, democratic citizenship, and state defense. Programmatically, civic education is designed as a subject of learning that emphasizes the substance of the content, which carries the content of embedding values and learning experiences in the form of various behaviors that need to be realized in the daily life.

Several competencies are needed in Civic education learning. Budimansyah (2008) suggests a number of required competencies encompassing the mastery of knowledge, the development of intellectual and participatory abilities, the development of character and mental attitude, as well as a commitment to the values and basic principles of constitutional democracy. Three main components need to

be studied in Civic education learning based on those competencies that must be developed, that are civic knowledge, civic skills, and civic dispositions. This means that the mission of Civic education as character education essentially aims to prepare the learners to be smart and good citizens who mastering the knowledge, skills, and values, which could be used to enhance the sense of nationality and love to the homeland.

Furthermore, the practice of education and learning indicates the degradation of the local values and local wisdom, which have been eroded by the flow of global education. Such conditions result in the diminution of etiquette, ethics, and creativity of the student. The education is considered not able to generate a quality graduate as the excellent Indonesian man. The decline of morality and values in the collective life of nation may be caused by the decrease of understanding and implementation of the noble values of Pancasila.

The phenomena in the educational field show the symptom of a desire to refuse the civic learning that merely presents moral values. Civic education learning is considered to have lost their academic characteristics because of the absence of adequate scientific theories. Civics education learning is considered to be more emphasizing the interests of certain political regimes with formalistic learning materials. The learning process does not encourage the ability of learners to be able to think critically. The process of civic education causes saturation because of the learning material tends to monotone, theoretical, cognitivist and even literalistic (Samsuri, 2009). The above phenomenon shows the determinant factors that cause the civic education learning be less interesting, *firstly*, the learning material tends to be literalistic over the moral values of Pancasila as civic virtues. *Secondly*, civic learning models tend to be cognitive memorization. Based on the above phenomena, it is necessary to find a solution for those problems so the civic education learning could become more interesting and liked by learners. One of the solutions is through the development of the model of civic education learning based on local wisdom.

Local wisdom is the values that live in society, which is believed to be true and become a reference in the daily behavior of the local community. According to Geertz (1963), the local wisdom is an entity that determines the

dignity of a human within a society. The local wisdom contains elements of intelligence, creativity, and local knowledge of the elite and the community that would determine the development of civilization. The local wisdom is often conceptualized as local knowledge and local genius. In the recent theoretical development, the local wisdom tends to correlate with the contingent product of power relations in the society (Kalb, 2006).

Education based on the local wisdom is an educational model or strategy that has a high relevance for the development of life skills with a focus on empowering skills and local potential in each region. Learning materials have meaning and high relevance to the society empowerment based on the reality they face in the daily life. The curriculum is prepared in accordance with the environmental condition, learner's interest, learner condition, and attention to sociological and cultural obstacles. The education based on the local wisdom is education that teaches learners to embrace the concrete situation that they face in their daily life.

One of the results of the education based on the local wisdom could be in form of the knowledge that describes attitudes and behavior that reflect the local-original culture. In the case of Surakarta, the local-original culture is the Javanese culture. The wisdom values of Javanese culture such as *gotong royong* or mutual cooperation, *tepo seliro* or tolerance, and solidarity are good values which should be imparted to the students in the school. Javanese culture is a source of the moral of citizenship. In a nation-state, the strong-binding rule in form of the moral of citizenship is needed, besides of the basic rights of citizens. The moral of citizenship is a life guideline of citizens, which could help the citizens to judge right or wrong actions.

Without any intention to undermining the role of other ethnic cultural communities that supporting the diversity in unity of Indonesia, the Javanese culture and its moral values are interesting to be studied. For example, the idiom '*oyo dumeh*' that could be meant that the people should not be arrogant despite having a high position. Unfortunately, such idiom, which has a moral value of Javanese culture, is no longer popular among the Javanese people, even some of them are not recognized it (Rahyono, 2009). Besides, it can be a moral source of the citizen;

the Javanese culture also could become a source to develop the civic culture. The excavation of Javanese culture aims to prove that there are universal values inside of Javanese culture, which could be accepted comprehensively by the Indonesian people and served as a strategy to achieve the objective of civic education learning that is to build the identity and character of the nation.

Based on the above description, the revitalization of civic education learning in accordance with the demands and the needs of the development of national identity and character are needed to be done. One of the strategies is through the development of civic education learning in Junior High School based on the local wisdom. The students of Junior High School theoretically is on the periods of adolescence in which they were on the period of cognitive transition as well the crucial period of character development (Lickona, 1996; Malin, Liauw, and Damon, 2017). Because of that, this development is intended to produce the model of civic education learning in Junior High School based on local wisdom, as a strategy to revitalize the values of Pancasila to strengthening the character and identity of the nation. In detail, this article is limited to the description, *first*, the initial design of the existing civic education learning. *Second*, the development of the model of civic education learning. *Third*, the effectiveness of the model of civic education learning based on local wisdom as a strategy to revitalize the values of Pancasila for strengthening the character and identity of the nation.

METHOD

This development research was product-oriented, in which the process was thoroughly described and evaluated. The product is a model of civic education learning for Junior High School based on local wisdom as a strategy to revitalize the values of Pancasila values and strengthening the character and identity of the Nation. The research site was in Surakarta due to the existence of tangible and intangible cultural construction of this city that had been fabricated by its historical process and social change (Cowherd, 2012). By the existence of cultural construction, theoretically, the civic education learning in Surakarta could be affected by the cultural construction of the city. The development

research approach (Gall & Borg, 2003) was chosen for its theoretical and practical excellence, especially from its research procedure that could be used systematically and cyclically to observe the needs and real situation of the Junior High Schools in Surakarta. The primary and secondary data were collected from informants, documents, places, and events (Miles, & Huberman, 1992), consist of several techniques, namely in-depth interviews with civic education teachers, the principals of Junior High Schools in Surakarta, and the officials of the National Education Office of Surakarta. The observation technique was observing the process of civic education learning in the classroom in some Junior High School State in Surakarta, furthermore, the researcher also scrutinized the learning content and held focus group discussions.

Research stages include preliminary studies as the basis for model development. Development stage was held in collaborative and participative (Wiriaatmadja, 2005: 83), which consist of some stages: drafting the model, validity tests, limited trials, and major revisions of the draft model. The drafting of the learning model was based on the theoretical framework of the literature review, which was combined with the characteristics of the developed model and the characteristic of the civic education subject as well as the learning conditions at the junior high school. The learning model was developed based on the five learning components of Joyce (2011), encompassing syntax of learning, social system, the principle of reaction, supporting system, instructional impact, and accompaniment impact. The last stage was the learning model testing. At this stage, researcher measured the effectiveness of hypothetical models, which have been enhanced in the early stages of development, through experiments between experiment classes and control classes.

RESULTS AND DISCUSSION

The Mapping of Civic Education Learning in Junior High School

The data of interview and observation show the existing civic education learning and the understanding of civic education teacher. *First*, the objective of civic education learning is to prepare the learners to be a good and smart citizen. Teachers understand that the objectives of the civic education learning produce: (1)

knowledgeable citizens, (2) possessing skills, (3) developing attitudes and values to grow a sense of nationality and love of the nation. Second, civic education is multi-dimensional, namely (1) civic education as a curricular program, (2) civic education as an academic program, and (3) civic education as a cultural social program. In the implementation of classroom learning, these three dimensions occur simultaneously. *Third*, civic education as a curricular program is essentially a program that is designed and taught to learners at a certain level of the educational unit. *Fourth*, civic education is not merely a subject in the school curriculum but rather a discipline education that has a comprehensive task. *Fifth*, civic education is developed in the context of community life that aims at all members of society to become good citizens in various situations and the changing times. Sixth, the existence of political euphoria in 1998 and the symbols of the new order are regarded as a latent danger, thus it is making the Pancasila Moral Education (*Pendidikan Moral Pancasila*) as a subject transformed into Civic Education (*Pendidikan Kewarganegaraan*) without Pancasila. Seventh, the coverage of material in Civic Education learning becomes one of the obstacles and difficulties for teachers in preparing the lesson plan and implementation of Civic Education learning.

In the interview, the teachers articulate the difficulties and obstacles in integrating Pancasila values and local wisdom. The difficulties and obstacles can be summarized as follows. First, the suitability of civic education materials and the time allocation contained in the curriculum is less balanced. Consequently, the learning process is monotonous, memorizing, and textual because teachers tend to use the lecture method. Second, teachers are faced with low student motivation in following civic education learning in the classroom. The students' assumption that the civic education learning tends to memorize is to be one of the factors causing low student motivation. Third, teachers are faced with students' perception that civic education learning is not very important. This was proved by the fact that civic education learning is not included in the national final examination. In addition, the civic education learning in class IX should be "taken" other subjects because of the focus of preparing national final examination. Fourth,

in instilling the values of Pancasila and local wisdom, teachers are sometimes confronted with the inconsistency between reality in the society and the subject matter. Fifth, teachers faced difficulties in applying student-centered learning methods and strategies. The reason is the low motivation of students and materials that tend to be more memorizing. Sixth, the teacher felt that the learning material of civic education is less meaningful and the compatibility between the civic education learning and the implementation in the field is not maximal yet.

Some of the preliminary findings above illustrate the strengths and weaknesses of civic education learning and are at the same time, those findings also become a rationale for developing a model of learning while integrating the values of Pancasila and the values of local wisdom for the strengthening of national identity.

The findings that the New Order government tried to correct any form of the deviation of the Old Order regime. However, the New Order tended to practice the liberalistic-capitalistic stance in managing the state, which means they also caught deviate from the political lines of Pancasila and the 1945 Constitution. This finding is interesting, therefore the reformation movement is considered able to correct the deviations that have been made by the New Order. However, in the present day, the meaning of Pancasila appears to be shifting back to the interests of particular power and political groups. Consequently, the promises of independence, which contains in Pancasila, have not been fully realized. Various phenomena in society should be considered by teachers and observers of civic education learning as the sign that the dynamic of national politics is always changing.

The findings of the preliminary stages of this study showed the importance of the values, which contain in each principle of Pancasila, to be implemented in civic education learning. These findings are reasonable because the character education could build the nation's personality. Education for children should include the values of nationality and love of the homeland, in which it would flourish the spirit of the struggle of the Indonesian nation to fill the independence as well as face a massive globalization. To build the global insight of young citizens within the

Indonesian context, the basic values of divinity, humanity, unity, community, social justice, competence, respect for others, freedom and peace, need to be developed (Murdiono, 2014). In civic education learning, the learners need to be helped to live based on true moral values, have a good character, and responsible for the undertaken activities.

In line with the Hutabarat's (2014) research, the findings of this study also confirmed that the implementation of civic education learning could be used to elevate the moral and character values in junior high school students. The results of Sitompul's research revealed that the civic education learning takes an important role as a device to instill the character of junior high school students. On the other hand, Angraini (2017) supports the orientation of civic education learning, which has a substance to shape the students' moral. Angraini stated that the civic education as value education is a subject that aims to shape the students to become moral beings. In order to achieve this purpose, an appropriate learning media is needed. Basically, civic education is the value education that aims to shape the human beings to be able to respect the others according to their dignity and build perfect human. The development of the intellectual thinking or Intelligence Quotient of students through a myriad of sciences is not enough to form a perfect human. The development should be accompanied by the enactment of behavior and moral awareness.

Based on those findings and reviews, the practice of civic education learning should be combined with various value approaches. The main characteristic of civic education is not merely transferred the knowledge, but it should be oriented to educate the society to live in a good manner. Thus, the substance of learning Civics is not only knowledge but it also contains moral and values learning. Teachers are expected to understand and apply various models of value education. Furthermore, teachers are also expected to have a correct understanding of Pancasila and the concept of the unity of Indonesia. This becomes important as Supeni's finding (2015) that the understanding of Pancasila and the unity of Indonesia of pre-school teachers in Surakarta was in low level.

The Development of the Model of Civic Education Learning

The finding of the development of civic education learning model is based on SWOT analysis, focus group discussion, and workshops from various components of educational stakeholders in Surakarta. The developments of the model of civic education learning based on the local wisdom in Junior High School of Surakarta are as follow. *First*, the content informal in civic education is contextual and in accordance with the social and cultural background of learners that is Javanese culture. *Second*, the core values of Javanese culture, which originate from the principle of respectful and harmonious, are described and mapped with the values of Pancasila and character values. *Third*, in preparing the learners to be smart and good citizens, the civic education learning is done by learning by doing, social problem-solving learning, socio-participatory learning, and enculturation and socialization. *Fourth* the learning processes as the authors mentioned in point 3, are realized by the Problem Based Learning, Project Based Learning, and value clarification approach. *Fifth*, the learning process through habituation and social-cultural interaction are realized by the school culture and role models of teachers, principals, and parents.

In order to achieve the objectives of civic education learning, the initial design of the model of civic education learning based on the local wisdom is developed into the learning syntax that includes some components such as the learning structure, social system, the principle of reaction, supporting system, and impact accompaniment.

Learning stages

The learning structure consists of six stages: (1) preparing the classroom and learners to follow the learning model, (2) delivering the learning materials, (3) guiding the learners to sort and choose the values and attitudes that need to be developed in freedom of opinion, (4) guiding group and class discussions, (5) evaluating and reflecting the result of discussion, (6) giving rewards and reinforcement. In the process of values strengthening, teachers act as facilitator, who explain about freedom of opinion by keeping in mind the wisdom values of Javanese culture, such as '*sepi ing pamrih rame ing gawe*', '*berbudi bowo leksono*', '*mikul duwur mendem*

jero', which are the attitudes that should be understood and developed by the learners.

The social system

In the design of the social system, the civic teacher behaves democratic and cooperative by giving freedom to the learner to express their opinion, open to accept the opinions of the learners, giving the learner the opportunity to reflect the learning material, and responsible for the ideas that appear in learning groups. In addition, civic teachers also become facilitators to support the achievement of the learning process. In this activity, teachers are required to have high creativity in order to create a fun learning atmosphere.

The principle of reaction

The principle of reaction is intended to provide learners to be convenience during the learning process in the classroom. Therefore, the learners have a high spirit, active, and able to thinking critically about various issues. The teacher's roles include are providing learning resources and media that are videos and articles related to the model, delivering the civic learning material of class VII and its relation to the principles of freedom of opinion, and guiding learners to analyze the relevance between the values and their daily life.

The supporting system

The civic education learning model based on local wisdom requires a supporting system, which consist some elements: (1) the lesson plan that contains the learning steps and the learning resources and media; (2) a group worksheet as a tool to implement the model based on the cooperative learning strategy, Problem Based Learning (PBL), and Value Clarification; (3) instrument of evaluation to measure the competence of learners and the attitude scale to measure the level of character and national identity.

The impact accompaniment

The impact accompaniment of civic learning model is designed to improve the character and identity of the Nation and as a strategy of revitalizing the values of Pancasila. The development of the civic learning model derives from contextual learning that prioritizes

the meaningfulness of learning, in which it would only be obtained through the development of knowledge by learners, and not through indoctrination and memorization. Through these activities, the learners are not only trained to achieve academic objectives but also to achieve the social objectives. In exploring the learning resources, the learner will gain intellectual experience, while in the activities of explaining, discussing and debating of a particular topic, they will be trained to organize their ideas rationally and artistically express their opinions

Besides giving scores according to the indicators of each aspect of the learning model, the validator asked to give a conclusion regarding the feasibility of the learning model as well improvement notes. The improvement notes from validator are as follows: (1) the learning syntax needs to be adapted with the model of Problem Based Learning and Value Clarification; (2) the lesson plan should correspond with the syntax of Problem Based Learning and Value Clarification; (3) the Javanese phrase and idiom should be translated in language that can be understood by junior high school students.

The results of the development stages show the importance of teachers' roles in observing the wisdom values of the Javanese culture. This in line with Feriandi's (2017) research that reveals some idiomatic expressions such as *aja dumeh*, *mendhem jero mikul dhuwur*, or *jer basuki mawa bea*, have universal moral values of citizenship so those could be the character or identity of the Indonesian people that is the part of the civic culture. The Javanese culture also constructs Indonesian civic culture, because of the values that include in the civic culture are then brought by political actors (executive and legislative) to be reflected in their behavior as the representative of the people in the context of social development, politic, economy, and politic culture. It means the Javanese culture, civic culture, and politic culture have a continuous attachment.

Another substantive finding is that the values of local wisdom, which contains in manuscript, could be used as a device in civic education learning in junior high school. This is supported by Ramdani & Sapriya's (2017) research that the values, which contains in the *Amanat Galunggung* manuscript, could be integrated into the civic education learning

because it corresponds to the learning objectives. The integration of the values of *Amanat Galunggung* manuscript in the civic education learning, especially in Darul Falah 2 Junior High School, is implemented by studying and incorporating the value of local wisdom in each of the basic competencies.

In the context of the Surakarta society, the values of the local wisdom of Javanese culture need to be explored more deeply, thus, it can be socialized to the younger generation. The local wisdom values, such as *gotong royong* or mutual assistance, *tepo seliro* or tolerance, and solidarity, are very important to be imparted to the learners through civic education learning. This is consistent with Ghufro'n's (2017) research, who states that the relevant learning approach to be used for to cultivate the cultural values in Yogyakarta is through the non-directional learning of Carl Rogers's version. The values of local wisdom essentially are the core of Pancasila values. Therefore, civic education learning based on local wisdom is expected to produce the learners, who have are cultured as well as have Indonesian personality.

Based on the aspect of assessment and 32 indicators that had been validated, obtained an average value of 4.18. The indicators represent the four components of learning model, encompassing the indicator of the learning stages, the social system, the teacher and student role, the supporting system, and the nurture effects (Joyce, Weil, and Calhoun, 2011). This shows that the developed learning model is well categorized. The finding that the lesson plan is needed to develop in some procedure that leads to the cooperative learning stage, Project Based Learning, and Value clarification is interesting. It because of the Problem Based Learning is developed to support the students to enhance the problem-solving skills and the intellectual skills, real experiences or stimuli and become autonomous and independent learners (Ibrahim, 2000). The aspects, which are validated by the expert includes the format of the lesson plan, content, and language of the lesson plan. The aspects are outlined in the revised lesson plan, in which the researchers collaborate with the subject teacher by attempting to refine the steps, especially in terms of content. Overall, the percentage of the scale that has been made is can be categorized in good category 53.33%

and very good 40%. Based on the results of the assessment, the lesson plan is classified in a good category, so it is feasible to be used in the civic education learning process.

The civic education learning model based on local wisdom requires good supporting system, such as syllabus, learning implementation plan (lesson plan), student worksheet, and assessment tools. The tools contain learning steps, learning resources, learning media to the teacher's value system. The importance of instructional tools is also expressed by Mannan, Sopyan, and Sunarno (2015), whose states that local wisdom-based learning is one of the innovations in the development of learning tools. The learning tools, which are developed include a syllabus, lesson plan, student worksheet, and learning outcomes that are integrated with local wisdom in Kandri area, Gunungpati.

The local wisdom of Javanese culture is packaged in an interesting way in shaping the character values of learners. It just takes the skills of teachers in assembling the value of local wisdom so that in accordance with the achievements of learning Civics. This is supported by Fajarini (2014) research, which states that digging and preserving various elements of local wisdom results in an effective function in character education while conducting studies and enrichment with new of wisdom.

The Effectiveness of Civic Education Learning Model Based on the Local Wisdom

The results of the effectiveness of civic education learning model based on local wisdom as revitalization strategy of Pancasila values and improve the character and identity of Nation refers to Nieveen (1999) criteria, which observe the validity, practicality, and effectiveness of the model. The *first* aspect is the problem of the validity of the model of civic education learning based on local wisdom. The model is classified to be valid if it meets the criteria: (1) at least two of the three experts (validators) state that the model is based on a strong theoretical basis; (2) at least two of the three validators state that the model components are consistently interrelated; (3) the test results show that the components are interrelated.

The result of expert and practitioner validation on the limited trial phases show that the initial draft of the civic learning model

had met the requirements of strong theoretical basis and interrelatedness of components in the learning model. The interrelatedness of the learning components is proved by the results of observation in the first test and the second test as well as in the validation test. The design of planning, implementation, and evaluation are interrelated. Between the syntax of learning to each other are also interrelated. Between teachers' activities with learners' activity are interrelated, between the activities of learners in-group activities with the activities of learners in the activities of individuals are also interrelated. Based on the test results, the civic learning model based on the local wisdom has fulfilled the validity requirements of a feasible learning model.

The *second* aspect is about the practicality of the civic learning model based on the local wisdom. The learning model is considered practical because it meets the criteria: (1) at least two of the three experts give consideration that the learning model can be applied in class; (2) the teacher states that they were able to apply the learning model in front of the class; (3) the level of implementation of the learning, the model is included in the high category. The results of a limited trial show that the validator of the practitioner, who is the civic teacher and asked to validate, had stated that the draft of civic learning model is feasible and applicable in the classroom.

The results of the limited trial showed that the observation of teacher activity indicates very well criteria. The results of the analysis of student's activity show very good and average mastery of competence or learning result of mastery learning by 70 and indicator of learner who reaches mastery reach 75%. The increase of the score of national identity reached 80%. Similarly, with the results of extensive trials, the results of observation of teacher's activities, learners, and learning outcomes of learners show an average value above 70. The criteria for the practicality of learning model have been fulfilled so it can be concluded that the learning model could be practically applied in the classroom.

The *third* aspect is about the effectiveness of civic learning model based on local wisdom. The model is categorized to be effective because it meets 4 of the 5 following criteria: (1) average of activity on the task of learners at least by

90%; (2) the average of learners' activity is at least 40%; (3) there is a tendency to increase test scores; (4) more than 50% of learners respond positively; and (5) the teacher responds positively to the model.

The effectiveness of the model of civic education learning could be seen in the development of learners' activity, teachers' activity, as well as teacher and learner's response to the implementation of the learning model. The results of the teacher and student's activity assessment in the implementation of the model at each stage of the test have progressed and reach a very good standard. Similarly, the tendency to improve students' learning outcomes in trials and extensive trials shows an increasing trend in the components of competence, character and national identity. Thus, the implementation of civic learning model based on the local wisdom, especially in State Junior High School 10 Surakarta and State Junior High School 21 Surakarta have been running in accordance with the developed model and able to increase the students' character score and the students' national identity score as much as 80%. The model is able to increase learning mastery of at least 75%. Therefore, it can be concluded that the model of civic education learning based on the local wisdom had fulfilled the requirements of the effectiveness of a learning model.

The utilization of local wisdom values, which is adopted in the civic education learning, is often done by the teachers. In fact, the value of local wisdom appropriate to be integrated with civic education learning. The result of the effectiveness test of the learning model is in line with the results of Mannan, Sopyan, and Sunarno's (2015) research. They stated that based on the observations using several indicators, the average gain for the first meeting until the third meeting was 0.33. The analysis of character indicates a moderate increase so it can be said that learning tools based on local wisdom can improve the students' character.

Sitompul (2014) does another research that supported this research. The results of his research concluded that there are 10 values of characters that have been applied in civic learning in Junior High School State 37 Medan, namely religious, honest, curiosity, tolerance, nationalism, reading, discipline, environmental care, social care, and responsibility. Meanwhile,

there are nine values of characters that have been applied in civic learning Junior High School Budi Murni 1 Medan, namely religious, honest, democracy, curiosity, peace love, tolerance, the spirit of nationalism, love to read, and love the homeland. Thus, the civic education learning can be used as a device to apply character education to junior high school students.

CONCLUSION

The conclusions of the research are briefly described as follows. *First*, there are strength, weaknesses, chances, and perils in civic education learning. Some obstacles that faced by the civic education teachers are the suitability of civic education materials with less balanced time allocation, low student motivation in following the civic education learning in the classroom, the students' perception that civic lesson is not very important, the reality of society is not in accordance with the subject matter of civics, and the implementation of student-centered learning methods and strategies.

Second, the initial design of the civic learning model based on the local wisdom is in accordance with the syntax of learning that includes the structure of learning, social system, principles of reaction, supporting systems, and impact accompanist. The structure includes several stages. The social system is embodied in the roles of teachers who are democratic and cooperative by giving students the freedom to argue. The principle of reaction is realized with the teacher to facilitate the learners during the learning process. The supporting system of the lesson plan acts as the tool to support the learning model and evaluation sheet to measure the competence of learners' competence and attitude scale to measure character and national identity. The impact of companions based on contextual learning that prioritizes the meaningfulness of learning.

Third, the effectiveness of civic education learning model based on the local wisdom in improving the character and identity of the Nation as a strategy of revitalizing Pancasila values is shown by the fulfillment of criteria of validity, practicality, and effectiveness. The effectiveness test at State Junior High School 10 Surakarta and State Junior High School 21 Surakarta has been run in accordance with the developed model and able to increase the character score

and the national identity score as much as 80%. The model of civics learning education based on local wisdom can improve learning mastery of at least 75%.

Furthermore, the recommendations are submitted to the civic education teachers. Since the civic learning model based on local wisdom is able to create a meaningful and fun learning, the civic teachers should improve their learning materials with the socio-cultural context of the learners. The school as a gathering place of learners of various groups, races, cultures, and gender are expected to be able to transform the noble values of religion that are considered 'absolute' and cultural values that are relative to the core values of character education. For the learners, one of the learning characteristics of this learning model is student-centered. The greater the learners engage in learning activities would result the greater the learners to do learning activities. In this case, the teacher is expected to improve the innovation and skills in designing the classroom, thus, the learners not only learn about the concepts and principles but also experience the process of learning about self-direction, responsibility, and social communication.

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STUDY OF INSTRUCTIONAL MODEL ON BLENDED LEARNING IN POLYTECHNIC

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Abstract: Polytechnic has characteristic which prioritizes the application of practical aspects supported by appropriate theory. Blended learning can be applied in Polytechnic, but a scheme is needed to formulate the correct instructional model. The study objectives were to examine the type of instructional model on blended learning that suits with Polytechnic. The research was conducted by qualitative descriptive approach by Miles and Huberman through observation, in-depth interview, Focus Group Discussion and literature review. The research validity was done by transferability, confirmability, credibility and dependability test. It can be concluded that the instructional model is appropriately determined by the suitability of educational model, technique and method of learning, and also facilities and infrastructure readiness. The instructional model on Blended Learning in Polytechnic is the Rotation Instructional Model. The study had implications on the learning process in Polytechnic. The lecturers could use the schema to determine the suit instructional model for their courses.

Keywords: *Instructional Model, Blended Learning, Polytechnic, Vocational*

STUDI MODEL INSTRUKSIONAL PADA PEMBELAJARAN KOMBINASI DI POLITEKNIK

Abstrak: Politeknik memiliki ciri khas pendidikan yang mengutamakan penerapan aspek-aspek praktis yang didukung oleh teori yang tepat. Blended learning dapat diterapkan di Politeknik, namun diperlukan sebuah skema untuk merumuskan instructional model yang tepat. Penelitian ini bertujuan untuk mengkaji jenis instructional model pada Blended Learning yang sesuai dengan karakteristik pendidikan Politeknik. Penelitian dilakukan dengan pendekatan deskriptif kualitatif model Miles dan Huberman, teknik pengumpulan data observasi, wawancara, Focus Group Discussion dan kajian pustaka. Keabsahan data dengan uji transferability, confirmability, credibility dan dependability. Penelitian menyimpulkan bahwa instructional model yang tepat ditentukan dengan mempertimbangkan kesesuaian antara model pendidikan yang diselenggarakan, teknik dan metode pembelajaran mata kuliah, serta ketersediaan sarana dan prasarana pembelajaran. Sesuai dengan pertimbangan tersebut maka instructional model pada Blended Learning di Politeknik adalah Rotation Instructional Model. Implikasi penelitian terjadi pada proses pembelajaran di Politeknik. Para dosen dapat memanfaatkan instructional model skema untuk menentukan instructional model yang tepat untuk mata kuliah yang diampu.

Kata Kunci: *Instructional Model, Blended Learning, Politeknik, Vokasi*

INTRODUCTION

Based on National Education System as stated in Indonesia Law no. 20 of 2003 and further reinforced by Indonesia Law no. 12 Year 2012 on Higher Education, Polytechnic is a vocational higher education who can conduct a Diploma education. The different characteristics and orientations between vocational and academic education required the design of

different learning processes and curricula. In vocational/polytechnic education, learning was conducted with a small numbers learners with average 28 students in a class. Therefore the addition of students number should be followed by the addition of learning facilities and infrastructure that would support their skill. It made the learning process was inefficient. As presented by Finch and Crunkilton, that the

ultimate success of vocational education was not only measured by learning achievement, but also on performance that was in line with the real world of work (Finch, 1999). Abie stated that vocational education graduates must have relevant skills supported by the foundations of science, service motives, and able to apply their abilities in various variations of circumstances, and have ethics, morals and values (Abie, 2014).

In line with Abie's opinion, the successful implementation of vocational education was largely determined by students, educators, curriculum and learning support facilities. In vocational education the design of the curriculum should be concerned in the composition between practice and supporting theories appropriately. In vocational education the composition of the practice was more dominant than the theory. Haider argued that there was a difference between theory and practice so that curriculum preparation is not enough done by educators who only had teaching experience but should involve practitioners who are believed to be very aware of the conditions that exist in the working world (Haider, 2016). To meet the needs of the technical personnel of the community, the curriculum must be tailored to the needs of the students.

The overall quality of the educational process was not only depending on the quality of the curriculum, but also on the ability to realize it. The main factor that affecting the quality of the curriculum is the basic elements in the implementation process. The main implementation elements are: (a) adequate conditions; (b) the ability of teachers to convey the objectives and expected outcomes of the curriculum; (c) inform the curriculum structure and its role in the teaching process; (d) preparation of relevant learning materials; (e) ability in managing the learning implementation process; (f) monitoring and evaluation of instructional process realization; and (g) connect with companies and other social partners.

Vocational Curriculum Development Guidance Manual from the Directorate General of Learning and Student Affairs, Ministry of Research, Technology, and Higher Education (KEMENRISTEKDIKTI) stated that for implementing the curriculum in order to fit the expected curriculum documents, every course should complete with Semester Learning Plan

(SLP) documents. SLP is a learning process plan that was prepared for learning activities in one semester to meet the learning achievements that charged to the course. On the implementation, the learning process should refer to the SLP that has been made including when conducted by online learning. SLP should contain the identity of the course, the learning achievement, the expected ability, the study materials, the method, the provided time, the student learning experience, the assessment, and the references. In line with the principles and content of the learning plan, the effectiveness of the learning process was also concerned. The effectiveness of the learning method was become one of the critical success factors. Along with the rapid utilization of ICT in learning process, there was a new concept of learning method. Currently the learning method was not only done conventionally face-to-face but also can be done online and can even be done by combining between face-to-face learning and online known as Blended learning (Hybrid learning) (Ghirardini, 2011). Blended learning is one of the learning methods that can be applied in higher education to improve the quality of learning. Yagci stated that learning supported by online learning methods could have a positive effect on increasing student motivation, and therefore have a positive effect on academic success (Yagci, 2016). Blended learning is well suited for encouraging collaborative and constructive learning that is strongly emphasized in today's learning styles (Wong, Hamzah, Goh, & Yeop, 2016). In Indonesia some universities have already implemented e-learning and the students responded positively to the e-learning (Herayanti, Fuadunnazmi, & Habibi, 2017; Divayana, 2017). While the utilization of ICT in vocational education had not been done optimally, it was still limited to utilization in theory learning course.

Implementation of blended learning in the learning process are found varies according to the discipline being taught, student characteristics and learning outcomes, and has a student-centered approach to learning design (Saliba, Rankine, & Cortez, 2013). There are four models that are generally implemented in blended learning namely Rotation model, Flex model, A La Carte model, and Enriched Virtual model (Brooke, 2015). The four models in their implementation must adapt to the

technology used, time, instructional learning, and effectiveness in improving student skills.

Based on the description, the research question was how the schema to formulate instructional model on blended learning in Polytechnic. Then the study objectives was to examine the instructional model on blended learning that was suitable to be implemented in the learning process in accordance with the characteristics of vocational education. The research was the beginning research of Modelling Vocational Blended Learning in Polytechnic

METHOD

The research was a phenomenology qualitative research. The research was conducted by qualitative descriptive approach. The subject of research was Polytechnic civitas academica, while the object of research was instructional model on blended learning in polytechnic as delivered by Brooke. The research was held from March until August 2017 by observing the learning process at one of the Polytechnic in Indonesia. The technique of data collection was done by observation, in-dept interview, Focus Group Discussion (FGD) and literature review. Respondents at the interview stage were Assistant Director of Academic Affairs, 6 persons of Head of Departments, and 13 persons of Head of Study Program. Respondents at the FGD stage were 45 people that were consisting of Assistant Director of Academic Affairs, the Heads of Department, the Heads of Study Programs and also the lecturers. The key informants were Assistant Director of Academic Affairs and the Heads of Study Program. The literature review was conducted on the Indonesian government's policy on Polytechnic and previous research relevant to the instructional model on learning through blended learning.

The variables studied in this study include four aspects of instructional model blended learning that consisting of Rotation model, Flex model, A La Carte model, and Enriched Virtual model. The data analysis used was descriptive qualitative analysis as delivered by Miles and Huberman. The analysis yield description about instructional model from the relevant blended learning as an effective model in achieving the learning objectives in polytechnic. As Miles and Huberman qualitative analysis, the research divided into three activities namely data reduction,

data display and conclusion. The research started from studying the problems of education in Indonesia until formulated instructional model which is appropriately applied to polytechnic higher education. The steps taken in this research namely:

1. Study of education problem in Indonesia
2. Study of vocational education paradigm
3. Study of ICT utilization in vocational education
4. Study of Instructional Model on Blended Learning in Polytechnic
5. Formulation of instructional model determination scheme that described in Discussion part of this paper.

The research validity was done by transferability, confirmability, credibility test and also dependability test. The credibility test was conducted by triangulation model that assessed the data with some different techniques such as observation, in-dept interview, and also FGD. The dependability test was done by audit from the experts.

Research design with the framework as shown in Figure 1.

FINDINGS AND DISCUSSION

Findings Education Problem in Indonesia

Based on interview with Assistant Director of Academic Affairs, it was found that the meaning of globalization implies the integration of national life into global life. When linked in the field of education, globalization of education means the integration of national education into world education. The problem of globalization in education concerns to the output of education. In today's global era, the superiority of a country is no longer measured by comparative advantage that focuses on the potential of natural resources, but on the competitive advantage that is based on the possession of qualified human resources (HR). Based on the report of The Global Competitiveness Index 2017-2018 released by World Economic Forum, Indonesia is ranked 36 out of 137 countries, while for the competitiveness of higher education is still ranked 64th.

In building quality human resources as a competitive advantage, the role of education becomes very important. It needs to make changes in the paradigm of education as to provide significant changes in the pattern of learning that can empower the learners to be more

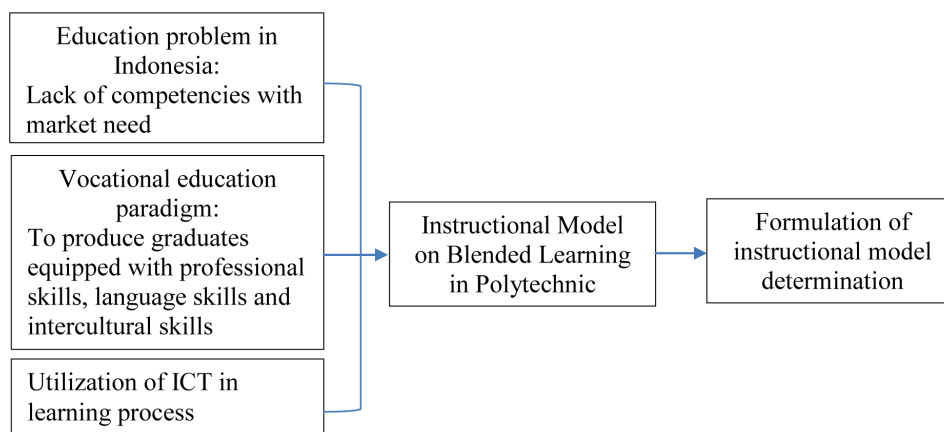


Figure 1. Research Framework

independent. An appropriate learning strategy developed today is student centered learning (SCL) by adopting the development of IT in learning (ICT). Utilization of ICT is able to create various learning media that is effective in transfer knowledge. In line with Suyanto's opinion that learning is no longer using a single media, takes place in isolation, teacher-student interaction in the form of information and teaching based on factual or knowledge (Suyanto, 2006).

Another problem faced by higher education in Indonesia, especially in vocational education is the low quality of graduates. This was found when interviewing the heads of departments and the heads of the study program. They got input from the external stakeholders like industry or graduate users. There were several factors of that problem, among others: unclear learning outcome, organizational issues, transparency and accountability, the design of learning in the form of curriculum documents that are not inline with the needs of industry, low ability and skills of academic and non-academic human resources, low quantity and quality of learning facilities and infrastructure. It was very worrying, because the graduates of vocational colleges that was expected to meet the needs of skilled workers for the industry was not achieved as expected. Actually, the graduates of vocational education contributed the increase of educated unemployment rate in Indonesia.

According to the Institute for Policy Research and Development study Indonesian Education Region V (2017), the availability of facilities and infrastructure of adequate learning facilities as a key element in realizing the quality of higher education. Beside that Kartikasari's research also described that learning facilities

and infrastructure as physical evidence was one of the main factors in the selection of universities (Kartikasari, Sinarti, Hidayat, & Irsutami, 2014). From the results of the study with the limited facilities owned by vocational colleges, it required the innovation in the learning process in order to run effectively and efficiently. One alternative that can be taken into consideration is by designing ICT-based learning process. As mentioned by Yagci, that online learning methods could have a positive effect on increasing student motivation, and therefore have a positive effect on academic success (Yagci, 2016).

Vocational Education Paradigm

Based on literature review, it was found in the explanation of pasal 16 ayat 1 Indonesia Law No.12 of 2012 about Higher Education that vocational education was education that prepares students to have skills and high work ability. Vocational education curriculum was prepared jointly with the professional community and professional organizations that are responsible for the quality of service in order to qualify profession professional competence. Vocational education had included professional education. The paradigm of vocational education was to encourage human development comprehensively by building human resources that have a balance between skill and professionalism. Graduates of vocational education were expected to have a balanced ability between soft skill and hard skill.

Respondents (Assistant Director of Academic Affairs and the heads of the study program) also said that currently vocational higher education is required to be able to produce internationally qualified graduates equipped

with professional skills, language skills and intercultural skills. The vocational college should also be able to contribute to the development of graduates who are competent, critical and solutive in dealing with Asean Economic Community (AEC) 2015. The challenges faced today in the development of vocational higher education is concerned with efforts to equip graduates with skills in accordance with the needs of the business world and industry, among others: leadership competencies, digital literacy, communication skill, emotional intelligence, entrepreneurship, global citizenship, problem solving, and teamwork. In line with Pearson study (Finch, 1999) as quoted by tribunews.com, education era nowadays is no longer just 3Rs (Reading, wRiting, and aRithmetic), but must also involve new skills that are needed by the working world today. Slamet's research also found that vocational education can play a key role in economic development if its alignment with the world of work around it is sought continuously, both in terms of quantity, quality, location, and time.

Vocational education would also play a role in economic development if it is able to integrate its programs with the existence of regulation, policy, planning, and government budgeting in the era of regional autonomy (Slamet, 2011). For Indonesia, the role of vocational education was enormous in promoting more advanced economic growth. The responsibilities of higher education institutions were needed in designing innovative learning process. Based on the guidance of curriculum preparation for vocational education in 2016, the characteristic of vocational higher education was to have profession-oriented and working world oriented graduates profile. The curriculum was designed for learning outcomes, among others graduates that have a standardized professional attitude, practical knowledge, special skills with working world oriented and had general skills in responsibility and could following the standard operational procedures. Therefore, the vocational education curriculum in its implementation should consider appropriate methods, strategies and learning models.

Vocational learning paradigm changed in the current era demand, it needed changes in teaching methods that follow the industry trend change, information systems, quality of education and learners which have a significant

relationship with the pedagogical methods and the needs of the workforce. Assistant Director of Academic Affairs said that nowadays the methods of teaching in vocational education generally was the learners are taught the theory in the classroom and apply them in practice tasks. Supposedly the relevant methods was developed so that learners were able to collect, select, filter, assimilate information in a creative and able to inspire the students to develop skills and to teach students to learn actively and effectively. With limited facilities vocational colleges were required to make improvements to the design and learning process with various alternatives that can answer the demands of the current education paradigm.

According to Kirby Yang, the innovative development of pedagogy and vocational education curriculum in the knowledge-based economy era is aimed at producing the following human resources: (1) creative, innovative, and management skills, (2) having initiative, and able to work independently as a team member, (3) have adaptive and integrative resourceful talents (resources) to meet the needs of technology development (Rau, 2006). According to Hopkin's research results, there are four components in effective vocational education teaching, namely teaching relationships (the relationship of teachers and learners), teaching models, teaching skills and teacher reflection (Hopkins, 2007). The synergy of these four components was believed to be able to support the creation of effective teaching.

In the context of teaching models, vocational education was very relevant in organizing Role-Play & Simulation, Cooperative Learning (CL), Collaborative Learning, Contextual Instruction (CI), Project Based Learning and Problem Based Learning and Inquiry. In addition, vocational education was also relevant organized by Small Group Discussion method, Case Study, and Discovery Learning (DL). In accordance with the characteristics of the process of organizing vocational learning was required lab/workshop/studio that support the achievement of work competence.

ICT Utilization in Vocational Education

Referring to the problems encountered in higher education and the learning paradigm changes in vocational education, the quality

of the developed learning system must be able to quickly fix the various weaknesses. The low quality of education was seen from the educational process and graduates provide an illustration of the low quality of the education system organizing process. Improving the quality of education process should be done, one strategy was to change the conventional learning system with a more effective and efficient learning system with the support of adequate facilities and infrastructure. Learning by utilizing the means of information technology was one appropriate alternative and could overcome various learning problems.

Assistant Director of Academic Affairs described that learning process of Polytechnic education was conducted by face-to-face, structured and independent learning. Face-to-face learning was done with direct interaction between lecturers and students that can be done in classroom, laboratory, or workshop. Structured learning was done with the assistance of the lecturer, and independent learning carried out independently by the student for the purpose of enhancing the knowledge of students to relevant knowledge areas. The head of study programs also explained that the current polytechnic learning system was still characterized Teacher Centered Learning (TCL), where the learning process was centered with the teacher. This condition was not in line with the government's expectation that the learning system in higher education refers to student-based learning system (SCL). The lecturers on FGD shared their experience in implementing learning system in Polytechnic, and they stated Polytechnic learning system should be conducted more portion on face to face learning than online learning. Therefore, the use of ICT in learning in polytechnics can be done by combining face-to-face learning with e-learning approach commonly called Blended Learning.

According to The Clayton Christensen Institute, Blended learning was an instructional methodology that utilizes technology as a more personalized learning approach, giving students opportunities to control time, place of learning, and encourage student speed in the development of a wider and integrated insight. There are four instructional models that are generally applied in the current learning process, namely:

1. Rotation model: learning takes place in a number of different activities, including whole group teaching, small group teaching, peer-to-peer activities, tasks, and individual work on a computer or tablet. In the rotation model, there are several different implementation settings: (1) Station rotation; students learn through a series of classroom activities during one or more class periods, at least one of the teaching activities through technology; (2) Individual rotation: students learn based on individual perceptions determined by lecturers with the help of technology-based assessment tools. (3) Lab rotation: students work on individual and online instructions in the lab either whole class or in small groups; (4) flipped classroom: students receive instruction in the form of online learning outside the day of the lecture and the task or project is done in the classroom with the guidance of the lecturer.
2. Flex model: instructional materials and instruction are given online and the lesson is self-guided. Lecturers remain in place, while the students work independently, individually tailored learning students and lecturers accompany. This model provides flexibility in learning, and lecturers act as mentors.
3. A La Carte model: students receive certain instructions online. Lecturers act as online instructors who are not on campus.
4. Enriched Virtual model: students are asked to conduct face-to-face sessions with lecturers, but then complete their tasks online. Students may not meet with their instructors every lecture schedule, but there are scheduled face-to-face but unlike the optional lecture hours. (Staker & Horn, 2017).

Instructional Model on Blended Learning in Polytechnic

Based on observation and Focus Group Discussion (FGD), it can be resumed that the pattern of learning with more dominant face-to-face was contradictory with the availability of facilities and infrastructure. Polytechnic learning contents required the composition of practice was greater than the composition of the theory in percentage. Limitations of classrooms, limitations of laboratory and workshops including the availability of equipment have not been able to provide opportunities for students to make the

learning process ideally. Limitations were not able to achieve the target as expected from the learning achievement. Many constraints faced by lecturers in transferring knowledge and skills to learners. So, the effectiveness of the learning process was still not effective as expected.

In dealing with field conditions in real terms, the learning process in the polytechnic was not designed in accordance with the schedule of lectures optionally, especially in the process of implementing practical and practicum learning. The heads of department in technology field described that the implementation of practice and practicum in lab or workshop was done with block and semi-block system. This system divided the class member into group according to the project to be done.

Block system in polytechnic was done in practice subject with full time in certain time span without any theoretical lecture. It mean that needed more effort in scheduling. With this block system, there was a relatively long grace period and needed more than one teacher, between the theory given and the practice to be done in line with the theory that already given. The workload of lecturers was not ideal in accordance with national standards of college.

The head of Electrical Engineering Study Program described about semi-block system. In semi-block system, students was divided into working groups on each project differently. The disadvantages were the projects done by each group but they had not followed the instructional sequences activity. This weakness affects the student's understanding of unstructured projects in accordance with the actual work order of practice. This is certainly need a harder effort from lecturers and students in making work instructions.

Observing the real condition of the implementation of learning in polytechnics currently showed that the implementation has not been run effectively, several cause factors were the timing that becomes ineffective, the limited facilities and infrastructure caused the process of learning practices to be unstructured in the order of the actual process. The process of implementing the currently applied learning has not given the guarantee of independence as a learning system based on student centered learning. The current weakness of the polytechnic learning system still refers to the conventional learning system, it's

not yet utilizing ICT as a medium in supporting the effectiveness of learning.

Blended learning class outcomes were better than the classic class. In addition, blended learning students were more active on assignments than regular classes (Mutaqin, Marethi, & Syamsuri, 2016). The pattern of learning in polytechnic was still prioritize the process of face-to-face learning in collaboration with online learning implementation. In the polytechnic learning guide, the assessment component was still consider the level of student attendance in each meeting. Assistant Director of Academic Affairs said that student expected to attend at least 75% of the total lecture hours in one semester. It is intended that students have discipline. Attendance was also the basis of policy evaluation on the success of student learning. Polytechnics may dismiss a student if not complying with the level of attendance in stages through the provision of Warning Letters I (WL I), WL II and WL III were continued with the current graduation ratings be Passed Trial for Absent. The research also observed the Warning Letters history documents.

The research found that the problem faced by polytechnics in the utilization of ICT in learning was not in the ability of lecturers and students in the mastery of technology. From the interviews conducted with the lecturers it is known that the lecturers have not understood how to utilize blended learning instructional model in supporting the learning process. It is necessary to strengthen the ability of lecturers to utilize ICT and encourage cultural change to focus more on online learning system. As known there were four instructional models that exist in blended learning, but not entirely applicable to learning in polytechnic. The choice of instructional model should consider several things, such as learning achievement, instructional media, learning strategies and evaluation.

Formulation of Instructional Model Determination Scheme

Based on data findings in step 1 until step 4, some aspects that become consideration in determining the appropriate instructional model for a college especially in polytechnic were the model and the pattern of higher education, the techniques and methods of learning on each course, and the availability of facilities and

infrastructure. The scheme of instructional model determination can be presented in Figure 2.

Based on the scheme of Figure 2 that is associated with the pattern and characteristics of learning in polytechnics, furthermore can be formulated instructional model on blended learning that can be applied in the learning process of vocational education. The study case of learning at one of Polytechnic in Indonesia found that the determination of instructional model is considered to be done by identifying three aspects as shown in Figure 2.

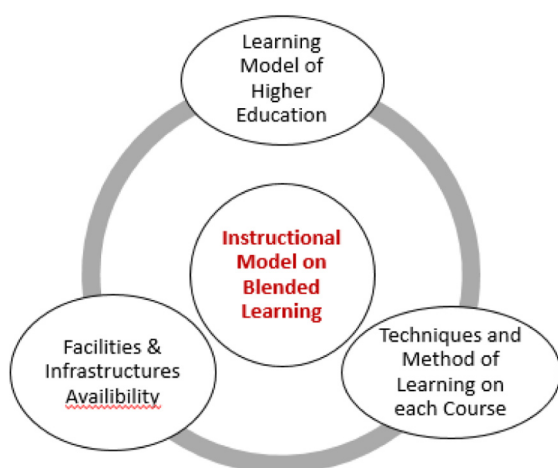


Figure 2. Instructional Model Determination Schema

(source: FGD's result 2017)

Discussion

This research part discussed about the research question based on the research framework in Figure 1. On the first step about the education problem in Indonesia, it can be concluded that there were two main problems which are Indonesia competitiveness rank that was still need to be improved and the low quality of graduates. The second step about vocational education paradigm, it was found that vocational education should be produced skilful graduates that have working world oriented. But it also found that the learning process in vocational education was still categorized as ineffective and inefficient. Then the third step study about ICT utilization, the research found there was blended learning approach that utilize ICT in vocational education, and there were many kinds of instructional model on blended learning that could be implemented in Polytechnic learning to improve its learning process was found on the fourth step.

The discussion section of this paper then would much discuss about the formulation of instructional model determination schema. To determine which of instructional model that suitable with the learning course, the reserach formulated the schema of instructional model determination that can be seen in Figure 2. The following described the analysis of each indicator that became a consideration in the selection of instructional model in accordance with the characteristics of polytechnic education.

First, learning model was still applied face-to-face approach with a minimum limit of 80% face-to-face and 20% with electronic media. From the techniques and methods of learning aspect, the observation found that with the implementation of e-learning was not an obstacle in the utilization of ICT-based learning. The problem faced is the lack of knowledge and skills of the teaching staff in the utilization of ICT as an alternative in achieving the target of learning effectively and efficiently. The lack of learning culture from teachers become a critical point of the lack of innovative ICT-based learning. It was a challenge for the research site to continue encourage faculty to further improve IT skills. Currently e-learning at Polytechnic served as a supporting e-learning in the provision of digital teaching materials for students as a substitute of the previous textbooks (hand-out) in print. Rusli and Negara(2017) found that animation in multimedia interactive learning gave a positive effect in improving students' learning outcomes. Zere at al. (2016) also found that the use of pictures and sound that is the typical characteristic of e-learning, help to make learning more internalized, which can positively affect students' creativity. Creative content has high impact in the successful of blended learning. All staffs must be well-prepared in order to use ICT and produce creative content. Lalima & Dangwal (2017) stated that well-trained teacher in using ICT and develop content in digital form so that it can be available to students online.

Second, the limitations of learning facilities, especially in the classroom, as well as practical tools were still a constraint in implementing quality learning process. Block or semi-block system that applied in practice subject was still not able to answer requirement of graduate competency achievement maximally. The current system requires less than ideal

learning time and requires a greater number of faculty. So, the learning schedule does not work properly. Gregory et al. (2012) uses blended learning resource to prepare the laboratory preparation (BPORC). BPORC has been shown to successfully improve the capacity of second year students to prepare more effectively for laboratory classes and have a positive impact on the capacity of students to achieve desirable learning outcomes. By using e-learning resource to prepare laboratory class, students can learn the theory and identify the problem online, so the face-to-face and laboratory section can be done well and more case study can be solved. For limited resource of laboratory tools, a use of virtual laboratory such as used by Ye et al. (2016) can be considered to implement using blended learning in research site.

Third, the techniques and methods of learning in research site were still designed for the needs of conventional learning systems with the dominant system with face-to-face. Conventional learning patterns such as this do not provide opportunities for students to be more flexible in learning. The weakness of this conventional system makes the learning system not achievable based on student (SCL). The use of blended learning system is highly relevant to the need to produce graduates to have comprehensive capabilities. The pattern can combine the theory of behaviourism, cognitivist and constructivism to form meaningful learning. Zere et al. (2016) found that e-learning will enable students to specify their learning trend with respect to their own problems and abilities. This independence in studying and learning is the effective element in learning that is not used in regular traditional classes; the ICT application in e-learning enables learners to control their learning process. Yagci stated that learning supported by online learning methods could have a positive effect on increasing student motivation, and therefore have a positive effect on academic success (Yagci, 2016).

From the aspect of the availability of facilities and infrastructure and also network infrastructure, based on the survey results is considered sufficient in the implementation of learning systems based on blended learning. So, the implementation of blended learning in research site is very potential to be applied. The implementation of blended learning system for research site has considerable benefits in order

to overcome the problem of availability of study space, study time, and the availability of practice equipment and practicum which is still not sufficient. With the compilation of curriculum in each study program, one of the implementation requirements of blended learning can be fulfilled in terms of availability of learning achievement.

By looking at the real condition of the learning process in research site, the instructional model in the appropriate blended learning is by applying the rotation model. That's because of 80% classroom meeting (face-to-face approach) regulation. So, rotation model was the suitable instructional model for Polytechnic. There were many types of instructional model, namely station model, rotation lab, individual rotation, and flipped classroom. Station model, rotation lab, and flipped classroom model can be applied in Polytechnic. But one sub model that cannot be applied is individual rotation model. This is because the system used in Polytechnic was based on Semester Credit Units in package form. The students could not determine the choice of courses to be taken in one semester. Therefore, the students could not individually choose their online learning course.

In theory learning that held in classroom, students are divided into groups with different learning tasks. One of these groups can take advantage of online media in the development of knowledge. In theory learning is implicitly embodied in it skills as a course achievement. With the implementation of this station model method, it can give special benefit in learning achievement with respect to the development of character and attitude of independence, special skills, general skills, and knowledge in accordance with the demands of the curriculum based on the Indonesian National Qualification Framework (KKNI).

The lab rotation model allows students to rotate in learning on predetermined schedules. Some students may study in the lab with the supervision of the instructor and some learn independently using the online media on the instruction of the lecturer who handles the course. The point in this model is that students still refer to the concept of face-to-face approach supported by the use of online learning media and can run effectively with the limited facilities owned in the lab/workshop. Next is the flipped classroom model, which is an inverted learning

model that lecturers present the material through online media and use face-to-face classes to provide an explanation of the work of the given task or project. So that lecturers can have more time in facilitation and provide understanding to students in more detail for completion of task or project.

For other instructional models, such as flex models, A La Carte models, and Enriched Virtual models are difficult to apply because they do not fit the learning characteristics of polytechnics. In flex models where learning follows the needs of students and has a very high freedom to make choices. It is not possible to apply in polytechnics with educational policies that have been established in the system and educational guidelines. A La Carte model provides learning to online students and lecturers, where face-to-face learning is a complement to online learning. Included also with Enriched Virtual instructional model that makes the learning process entirely online. Surely this is not in accordance with polytechnic education policy. This is in line with Chou's concept of conducting research on the most optimal proportion of face-to-face with e-learning. The study found that the best proportion for face-to-face meetings with e-learning is 2: 1, then 1: 1 and the worst is 3: 1 (Chou, Chuang, & Zheng, 2013).

Based on the analysis of FGD results and observations it has been found that the learning pattern based on blended learning relevant to polytechnic is by rotation model method. Furthermore, in implementing this rotation model should be followed by instructional design of relevant learning model. Aspects to consider were:

1. Course content and learning unit analysis, such as subject content, coverage, relevant topics and semester credit units;
2. Learner analysis, such as student education background, age, sex, employment status;
3. Learning context analysis, such as what the desired learning competition should be discussed in depth in this section;
4. Instructional analysis, such as what teaching materials are grouped according to importance, arranging tasks from easy to difficult;
5. State instructional objectives. This instructional objective may be structured on the basis of the results of the instructional analysis;

6. Construct criterion test items. The preparation of this test can be based on the stated instructional objectives;
7. Select instructional strategy. Instructional strategies can be established based on existing facilities.

CONCLUSION

Based on the study that has been done, there were three considerations in formulating the right instructional model for blended learning. First was the institution learning model, second was the course's technique and method of learning, then third the institution facilities and infrastructures. In accordance with these considerations, it can be concluded the right instructional model on Blended Learning in Polytechnic is the Rotation Instructional Model. There was one type of rotation instructional model that could not be applied in Polytechnic, it was Individual Rotation Model. The others type namely station model, rotation lab, individual rotation, and flipped classroom could be applied in Polytechnic. The study had implications on the learning process in Polytechnic. The lecturers could use the schema to determine the instructional model that suitable on their courses. In research site, practice courses that held in laboratories or workshops really appropriate to apply the lab rotation model in its application due to the condition of learning facilities and infrastructures.

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ANALYSIS OF THE INDONESIA MATHEMATICS TEACHERS' ABILITY IN APPLYING AUTHENTIC ASSESSMENT

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Abstract: The 2013 curriculum implies the use of authentic assessment that emphasizes on the assessment of students' readiness aspects, processes and students' learning outcomes as a whole. The integration of the assessment of the three components will demonstrate the students' capacity, style, and learning achievement. It is important for mathematics teachers to have the ability to conduct assessments of learning and to utilize the results of those assessments for the purposes of mathematics learning. This study aims to: (1) analyze the profile of the ability of the mathematics teachers in carrying out the authentic assessment, (2) find out the profile of the mathematics teachers' ability to apply authentic assessment results, and (3) know the constraints of the mathematics teachers in developing the authentic assessment. This research uses a quantitative descriptive method involving junior high school teachers in Yogyakarta Indonesia. Data were collected using questionnaires and triangulated with documentation and Focus Group Discussion (FGD). The results show that the ability of the junior high school teachers in Yogyakarta in applying and using the results of authentic assessment was relatively good. The teachers used authentic assessment information to design remedial and enrichment programs. This study also reveals that the teachers still experienced difficulties in developing authentic assessment instruments. Student learning assessment plays an essential role in teaching and learning mathematics. However, limited studies have been conducted to investigate mathematics teachers understanding about how they develop and assess their students, particularly how well mathematics teachers applying authentic assessment. This study was conducted in Yogyakarta Indonesia by applying a purposive sampling technique was applied in this study. The data and triangulated to assess the validity and reliability of the data. Additionally, t

Keywords: *authentic assessment, teachers' ability, mathematics teachers, Curriculum 2013*

ANALISIS KEMAMPUAN GURU MATEMATIKA DI INDONESIA DALAM MENERAPKAN PENILAIAN OTENTIK

Abstrak: Kurikulum 2013 mengisyaratkan penggunaan penilaian otentik yang menekankan penilaian pada aspek kesiapan, proses, dan hasil belajar siswa secara utuh. Keterpaduan penilaian ketiga komponen tersebut akan menggambarkan kapasitas, gaya, dan perolehan belajar siswa. Penting bagi guru matematika untuk memiliki kemampuan menyelenggarakan penilaian terhadap pembelajaran serta memanfaatkan hasil penilaian tersebut untuk kepentingan pembelajaran matematika. Penelitian ini bertujuan untuk: (1) menganalisis profil kemampuan guru matematika dalam melaksanakan penilaian otentik, (2) profil kemampuan guru matematika dalam menerapkan hasil penilaian autentik, dan (3) mengetahui hambatan-hambatan dari guru matematika dalam mengembangkan penilaian otentik. Penelitian menggunakan metode deskriptif kuantitatif yang melibatkan guru matematika SMP di Yogyakarta Indonesia. Data dikumpulkan dengan menggunakan kuesioner dan dilakukan triangulasi dengan dokumentasi dan *Focus Group Discussion*. Hasil penelitian menunjukkan bahwa kemampuan guru SMP di Yogyakarta untuk menerapkan dan menggunakan hasil penilaian otentik relatif baik. Guru telah menggunakan informasi hasil penilaian otentik untuk mendesain program remedial dan pengayaan. Studi ini juga mengungkapkan bahwa para guru juga masih mengalami kendala dalam mengembangkan instrumen penilaian otentik.

Kata Kunci: *penilaian otentik, kemampuan guru, guru matematika, Kurikulum 2013*

INTRODUCTION

Good mathematics learning is supported by various essential components in its implementation. One of them is the availability of quality mathematics teachers. The Indonesian government has undertaken various ways to improve the quality of education by improving the quality of teachers (Sumintono & Subekti, 2014).

The success of mathematics learning cannot be separated from teacher role as the main controller of the learning process, for example how the mathematics teachers conduct an assessment of mathematics learning. It is essential as its results can be used as an indicator of successful mathematics learning. It allows students to demonstrate their competence during the learning process (Resnick, 1993). Therefore, assessment ability should be one of the competencies of the mathematics teachers which should be possessed.

Heaney (1994) stated that assessment is mandatory in elementary and secondary level to any degree in any core subjects, such as English, math, and science. Heaney also argued that one of the main objectives of the assessment is to find out what children understand, know and do by observing or monitoring periodically their work so that teachers can make fair, accurate and balanced judgments of every child's progress in each group of a particular academic year.

Curriculum changes generally also have implications for the paradigm shift in various aspects of learning. One of the changes can occur in the role of assessment that must be in line with curriculum change (Holme et al., 2010). The implementation of the 2013 curriculum in the education system in Indonesia has also brought changes to the assessment system in mathematics learning, such as the implementation of competency-based assessments, criterion-referenced tests, authentic assessment, and portfolio.

The 2013 curriculum advocates the implementation of the authentic assessment emphasizing on assessing students' readiness aspects, processes and student learning outcomes as a whole. The integration of the assessment of those three components will demonstrate students' ability, style, and learning achievement. In addition, an integrated assessment will clearly demonstrate the impact of mathematical

instructional and nurturant effect of mathematics learning on student learning achievement. Authentic assessment results can be used by teachers to plan improvement, enrichment or coaching and counseling programs aimed at improving mathematics learning to comply with predetermined educational assessment standards.

Socialization and professional training activities to strengthen the implementation of the Curriculum 2013 have been implemented by the Indonesian government and various teacher training institutions. Those programs are expected to improve teachers' understanding and prepare the ability of the mathematics teachers to implement the curriculum. Such training is important given that teachers' lack of understanding of paradigm shifts is often an obstacle to the implementation of the new curriculum (Cheung & Wong, 2012). Various studies reveal that teachers do not have a relatively good understanding and skills in applying the authentic assessments, such as about how to develop an approach to carry out the authentic assessment to continue developing learning (Charoenchai, Phuseorn & Phengsawat, 2015).

Several studies have been conducted in the areas of mathematics teaching. Retnawati (2015) conducted a descriptive study to explore the obstacles encountered by mathematics teachers in conducting assessment through interviews. However, she did not analyze deeply what teachers did in the assessment activities of mathematics learning.

Mathematics teachers' abilities include planning, implementing and using assessment results. Unfortunately, there has been limited research that examines specifically about the assessment conducted by junior high school mathematics teachers in Yogyakarta Indonesia. This province was selected as it has been known to have a good reputation in education and was selected as one of the provinces in Indonesia as the sample of the implementation of the curriculum 2013 by the Ministry of National Education. Therefore, research to assess the assessment ability of mathematics teachers needs to be undertaken to evaluate evaluation model development the curriculum 2013 implementation.

Based on the background of the study, three research questions were addressed: (1) What is the profile of the ability of junior high school mathematics teachers in Yogyakarta to implement the authentic assessment? (2) What is the profile of junior high school mathematics teachers' ability in Yogyakarta to use the authentic assessment results? (3) What are the obstacles of junior high school mathematics teachers in Yogyakarta to develop authentic assessment?

Assessment in the Curriculum 2013

Curriculum is the main foundation in an education system. The Law on National Education System No. 20 of 2003 states that the curriculum is a set of plans and arrangements concerning objectives, content and instructional materials and ways used as guidelines for the implementation of learning activities to achieve certain educational goals. The development of the school curriculum is a long process involving various parties, such as educators, education practitioners, schools and communities or stakeholders in Indonesia.

The curriculum is a system consisting of five interrelated components, namely objectives, content/resource, strategy, organization, and assessment. Neely & Tucker (2012) stated that in order to address the gaps, the curriculum must be redesigned to include applied skills, such as problem-solving, communication, and analytical skills. Custer et al., (2000) added that textbooks, exams, and the content of the teacher education program would change according to the mandated curriculum. Furthermore, Narayani, Gading, and Suartama (2015) stated that the learning process can be successful if it can create optimal learning outcomes, then the quality of a teacher in applying approaches to learning is needed in order to achieve optimal learning outcomes of learners.

Curriculum changes have occurred several times in Indonesia as an effort to achieve the goals of national education. At every school curriculum change, it is followed by changes to the characteristics of its components including in the assessment component. This difference is generally due to the approach used in the curriculum. The 2013 curriculum applies scientific approach so that of course it has different assessment criteria. This is in line with

Ine's opinion that the characteristic of learning in the Curriculum 2013 is a scientifically based approach to learning (Ine, 2015).

Learning activities contribute to students' intuitive understanding of mathematics. Therefore, good mathematics learning should be implemented. Efriana (2014) argued that in addition to making students more active in constructing their knowledge and skills, the scientific approach can also encourage the students to investigate further in order to discover the facts of a phenomenon or event.

Assessment is an activity to provide continuous and comprehensive information about the learning process and outcomes achieved by the students (Gronlund & Linn, 1985; Popham, 2011). Immegart (1994) stated that the focused or targeted assessments are in terms of standards, such as goals, objectives, and behaviors or in terms of normative assessments such as manifesting good attitudes, developing certain skills, and making student performance as desired.

The educational assessment standards for the 2013 curriculum are stated in the Indonesian Government Regulation No.66 Year 2013. Education assessment standards are the criteria of the mechanisms, procedures, and instruments of student learning outcomes. The assessment approach used in the Curriculum 2013 is the criterion reference based assessment. It applies minimum mastery criteria (KKM) to assess learning outcomes. The KKM is a minimum learning completeness criterion determined by the educational unit taking into account the characteristics of basic competencies to be achieved, and characteristics of students.

The Indonesian Government Regulation No.66 Year 2013 states that the assessment of student learning outcomes in secondary education is based on six principles, namely: objective, integrated, economical, transparent, accountable, and educative. This is in line with Bullens (2002) who stated that correct assessment is needed to guide the curriculum process. The objective principle emphasizes that the assessment should be standards-based. It should be as objective as possible in order to describe the actual situation in achieving competence and achievement of learning objectives. Assessment objectives and targets should be formulated clearly before learning to reach all aspects of the assessment.

Sani (2016) stated that teachers can do reflection and evaluation on the quality of learning that has been done through the assessment activities. The assessment is done before, during and after the learning takes place. It must be efficient and effective in planning, execution, and reporting. It must be transparent meeting the assessment procedure, assessment criteria, and the basis of decision making can be accessed by all parties. In other words, the assessment should be open, so that all interested parties to the results of the assessment can obtain clear and correct information regarding the assessment of learning that has been implemented. It is also accountable which means that assessments can be held accountable to internal school and external parties for technical aspects, procedures, and results. Finally, it must also be educative by relating to the nature of judgment in educating and motivating students and teachers. According to Gao & Grisham-Brown (2011), an assessment-based curriculum can be used for accountability under conditions of assessment whose objectivity is ensured by checking for reliability and consistency.

Assessment of learning at secondary education level is carried out by educators, educational unit, government or independent institutions. Berg (2007) stated that the assessment is used to inform expectations and to set the recommended goals, assessment objectives related to future learning. The assessment activities are conducted by the education unit in the form of school exams, while the Government performs an assessment in the form of national examinations. Kearney & Perkins, 2014 stated that traditional forms of focus are judgments on scientific principles, seeking to be objective and seen to be separated from learning and built on uniformity and fairness.

Educational assessment standards mandate teachers to use various techniques in conducting assessments. Assessments of attitude are conducted through observation, self-assessment, peer assessment, and journal with assessment instrument in the form of assessment rubric. Knowledge domain assessments are conducted through written, oral, and assignment tests. Assessments of student skills are conducted through performance appraisal using practice tests, project appraisals, and

portfolio assessments. This is consistent with Craig & Mc Cormick's (2002) statement that using techniques such as observation checklists, journals, portfolios, and graphic organizers will help teachers assess the true learning and knowledge gained.

Evaluation activities conducted by teachers should be planned. Planning aims to make the assessment synergized with the objectives of learning to be achieved, the content of teaching materials provided and learning strategies applied. The Decree of the Ministry of Education Number 66 of 2013 states that there are five steps that must be taken in planning and executing the assessment. The five steps are successively arranging the grid, developing the instrument, carrying out the values, processing the values, and reporting and utilizing the assessment results.

Authentic Assessment in Mathematics Learning

Authentic Assessment in mathematics learning is an assessment that asks students to use the same competencies, or a combination of the knowledge, skills, and attitudes they need for application in specific situations in professional life (Gulikers, Bastiaens & Kirschner, 2004). It can also be referred to as an alternative assessment. Stiggins (1994) defined it as an examination of the ability to demonstrate competencies and special skills to apply skills and knowledge that have been mastered.

The authentic assessment is a measurement method requiring students to demonstrate important knowledge and skills by performing real-life tasks or close estimates. It emphasizes on efforts to help students learn. Bosco & Ferns (2014) stated that authentic learning tasks are fundamental steps of program specificity and serve as an important criterion for attracting students. It involves real experience, including personal judgment and reflection, measured as performance and skills and takes place in an integrated and sustainable manner. Moon, et al (2005) stated that authentic assessment can also enhance teaching and learning in secondary schools by integrating complex nature of learning. Keyser & Howell (2008) adds that the assessment should be analyzed to determine the presence or degree of authenticity for results of learning to be aligned with goals.

The types and forms of assessment used in the various authentic assessments depend on the type of competence, the learning outcome indicators, the learning materials and the purpose of the assessment itself. This type of assessment can be used in the authentic assessment, such as performance assessment, project assessment, product assessment, portfolio assessment, and observation. This is in line with Gao & Brown (2011) stating that the authentic assessment includes methods such as work sampling, anecdotal notes, portfolios, checklists, assessment scales, and teacher-designed classroom observations. Assessment techniques in mathematics learning are as follows.

It is conducted by observing the activities of students in doing something. This assessment is suitable for assessing competency achievement that requires students to perform tasks/movements or psychomotor domains, such as presentations, using mathematical tools and using software to solve math problems. The instrument used can be a rating scale and assessment rubric as a guide in making observations. According to Kinay & Bagceci (2016) authentic assessment is also represented as a performance appraisal, an appropriate assessment, an alternative assessment, or a direct assessment, contains techniques such as written text, portfolios, checklists, teacher observations, and group projects.

It is conducted to assess student tasks that must be completed within a certain timeframe and include some competencies. Assigned tasks can be an investigation of a process or event that starts with planning activities, collecting data, organizing, processing data and presenting the results of the investigation. The project assessment function includes pedagogical and meaningful assessments for students, giving students opportunities to express their competence in a whole, more efficient manner and produce economically valuable products as well as generate competence control values that can be accounted for.

It is a kind of continuous assessment based on a collection of information that shows the development of special abilities on the psychomotor aspects of students in a certain period. There are six principles that must be considered in carrying out portfolio assessment.

The six principles include; the authenticity of students' work, trust in judgment between teacher and student, mutual ownership of work between teacher and student, conformity between student's work with competency achievement indicator, including process assessment and learning result and integrated into learning. Buyarski & Landis (2014) added that a portfolio designed for assessment purposes allows for the measurement of student learning against established standards while a personal portfolio allows learners to define and narrate their learning as they see it. Wicks & Lumpe (2015) stated that students use portfolios for their learning process and demonstrate the product or the nature of this learning.

Buyarski & Landis (2014) suggested that portfolio assessment is not only used to see what students learn but also how students learn. It can also play a role in assessing the effectiveness of learning and curriculum. In addition, it supports affective and cognitive development of students as a learning portfolio. It can also be used for various purposes including in class and extracurricular program. Bullens (2002) states that portfolios designed for assessment purposes allow for the measurement of student learning against established standards. Appropriate assessment is needed to guide the curriculum process. Assessment should not only measure learning, but it also promotes it. Engel et al., (2003) state that with the existence of authentic tasks, students have an understanding of what to expect, and teachers see judgment as a useful tool for improving instruction.

Mathematics Teachers' Assessment Capability

According to the Indonesia Government Regulation No. 19 of 2005 on the National Education Standards article 28, educators or teachers are learning agents that must have four types of competence, namely pedagogic competence, professional competence, personality competence and social competence. Pedagogic competence is a skill with respect to the understanding of students and educational and dialogical learning managers. This competence includes the ability of understanding to students, design, and implementation of learning, evaluation of learning outcomes, and self-development of students to actualize various

potentials. Custer et al., (2000) stated that increased education requires changes in some components of the education system including curriculum, textbooks, teacher preparation, and professional development.

The ability of the mathematics teacher in the assessment of learning is one aspect of the pedagogic competence that the teacher must master. The Indonesian Government Regulation No. 16 year 2007 outlines the competence and sub-competence of teachers in the assessment of the ability to organize process assessments and learning outcomes and the ability to utilize the assessment results for the purposes of learning. There are seven sub-capabilities that mathematics teachers must master in relation to the assessment. First, it is an understanding of the principle of process assessment and learning outcomes according to the characteristics of mathematics subjects. Second, it is the ability to determine the process and learning outcomes that are important to assess. Third, it is the ability to determine process assessment procedures and learning outcomes. Fourth, it is the ability to develop process assessment instruments and learning outcomes. Fifth, it is the ability to administer process assessments and learning outcomes on an ongoing basis using various instruments. Sixth, it is the ability to analyze the results of process assessment and learning outcomes for various purposes. Seventh, the ability to evaluate the process and learning outcomes.

The ability to use assessment results consists of four sub-capabilities. First, it is the ability to use the assessment information to determine learning completeness. Second, it is the ability to use assessment results to design remedial and enrichment programs. Third, it is the ability to communicate the results of the assessment to stakeholders. Fourth, it is the ability to use the results of the assessment of learning to improve the quality of learning. Barber, King & Buchanan (2015) stated that, in order to create authentic learning and assessment tools, teachers need to learn how to design their tasks. Noor & Yusoff (2016) added that teachers can introduce themselves or peer-assessment as another option to assess children with simple observations or questionnaires that can be designed and utilized to help assess. Moon et al. (2005) also argued that teachers and students

involved in the classroom where authentic assessment is conducted are asked to reflect on their experiences by using or appraising.

METHOD

Population and Sample

This research used a mixed method. The population of this research was junior high school Mathematics teachers in Yogyakarta Indonesia. A purposive sampling technique was applied by involving 41 experienced teachers with teaching service more than 1 year. Most of the respondents' ages (46%) ranged from 36-50 years and most of them (58.5%) had taught mathematics for more than 10 years. Based on the level of education, almost all of the respondents met the minimum academic requirement of undergraduate degree (S1). Additionally, there were 14.6% of the teachers holding master degree (S2).

Data Collection Techniques

Data were conducted by distributing questionnaires, collecting documents and conducting Focus Group Discussion (FGD). The questionnaires were used to explore aspects of the implementation and utilization of assessment result by the Mathematics teachers. It consisted of 3 parts, namely: identity and general information, understanding, and experience of teachers in carrying out the authentic assessment and the utilization of teacher assessment results.

Details of the questionnaire are as follows: *First*, scales to assess the ability of junior high school mathematics teachers in carrying out the authentic assessment. *Second*, scales to assess the ability of junior mathematics teachers in using the results of the assessment of learning. *Third*, the questionnaire is used to explore obstacles faced by junior high school teachers in Yogyakarta in applying the authentic assessment.

To ensure the research instruments were valid and reliable, the researcher tested the instruments by conducting a preliminary study involving a small group of mathematics teachers. Triangulation processes were undertaken to ensure the validity and reliability of the data analysis following steps suggested by Miles and Hubberman (1994).

Table 1. Research Instrument

Variables	Indicators	Number of Items
1. The ability of mathematics teachers in carrying out the authentic assessment	understanding of the concepts of authentic assessment	4
	the ability to decide which aspects of learning are important to assess	3
	the ability to develop assessment instruments	3
	the ability to administer the assessment documents	1
	the ability to analyze the assessment results	3
2. The ability of mathematics teachers in using the results of the assessment of learning	ability to use assessment information to design remedial and enrichment programs	1
	analyzing learning outcomes, developing a remedial program based on the result of the assessment, and developing a program based on the learning achievement	2
	ability to use assessment information to improve the quality of learning	1
3. The obstacles faced by mathematics teachers	Open questionnaire	

Table 2. Teachers' Ability to Apply *Authentic Assessment*

No.	Indicator	Poor	Fair	Good
1	Understanding about the <i>authentic assessment</i>	12 29.27%	17 41.46%	12 29.27%
2	Ability to determine important aspects for evaluation	12 29.27%	10 24.39%	19 46.34%
3	Ability to determine evaluation procedures	7 17.07%	16 39.03%	18 43.90%
4	Ability to develop evaluation instruments	7 17.07%	16 39.03%	18 43.90%
5	Ability to manage evaluation	1 2.44%	30 73.17%	10 24.39%
6	Ability to analyze evaluation results	33 80.49%	6 14.63%	2 4.88%

Data Analysis Techniques

Data obtained from questionnaires were analyzed using descriptive statistics. The results of the analysis were categorized into *very poor*, *poor*, *fair*, *good*, and *very good* by implementing the criteria proposed by Widoyoko (2009). The procedure of the descriptive analysis is as follows.

- Scoring*, changing the value in qualitative terms to quantitative.
- Calculate the average score* for each aspect of the instrument,
- Determine the criteria of category for each research variable.

FINDINGS AND DISCUSSION

Findings

Profile of Ability to Carry Out an Authentic Assessment

Table 2 shows the results of the analysis of the mathematics teachers' ability to apply authentic assessment. From this table, it can be

seen that the indicator to manage evaluation has the highest score indicating the mathematics teachers performed well in managing evaluation using authentic assessment. On the other hand, the ability to analyze evaluation results has the lowest score indicating that the mathematics teachers did not perform well in using the results of the evaluation.

Teachers' Profile In Using Authentic Assessment Results

From Table 3, it can be seen that the teachers demonstrate poor indicator in the aspect of *using the assessment results to determine the learning mastery* (27 respondents or 65%). On the other hand, they demonstrate good ability for the aspect of *using the assessment results to design remedial and enrichment programs*. Furthermore, in general, the mathematics teachers' ability in *using the assessment results to improve the quality of learning* can be considered fair.

Table 3. Teachers' Competence in Applying *Authentic Assessment*

No.	Competence Aspect	Poor	Fair	Good
1.	Using the assessment information to determine the learning mastery	27 65.85%	12 29.27%	2 4.88%
2.	Using the assessment information to design remedial and enrichment programs	1 2.44%	16 39.02%	24 58.54%
3.	Using the assessment information to improve the quality of learning	0 0.00%	23 56.10%	18 43.90%

Table 4. Obstacles to Developing *Authentic Assessment*

No.	Aspect of Ability	Percentage
1	Understanding the concept of <i>authentic assessment</i>	2 5.56%
2	Ability to determine important aspects learning to be evaluated	8 22.22%
3	Ability to determine evaluation procedures	7 19.44%
4	Ability to develop evaluation instruments	9 25.00%
5	Ability to manage the evaluation	3 8.33%
6	Ability to analyze evaluation results	7 19.44%

Obstacles to developing authentic assessment

Table 4 shows the number of the respondents who experienced obstacles in applying the authentic assessment.

Table 4 shows that a total of nine teachers (25.00%) often had an obstacle in the aspect of the *ability to develop evaluation instruments*. Secondly, the teachers had a problem in the aspect of the *ability to determine important aspects learning to be evaluated* (8 respondents or 22.22%). It shows that only two teachers who experience problems in the aspect of *understanding about the concept of authentic assessment* and three teachers who experience problems in the aspect of the *ability to manage evaluation*. In general, it can be interpreted that mathematics teachers experienced obstacles in developing the authentic assessment.

Discussion

The implementation of the authentic assessment has strong relevance to the scientific approach to learning in accordance with the demands of the Curriculum 2013. This is relevant as it is able to describe the improvement of student learning outcomes. It can also be developed by the teachers alone, the teachers

on the team, or the teachers in collaboration with the students. Student involvement in planning assessments plays an important role in the authentic assessment. The important role is based on the assumption that students can perform better learning activities when they initially know how students will be assessed. Carter (2013) stated that the core of authentic assessment involves students with real life.

In general, the ability of junior mathematics teachers in Yogyakarta in implementing the authentic assessment is categorized relatively fair. It suggests that the teachers still need additional knowledge about authentic assessment. Gao & Grisham-Brown, (2011) argued that one of the advantages of using the authentic assessment can improve the relationship between teachers and students. Authentic assessments, often called performance-based assessments, engage students in real-world tasks and scenario-based problem solving more than traditional measures such as multiple-choice and pencil-and-paper tests. The practical issues of using the authentic measure can be addressed by providing in-depth training to teachers and increasing teachers' familiarity with their student. The assessment should be conducted in a naturalistic environment, reflecting functional skills, and

linked to the curriculum and individual goal development.

Authentic assessment should include an assessment of attitudes, skills, and knowledge. Nurgiyantoro (2011) stated that assessment techniques in the authentic assessment include direct measurement of students' skills, assessment of tasks related to performance, and process analysis used to generate student responses to the attainment of attitudes, skills, and knowledge. Therefore, to increase the quality of the teachers' ability in using authentic assessment, there is a need to undertake a professional development program such as training and workshop involving those three aspects.

The results showed the teacher's ability to develop assessment instruments was also good enough. The development of assessment instruments includes the preparation of tests, the compilation of non-assessment instruments, and the way in which instruments are developed. The average ability of teachers in administering incoming assessments in sufficient categories. This means that the junior high school mathematics teacher in Yogyakarta has not been very good at documenting the assessment that has been done. Though the assessment results are also important for the evaluation of learning materials that have been implemented. While the ability of teachers in analyzing the assessment results are still not good. This can be caused by teachers who only take the value only without evaluating or following up on the assessment results. Though evaluation is very important for the improvement of further learning. And so?

Once a teacher has determined which content standards they want to assess they must define what student mastery is, and what it looks like when it occurs. After the teacher has developed and administered an authentic assessment the results are submitted to interpretation. In terms of the use of the authentic assessment by junior high school teachers in Yogyakarta, in general, it can be considered to be fair. It can be interpreted that the teachers need to optimize to the use of the results of the assessment to be a powerful tool in developing student learning. For example, the results of the assessment can be used as an evaluation material in the learning, whether there are still students who have not understood

on certain materials. Therefore, the teachers can give special guidance to the student. Koyan (2011) stated that the benefits of the assessment are for giving feedback, diagnosing learning difficulties, and determining rate or graduation increase. The authentic assessment can also enhance teaching and learning in secondary schools by integrating complex nature of learning (Moon, et al., 2005). The types of assessments can provide quantifiable information about student learning, as well as inform the instructional process.

Finally, this study reveals that the implementation of the authentic assessment does not always run smoothly as teachers might experience problems. Developing the assessment instruments such as rubric and how to analyze the results of the assessment with rubrics are often complained by teachers. The role of the assessment rubric according to Montgomery's (2008) is that assessment results are made to integrate assessment with instruction and open collaborative approaches between students and teachers in teaching and learning process. It also supports the assessment of student progress and serves as a tool for interaction between students, teachers, and parents. Furthermore, the results of the assessment rubric can be written in the student portfolio to find out the extent of student progress in the learning process.

The main and most important reason why teachers implement changes in the assessment is to get an overview of the level of achievement of the curriculum objectives, the success of the learning method, and the accuracy of the self-assessment practice. Through this assessment practice, teachers can draw conclusions about what is needed in learning, progress in achieving the curriculum goals, and the effectiveness of the applied mathematics program. Therefore, the significance level of the assessment will depend on the alignment between the assessment method and the curriculum. If the assessment does not reflect the purpose, purpose, and content of the curriculum, then the information about what the students have already gained will be limited.

To overcome the obstacles experienced by teachers in developing the authentic assessment, the teachers need to have training on the authentic assessment. It can cover issues of preparation and analysis of the assessment rubric, preparation of the grid corresponding

to the assessment indicator, as well as the less complex assessment analysis so that the teachers can better understand the concept of authentic assessment well and appropriate assessment to students.

Thus, running well-developed professional training programs focusing on the weaknesses of the ability of the teachers in using authentic assessment might be one of the effective ways to improve the quality of the mathematics teachers. how do you assure the reader with this suggestion?

CONCLUSION

The ability of the junior high school teachers in Yogyakarta Indonesia to implement authentic assessment and the use of the results of the authentic assessment results can be generally categorized relatively fair. This study also revealed which obstacles mostly experienced by the mathematics teachers when implementing the authentic assessment. Therefore, this research recommends the Indonesian government provide professional development programs for junior high school mathematics teachers in developing the authentic assessment so that they can learn how to develop good authentic assessment which in turn leads the success of the implementation of the Curriculum 2013.

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UNDERSTANDING ON STRATEGIES OF TEACHING MATHEMATICAL PROOF FOR UNDERGRADUATE STUDENTS

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Abstract: Many researches revealed that many students have difficulties in constructing proofs. Based on our empirical data, we develop a quadrant model to describe students' classification of proof result. The quadrant model classifies a students' proof construction based on the result of mathematical thinking. The aim of this article is to describe a students' comprehension of proof based on the quadrant model in order to give appropriate suggested learning. The research is an explorative research and was conducted on 26 students majored in mathematics education in public university in Banten province, Indonesia. The main instrument in explorative research was researcher itself. The support instruments are proving-task and interview guides. These instruments were validated from two lecturers in order to guarantee the quality of instruments. Based on the results, some appropriate learning activities should be designed to support the students' characteristics from each quadrant, i.e: a hermeneutics approach, using the two-column form method, learning using worked-example, or using structural method.

Keywords: *proof, proving learning, undergraduate, quadrant model*

MEMAHAMI STRATEGI PENGAJARAN PEMBUKTIAN MATEMATIS DI PERGURUAN TINGGI

Abstrak: Banyak peneliti pendidikan matematika menyatakan bahwa siswa mengalami kesulitan dalam mengonstruksi bukti. Berdasarkan kajian empiris, penulis membangun suatu model kuadran untuk mendeskripsikan kategori konstruksi bukti yang dibangun siswa. Model kuadran tersebut mengklasifikasikan konstruksi bukti berdasarkan cara berpikir matematis siswa. Adapun tujuan dari artikel ini ialah mendeskripsikan pemahaman siswa dalam mengonstruksi bukti berdasarkan model kuadran serta memberikan saran strategi pembelajarannya. Penelitian ini merupakan penelitian eksploratif yang melibatkan 26 mahasiswa Jurusan Pendidikan Matematika pada universitas negeri di Provinsi Banten. Instrumen utama dalam penelitian eksploratif adalah peneliti sendiri. Instrumen pendukungnya ialah tugas pembuktian matematis dan panduan wawancara. Kedua instrumen pendukung tersebut telah divalidasi untuk menjamin kualitas instrumen yang digunakan. Hasil penelitian ini memberikan saran terkait aktivitas pembelajaran yang seharusnya dilakukan oleh pengajar agar sesuai dengan karakteristik berpikir siswa dalam mengonstruksi bukti pada masing-masing kuadran, misalnya : pendekatan hermeneutik, menggunakan metode dua-kolom, pembelajaran worked-example ataupun menggunakan metode terstruktur.

Kata Kunci: *bukti, pengajaran bukti, mahasiswa, model kuadran*

INTRODUCTION

Proof and proving in mathematics education are an important part of mathematics, as a pillar of the mathematics building. Therefore, mathematics education especially in mathematics learning in university emphasizes the constructing of mathematical proof. Students who enter college level should develop a formal mathematical knowledge.

Many researchers have investigated about mathematical proving and its learning. Some researchers wrote about students' proof schemes for mathematical proving (Iannone, Inglis, Mejía-Ramos, Simpson, & Weber, 2011; Lee, 2016; Syamsuri & Santosa, 2017). And another ones wrote about thinking process in proof production (Weber & Alcock, 2004; Sean Larsen & Zandieh, 2008; Stylianides & Stylianides, 2009; Syamsuri, Purwanto, Subanji, & Irawati, 2017) and its

material learning (Fadillah & Jamilah, 2016). It is indicated that teaching mathematical proof is important in mathematics education.

Students are introduced to formal proof in the study of mathematics at university. Formal proof as a process begins from explicit quantified definitions and deduces that other properties hold as a consequence (Tall et al., 2012). Learning how to construct formal proof is given to make sense a formal definition that can be used in building the basis of deduction theorem. It is indicated that undergraduate students must develop their mathematics knowledge formally. A formal proof is based on rigorous logic and can be communicated like a discussion of mathematicians on scientific forum. Therefore, undergraduate students need proving exercises so that they will able to understand a formal mathematics structure.

The process of proving a mathematical proposition is a sequence of mental and physical actions, such as writing, thinking to begin the proof, draw diagrams, to reflect on previous actions or trying to remember the example. The process of proof formation of a theorem or statement is more complex than the proof itself (Selden & Selden, 2003). Therefore, teacher is needed for facilitating in learning mathematics thus facilitate students in mathematical proofs. In mathematics, one of the teachers' aid to help the students in order to make it easy to perform mathematical proofs is to make it into a tangible proof (Sowder & Harel, 2003). So, teaching assistance on mathematical proof to the students can be done gradually and trying to create proof into something tangible.

Many researches revealed that many students have difficulties in constructing proofs (Moore, 1994; Baker & Campbell, 2004; Weber, 2001). Moore stated that there are 7 difficulties in mathematical proving, i.e.: the students (1) did not know the definitions, (2) had little intuitive understanding of the concepts, (3) had inadequate concept images for doing the proofs, (4) were unable, or unwilling, to generate and use their own examples, (5) were unable to understand and use mathematical language and notation, (6) did not know how to use definitions to obtain the overall structure of proofs, and (7) did not know how to begin proofs. Meanwhile, Baker and Campbell (2004) explained that students' difficulties in proving were caused by some

factors, i.e.: (1) understanding of the rules and nature of proof, (2) conceptual understanding, (3) proof techniques and strategies, and (4) cognitive load. In addition, Weber (2001) asserted that: (1) students' difficulties included their misunderstanding of a theorem or a concept and misapplying it, (2) students' inadequate conception knowledge about mathematical proof, and (3) students' inadequacy in developing strategies for proof. Therefore, the difficulties that students face consist of uncompleted conceptual understanding and incorrect proving strategy.

Another research was revealed a proof assessment instruments. Andrew created The Proof Error Evaluation Tools (PEET) to assess a students' proof. A PEET consists of proof structure and conceptual understanding (Andrew, 2009). And also, Mejia-Ramos et al. (2012) developed an assessment model for proof comprehension in undergraduate mathematics. They stated that the model described ways to assess students' understanding of seven different aspects of a proof. These types of assessment are: (1) Meaning of terms and statements, (2) Logical status of statements and proof framework, (3) Justification of claims, (4) Summarizing via high-level ideas, (5) Identifying the modular structure, (6) Transferring the general ideas or methods to another context, and (7) Illustrating with examples. Therefore, the assessment consists of conceptual understanding and proving strategy. Based on our empirical data, we develop a quadrant model to describe students' classification of proof production. Figure 1 describes the quadrant model.

The quadrant model classifies a students' proof construction based on result of mathematical thinking. Therefore, investigation of thinking process or outcome of thinking process is necessary for selecting an appropriate learning strategies. Many prior researches revealed outcome thinking process about proof construction. For instance, a students have difficulties in proof construction (Moore, 1994; Gibson, 1998; Baker & Campbell, 2004; Weber, 2006) and so students made errors in proof construction (Selden & Selden, 2003; Sowder & Harel, 2003). Nevertheless, researches which reveal mental structures and mental mechanisms are rarely found. Whereas knowing students' thinking process that consisting of both mental structures and mental mechanisms

can help teachers or lecturers in order to give an appropriate learning assistance. Some suitable learning activities should be designed to support the construction of this thinking process. In addition, if students' thinking process is incorrect, then refinement thinking process can be easy in order to it does not occur in next learning.

In this article, we will describe a students' comprehension of proof based on quadrant model in Figure 1.

RESEARCH METHOD

Participants

The research was conducted on 26 students majored in mathematics education in public university at Banten province, Indonesia. The consideration of that was because the students were able to think a formal proof in mathematics. And also, the students are more easily managed by the researcher to follow the procedures empirically planned, so that the data obtained is a students' actual of reflection thinking. Giving a proving-question in the beginning, aim to select students who will be the subjects, which further deepened with the interview. The diagram of selecting research subject is Figure 2.

Instruments

The main instrument in explorative research was researcher itself. The support instruments are proving-task and interview guides. These instruments were evaluated and validated from two lecturers in order to guarantee the quality of instruments. The interview is open

and it's needed to reveal students' response about proof comprehension. Procedures to obtain data are 1) subject is given the task proving and asked him/her to accomplish the task by think-aloud. And then 2) subject is interviewed based on-the-task. Therefore, the scratch of proving-task and transcript of the interview is obtained. The proving-task is in the following.

Prove: For any positive integer m & n , if m^2 and n^2 are divisible by 3, then $m+n$ is divisible by 3.

We used this task because some methods can be used for solving, i.e.: direct proof, contradiction, and contrapositive. Besides, we would like to test students' comprehension about mathematical induction method, because some students have an opinion that using mathematical induction to prove a number which is "divisible by 3".

The interview guides is created for confirmation and clarification about students' proof comprehension. According to Mejia-Ramos et al. (2012) we compile the interview questions, i.e.: (1) What mathematical concepts that are used in the proving task? Explain. (2) How do you accomplish the task? (3) Why do you argue with this step?, (4) What is the big idea in your proof construction?, (5) What mathematical proposition that supports your proof construction?, (6) Would you like to give an example of the task?, and (7) In the task, if number "3" is replaced by "4", what is your opinion?

	Proof-structure	
<p>Quadrant II Insufficient concept in formal-proof construction</p> <ul style="list-style-type: none"> • An error caused important parts of the proof to be left unaddressed. • False statement or incorrect computation in the proof 		<p>Quadrant I Correct Proof Construction</p> <ul style="list-style-type: none"> • Correct in Proof-structure • Correct in Conceptual Understanding <p style="text-align: center;"><i>Conceptual-Understanding(U)</i></p>
<p>Quadrant III Insufficient concept and Incorrect proof-structure in formal-proof construction</p> <ul style="list-style-type: none"> • The proof contained extraneous details or steps that did not really contribute to the proof. • False statement or incorrect computation in the proof • Incorrectly claimed that one statement implied or equaled another statement. 		<p>Quadrant IV Incorrect proof-structure in formal-proof construction</p> <ul style="list-style-type: none"> • The approach taken in proving a statement will not work • The proof was to be completed using a specific method, but this method was not used. • False statement or incorrect computation in the proof

Figure 1. Quadrant model of students formal-proof construction
(Syamsuri, Purwanto, Subanji, & Irawati, 2016)

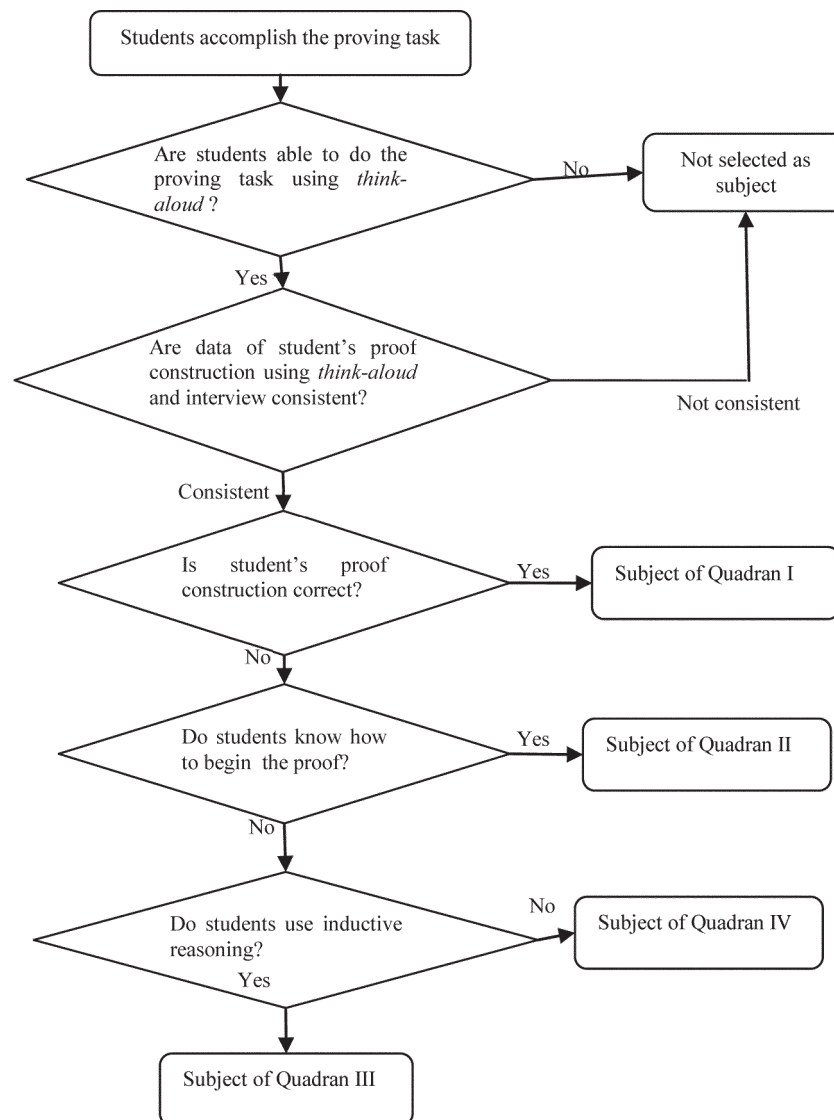


Figure 2 - Process of selecting subject

RESULTS AND ANALYSIS

Results

The following are the description of the data of the failures experienced by students. The tool used in the evaluation of the proofs was the Error Proof Evaluation Tools (PEET) developed by Andrew (2009).

The most frequent errors were an error in claiming a statement, the error in making a statement, and one in choosing a proof type. Errors in claims occurred at the beginning of proof by stating $n^2 = (3a)^2$, with a is an integer. The error in choosing a proof type was by choosing an incorrect method.

Based on PEET results, students' response can be further classified into three categories. First, there are 6 students who are wrong in extracting a concept so become wrong in

expressing formal proof (corresponding to U4-2 and U5-1 on Table 1 and 2). Secondly, as many as 10 students less likely to complete in deepening the concept, so there is a missing piece of concept (corresponding to S2, S3, U4-1, U5-1 and U5-2 on Table 1 and 2). Finally, there are 5 students who committed errors in selecting methods of proof in the initial stage of logic verification (corresponding to S1-2, S2, and S7-1 on Table 1 and 2). Therefore, of the 26 students who were given the task of mathematical proof, there were 5 students, 6 students, 10 students and 5 students in Quadrant I, Quadrant II, Quadrant III and Quadrant IV, respectively. We will describe characteristics of proof comprehension of S1, S2, S3, and S4 as subjects in Quadrant I, Quadrant II, Quadrant III and Quadrant IV, respectively. The students' proof construction is below.

Table 1. Students' error on proof-structure (S) in constructing formal proof

No	Element of Proof Structure	Component Descriptions	Number of Students who made error
1	Proof setup	S1. Introduced variables without defining them or performed operations that were undefined.	8
		S1. The approach taken in proving a statement will not work.	10
		S1. The proof was to be completed using a specific method, but this method was not used.	10
2	Assumption	S2. Made a false assumption somewhere in the proof.	15
3	Linear/sequential order	S3. Didn't proceed through the proof in a linear fashion, and ideas were not in logical order.	10
4	Stray details/conciseness	S4. The proof contained extraneous details or steps that did not really contribute to the proof.	6
		S4. The length of the proof was unnecessarily long and thus extremely difficult to follow.	2
5	Neat presentation	S5. The write-up was illegible at times, making it difficult to read and/or understand.	0
6	Technology's place	S6. Relied too much on calculator or computer-generated information in one step of the proof.	0
7	Proof type	S7. Needed to show $p \rightarrow q$ but did not show directly, or by $\neg q \rightarrow \neg p$, or by contradiction	15
		S7. Only gave an example to establish the truth of a mathematical statement.	10
8	Correct use of symbols/notation	S8. Used nonstandard or confusing notation.	0

Table 2. Students' error on conceptual-understanding (U) in constructing formal proof

No	Element of Mathematical Concept	Component Descriptions	Number of Students who made error
1	Sufficient details	U1. Wrote a statement that was not justified, explained, or verified.	10
2	Clarity	U2. Wrote a statement or paragraph that was ambiguous, confusing, and/or unnecessarily complex.	3
3	Pictures in the proof	U3. Failed to include an illustrative picture that would make the proof easier to understand.	0
		U3. Relied too much on a picture to prove something was true.	0
4	Crucial step/main idea	U4. Did not sufficiently justify a crucial step in the proof.	18
		U4. An error caused important parts of the proof to be left unaddressed.	10
5	Correct implications and statements	U5. Made a false statement or incorrect computation in the proof.	21
		U5. Incorrectly claimed that one statement implied or equaled another statement.	21
6	All cases present	U6. Included some cases but not others (which were not trivial).	1

Students' proof construction depends on their understanding about the proving task. A different proof construction among students indicated that the understanding of proof is different too. Subject S1 knew how to begin the proof. And also, he could connect to appropriate mathematical concepts well. Subject S2 knew

how to begin the proof, but he fails in connecting mathematical concept. Subject S3 didn't know how to begin the proof, and so she solves the proving task using inductive reasoning. Subject S4 didn't know how to begin the proof, and so she fails in beginning a proof. Therefore, we suggest that the proof comprehension of these students

Table 3. Students' proof comprehension

No.	Component of Proof Comprehension	Subject S1	Subject S2	Subject S3	Subject S4
1	Logical status of statements and proof framework	Direct proof Using congruent modulo number	Direct proof Using congruent modulo number	Inductive reasoning	Direct proof Failure in beginning a proof
2	Justification of claims	Create 5 correct claims	Create a correct claim and an incorrect claim	Create only a clarified claim	Create an incorrect claim in beginning proof
3	Meaning of terms and statements	- Integer - quadratic number - number that divisible by 3 - congruent modulo number	- integer - quadratic number - number that divisible by 3 - congruent modulo number	- integer - number that divisible by 3 - simple description of concepts	- integer - number that divisible by 3 - adequacy of concept image
4	Summarizing via high-level ideas	- Showed that if both m^2 and n^2 are divisible by 3 then m^2-n^2 is divisible by 3 - Showed that if m^2-n^2 is divisible by 3 then $(m+n)(m-n)$ is divisible by 3 - Showed that if $(m+n)(m-n)$ is divisible by 3 then $m+n$ is divisible by 3	- Showed that if both m^2 and n^2 are divisible by 3 then m^2-n^2 is divisible by 3 - Showed that if m^2-n^2 is divisible by 3 then $(m+n)(m-n)$ is divisible by 3	- Not appeared	- Define that $m=3a$ - Define that $n=6a$ - Verified that m^2 is divisible by 3 - Verified that n^2 is divisible by 3 - Verified that $m+n$ is divisible by 3
5	Identifying the modular structure	There are some theorems - If $a b$ and $a c$ then $a b-c$, $a b+c$ - If $c ab$ then $c a$ or $c b$	- Not appeared	Not appeared	- Not appeared
6	Illustrating with examples	- Give an example that $m^2=6^2$ and $n^2=3^2$	- Failure in giving an example; $m=2$ and $n=7$, because he believe that the proposition is incorrect	- $m=6$ and $n=3$, but she determined m and n before m^2 and n^2 .	- She stated that the proposition is incorrect because not all of m^2 and n^2 is divisible by 3.
7	Transferring the general ideas or methods to another context	Before reflective thinking, he stated that "If both m^2 and n^2 are divisible by 4 then $m+n$ is divisible by 4" is correct proposition, nevertheless when asked to give an example, he gave $m=2$ and $n=4$ that is a counter-example of the proposition. Immediately, S1 aware a failure and stated that the proposition is incorrect	S2 stated that "If both m^2 and n^2 are divisible by 4 then $m+n$ is divisible by 4" is incorrect proposition, because the before proposition is incorrect. In addition, S2 tried $m=2$ and $n=4$ that is a counter-example of the proposition.	S3 stated that "If both m^2 and n^2 are divisible by 4 then $m+n$ is divisible by 4" is correct proposition. She argued using several example.	S4 stated that "If both m^2 and n^2 are divisible by 4 then $m+n$ is divisible by 4" is incorrect proposition. She argued using incorrect reason.

is different. Furthermore, the different proof comprehension influences a learning strategy for students in order to afford a mathematics proving.

Characteristics of Proof Comprehension and Appropriate Learning in Quadrant I

Subject S1 has solved the proving task. He knew how to begin the proof. And also, he could connect it to appropriate mathematical concepts well. According to Table 3, Subject S1 could construct a proof in thought-experiment level (Balacheff, 1988; Varghese, 2011) and thought level 2 (Van Dormolen, 1977). This level encouraged student to construct a proof using definition and rigorous logics (Weber, 2004), and also using deductive reasoning and symbolic. Therefore, according to the three worlds, the thinking process of S1 is in axiomatic-symbolic development (Tall, 2010).

According to Table 1 above, characteristics of proof comprehension is a complete comprehension. It indicated that both a local proof comprehension (component 1-3) and a holistic proof comprehension (component 4-7) are complete. Therefore, Subject S1 was able to construct proof correctly. According to Polya (Meel, 2003), this student's understanding is at intuitive level. It showed that in his mind, there are three worlds of knowledge in mathematical understanding, i.e.: applications, meanings, and logical relationship (Lehman, 1977). Meanwhile, following Skemp's understanding, Subject S1 has a relational understanding. And so, type of understanding of the subject is inventing layer (Pirie & Kieren, 1989). Therefore, proof comprehension in this subject is called completed comprehension.

According to students' characteristics in this quadrant, we suggest that all learning strategy is appropriate for students in the quadrant. Mathematics is not only a subject to be learned and taught, but it is to be produced. However, with hermeneutics, it would be easy to develop our own idea and produce mathematics. Thus, some appropriate learning strategies for students in this quadrant are hermeneutics approach. This was the best opportunity for students to learn from the pioneers how to develop a new idea and create something new. Only with hermeneutics, teaching and learning mathematics and also research in mathematics could be flourishing and fruitful (Djauhari, 2015).

Characteristics of Proof Comprehension and Appropriate Learning in Quadrant II

Subject S2 knew how to begin the proof, but he failed in connecting mathematical concept. According to Table 3, Subject S2 could construct a proof in thought-experiment level (Balacheff, 1988; Varghese, 2011) and thought level 2 (Van Dormolen, 1977). This level encouraged student to construct a proof using definition and rigorous logics and also using deductive reasoning and symbolic.

According to Moore, Subject S2 has difficulty in understanding a concept, so his concept image is not enough for constructing a proof (Moore, 1994). Following Gibson's suggestion, Subject S3 has some difficulties in conceptual understanding, proof techniques and strategies. According to Weber (2004) opinion's, S2's difficulties included their misunderstanding of a theorem or a concept and misapplying it and his inadequate conception knowledge about mathematical proof. Thus, Subject S2's fault is in connecting mathematical concept.

According to Table 1 above, characteristics of proof comprehension is an uncompleted comprehension. It indicated that both a local proof comprehension (component 1-3) and a holistic proof comprehension (component 4-7) are incomplete. According to Polya (Meel, 2003), this student's understanding is at rational level. Meanwhile, following Skemp's understanding, type of understanding of Subject S2 is a relational understanding (Skemp, 1978). Whereas, another suggestion stated that type of understanding of the subject is layer observing (Pirie & Kieren, 1989). Therefore, proof comprehension in this subject is called uncompleted comprehension.

We suggest that one of appropriate leaning for this quadrant is using the two-column form method. This method can play a dual role, so student can connect some mathematical concept easily. While in many cases teachers do use the form in a way that limits students ability to think flexibly when formulating an argument, in other cases teachers can use the form in a way that enables greater flexibility in reasoning and proving (Weiss, Herbst, & Chen, 2009).

Besides, students' characteristic is weak validation skill. It indicated that proof comprehension component of "transferring the general ideas or methods to another context" is a wrong validation. Finally, the students

may not be able to distinguish proofs from supplementary or explanatory and so may not be able to distinguish proofs from supplementary or explanatory comments. It might be good to present material in a way that makes these comments. For example, explanations of definitions, illustrations of relevant concepts, cautionary remarks, and even remarks of proofs, except those needed to organize their linear presentation and help readers with validation, might best be treated as annotations. This might simultaneously provide prototypical examples for enhancing students' conceptions of proof and also encourage them to validate proofs carefully (Selden & Selden, 1995).

Characteristics of Proof Comprehension and Appropriate Learning in Quadrant III

Subject S3 didn't know how to begin the proof. According to Table 3, Subject S3 could construct a proof in naïve-empirism level (Balacheff, 1988; Varghese, 2011) and ground level (Van Dormolen, 1977). This level encourage student to construct a proof using inductive reasoning. Therefore, according to Tall, the thinking process of S3 is in embodiment world (Tall, 2010).

According to Moore, Subject S3 has difficulty in understanding a concept, so his concept image is not enough for constructing a proof. Subject S3 has a misunderstanding a theorem or a concept and misapplying it (Moore, 1994). Subject S3 has a difficulty to think deductive reasoning (Recio & Godino, 2001). And so, these difficulties encourage her to construct a proof using inductive reasoning.

According to Table 1 above, characteristics of proof comprehension is uncompleted comprehension. It indicated that both a local proof comprehension (component 1-3) and a holistic proof comprehension (component 4-7) are incomplete. According to Polya (Meel, 2003), this student's understanding is at inductive level. Meanwhile, following Skemp's term, type of understanding of Subject S1 is instrumental understanding (Skemp, 1978). Whereas, another suggestion stated that type of understanding of the subject is layer image having (Pirie & Kieren, 1989). Therefore, the proof comprehension in this subject is called uncompleted comprehension.

The students' characteristics have no proof-structure, and also have a little conceptual

understanding. One of learning strategies for this quadrant is asking a generate example. Many mathematics education researchers have suggested that asking learners to generate examples of mathematical concepts is an effective way of learning about novel concept (Iannone et al., 2011).

Of course, the students need assistance to refine a proof-structure and conceptual understanding about proposition. Another method is learning using worked-example (Retnowati, Ayres, & Sweller, 2010; Margulieux & Catrambone, 2016; McLaren, Van Gog, Ganoë, Karabinos, & Yaron, 2016) and what kind of assistance to provide, is a much-debated problem in research on learning and instruction. This study presents two multi-session classroom experiments in the domain of chemistry, comparing the effectiveness and efficiency of three high-assistance (worked examples, tutored problems, and erroneous examples. Weber stated that proving is a problem solving activity (Weber, 2005). According to Retnowati et al. that students could understand the material more easily using worked examples than when solving problems. And also, Margulieux and Catrambone stated that worked-example as guided instruction is important for novices because it helps them to organize and use new information more effectively. The students who are unable to construct a formal proof are novice students. Worked-example is example how to proving a proposition, and involved arguments in every step. Worked-example can refine students' knowledge, 1) how to begin a proof, 2) how to understand about end of proof, 3) how to give argumentation for each step, and 4) how to select mathematical concept needed. Point 1) and 2) related to refine proof-structure, in addition point 3) and 4) related to refine a conceptual-understanding. Therefore, we suggest that the proving process will be generated through this method.

Characteristics of Proof Comprehension and Appropriate Learning in Quadrant IV

Subject S4 didn't know how to begin the proof, so she failed in beginning a proof. According to Table 3, Subject S4 could construct a proof in thought-experiment level (Balacheff, 1988; Varghese, 2011) and thought level 2 (Van Dormolen, 1977). This level encourage student

to construct a proof using definition and also using deductive reasoning. Therefore, according to Tall, the thinking process of S4 is in axiomatic-symbolic development (Tall, 2010).

According to Moore, Subject S4 did not know how to use definitions to obtain the overall structure of proofs (Moore, 1994). Following Gibson's suggestion, Subject S4 has difficulties in conceptual understanding and proof techniques and strategies. According to (Weber, 2004) Weber's opinion, S4's difficulties included their misunderstanding of a theorem or a concept and misapplying it and his inadequate conception knowledge about mathematical proof. Therefore, Subject S4 failed in beginning a proof.

According to Table 1 above, characteristics of proof comprehension is uncompleted comprehension. It indicated that both a local proof comprehension (component 1-3) and a holistic proof comprehension (component 4-7) are incomplete. According to Polya (Meel, 2003), student's understanding is at rational level. Meanwhile, following Skemp's term, type of understanding of Subject S1 is relational understanding. Whereas, following other theory about understanding stated that type of understanding of the subject is formalizing layer (Pirie & Kieren, 1989). Therefore, proof comprehension in this subject is called uncompleted comprehension.

The students' characteristics have no proof-structure, so that she/he failed in beginning a proof. One of learning strategies for this quadrant is structural method. Among attempts to improve students' proof comprehension in constructing a proof, one can distinguish two broad approaches: (a) changing the presentation of the proof and (b) changing the way a student engages with it (Leron, 1983). The aim of changing the presentation is to make it easier in understanding proof-structure. A structured proof is arranged in levels, with the main ideas and approach given at the top level and subsequent levels giving details and justifications of each of the steps in the preceding levels.

When the presentation is changed, explanations must be provided by the instructor. The explanations can help students who construct incorrect-proof to understand how constructing correct-proof. In terms of Mejía-Ramos et al.'s framework, a structured proof is designed to

facilitate understanding higher-level ideas and identifying modular structure, though it does so at the expense of separating some claims from their supporting data and warrant. These changes are reflected in empirical research on the efficacy of structured proofs. Fuller et al. found that, compared to those who read a traditional proof, students who read structured proofs were more successful at summarizing the key ideas of the proof (Fuller et al., 2011). These way can help students who are in Quadrant-IV.

CONCLUSION

We develop a quadrant model to describe students' classification of proof production. Characteristics of students' proof comprehension in first quadrant are completed comprehension. According to students' characteristics in this quadrant, we suggest that all learning strategies are appropriate for students in the quadrant. Nevertheless, we suggest that appropriate learning strategy for students in this quadrant is a hermeneutics approach. Characteristics of students' proof comprehension in second quadrant are uncompleted comprehension, especially in connecting mathematical concepts and validation skill. We suggest that one appropriate leaning for second quadrant is using the two-column form method. This method can play a dual role, so a student can enable greater flexibility in reasoning and proving.

Characteristics of students' proof comprehension in third quadrant are uncompleted comprehension, especially the difficulty to generate deductive reasoning. The students' characteristics have no proof-structure, and also have a little conceptual understanding. One of learning strategies for this quadrant is asking to generate example and learning using worked-example. Many mathematics education researchers have suggested that asking learners to generate examples of mathematical concepts is an effective way of learning about novel concept. Characteristics of students' proof comprehension in fourth quadrant are uncompleted comprehension, especially in beginning a proof. The students' characteristics have no proof-structure, so that she/he failed in beginning a proof. One of learning strategies for this quadrant is structural method.

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PENGEMBANGAN TES *CREATIVE THINKING SKILLS* FISIKA SMA (PhysCreTHOTS) BERDASARKAN TEORI TES MODERN

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Abstrak: Pada umumnya tes dikembangkan berdasarkan teori tes klasik yang banyak kelemahannya, maka tes yang dikembangkan ini dilakukan berdasarkan teori tes modern (*Item Response Theory*). Penelitian bertujuan untuk mengembangkan tes *Creative Thinking Skills* fisika Kelas X SMA (PhysCreTHOTS) yang layak digunakan berdasarkan teori tes modern. Penelitian ini merupakan penelitian pengembangan menggunakan model 4D yang melibatkan 300 peserta didik Kelas X SMA di Kabupaten Gunung Kidul DIY. Penskoran *item* tes menggunakan skala politomus empat kategori dan menggunakan teknik *Partial Credit Model* (PCM). Karakteristik tes terdiri atas kecocokan item, reliabilitas, tingkat kesukaran item dan fungsi informasi dan *Standard Error of Measurement* (SEM). Hasil penelitian menyatakan bahwa reliabilitas instrumen sebesar 0,72. Keseluruhan instrumen tes dinyatakan fit dengan PCM, dengan rentang INFIT MNSQ 0,93 sampai 1,10. Indeks kesukaran 63 item (*difficulty*) antara -1,06 sampai 1,04. Berdasarkan fungsi informasi dan SEM diketahui bahwa instrumen tes sesuai dengan peserta didik berkemampuan dari -1,8 sampai 3,0. Keseluruhan tes dinyatakan layak digunakan untuk mengukur *Creative Thinking Skills* Fisika peserta didik kelas X SMA.

Kata kunci: *creative thinking skills, partial credit model, politomus, fisika*

THE DEVELOPING OF CREATIVE THINKING SKILLS TEST BASED ON MODERN TEST THEORY IN PHYSICS OF SENIOR HIGH SCHOOLS

Abstract: In general, a test was developed based on classical test theory which had many weaknesses, therefore the test in this research was developed based on modern test theory (Item Response Theory). This study aimed to develop a Creative Thinking Skills test on physics lessons for Class X High School (PhysCreTHOTS) that eligible to be used based on modern test theory. This research was a development research using 4D model which involving 300 students of Class X High School in Gunung Kidul District of DIY. The scoring of test items using four categories of politomus scales and Partial Credit Model (PCM) techniques. The characteristics of the test consist of item match, reliability, difficulty level of item, information function and Standard Error of Measurement (SEM). The results showed that the instrument's reliability was 0.72. The entire test instrument is considered fit with PCM, with an INFIT MNSQ range of 0.93 to 1.10. The difficulty index of 63 items ranges from -1.06 to 1.04. Based on the information function and SEM it is known that the test instrument corresponds to the learner with a score of -1.8 to 3.0. The entire test is considered feasible to be used to measure Creative Thinking Skills in Physics lessons for high school X grade students.

Keyword: *creative thinking skills, partial credit model, polytomus, physics*

PENDAHULUAN

Fisika dianggap sebagai mata pelajaran yang sulit dan menakutkan (Angell, Guttersrud, & Henriksen, 2004:698). Hal ini disebabkan dalam fisika terdapat banyak persamaan matematis dan peserta didik menganggap persamaan matematis tersebut harus dihafalkan. Anggapan yang demikian tentu saja tidak muncul dengan sendirinya.

Pendekatan yang digunakan oleh guru dalam mengajarkan konsep-konsep fisika seolah-olah menegaskan bahwa konsep-konsep fisika adalah kumpulan persamaan-persamaan matematis (Loviza, 2011:1).

Fisika merupakan pengetahuan mendasar yang dibutuhkan untuk kemajuan teknologi untuk masa depan dan pengembangan kreativitas adalah salah satu cara untuk mengintegrasikan-

nya (Klieger & Sherman, 2015). Sebagian besar pengajaran fisika dilakukan dengan memberikan contoh soal dan latihan mengerjakan soal-soal sehingga peserta didik terjebak pada pembahasan penyelesaian soal-soal dan sedikit mengungkapkan proses yang sebenarnya terjadi.

Pembelajaran fisika menuntut peserta didik aktif sehingga akan memperkuat pemahaman terhadap konsep-konsep fisika. Hal ini sesuai dengan prinsip-prinsip konstruktivisme, dimana pengetahuan dibangun oleh peserta didik sendiri. Peserta didik yang tidak aktif, tidak dapat menerima pengetahuan secara langsung yang ditransfer oleh guru. Peserta didik yang aktif secara terus menerus, akan dapat memperoleh pengetahuan sehingga selalu terjadi perubahan konsep menuju ke arah yang lebih kompleks. Marilyn (2012:33) menjelaskan bahwa guru hanya bertindak sebagai fasilitator (menyediakan fasilitas bagi siswa), pembimbing (memperbaiki pemahaman peserta didik yang salah), motivator (meningkatkan semangat belajar peserta didik), dan inovator (memancing didik untuk berkreasi dengan model-model yang dibentuknya).

Pembelajaran fisika yang tepat akan menghasilkan kualitas peserta didik yang unggul. Hadi & Handhika (2015:179) menyatakan bahwa pembelajaran fisika di sekolah seharusnya dilakukan dengan pendekatan ilmiah (*scientific approach*) agar lebih bermakna dan membentuk karakter peserta didik. *Scientific approach* menurut Daryanto (2014:51) cocok diterapkan dalam pembelajaran fisika, karena peserta didik dituntut untuk aktif dalam melatih keterampilan berpikir peserta didik.

Berkaitan dengan pembelajaran, untuk memantau kemajuan peserta didik dibutuhkan penilaian dan evaluasi. Penilaian dan evaluasi dapat memberikan bimbingan kepada peserta didik dalam rangka menentukan perubahan hasil pembelajaran yang lebih kompleks. Penilaian merupakan bagian dari evaluasi yang saling berkaitan. Penilaian merupakan proses yang sangat penting dalam proses pembelajaran, hal ini diungkapkan oleh Binkley *et al*, (2012:20). Penilaian dapat memberikan gambaran hasil sejauh mana proses pembelajaran telah dicapai, untuk mengetahui tingkat ketercapaian tersebut maka perlu dilakukan tes sebagai alat atau instrumen penilaian.

Penilaian merupakan bagian dari proses pembelajaran. Penilaian yang terencana dengan

baik dapat memberikan hasil yang baik juga. Hadirnya Kurikulum 2013, membantu para pendidik agar dapat merencanakan penilaian yang sesuai dengan tujuan pembelajaran. Konsep Kurikulum 2013 adalah keseimbangan *Hard-skills* dan *Softskills* dimulai dari Standar Kompetensi Lulusan, Standar Isi, Standar Proses dan Standar Penilaian. Sariono (2014:7) menjelaskan bahwa Kurikulum 2013 perlu diterapkan dalam pembelajaran, karena erat kaitannya dengan usaha mengembangkan peserta didik sesuai dengan tujuan yang ingin dicapai. Untuk mencapai tujuan tersebut, diperlukan sebuah penilaian berupa tes.

Tes merupakan alat pengukuran terencana yang digunakan oleh guru untuk memberikan kesempatan bagi peserta didik untuk menunjukkan prestasi dan kaitannya dengan tujuan yang telah ditentukan (Cangelosi, 1995: 23). Selanjutnya, Cangelosi (1995:24) juga menjelaskan variasi dalam mengembangkan tes tertulis, yaitu *multiple choice, sentence completion, listing, true-false, matching, essay, dan modified form*. Tes yang digunakan guru sejauh ini tidak mampu mengukur kemampuan berpikir peserta didik salah satunya adalah kemampuan *creative thinking skills*. Sejalan ini tes yang dikembangkan hanya pada tingkat mengingat dan menghafal, sedangkan kemampuan *creative thinking skills* lebih dari sekadar mengingat dan menghafal.

Pilihan ganda merupakan salah satu bentuk tes yang sering digunakan. Tes pilihan ganda lebih dapat dipercaya dibandingkan dengan jenis tes lainnya yang mendapat pengaruh negatif oleh subjektivitas (Ozturk, 2007). Selain itu Brown (2004) menyatakan bahwa tes pilihan ganda mengurangi beban guru dengan proses penilaian dan pemberian skor yang mudah dan konsisten. Secara umum bentuk soal pilihan ganda belum mampu mengukur kemampuan *creative thinking skills* peserta didik. Untuk dapat mengukur kemampuan *creative thinking skills* maka perlu dilakukan pengembangan soal pilihan ganda beralasan (*Reasoning Multiple Choice*). Pada tes soal pilihan ganda beralasan menuntut peserta didik harus berpikir mengenai alasan yang sesuai dengan pilihan jawabannya. Penggunaan pilihan ganda beralasan sangat tepat digunakan untuk jenjang SMA, karena pilihan ganda beralasan dapat mengukur taksonomi yang lebih tinggi (Kubiszyn & Borich, 2013:138). Dengan demikian secara langsung proses berpikir me-

mentukan alasan yang tepat sehingga dapat melatih kemampuan *creative thinking skills* peserta didik.

Mitchell, Stueckle, & Wilkens (1983:15) dalam penelitiannya mengembangkan 4 ciri berpikir kreatif oleh Guilford (1970) dan Torrance (2006) kedalam 14 ciri berpikir kreatif yang lebih spesifik. Mitchell, Stueckle., & Wilkens mendefinisikan ciri-ciri berpikir kreatif ke dalam 14 elemen dasar, yaitu (1) mengembangkan humor, (2) kelancaran (*fluency*), (3) keluwesan (*flexibility*), (4) *originality*, (5) *elaboration*, (6) *self-concept*, (7) melakukan eksperimen dan menguji ide/gagasan, (8) belajar dari kesalahan, (9) toleransi terhadap keambiguan, (10) *resourcefulness*, (11) peka terhadap permasalahan, (12) *synergi*, (13) imajinasi, (14) *synetic*. Di samping itu, peserta didik kreatif jika melakukan aktivitas berikut: (1) mengenali secara dalam pengetahuan dasar dan mempelajari sesuatu yang baru, (2) membuka gagasan baru, (3) dan mencari sumber materi untuk mengembangkan gagasan-gagasan (Brookhart, 2010:128). Dalam penggunaan 14 elemen berpikir kreatif dan 3 sifat peserta didik kreatif, pendidik diharapkan menentukan dan menyesuaikan dengan tingkat satuan pendidikan.

Berpikir kreatif merupakan sebuah proses berpikir yang menghasilkan bermacam-macam kemungkinan jawaban ketika merespon permasalahan yang diberikan. Mata pelajaran fisika mempunyai tujuan agar siswa memiliki ketrampilan berpikir dengan menggunakan konsep dan prinsip fisika untuk menjelaskan berbagai peristiwa alam. Artinya berpikir kreatif telah memiliki dasar-dasar konsep yang mendalam terhadap apa yang telah dipelajari dalam hal ini materi fisika, sehingga kemampuan berpikir kreatif diperlukan dalam mata pelajaran fisika. Berpikir kreatif memiliki beberapa aspek, diantaranya adalah kelancaran (*fluency*), keluwesan (*flexibility*), penguraian/ memperinci (*elaboration*), dan keaslian (*originality*). Sistem pendidikan saat ini bertujuan agar informasi yang diterima peserta didik tidak didapatkan secara langsung. Peserta didik harus berpikir dengan cara multidimensi, menghindari melihat sesuatu hanya dari satu perspektif saja dan membuat hal yang baru (Aldig & Arseven, 2017). Selain itu guru juga harus lebih memahami siswa mereka dan merancang program individu yang sesuai untuk minat dan pengembangan karakteristik peserta didik (Ye-

nilmez, 2007). Proses kreatif adalah proses kognitif yang mengarah ke produk kreatif (Smith & Smith, 2010; Stojanova, 2010).

Usulan ciri dasar atau 14 elemen kreativitas oleh Mitchell pada dasarnya sudah lengkap karena melengkapi indikator dari ciri-ciri kreativitas yang banyak dianut. Oleh karena itu dalam penelitian ini yang dimaksud berpikir kreatif dicirikan oleh 4 aspek/komponen, yaitu *fluency*, *flexibility*, *originality* dan *elaboration*. Mengacu pada penelitian Liliawati (2011: 94), yaitu aspek/komponen berpikir kreatif disesuaikan dengan prinsip pembelajaran fisika.

Tes pilihan ganda lebih banyak digunakan dari pada bentuk tes yang lain. Berdasarkan hasil survei pendahuluan dengan cara melakukan wawancara dengan guru-guru Fisika SMA di Kabupaten Gunung Kidul Daerah Istimewa Yogyakarta (DIY), sebagian besar di sekolah, baik pada tes tengah semester maupun tes akhir semester umumnya menggunakan tes pilihan ganda biasa dengan penskoran dikotomus. Namun kenyataannya tes pilihan ganda yang digunakan di SMA untuk tes hasil belajar mata pelajaran Fisika belum mengukur kemampuan berpikir kreatif peserta didik.

Prosedur penilaian yang biasa digunakan dalam tes berupa penskoran yang dilakukan setiap langkah dan skor setiap butir yang diperoleh peserta didik. Skor akhir diperoleh dengan cara menjumlahkan skor masing-masing. Model penskoran ini dianggap belum tepat karena tingkat kesulitan setiap langkah tidak diperhitungkan. Pendekatan alternatif yang dapat digunakan adalah pendekatan teori respon butir untuk penskoran politomi. Model matematis dari teori respon butir adalah bahwa kemampuan peserta didik menentukan probabilitas subjek menjawab butir dengan benar, artinya peserta didik dengan kemampuan tinggi akan memiliki peluang menjawab benar lebih tinggi (Retnawati, 2014:1).

Model yang biasa digunakan dalam analisis butir politomi salah satunya adalah *partial credit model (PCM)* (Widhiarso, 2010:6). Baker, Rounds dan Zeron (2000) melaporkan bahwa analisis respons secara politomus dapat meningkatkan akurasi pengukuran, karena itu kecenderungan pengembangan penskoran sebaiknya diarahkan pada sistem penskoran politomus, dengan menggunakan banyak kategori. Di antara sejumlah model penskoran politomus, penskoran *partial credit model* memiliki karakteristik pen-

skoran yang sesuai dengan permasalahan bidang fisika. PCM tidak mensyaratkan langkah pada penyelesaian tes harus berurutan dan tidak harus memiliki kesulitan yang sama (De Ayala, 1993). Berkaitan dengan PCM yang dikembangkan untuk menganalisis butir tes, Istiyono, Mardapi., & Suparno (2014:7) mengungkapkan bahwa dalam menganalisis butir tes menggunakan PCM perlu beberapa langkah penyelesaian. Butir yang mengikuti pola kredit parsial dapat mengukur kemampuan individu yang berbeda-beda. Misalnya, kemampuan individu lebih tinggi diharapkan memiliki skor yang lebih tinggi dari pada individu yang memiliki kemampuan lebih rendah. Penerapan PCM pada pilihan ganda termodifikasi sebagai model alternatif dalam asesmen pembelajaran fisika yang efektif dan adil.

Berdasarkan uraian tersebut, untuk mengukur kemampuan berpikir kreatif Fisika digunakan tes berbentuk pilihan ganda beralasan yang dinamakan *Creative Thinking Skills Test*. Untuk itu perlu disusun instrumen penilaian kemampuan berpikir kreatif yang terdiri atas tes dan pedoman penilaian serta karakteristik *Creative Thinking Skills Test*.

METODE

Model pengembangan yang digunakan adalah 4-D Thiagarajan & Semmel (1974), yang meliputi empat tahap yaitu *Define, Design, Development* dan *Dissemination*.

Tahap *define* meliputi (1) penentuan tujuan tes, (2) penentuan Kompetensi yang akan diujikan, (3) penentuan Materi. Tahap *Design* meliputi (1) penyusunan kisi-kisi tes, (2) penulisan item. Tahap *Development* meliputi (1) validasi butir tes, (2) perbaikan item dan perakitan tes. Tahap *Dissemination* meliputi (1) penentuan subjek uji coba (SMA), (2) pelaksanaan uji coba. Penelitian ini menggunakan subjek uji coba empat (4) SMA di kabupaten Gunung Kidul, yaitu SMAN 1 Patuk, SMAN 2 Playen, SMAN 1 Karangmojo dan SMAN 1 Wonosari. Jumlah subjek uji coba yang digunakan 300 peserta didik.

Instrumen tes *Creative Thinking Skills* divalidasi oleh 2 ahli fisika dan 2 ahli pendidikan fisika. Langkah validasi item soal dengan meminta penilaian dari para ahli merupakan validasi konten. Indeks kuantitatif yang diterima secara umum untuk validasi konten suatu instrumen, yaitu dengan menggunakan analisis V Aiken.

Keseluruhan butir tes valid jika nilai indeks V Aiken berada pada rentang 0,37 sampai 1 (Kowsalya, 2012:702).

$$V = \frac{s}{n(c-1)} \quad (1)$$

Keterangan :

V = indeks V Aiken

I_o = angka penilaian terendah

r = angka yang diberikan oleh ahli

c = angka penilaian tertinggi

s = $r - I_o$

Nilai Reliabilitas keseluruhan instrumen sesuai dengan interpretasi nilai reliabilitas dengan model Rasch.

Analisis data penelitian ini menggunakan *Partial Credit Model 1 PL* (PCM 1PL) untuk pengujian *fit item* tes kemampuan berpikir kreatif untuk mata pelajaran Fisika SMA. Dimana PCM sebagai pengembangan Rasch Model yang merupakan model 1-PL dan dapat diterapkan dalam instrumen tes dengan data politomus. Analisis item dengan menggunakan 1-PL artinya menggunakan teori respon butir untuk analisis item soal hanya mempertimbangkan tingkat kesukaran soal, berbeda dengan 2-PL yang mempertimbangkan tingkat kesukaran soal dan daya beda. Analisis data dilakukan pada beberapa aspek antara lain kecocokan item (*goodness of fit*), reliabilitas, tingkat kesukaran item, dan fungsi informasi dan *SEM* (*Standard Error Measurement*).

Tabel 1 menjelaskan sebaran item tes *Creative Thinking Skills* yang terdiri atas 2 set, yaitu set 1 merupakan Paket A dan set 2 merupakan Paket B yang masing-masing terdiri dari 35 *item*. Setiap tes meliputi materi elastisitas dan hukum hooke, fluida statis, suhu & kalor dan alat optik. Kedua perangkat tes tersebut memiliki 7 *item* sebagai *anchor items*.

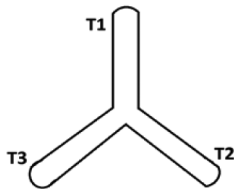
HASIL DAN PEMBAHASAN

Hasil

Hasil pengembangan ini berupa dua set PhysCreTHOTS yang dilengkapi dengan pedoman penskoran dan panduan penggunaan. Berikut contoh item PhysCreTHOTS no 33 untuk aspek elaborasi dan subaspek mencari arti lebih mendalam terhadap suatu permasalahan.

Tabel 1. Sebaran item tes *Creative Thinking Skills* kelas X

Aspek	Sub Aspek	Indikator <i>Creative Thinking Skills</i>	Materi				Jumlah
			Elastisitas dan Hukum Hooke	Fluida Statis	Suhu & Kalor	Alat Optik	
Fluency	Merumuskan Jawaban	Menjawab Sejumlah pertanyaan dengan sejumlah fakta.	1A,10B	2A,8B	3A,9B	29A,6B*	7
	Mengungkapkan gagasan	Lancar membuat gagasan / hipotesis	4A,11B	5A,12B	6A,13B	7A,14B	8
	Mengkritisasi suatu obyek	Melihat kesalahan dari suatu obyek	8A,15B	9A,16B	10A,17B	11A,18B	8
Flexybility	Melakukan penafsiran.	Memberikan sudut pandang.	12A,19B	13A,21B	14A,20B	30A,7B*	7
	Mencari alternatif jawaban	Memikirkan cara pemecahan masalah.		15A,22B	16A,23B		4
	Mengkategorikan	Menggolongkan hal-hal menurut pembagian atau kategori yang berbeda	17A,25B	18A,26B	19A,24B	20A,27B	8
Originality	Merencanakan hal baru.	Menyelesaikan permasalahan baru.		31A,1B*	21A,28B		3
Elaboration	Memecahkan Masalah dengan prosedur terperinci	Mencari arti lebih mendalam tentang suatu permasalahan	22A,29B		33A,3B*	32A,2B*	4
	Mengembangkan gagasan.	Memperkaya gagasan orang lain	23A,32B	34A,4B*	24A,30B	25A,31B	7
	Menguji	Mencoba membuat sesuatu hal yang baru	35A,5B*	36A,35B	27A,33B	29A,34B	7
TOTAL			15	16	19	13	63



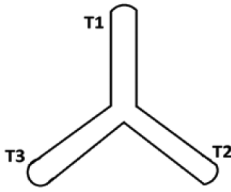
Tiga buah batang logam yang berbeda jenis di las sehingga seperti pada gambar diatas. Ketiga batang tersebut memiliki panjang dan luas penampang yang sama. Jika konduktivitas masing-masing batang adalah dengan $T_1=90^\circ\text{C}$, $T_2=30^\circ\text{C}$, dan $T_3=0^\circ\text{C}$. Bagaimanakah nilai suhu sambungan ketiga batang tersebut dan laju kalor paling besar pada masing-masing batang...

- Suhu campuran 60°C dengan laju kalor paling besar pada batang pertama.
- Suhu campuran 30°C dengan laju kalor paling besar pada batang pertama.
- Suhu campuran 60°C dengan laju kalor paling besar pada batang kedua.

- Suhu campuran 30°C dengan laju kalor paling besar pada batang kedua.
- Suhu campuran 30°C dengan laju kalor paling besar pada batang ketiga.

Alasan

- Logam berbeda jenis jika dipanaskan maka konduktivitas dan suhu pada masing-masing logam akan berbanding terbalik dengan laju kalornya.
- Ketiga logam diatas memiliki laju kalor yang sama meskipun suhunya berbeda-beda.
- Laju kalor batang kedua akan sama dengan jumlah laju kalor batang pertama dan ketiga.
- Jumlah laju kalor kedua dan ketiga sama dengan laju kalor batang pertama, sehingga diperoleh suhu campuran ketiga batang.
- Massa logam mempengaruhi jumlah laju kalor pada ketiga logam tersebut.

No	Penyelesaian	Skor
33	 <p>Tiga buah batang logam yang berbeda jenis di las sehingga seperti pada gambar diatas. Ketiga batang tersebut memiliki panjang dan luas penampang yang sama. Jika konduktivitas masing-masing batang adalah $k_1 < 2k_3 < 3k_2$ dengan $T_1 = 90^\circ\text{C}$, $T_2 = 30^\circ\text{C}$, dan $T_3 = 0^\circ\text{C}$. Maka nilai suhu sambungan ketiga batang tersebut dan laju kalor paling besar pada masing-masing batang yaitu suhu campuran 30°C dengan laju kalor paling besar pada batang pertama.</p> <p>Alasan Jumlah laju kalor kedua dan ketiga sama dengan laju kalor batang pertama, sehingga diperoleh suhu campuran ketiga batang. Jawaban : B Alasan : D</p>	4
	Jawaban : A,C,D,E Alasan : D	3
	Jawaban : B Alasan : A,B,C,E	2
	Jawaban : A,C,D,E Alasan : A,B,C,E	1

Tabel 2. Hasil Estimasi Item dan Estimasi Testi dalam Uji Coba Soal *Creative Thinking Skills*

No.	Keterangan	Estimasi untuk Item	Estimasi untuk Testi
1.	Nilai rata-rata dan simpangan baku	0,00±0,53	-0,23±0,34
2.	Estimasi Reliabilitas	0,72	0,70
3.	Nilai rata-rata dan simpangan baku INFIT MNSQ	1,00±0,05	1,00±0,19
4.	Nilai rata-rata dan simpangan baku OUTFIT MNSQ	1,01±0,25	1,02±0,31
5.	Nilai rata-rata dan simpangan baku INFIT t	0,01±0,58	-0,01±0,99
6.	Nilai rata-rata dan simpangan baku OUTFIT t	0,11±1,10	0,03±0,76

Data penelitian dianalisis dengan menggunakan PCM 1 PL, dimana hasil analisis dapat menguji *fit item* tes kemampuan berpikir kreatif siswa SMA pada mata pelajaran fisika. Adapun karakteristik PhysCreTHOTS dinyatakan dengan estimasi beberapa nilai parameter, validitas atau kecocokan item tes (*goodness of fit*), tingkat kesulitan butir, reliabilitas, kurva karakteristik butir (ICC), fungsi informasi dan SEM. Kriteria penskoran tes disusun dengan empat kategori. Kategori 1 jika siswa menjawab soal dan alasan salah. Kategori 2 jika benar menjawab soal namun alasan salah. Kategori 3 jika siswa salah menjawab soal dan alasan benar. Kategori 4 jika soal maupun alasan dijawab dengan benar. Menurut Bond & Fox (2007: 221) penambahan jumlah kategori dalam penskoran akan meningkatkan

reliabilitas pengukuran, bila penambahan tersebut tidak dilakukan secara sembarangan.

Estimasi nilai parameter

Sebelum dilakukan analisis estimasi kemampuan responden dan estimasi tingkat kesukaran butir, terlebih dahulu dilakukan analisis fit butir menggunakan parameter INFIT dan OUTFIT untuk mean square (kuadrat rata-rata) dan t .

Penetapan *fit* item secara keseluruhan dengan model (Adam & kho, 1996) yang didasarkan pada nilai rata-rata INFIT *Mean of Square* (INFIT MNSQ) beserta simpangan baku atau INFIT t . Penetapan *fit* tiap *case* juga dengan model didasarkan pada besarnya INFIT MNSQ atau nilai INFIT t item tersebut.

Kecocokan Item Instrumen (*Goodness of fit*)

Pengujian *fit* tes keseluruhan butir soal yang dikembangkan berdasarkan nilai rerata INFIT *Mean of Square (Mean INFIT MNSQ)* beserta simpangan bakunya atau mengamati nilai rata-rata INFIT *t (Mean INFIT t)* beserta simpangan bakunya, Jika rerata INFIT MNSQ sekitar 1,00 dan simpangan bakunya 0,00 atau rerata INFIT *t* mendekati 0,00 dan simpangan bakunya 1,00, maka keseluruhan tes *fit* dengan model PCM 1 PL.

Tingkat Kesukaran Butir

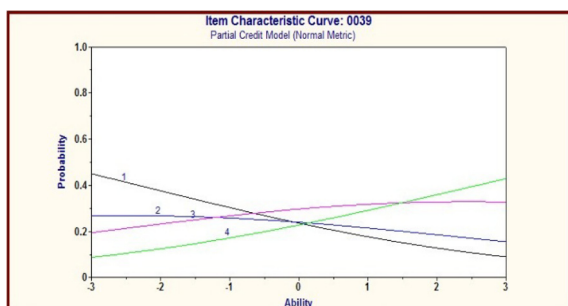
Berdasarkan hasil perhitungan besarnya tingkat kesukaran 63 item soal *Creative Thinking Skills* pada dua paket soal yang dikembangkan baik yaitu berada diantara rentang -1,06 sampai 1,04.

Reliabilitas Item

Nilai reliabilitas item diketahui berdasarkan nilai *summary of item estimate* menunjukkan angka 0,72, sedangkan reliabilitas orang berdasarkan *summary of case estimate* sebesar 0,70.

Item Characteristic Curve

Penaksiran PCM disajikan dalam grafik *Categorical Response Function (CRF)* untuk butir soal. Grafik ICC menunjukkan probabilitas jawaban pada setiap kemampuan peserta didik. Gambar 1 menunjukkan bahwa semakin besar nilai *ability* peserta didik, maka akan semakin besar kemungkinan peserta didik menjawab kategori 4. Peserta didik berkemampuan rata-rata akan menjawab kategori 2 dan 3. Peserta didik berkemampuan rendah akan menjawab dengan kategori rendah, yaitu kategori 1. Gambar 1 merupakan penaksiran PCM untuk butir soal ke-6.



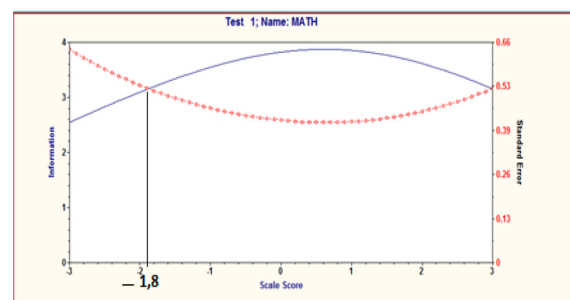
Gambar 1. Kurva ICC Butir 6(6A)

Karakteristik *item* ditunjukkan dengan kurva karakteristik *item* (ICC) Berdasarkan analisis diperoleh kurva karakteristik *item* (ICC) sebanyak

63 buah. Pada Gambar 1 disajikan contoh ICC untuk *item* 6A. Suatu item atau testi dinyatakan *fit* dengan model menggunakan program QUEST jika batas kisaran INFIT MNSQ dari 0,77 sampai 1,33 (Adam & Khoo, 1996: 30 & 90).

Fungsi Informasi dan SEM

Fungsi informasi butir menyatakan kekuatan atau sumbangan butir tes dalam mengukur kemampuan latent (terpendam) yang diukur dengan tes tersebut (Retnawati, 2015:18). Hasil analisis diperoleh fungsi informasi dan *standard error measurement (SEM)*. Berdasarkan fungsi informasi dan *SEM* yang dinyatakan Gambar 2.



Gambar 2. Fungsi informasi dan SEM

Grafik fungsi informasi di atas menunjukkan bahwa rentang kemampuan tingkat terendah hingga tertinggi (-3 sampai 3) ditunjukkan oleh sumbu mendatar, nilai fungsi informasi yang diberikan menghasilkan nilai informasi sebesar 3 dimana pada grafik dapat dilihat pada skala sebelah kiri dengan mengacu pada garis perpotongan grafik fungsi informasi dan SEM. Untuk nilai SEM didapatkan hasil sebesar 0,53 yang dilihat pada skala sebelah kanan dengan mengacu pada garis perpotongan grafik fungsi informasi dan SEM, serta dapat dilihat bahwa rentang kemampuan siswa antara -1,8 sampai 3.

Pembahasan

Berdasarkan respon dan penilaian dua ahli penilaian pendidikan fisika dan dua ahli fisika maka didapatkan nilai indeks V Aiken dari 63 item soal yang dikembangkan berada pada rentang 0,71 sampai 0,76. Indeks V Aiken perbutir soal keseluruhan berada diantara 0,37-1,00 sehingga keseluruhan butir soal yang dikembangkan dinyatakan valid oleh ahli fisika dan ahli pendidikan fisika. Hal ini sesuai dengan langkah interpretasi yang dilakukan (Kowsalya, 2012:702).

Reliabilitas instrumen hasil penelitian sebesar 0,71. Nilai reliabilitas keseluruhan instru-

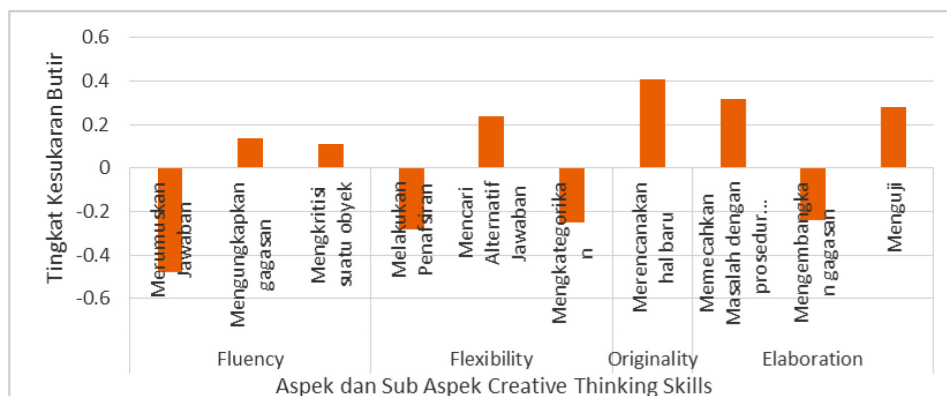
men dapat dilihat pada tabel 2. Dengan demikian interpretasi reliabilitas sebesar 0,71 dikatakan cukup, hal ini sesuai dengan model Rasch, yaitu nilai reliabilitas pada rentang 0,67 sampai 0,80 dikatakan cukup reliabel. Jadi instrumen ini sudah dapat digunakan untuk penelitian yang mengukur kemampuan berpikir kreatif siswa pada mata pelajaran fisika.

Hasil penelitian ini diperoleh *goodness of fit* keseluruhan butir soal yang dikembangkan berdasarkan nilai rerata INFIT *Mean of Square (Mean INFIT MNSQ)* beserta simpangan bakunya atau mengamati nilai rata-rata INFIT *t (Mean INFIT t)* beserta simpangan bakunya. Jika rerata INFIT MNSQ sekitar 1,00 dan simpangan bakunya 0,00 atau rerata INFIT *t* mendekati 0,00 dan simpangan bakunya 1,00, keseluruhan tes *fit* dengan model PCM 1 PL. Batas penerimaan item menggunakan *infit MNSQ* antara nilai 0,77 sampai dengan 1,30. Hasil penelitian menunjukkan nilai *goodness of fit* keseluruhan butir soal berada pada rentang 0,93

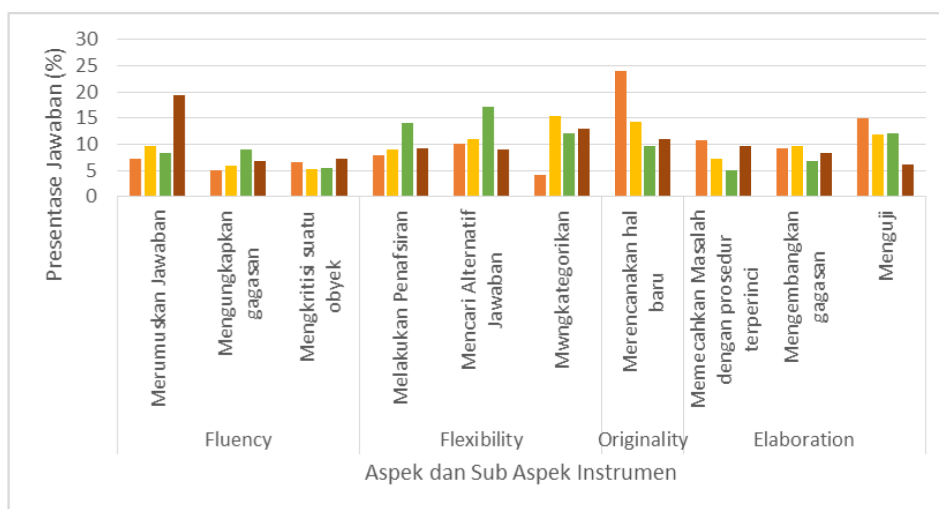
sampai-1,10 Keseluruhan item *fit* karena berada diantara dalam dua garis batas *goodness of fit*. Data atau respons dikatakan fit dengan model PCM, bila harga infit dan outfit mean square (MNSQ)-nya mendekati 1 dan harga infit dan outfit *t*-nya mendekati 0 (Adams & Khoo, 1996:30).

Hasil ini menyimpulkan jika butir soal yang dikembangkan *fit* dengan model *Partial Credit Model (PCM)* hal ini sesuai teori yang dikembangkan Adam & Khoo (1996: 30) dan valid berdasarkan uji empiris dengan Sebaran *Goodness of Fit* berdasarkan *INFIT MNSQ* 63 Butir Soal *Creative Thinking Skills* berada diantara rentang 0,77 sampai 1,30 Kriteria item dinyatakan valid (*fit*) dengan melihat kriteria (Sumintono & Widhiarso, 2009:115).

Tingkat kesukaran per butir atau nilai *difficulty* merupakan tingkat kesukaran perkategori jawaban peserta didik. Item dikatakan baik jika indeks kesukaran lebih dari -2,0 atau kurang dari 2,0 yang dapat dinyatakan dengan $(-2,0 < b <$



Gambar 3. Tingkat Kesukaran Item Per Aspek dan Sub Aspek



Gambar 4. Sebaran Frekuensi Jawaban Peserta Tes Perkategori pada Aspek dan Sub aspek Instrumen

2,0). Berdasarkan hasil perhitungan besarnya tingkat kesukaran 63 item soal *Creative Thinking Skills* pada dua paket soal yang dikembangkan baik yaitu berada diantara rentang -1,06 sampai 1,04, hal ini sesuai dengan teori (Hambleton & Swaminathan, 1985:107) tingkat kesukaran yang baik jika nilai tingkat kesukaran item antara -2,0 dan +2,0.

Menurut Tognolini & Davidson (2003), *threshold* kategori yang lebih tinggi dalam penskoran PCM tidak selalu lebih besar dari *threshold* kategori sebelumnya. Urutan tingkat kesukaran soal dari yang tersukar adalah aspek *Originality* dengan sub aspek merencanakan hal baru aspek *Elaboration* dengan sub aspek memecahkan masalah dengan prosedur terperinci dan men- guji dan *Flexibility* dengan sub aspek melakukan penafsiran. Tingkat kesukaran item berdasarkan tabel kemudian digambarkan dalam diagram *chart* pada Gambar 3.

Berdasarkan Gambar 3. Diketahui jika tingkat kesukaran soal paling rendah pada aspek *Fluency* dengan subaspek merumuskan jawaban dan tingkat kesukaran soal paling tinggi adalah pada aspek *Originality* dengan subaspek merencanakan hal baru. Hal ini menandakan jika kemampuan *Creative Thinking Skills* peserta didik paling tinggi pada kemampuan merumuskan jawaban dan paling rendah pada kemampuan merencanakan hal baru.

Hasil Uji Coba Tes juga menyajikan sebaran frekuensi peserta tes menjawab perkategori item dalam tiap aspek dan subaspek *Creative Thinking Skills*. Frekuensi jawaban peserta tes per kategori pada aspek dan sub aspek *Creative Thinking Skills* ditampilkan pada Gambar 4.

Aspek yang memiliki persentase tinggi pada kategori 1 artinya aspek tersebut dinyatakan sukar, yaitu aspek *Originality* dengan sub aspek merencanakan hal baru, dengan persentasi peserta tes menjawab kategori 1 sebesar 24,1%. Aspek yang memiliki persentase paling tinggi pada kategori 4 artinya aspek tersebut dinyatakan mudah, aspek tersebut adalah aspek *Fluency* dengan sub aspek merumuskan jawaban, dengan presentasi 19,4% peserta tes menjawab kategori 4.

Karakteristik item ditunjukkan dengan kurva karakteristik item (*ICC*) 63 butir soal *Creative Thinking Skills*. Kurva tersebut menjelaskan kemampuan peserta tes yang mampu mengerjakan soal pada masing-masing kategori. Pada Gambar ditampilkan contoh *ICC* untuk butir nomor 6 (6A),

berdasarkan gambar dapat diketahui jika: (a) skor 1 (kategori 1) mampu dikerjakan oleh sebagian besar peserta didik dengan kemampuan rendah ($\theta = -3$), (b) skor 2 (kategori 2) mampu dikerjakan oleh peserta didik dengan kemampuan rendah ($\theta = -2$), (c) skor 3 (kategori 3) mampu dikerjakan oleh peserta didik dengan kemampuan tinggi ($\theta = 1,5$) dan (d) skor 4 (kategori 4) soal mampu dikerjakan oleh peserta didik dengan kemampuan tinggi ($\theta = 3$).

Fungsi informasi dan *SEM* memiliki hubungan berbanding terbalik, yaitu berdasarkan hasil penelitian pada Gambar 33. Hal ini sesuai dengan teori (Hambleton, Swaminathan, & Rogers, 1991: 94) yang menyatakan jika hubungan *SEM* dan fungsi informasi benar berbanding terbalik, semakin tinggi *SEM* maka akan semakin rendah fungsi informasi yang diperleh, begitupun sebaliknya. Dari hubungan ini maka akan diketahui kemampuan peserta didik yang sesuai dengan instrumen yang dikembangkan. Berdasarkan Gambar 2 diketahui bahwa soal tes dikerjakan oleh peserta didik dengan kemampuan ($\theta = -1,8$ sampai $\theta = +3$), sehingga tes ini cocok dikerjakan oleh peserta didik dengan kemampuan sedang dan tinggi. Semakin besar fungsi informasi, semakin akurat estimasi yang dihasilkan (Hambleton *et al*, 1991; Lin, 2008).

PENUTUP

Berdasarkan uraian di atas dapat disimpulkan bahwa PhysCreTHOTS layak digunakan untuk mengukur kemampuan berpikir kreatif menurut teori tes modern. Hal ini didasarkan pada: (1) dua paket instrumen PhysCreTHOTS berbentuk pilihan ganda beralasan yang berisi 63 butir soal fit (*valid*). (2) instrumen PhysCreTHOTS telah memenuhi validitas isi dan empiris validitas konstruk *fit* pada *Partial Credit Model (PCM)* berdasarkan data politomus empat ketegori. (3) seluruh *item Creative Thinking Skills* dalam kriteria baik karena tingkat kesulitannya berada pada rentang antara -2,00 sampai dengan 2,00. (4) reliabilitas tes PhysCreTHOTS telah memenuhi syarat, yaitu termasuk kriteria cukup (koefisien reliabilitas sebesar 0,72). (5) berdasarkan fungsi informasi, tepat digunakan untuk mengukur kemampuan berpikir kreatif fisika peserta didik yang berkemampuan dari -1,8 sampai 3, dengan kata lain instrumen PhysCreTHOTS dapat mengukur kemampuan berpikir kreatif siswa dari kemampuan sedang hingga tinggi.

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FAIRY STORY INTEGRATION FOR MEANINGFUL CLASSROOM

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Abstract: The National Indonesian Ministry of Education expresses the importance of educating friendliness by stating it in a Master Plan of National Character Development for 2010-2015. However the success of character education needs a meaningful classroom situation. Unfortunately, teaching materials to create meaningful classroom situation that enhances friendliness character is still rare. Sainsmatika fairy tale books are science and mathematics teaching material which was developed with the wisdom of fairy tale, which is attractive to integrate friendliness value. The study aimed to investigate the effectiveness of sainsmatika fairy tale books as a means of integrating friendliness into teaching materials for fourth-grade students in Indonesia. A pretest-posttest control-group experimental design was used in this study to investigate the product effectiveness. This study involved 80 fourth-grade students at one of the districts in Indonesia. The experimental group was taught using sainsmatika fairy tale books containing one of the character values in character education, i.e., friendliness. The quantitative data were collected through observation on student activity. The data were then analyzed using statistical methods to calculate the values and determine the frequency as well as the mean of pretest and posttest scores in both control and experimental groups. Through one way ANOVA statistical analysis, it was found that the use of sainsmatika fairy tale books is significantly effective to enhance the student friendliness.

Kata Kunci: *fairy stories, sainsmatika, friendliness character*

INTEGRASI CERITA DONGENG UNTUK PEMBELAJARAN BERMAKNA

Abstrak: Kementerian Pendidikan Nasional Indonesia mengekspresikan pentingnya mengajarkan karakter bersahabat dengan memasukkannya ke dalam Master Plan Pengembangan Karakter Nasional 2010-2015. Keberhasilan pendidikan karakter membutuhkan situasi pembelajaran yang bermakna. Bahan ajar untuk menciptakan situasi pembelajaran bermakna yang dapat meningkatkan karakter bersahabat masih kurang. Buku dongeng sainsmatika adalah bahan ajar sains dan matematika yang dikembangkan dengan pendekatan kearifan dongeng yang menarik untuk diintegrasikan dengan nilai karakter bersahabat. Penelitian ini bertujuan untuk mengetahui keefektifan buku dongeng sainsmatika sebagai bahan ajar terhadap karakter bersahabat siswa. Penelitian menggunakan pendekatan *experimental pretest-posttest control-group design*. Sebanyak 80 siswa kelas 4 sekolah dasar di salah satu provinsi di Indonesia dilibatkan dalam penelitian ini. Setiap kelas eksperimen belajar menggunakan buku dongeng sainsmatika. Data dikumpulkan dengan menggunakan teknik observasi dan dianalisis dengan teknik statistik anova untuk menghitung frekuensi dan rata-rata hitung pretes dan postes baik kelas eksperimen maupun kelas kontrol. Hasil penelitian menunjukkan bahwa penggunaan buku dongeng sainsmatika mampu meningkatkan karakter bersahabat siswa secara signifikan.

Keywords: *dongeng, sainsmatika, karakter bersahabat*

INTRODUCTION

Every child is a part of society. In the next decade, children will grow up and become change makers of the world. As a part of society, children need to be a friendly individual who has friendliness values such as showing genuine respect, caring for others, and communicating

well. Friendliness is an essential skill which is important for students in all levels of education. Children who have friends are more confident and accomplish better performance than those without friends. Unfortunately, most children have difficulty making friendships with others. When children have difficulty in making friendships, it

encourage negative self-concept, feeling lonely and rejected by others. The three-year study in Florida show which involved 130 girls and 101 boys in the third and fifth grades, found that children who reject in circle is children with poorer social skills or perceived as overly aggressive. Social deficit also causes difficulties in children development (Bennett, et.al., 2009). In other hand, child's pals can protect children from sadness, anxiety and even depression (Borba.2015).

Indonesia Government expressed the importance of educating friendliness, by stating a Master Plan of National Character Development for 2010-2015. This masterplan aim to develop *Indonesia Golden Generation* who aware to human value and social responsibility, belonging to friendliness. As consequences, character education should implemented in all grade of Indonesian School. However, there is no way that a child can possess these value in an instant. To have well-developed social responsible, a child is indeed required to get actively involved in the real situations of social interaction. Going along with the above-mentioned notions, Piaget (1932), Kohlberg (1969) and domain theories affirm that the development in the moral domain is encouraged through direct interaction and children's real experiences in social relations, as well as the consequences of every action when they build relationships with others (Nucci, 2014). Therefore, teacher need to integrating character education with learning process.

Almost Indonesian school has implementing character education in integrated way with learning process in classroom, but not all character value can instructed clearly. Friendliness is a character value described as in the positive attitude toward others, eagerness to communicate, and ability to adapt easily to new environments. These interpersonal features are parts of basic social skills. However, friendliness has yet to be the concern of schools, particularly in elementary schools in some regency of Indonesia.

Friendliness Indicators

"Friendliness is the best cure for loneliness" (Chandler, 2012). Being friendliness is effort to make another people feel welcomed. Friendliness defined by Fathurrohman, et al (2013) as the behavioral virtue of being kindly

communicative and eager to make friends and cooperate with other people. The fact of children with ability to build friendliness have a skill to take pleasure in all activity, make relationship, and play with another children easily (Grose, 2008). Friendliness expresses in actions that demonstrate a sense of love to talk, hangout, and working with others (Indonesia Ministry of Education, 2010). When children enjoy conversing, this indicates that they feel comfortable with their environment and possess positive self-confidence. Within the scope of learning environment, this attitude is reflected in the bright enthusiasm of the young learners to express their opinions, deliver their ideas, accept criticism and answer questions without fear. When they enjoy making friends and cooperating with other people, this means that they have the conception about friendliness.

One with a friendly personality is perceived to be an individual with great flexibility in establishing communications not only with his contemporaries, but also with other people of different ages. Another trait shown by a friendly individual is his capability of solving problems in teamwork. He does not close himself off, feels comfortable when interacting with other people, expresses his opinions clearly, respects other people's opinions, and accepts criticism with an open heart.

Theoretically, friendliness is similar to the concepts of 'social and emotional skills' proposed by Davidson, et al (2014) in '*Eight Character Strengths*'. One with well-developed social and emotional skills is viewed as a human being who has healthy confidence and a positive attitude, has good manners, shows empathy and cares about others, and possesses the abilities to communicate effectively, work together with others and cultivate his emotions. Suyadi (2013) explain friendliness as open-minded attitude to another people through polite communication therefore created good cooperation. The indicator of friendliness have proposed 7 (seven) act such as, "initiate communication", "support other", "glad to share", "open to discuss", "appreciate", "respect", and "cooperate" (Sulhan, 2011).

As mentioned above, friendliness is generally demonstrated through a cooperative and respectful attitude as well as positive thoughts toward others. According to theory which explained, the indicator of friendliness

are sociable, glad to share, respect to other, reciprocity, and open-minded.

Friendliness Traits

Friendship require responsible act, like give and take. Australian Primary Schools Mental Health Initiative (2013) propose that children in 4 (fourth) grades comprehend the concept of friend as someone who trusts you and is trustworthy. At this age, children can express some friendship skills such as sharing with confidences, making negotiation, and respecting one another. When children success at making friendship, they have more opportunity to learn and practice many social skills (Joseph, et.al., 2010). Trial and error process for making friendship are several discrete behaviors that children do during playing activity that seem related to having friends (Tremblay, et.al, 1981; Joseph, et.al., 2010). Friendly act is typically expressed in mild act such as giving a greeting, waving to other, shaking hands, or doing a small favor (Hall & Domhoff, 1967).

A friendly interaction is defined as some following types of behavior such as (1) feeling friendly without outward expression; (2) friendly in action; (3) giving or loaning something; and (4) helpful act (Hall & Domhoff, 1967). This friendly interaction has similar defining with friendship skills which following some types of behavior such as (1) give suggestions; (2) share something (material/ non material); (3) reciprocity; (4) gives compliments; (5) understand how and when to give an apology; and (6) begins to emphasize (Joseph, et.al., 2010). Fathurrohman, et al (2013, p.111) explains that the traits of student with friendliness are: 1) the students are willing to take part in teamwork in the classroom; 2) the students want to converse with their classmates; 3) the students enjoy spending time with their classmates during recess; 4) the students enjoy interacting with other friends at school; and 5) the students confidently talk to the teachers, principal, and other school staffs.

Developing Sainsmatika Fairytale Books to Enhance Friendliness

Only through personal experiences, child can learn how to interact with other people and find the value his social life. From the perspectives of cognitive-social development theories, social interaction is very important

for children because it will help develop their conceptions of social and moral rules (Smetana, 2006; Turiel, 1998). Character education should be reinforced everywhere: on the playing fields, in classroom corridors, interaction between teacher and students and even learning procces. Both science (read. sains in bahasa) and mathematics are subject which using book as teaching material. Teaching material is a systematically arranged component that presents some of the competencies that will be learned by students (Dick & Carey, 1996: 120). Based on this opinion, the teaching materials are arranged to facilitate students learning easily. In Indonesian School, science and mathematics book not only contain both subject information, but also character education content. Unfortunately, friendliness value is not fulfilled clearly.

The ideal book for lesson character education is not about show the value on words, but also bringing up the enterprise and students awareness about social in interesting way. Every textbook that offered to children should correspond to children's cognitive and linguistic abilities to less frustrations and lack of interest in studies (Gabitov & Ilyasova, 2016; Solnyshkina, et.al., 2017). According to it, book which easy to read and understood for children is more attractive.

Saxby (1991, p.10) states that "a good book will make the reader hear, feel, and see."According to it, a good book will make children as the reader able to hear, feel, and see another perspective. A fairy tale as a part of children's literature can be the place into which the values of character education are integrated. Furthermore, Lepin (2012, p.5) explains fairy tales do not only bring "the atmosphere of mystery, thrill and wonder which makes fairy tales so unques and valuable but they can bring the whole magic world to a young reader and learner. They can open the old wisdom and knowledge of humankind which we often forget about".

Interesting plots in a fairy tale will encourage children to learn universal values and explore those values in social life, including friendliness. In the other hand, folk stories and legends are always in top position that interest and populare for younger children up to about eleven (Tucker, 1972). Fictional stories have a deep reaching power to stimulate emotions,

force engagement and endless reading. This is one of the ways to think, basic in organizing information and ideas, understanding a culture and stimulating human consciousness (Livo, 2003).

Besides the criteria as have been mentioned above, the *sainsmatika* fairytale books was built on rationale that friendliness can integrated to science and mathematics learning process with fairytale as a media. Integrating friendliness value into science and mathematics teaching material with the wisdom of fairytale as a package is the concept of *sainsmatika* fairytale books. This book had some content to enhance friendliness value for example: “*Aku teman baik*” (I’m kindly friend) which stimulate student to act responsive and sociable.

MATERIAL & METHOD

In this study, the student groups’ examined to respond some open-ended problem which presented during 3 (three) week instructions. Students responses and activity were scored on 5-point scale. The final result for this study is investigating the use of *Sainsmatika Fairytale Book* as a tool to enhance student friendliness.

Participants

The population involved in this research consists of 80 fourth-grade students in Daerah

Istimewa Yogyakarta Province in Indonesia. These research subjects are 37 male students and 43 female students who live in a homogenous area, which is a highland area not far from the city center. The respondents were selected through a purposive sampling technique, where only fourth-grade students of elementary schools which are appointed to undertake pilot projects of the national curriculum of Indonesia were involved.

Problem Selection

Five indicator of friendliness character were selected and adapted for the stories’ activity content (Table 1). The indicator such as sociable, glad to share, respect to other, reciprocity, and open-minded are adapted to the fairy stories.

The activity content problem was developed based on area and perimeter and also sound energy substance. Students are requested to solve the problem with their classmates. They will be faces difficulty if don’t accustomed to independently share their idea.

Design and Procedure

During the 3 week study, experimental group engaged in instruction which using *SFB (Sainsmatika Fairytale Book)* as teaching tool. Student were randomly split into groups and learn to intermingle with everyone in classroom.

Table 1. *Sainsmatika* Activity Content X Fairy Stories.

Fairy Stories Content	Objectives	Friendliness Character
Atta found some random picture and requested to find the connection to be among mentioned picture.	Student randomly choose unusual mate to seat on the next her/him and help Atta to found the connection between some random picture	Try to working with random people (sociable)
The magical door in the gave only want to open if Atta could mention as much as thing which have area and perimeter	Mention as much as thing which have area and perimeter or usually looked for area and perimeter with your classmates.	Glad to share knowledge to another student
Guiliram (a dreadful monster) give a challenge for Atta to arrange his castle	Create a home plans in plot paper based on area and perimeter measurement and show it to your classmates.	Learning to respect other work
Peri Hutan had a challenge to measuring fort (multiple shape)	You need to see and properly score your classmates’ work	Reciprocity to find the possible problem solving with another student
Every night, Atta seeing at star, he imagine could explore the space and investigate the sound of space.	Discuss with your friend to find the possible way to measure area and perimeter of multiple shape. Share and response as much as logically question about sound energy in space with your classmates.	Share and accept another student responses

Student reading the opening page of SFB together. In the middle of the reading activity, teacher give opportunity to student reading aloud the SFB in front of classroom. After a pure atmosphere, then student offered opportunity to answer the challenge they found in SFB.

The control group engaged with the conventional method. Teacher explain and demonstrate the principal theory of sound energy and area perimeter. In elaboration, student discuss to solve a problem which given by teacher. At the end of instruction, student take a daily test to assess their comprehension.

Evaluation Instrument

Students' performance level assessing based on their behavior during the instruction. The data were collected through observation and questionnaires. The observation using checklist with 3 rate scoring (*never=0 point, rare=1 point, often=2 point, always=3 point*). Some observers were present during the process of learning to watch students' behaviors and assess their characters.

Data Analyze

The collected quantitative data were then analyzed using a descriptive and one way ANOVA statistics method with the error rate at 5%. It is to determine if the use of *sainsmatika* fairytale books significantly affects students' character of friendliness.

RESULTS& DISCUSSION

Results

Based on the collected data through observation, it is found that the character of friendliness of students who learned through *sainsmatika* fairytale books shows significant enhancement if compared to students who did not learn through *sainsmatika* fairytale books. In diagram 1, the descriptive analysis of observation results of students' behaviors during the process of learning is presented. This data show that friendliness enhancement of experimental class is higher than control class.

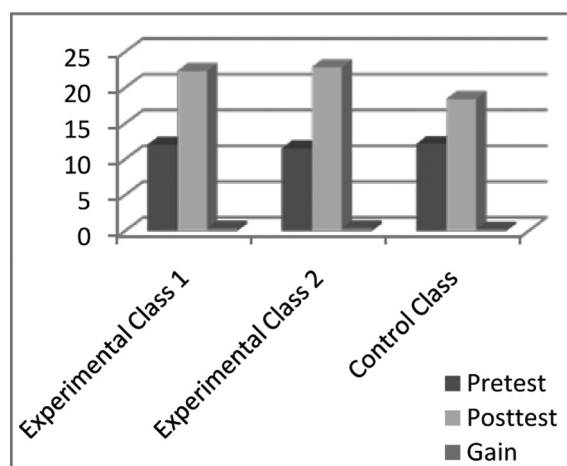


Diagram 1. The Comparison of Enhancement of Students' Character of Friendliness Based on The Observation Results

In diagram 1, it can be seen that there is significant difference shown by the experimental classes and the control class regarding the enhancement of students' character of friendliness. Based on the data collected from the observation during the process of learning, it is found that the gain scores which represent the enhancement of students' character of friendliness shown by the results of treatment in the experimental classes are close each other, which are 0,3 and 0,4. However, the gain score of the control group is only 0,2. This finding specifically shows that the gain scores of the experimental classes are higher than the gain score of the control group. Based on the results of observation, it can be said that the use of fairytale books enhance the students' character of friendliness at the medium level of effectiveness.

Table 1. The One-Way Analysis of Variance Based on The Results of Observation

	df	MS	F	Sig.
Between Groups	2	.232	7.725	.001
Within Groups	77	.030		
Total	79			

Ho: $\mu_1 = \mu_2 = \mu_3 = 0$

H1: there must be μ with different values at a minimum of one pair

In table 1, it can be seen the gained significant difference is at the level of

0.001<0.05. This indicates that there is significant mean difference at the minimum of one pair of population, so next the post hoc test is conducted to find out which pair of population has significant mean difference.

The post hoc test shown that the mean difference between experimental class 1 and control class is significant at the 0.05 level (mean difference=.1346*). It is also happened between experimental class 2 and control class (mean difference= .1794*). From these results, it can thus be concluded that there is significant difference regarding character of friendliness between experimental classes (1 & 2) and control class.

Based on table 3, the subset for alpha 1 is only one score, and the subset for alpha 2 is two score. The result show that the mean score of experimental class 1 and experimental class 2 is different. And, the mean score of control class is significantly different with both mean score of experimental class 1 and experimental class 2.

Discussion

Through Story, Student do Self- Reflection About Friendliness Value

A fairy tale as part of children's literature does not only bring entertainment, but it also allows moral values which are believed by the society as the truth to be passed down from generation to generation. Even by people in the past, a fairy tale is considered to be the only way to teach readers especially children about important values in life. Indeed, a fairy tale exists through its mission to deliver moral teachings. It sets examples which provide guidance on how one should behave and live his life, and the messages it contains are usually implied or expressed through pictures or persuasive plots.

The friendliness value in story of Sainsmatika Fairytale Book (SFB) gives students the chances to practice self-reflection, encouraging them to feel as if they are parts of the story so they are emotionally engaged to take good examples from their experiences through the fairy tale. As a literarywork, a fairy tale is a medium which can effectively teach the children

Table 2. The Post Hoc Test Based on The Observation

	(I) Method	(J) Method	Mean Difference (I-J)	Std. Error	Sig.
Tukey HSD	Experimental class 1	Experimental class 2	-,0448	,0472	.611
		Control class	,1346*	,0481	.018
	Experimental class 2	Experimental class 1	,0448	,0472	.611
		Control class	,1794*	,0472	.001
	Control class	kelas_eksperimen1	-,1346*	,0481	.018
		Experimental class 2	-,1794*	,0472	.001
Bonferroni	Experimental class 1	Experimental class 2	-,0448	,0472	1.000
		Control class	,1346*	,0481	.019
	Experimental class 2	Experimental class 1	,0448	,0472	1.000
		Control class	,1794*	,0472	.001
	Control class	Experimental class 1	-,1346*	,0481	.019
		Experimental class 2	-,1794*	,0472	.001

Table 3. The Homogeneous Subsets Test Based on The Observation

	Method	N	Subset for alpha = 0.05	
			1	2
Tukey HSD ^{a,b}	Control class	26	,238	
	Experimental class 1	26		,373
	Experimental class 2	28		,418
	Sig.		1.000	.615

about moral values, appropriate attitude, social norms and ethics.

The similar thing is also expressed by Danandjaja (2007, p.83), that a fairy tale is created primarily for entertainment, although it can also be imbued with moral teachings, life lessons and even satirical messages. In addition, Carvalho-Neto (Danandjaja, 2007, p.4) says that the usefulness of a fairy tale can be manifested in teaching materials, and it can also be effective as a source of solace, a projection of pent-up desire, and social criticism. At the age of 7-11 years old, children are able to construct and identify specific conceptions about character after they have been through many experiences in life. For example, they will develop various perspectives when they read a fairy tale, hoping that the good figures in the story can win in whatever adventures they are involved in and that the story can have a happy ending. In this range of age, children love reading fictional stories which tell about adventures, so they can use their imagination to feel as if they experience the adventures (Tucker Tucker, 1989). Therefore, a fairy tale can be used as a medium to teach children specifically in the scope of character education. During the concrete operational stage, children will develop the ability to perceive their surroundings with different points of view. In this stage their logical thinking will improve, and therefore they need to read books which can connect them to different points of view, provide facts and deeper information, and challenge them to solve problems, mysteries or riddles (Mitchell, 2003: 12).

According to Kilic (2015, p.388), "fairy tale is one of the most important genres in literature which reflects childish sensitivity, feeds child's soul, enriches his/her imagination and prepare him/her for the future". Specifically when children grow sensitivity, they will be curious about problems which happen in their social environment. With the character value of friendliness manifested in a fairy tale, children can read it and develop their sensitivity when socializing with other people. It can stimulate them to respect others and help them maintain positive thinking. Furthermore, they can place themselves as agents who also take the responsibilities of solving the problems in their environment, and this is a good example which they take and follow from the fairy tale.

The results of this research reveal that the use of *sainsmatika* fairytale books is effective to enhance students' character of friendliness. This is in accordance with the opinion of Huck, et al (1987, p.6-14), that a fairy tale as children's literature gives advantages which are divided into two kinds: personal values and education values. Regarding personal values, a fairy tale gives positive influences on children's development, such as improving their emotional development, intellectual development, and imagination development, as well as improving their social, ethical and religious senses. Then, regarding education values, a fairy tale can motivate children to explore their environment and discover the truth about phenomena happening around them, which can be very useful to cultivate their linguistic skills, sense of art, multicultural insights and habit of reading.

Improve Student Friendliness Through Direct Activity

Every child is a part of society. In the next decade, children will grow up and become changemakers of the world. As a part of society, a child as an individual needs basic social skills such as showing genuine respect, caring for others, and communicating well. However, there is no way that a child can possess these social skills in an instant. To have well-developed social skills, a child is indeed required to get actively involved in the real situations of social interaction. Only through personal experiences can a child learn how to interact with other people and find the value his social life.

From the perspectives of cognitive – social development theories, social interaction is very important for children because it will help develop their conceptions of social and moral rules (Smetana, 2006; Turiel, 1998). With social interaction, a child can deepen his understanding of moral principles manifested such as in reciprocity and cooperation, fairness and human welfare (Horn et.al, 2014). Going along with the above-mentioned notions, Piaget (1932), Kohlberg (1969) and domain theories affirm that the development in the moral domain is encouraged through direct interaction and children's real experiences in social relations, as well as the consequences of every action when they build relationships with others (Nucci, 2014, p.396). Moral development is fostered by

the opportunity for children to interact with other individuals in their social environment. When they socialize with their contemporaries, moral understanding which include positive attitude toward others, openness and courage to express themselves will gradually grow and improve over time.

The direct activity content in Sainsmatika Fairytale Book (SFB) require student adapted to outgoing atmosphere. Changing mate who seat next the student, discuss, share the idea and responses to another student statement is effective strategy to make student more sociable. "School is a social context" (Horn et.al, 2014, p. 393). It is a place where there is complex social interaction between teachers and students, and students with other students. Through social interaction in school, students are provided with direct experience of socialization. However, not all students are able to explore their social environment on their own initiative. The direct activity content in SFB being stimully student desire to socialize, and being media which can inspire them and provide them with insights into the culture of positive social interaction.

CONCLUSION

Sainsmatika Fairytale Books (SFB) is a tool to improve students' friendliness character. The differences among SFB and the general fairytale is SFB containing science and mathematics' content so SFB can used as a learning tool in instructional situation. The friendliness value, which developed to the fairy stories gradually changes student perspective about friendship and direct the student to reflect they behavior to another people. The direct activity content in SFB, had much role to improve student friendliness. During the instruction, student is encouraged to speak, listen and share their perspective, idea or responses to all classmates. One most difference atmosphere is they learn to appreciate and accept the another student without except for. The stimuli, like fairystories is a precise tool to enhance student friendliness. Teacher can also adapted this approach to improve student friendliness character using another popular fairystories, like 'Tinkerbelle' or 'Peterpan' with a little alteration. So it can used as a learning tool in classroom situation and accepted by all students.

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STANDARISASI PADA FASILITATOR *EXPERIENTIAL LEARNING* DI SUMATERA BARAT

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Abstrak: Tujuan penelitian ini adalah melakukan standarisasi pada fasilitator *experiential learning* (EL) dalam kegiatan *outdoor* di Sumatera Barat. Hasil penelitian diharapkan dapat memberikan masukan untuk dikeluarkannya sertifikat profesi oleh Badan Nasional Sertifikat Profesi (BNSP) kepada fasilitator EL karena memenuhi syarat kompetensi. Penelitian ini menggunakan metode kuantitatif dengan pendekatan deskriptif analitik dilakukan dalam dua tahap: (1) melaksanakan program *workshop* bagi fasilitator EL dan memberikan rekomendasi pada peserta, (2) melakukan uji kompetensi fasilitator EL oleh BNSP. Jumlah responden adalah 20 orang fasilitator dari 4 provider (n=20). Data dikumpulkan menggunakan standar kompetensi kerja nasional Indonesia sektor pariwisata bidang kependudukan outbound/fasilitator *experiential learning* dan pelaksanaan test profesi oleh BNSP. Data diolah menggunakan teknik analisis statistik deskriptif. Hasil dari penelitian menunjukkan bahwa 19 fasilitator dinyatakan lulus dan 1 orang dinyatakan tidak lulus oleh BNSP. Hasil ini menunjukkan bahwa program *workshop* EL menghasilkan 19 peserta yang kompeten dalam memandu kegiatan *outdoor* menggunakan pendekatan *experiential learning*.

Kata Kunci: *fasilitator experiential learning, standarisasi, outbound training*

STANDARIZATION OF EXPERIENTIAL LEARNING FACILITATOR IN WEST SUMATERA

Abstract: The purpose of this research was to standardize experiential learning (EL) facilitators in outdoor activities in West Sumatera. The result of this research is expected that the EL facilitator is competent with the issuance of professional certificate by the National Agency for Profession Certification (BNSP). This research uses quantitative method with analytic descriptive approach and has been done in two stages. First, Implementation of workshop program for experiential learning facilitators and produce recommendations for workshop participants. Second, conducted a competency test of EL facilitators by the National Agency for Profession Certification (BNSP). The number of respondents was 20 facilitators from 4 providers (n=20). Data were collected using Indonesian national competence standard of tourism sector in the field of outbound / experiential learning facilitator and BNSP test. The data were processed using descriptive statistical analysis technique. The results of the study showed that 19 participants were declared competent and 1 incompetent participant. The results of the study showed that 19 participants were declared competent and 1 participants declared incompetent by the National Agency for Profession Certification (BNSP). These results indicate that the EL workshop program resulted 19 participants have been declared competent in guiding outdoor activities using experiential learning approach.

Keyword: *facilitator of experiential learning, standardization, outbound training*

PENDAHULUAN

Outdoor training merupakan kegiatan yang sering digunakan untuk pengembangan diri. Kegiatan ini banyak digunakan baik secara perorang-

an maupun kelompok. Kegiatan *outdoor* biasa dilaksanakan oleh institusi pendidikan maupun perusahaan baik negeri maupun swasta. Di Indonesia, kegiatan *outdoor* ini lebih dikenal dengan

istilah *outbound training*. Kegiatan *outbound training* di Indonesia berkembang pesat ke arah yang baik. Provider penyedia jasa *outbound training* di Indonesia dinaungi oleh induk organisasi Asosiasi *Experiential Learning* Indonesia atau disingkat dengan AELI. AELI menerapkan metode pembelajaran *Experiential Learning* (EL) dalam setiap kegiatan *outdoor*. *Experiential learning* merupakan sebuah proses pembelajaran dengan menggunakan pendekatan pengalaman yang didapat peserta melalui empat aspek yaitu 1) peserta pelatihan memiliki pengalaman konkret; 2) pengalaman ini diamati dan direfleksikan; 3) pengalaman diabstraksikan, dikonsepsi, dan digeneralisasikan; dan 4) generalisasi diuji dalam situasi baru yang mengarah pada pengalaman konkret (Kolb and Wolfe 1981).

Banyak penelitian menunjukkan bahwa kegiatan *outbound training* dengan menerapkan metode EL mampu meningkatkan sikap kepemimpinan, kemampuan membangun tim, meningkatkan kemampuan dalam memecahkan masalah, meningkatkan kepercayaan diri dan meningkatkan kemampuan dalam berkomunikasi (Williams, Graham, and Baker, 2003). Adapun manfaat mengikuti kegiatan *outbound* adalah melatih ketahanan mental, menumbuhkan empati, melahirkan semangat kompetisi yang sehat, meningkatkan jiwa kepemimpinan, melihat kelemahan orang lain bukan sebagai kendala, dan meningkatkan kemampuan mengambil keputusan dalam situasi sulit secara cepat dan akurat (Susanta 2010). Kegiatan pembelajaran berbasis pengalaman (EL) bisa dilaksanakan diluar ruangan (*outdoor*) maupun di dalam ruangan (*indoor*). Program *outdoor* dimanfaatkan untuk meningkatkan *soft skills* seperti kerja tim, pemecahan masalah, pengambilan risiko, harga diri dan komunikasi interpersonal, sementara program EL yang dilaksanakan di dalam ruangan bisa membantu dalam meningkatkan kemampuan kerja tim, hubungan interpersonal dan pemecahan masalah (Hamilton, Thomas, & Cooper, 2001). Penelitian yang dilaksanakan oleh (Judge, 2005) memperlihatkan adanya peningkatan hasil belajar pada setiap metode EL yang dilaksanakan setiap tahunnya dalam waktu tiga tahun. Dalam penelitian lainnya metode EL dalam kegiatan *outdoor* juga

berpengaruh terhadap peningkatan stimulasi *occupational motivation* (Hamilton, Thomas, & Cooper, 2001).

Adanya peningkatan kinerja sebesar 10% dibandingkan dari peningkatan kinerja sebelumnya yang meningkat hanya sebanyak 2% (Andries & Sauerma, 2010). Selain itu, aktivitas *Outdoor* dengan pendekatan EL juga mampu meningkatkan kemampuan kognitif, linguistik, sosial emosional, dan kemampuan motorik. (Sepdanius and Sugiyanto 2015) (Yıldırım and Akamca, 2017). Efektivitas EL juga terbukti efektif dibandingkan dengan metode pembelajaran secara umum pada mata pelajaran tertentu (Lyu, Li, and Wang, 2016). Pendekatan pembelajaran berbasis pengalaman juga terbukti efektif dalam pembelajaran secara informal maupun kegiatan formal di dalam kelas yang terkait dengan pengalaman (Jose, Patrick, and Moseley 2017). Penelitian lain, mengindikasikan bahwa penerapan EL menjadi efektif jika diterapkan dengan cara yang tepat (Yardley, Teunissen, and Dornan, 2012). Melakukan pemetaan metode EL dalam proses pembelajaran mampu meningkatkan lima komponen hasil belajar yaitu dari adanya penguatan dari hasil belajar sebelumnya yang masih belum baik menjadi lebih baik, dari polaritas ke realitas yang dirasakan secara holistik, dari konsep yang tidak jelas hingga simbolisme visual yang berwarna-warni, dari fokus pada masa lalu untuk membuka penerimaan masa depan, dari yang bersifat kepribadian menuju komunitas, dan dari pengalaman ke tingkat spiritual atau holistik (Jose et al, 2017). Berdasarkan penjelasan-penjelasan tersebut menyatakan bahwa kegiatan *outdoor* berbasis EL memiliki keunggulan-keunggulan dalam menyampaikan informasi dalam proses pembelajaran.

Metode EL erat kaitannya dengan kegiatan *outdoor* dalam usaha penyampaian tujuan pembelajaran. Oleh sebab itu, seorang fasilitator kegiatan *outdoor*, harus paham betul dengan metode pembelajaran EL ini. Untuk mendapatkan hasil maksimal dalam proses pembelajaran menggunakan metode EL maka dibutuhkan fasilitator EL yang memiliki kompetensi baik. Pembelajaran metode EL mengandung 4 siklus pembelajaran yang berdasarkan pada observasi dan refleksi

pengalaman nyata dalam pembelajaran. Observasi tersebut diasilimasikan kedalam sebuah teori yang mana berimplikasi terhadap sebuah aksi yang baru dan menjadi sebuah kesimpulan. Implikasi ini dituangkan dalam sebuah aktivitas fisik yang dipandu oleh seorang fasilitator EL yang berperan mengkreasikan sebuah pengalaman baru bagi pembelajar. Untuk menunjang proses pembelajaran dibutuhkan empat jenis kemampuan genotip adaptif yang berbeda yang harus dimiliki pembelajar, yaitu kemampuan pengalaman yang konkret, kemampuan observasi reflektif, kemampuan konseptualisasi abstrak, dan kemampuan eksperimen aktif (Kolb, 1984).

Di Indonesia, penyedia jasa *outbound training* merupakan sebuah profesi. Untuk menjaga kepercayaan konsumen pihak *provider* terus melakukan pembaruan terhadap kegiatan *outbound* yang dibawakan, terutama fasilitator yang nantinya menjadi pemandu dalam kegiatan *outdoor*. Untuk menjaga kualitas *provider outbound*, Menteri tenaga kerja dan transmigrasi republik Indonesia Nomor: KEP 329/MEN/XII/2011 menetapkan sebuah standar kompetensi nasional Indonesia sektor pariwisata bidang kependudukan *outbound /fasilitator experiential learning* menjadi standar kompetensi kerja nasional Indonesia yang diujikan bagi fasilitator EL yang ingin mendapatkan sertifikat profesi (Kemenakertrans 2011). Sertifikat yang dikeluarkan oleh BNSP menyatakan bahwa fasilitator EL sudah kompeten dalam kependudukan kegiatan *Outbound*. Adapun kompetensi yang perlu dimiliki oleh seorang pemandu *outbound/fasilitator* yaitu terbagi dalam tiga kompetensi yaitu kompetensi dasar, kompetensi inti dan kompetensi pendukung. Dalam pelaksanaannya kompetensi inti menjadi penentu utama seseorang tersebut dinyatakan kompeten (Kemenakertrans).

Hasil penelitian yang dilakukan sebelumnya menunjukkan bahwa 19 (95%) fasilitator dari 20 fasilitator dari 4 provider di Sumatera Barat belum memiliki sertifikat yang menandai ke profesionalan fasilitator dalam memandu kegiatan *outbound training* yang dikeluarkan oleh BNSP, namun dilihat dari objektivitas kegiatan dilaksanakan, fasilitas yang disediakan serta standar keselamatan yang digunakan sudah memenuhi

standar (Sepdanius, Endang & Chaeroni, 2017). Dari hasil tersebut disimpulkan bahwa provider yang ada di Sumatera Barat sudah melaksanakan kegiatan *outbound* sesuai kriteria yang baik, hal ini dipengaruhi oleh pengalaman dalam menjalani pemanduan *outbound training*. Namun, dari sisi fasilitator yang digunakan masih belum memiliki pengakuan kompetensi yang memenuhi standar profesional dari Badan Nasional Sertifikasi Profesi Indonesia. Untuk memenuhi kebutuhan tersebut perlu dilaksanakan standarisasi pada fasilitator EL yang ada di Sumatera Barat.

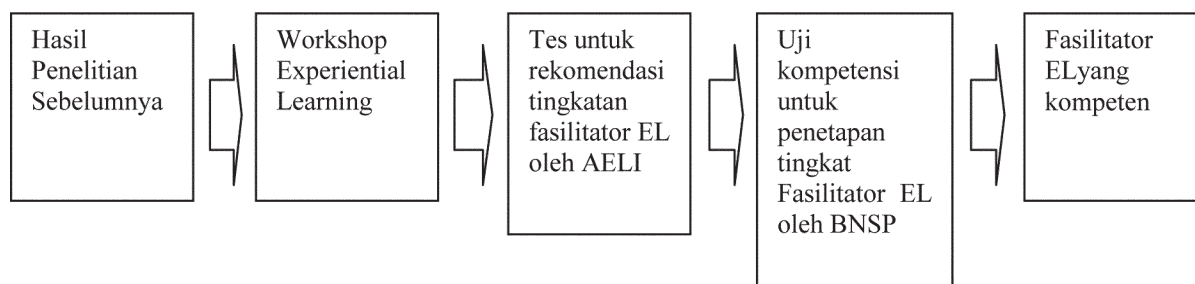
Pentingnya sertifikasi profesi bagi para tenaga kerja adalah untuk mensertifikasi personal pemasok produk atau jasanya untuk memastikan dan memelihara kompetensi yang telah dicapai selama memasok jasa yang mendapatkan lisensi dari otoritas sertifikasi yang kompeten untuk mewajibkan sertifikasi kepada jejaring otoritasnya untuk memastikan dan memelihara kompetensi pelaksana dari kebijakan negara (Sertifikasi BNSP 2017). Untuk mendapatkan hasil yang maksimal dalam pelayanan jasa harus sesuai dengan SKKNI (standar kompetensi kerja nasional Indonesia) dalam hal ini rumusan kemampuan kerja yang mencakup aspek pengetahuan, keterampilan dan/atau keahlian serta sikap kerja yang relevan dengan pelaksanaan tugas dan syarat jabatan yang ditetapkan sesuai dengan ketentuan peraturan perundang-undangan yang berlaku (Sertifikasi BNSP 2017).

METODE

Penelitian ini menggunakan metode kuantitatif dengan pendekatan deskriptif. Jumlah responden dalam penelitian adalah 20 fasilitator dari 4 provider (n=20) yang ada di Sumatera Barat.

Tabel 1. Frekuensi Demografi Sampel

Demografi sampel		F	Persentase
Jenis kelamin	Male	19	95%
	Female	1	5%
Usia	20-29	7	35%
	30-39	10	50%
	>40	3	15%
Lama Memandu Kegiatan	1-3 tahun	8	40%
	4-5 tahun	6	30%
	>6 tahun	6	30%
n=		20	100%



Gambar 1. Alur Pelaksanaan Penelitian

Desain

Penelitian ini dilakukan dalam dua tahap: (1) Pelaksanaan program workshop bagi fasilitator *experiential learning* kemudian menghasilkan rekomendasi tingkatan yang diberikan oleh Asosiasi *Experiential Learning* Indonesia (AELI), (2) Pelaksanaan uji kompetensi oleh Badan Nasional Sertifikat Profesi (BNSP).

Instrumen Penelitian

Pada tahap I AELI memberi rekomendasi kepada peserta yang sudah mengikuti program workshop kependidikan *outbound*/fasilitator *experiential learning*. Adapun kompetensi inti yang diworkshopkan adalah 1) merencanakan program kegiatan rekreasi, 2) merencanakan program kegiatan pembelajaran, 3) mengatur sumber daya program, 4) melaksanakan pemanduan kegiatan rekreasi, 5) melaksanakan pemanduan kegiatan pembelajaran, 6) melakukan pemanduan kegiatan tali rendah, 7) melakukan pemanduan kegiatan tali tinggi, 8) menganalisis resiko dalam kegiatan, 9) memberikan pertolongan pertama. Berdasarkan pada 9 komponen ini AELI memberikan penilaian dengan skala 1 sampai 10. Berdasarkan hasil penilaian akan diberikan rekomendasi kepada peserta berada pada tingkatan level *experiential Learning*.

Pada tahap II dilakukan uji kompetensi fasilitator EL berdasarkan instrumen standar kompetensi kerja nasional Indonesia sektor pariwisata bidang kependidikan *outbound*/fasilitator *experiential learning* yang diselenggarakan oleh BNSP.

Teknik Analisis Data

Data diolah menggunakan teknik analisis statistik deskriptif. Teknik analisis ini bermaksud untuk menganalisis data dengan cara mendeskrip-

sikan atau menggambarkan data sebagaimana adanya. Hasil yang didapat merupakan akumulasi dari data dasar dalam bentuk deskripsi semata. Kesimpulan dari deskriptif data yang didapat tidak berlaku untuk umum.

HASIL DAN PEMBAHASAN

Hasil Program Workshop Fasilitator *Experiential Learning*

Program workshop *experiential learning* merupakan program yang dikembangkan untuk menyamakan persepsi dan fungsi fasilitator didasarkan pada sembilan kompetensi inti. Program ini berjalan selama tiga hari dengan dilakukan kontrol terhadap peserta. Peserta dikondisikan pada lokasi tempat tertentu. Adapun hasil dari program tersebut berupa rekomendasi yang diberikan oleh instruktur dari AELI terhadap tingkatan kompetensi peserta. Adapun hasil dari program tersebut dapat dilihat pada Tabel 2.

Berdasarkan tabel 2 terlihat unit kompetensi 1, 2 dan 5 merupakan rata-rata kompetensi terendah secara berturut turut, kompetensi 1 yaitu merencanakan program kegiatan rekreasi memiliki ($M=5.9$ $SD=2.227$), kompetensi 2 yaitu merencanakan program kegiatan pembelajaran ($M=6.3$ $SD=2.812$), dan kompetensi 3 melaksanakan pemanduan kegiatan pembelajaran ($M=7.5$ $SD=2.438$).

Berdasarkan pada tabel 2, data dapat dirincikan dalam tiga tingkatan fasilitator EL (Muda, Madya dan Utama) sesuai dengan nilai kompetensi terendah. Untuk lebih jelasnya dapat dilihat pada tabel 3.

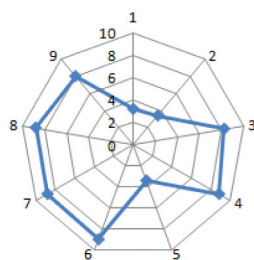
Pada fase muda, 3 nilai kompetensi fasilitator tidak memenuhi kategori tuntas, rata-rata kurang dari 7. (Mean Kompetensi 1 =3,2., Mean Kompetensi 2=3.4 dan mean Kompetensi 5 = 3.4). Sedangkan fase Madya, 2 nilai kompetensi

Tabel 2. Nilai Rata-rata 9 Kompetensi Inti Peserta Program Workshop Fasilitator EL

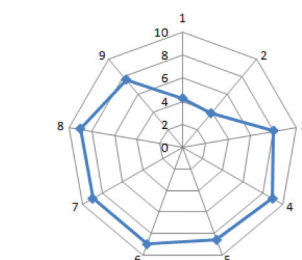
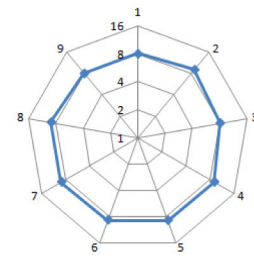
No.	Unit Kompetensi	Σ	M	SD
1.	Merencanakan Porgram Kegiatan Rekreasi	117	5.9	2.277
2.	Merencanakan Porgram kegiatan Pembelajaran	126	6.3	2.812
3.	Mengatur Sumbar Daya untuk Program	161	8.1	0.224
4.	Melaksanakan pemanduan kegiatan rekreasi	179	9.0	0.224
5.	Melaksanakan pemanduan kegiatan Pembelajaran	149	7.5	2.438
6.	Memandu Kegiatan <i>Lowrope</i>	178	8.9	0.447
7.	Memandu Kegiatan <i>Highrope</i>	179	9.0	0.224
8.	Menganalisis Resiko Dalam Kegiatan	179	9.0	0.224
9.	Menolong Korban	158	7.9	0.641

Tabel 3. Nilai Rata-rata Masing-masing 9 Kompetensi Utama pada Tiga Level Fasilitator *Experiential Learning* (EL)

Level Fasilitator Experiential learning	Mean Unit Kompetensi								
	1	2	3	4	5	6	7	8	9
Fasel Muda	3.2	3.4	8.2	8.8	3.4	9	8.8	8.8	8
Fasel Madya	4.2	3.8	8	9	8.6	9	9	9	7.6
Fasel Utama	8	9	8	9	8.9	8.8	9	9	8



Keterangan : —◆— Competence

Grafik 1. Kompetensi pada fasilitator EL Muda**Grafik 2. Kompetensi pada fasilitator EL Madya****Grafik 3. Kompetensi pada fasilitator EL Utama**

fasilitator belum memenuhi kategori tuntas (Mean Kompetensi 1 =4.8, Mean Kompetensi 2=3.8). Sedangkan untuk fasel utama sudah memenuhi kriteria standar penilaian. Untuk melihat lebih jelasnya dapat dilihat pada Grafik 1,2 dan 3.

Grafik 1. di bawah menjelaskan bahwa terdapat 3 kompetensi fasilitator EL muda dibawah standar yaitu pada kompetensi 1. merencanakan program kegiatan rekerasi, kompetensi 2. merencanakan program kegiatan pembelajaran dan kompetensi 5.melaksanakan pemanduan kegiatan pembelajaran. Grafik 2. di atas menjelaskan bahwa terdapat 2 kompetensi fasilitator EL di bawah standar yaitu kompetensi pada kompetensi 1; merencanakan program kegiatan rekerasi, dan kompetensi 2; merencanakan program kegiatan pembelajaran. Grafik 3 menjelaskan bahwa terdapat seluruh kompetensi dari 9 kompetensi yang ada, sudah memenuhi standar fasilitator utama

Rekomendasi Untuk Level Fasilitator *Experiential Learning*

Berdasarkan nilai tersebut ditampilkan data tentang jumlah peserta program workshop fasilitator EL yang termasuk dalam fasilitator EL Muda, fasilitator EL madya dan fasilitator EL utama. Berikut disajikan data persentase jumlah fasilitator berdasarkan level fasilitator yang telah mengikuti program workshop EL pada Tabel 4.

Dari tabel 4 terdapat 25% peserta direkomendasikan untuk berada pada level fasilitator EL Muda, 25% peserta direkomendasikan untuk berada pada level fasilitator EL Madya dan 50% peserta direkomendasikan untuk berada pada level fasilitator EL Utama. Tindak lanjut dari hasil rekomendasi program workshop ini adalah pengajuan uji kompetensi kepada Badan Nasional Sertifikasi Profesi Indonesia untuk dilaksanakannya uji kompetensi kependamuan *outbound* atau fasilitator EL.

Tabel 4. Persentase Fasilitator yang Direkomendasikan Berdasarkan Level Fasilitator EL

Jumlah Fasilitator EL	Rekomendasi dari instruktur					
	Fas. EL Muda		Fas. EL Madya		Fas. EL Utama	
		%		%		%
20	5	25%	5	25%	10	50%

Tabel 5. Hasil dari Uji Kompetensi BNSP

Jumlah Fasilitator EL	Hasil uji kompetensi oleh BNSP					
	Fasilitator EL Muda		Fasilitator EL Madya		Fasilitator EL Utama	
		%		%		%
19	8	42%	2	11%	9	47%

Tabel 6. Perbandingan Jumlah Fasilitator EL Rekomendasi Pascaworkshop dengan Jumlah Fasilitator EL Uji Kompetensi oleh BNSP

Level Fasilitator Experiential learning	Rekomendasi pascaworkshop (fasilitator)	Uji Kompetensi (fasilitator) oleh BNSP
Fasel Muda	5	8
Fasel Madya	5	2
Fasel Utama	10	9
n=	20	19

Hasil Test Fasilitator *Experiential Learning* oleh BNSP

Keputusan menteri tenaga kerja dan transmigrasi republik Indonesia Nomor: KEP 329/MEN/XII/2011 tentang penetapan rancangan standar kompetensi nasional Indonesia sektor pariwisata bidang kependidikan *outbound* / fasilitator *experiential learning* menjadi standar kompetensi kerja nasional Indonesia menyusun daftar unit kompetensi yang diujikan bagi fasilitator EL yang ingin mendapatkan sertifikat profesi. Uji kompetensi ini diselenggarakan oleh lembaga sertifikasi Profesi Pramuwisata Indonesia (LSP PRAMINDO). Adapun kelompok kompetensi yang diujikan adalah kelompok kompetensi umum, kelompok kompetensi inti, dan kelompok kompetensi pendukung. Hasil dari uji kompetensi tersebut, BNSP menyatakan 19 peserta dinyatakan kompeten dan terbagi dalam tiga tingkatan fasilitator. Berikut ditampilkan jumlah fasilitator yang kompeten berdasarkan hasil test BNSP.

Dari tabel 4 di atas menunjukkan bahwa 8 (42%) peserta uji kompetensi dinyatakan berada pada fasilitator EL Muda, 2 (11%) peserta uji kompetensi dinyatakan berada pada fasilitator EL madya, dan 9 (57%) peserta uji kompetensi dinyatakan berada pada fasilitator EL utama.

Pembahasan

Adanya perbedaan yang jelas dari jumlah hasil rekomendasi program *workshop* dengan

hasil uji kompetensi dari BNSP bisa dilihat dari jumlah fasilitator. Peserta dalam kegiatan *workshop* direkomendasikan untuk mengajukan uji kompetensi ke BNSP untuk mendapatkan sertifikasi profesi. BNSP menindaklanjuti pengajuan ini dengan melaksanakan uji kompetensi dan diikuti oleh 19 orang peserta. Satu peserta dinyatakan tidak memenuhi persyaratan dalam proses administrasi uji kompetensi sehingga tidak dinyatakan kompeten sebagai Fasilitator *Experiential Learning*.

Dilihat dari tabel 6 di atas menunjukkan bahwa adanya perbedaan jumlah fasilitator EL setelah *workshop* dengan jumlah fasilitator EL setelah uji kompetensi. Dari 10 fasilitator EL yang direkomendasikan untuk berada pada fasilitator EL utama menjadi 9 orang yang lulus pada uji kompetensi pada fase utama. Dari 5 fasilitator EL yang direkomendasikan untuk berada pada fasilitator EL madya menjadi 2 orang yang lulus pada uji kompetensi pada fase madya. Dari 5 fasilitator EL yang direkomendasikan untuk berada pada fasilitator EL muda menjadi 8 orang yang lulus pada uji kompetensi pada fase muda. Hasil ini menjelaskan bahwa perbedaan rekomendasi dengan hasil tes kompetensi tidak jauh berbeda. Oleh karena itu, bisa dikatakan program *workshop* mampu memberikan pemahaman dan persepsi tentang kompetensi kependidikan *outbound* / fasilitator *experiential learning*.

Kompetensi merupakan kemampuan melaksanakan pekerjaan atau tugas yang didasari keterampilan maupun pengetahuan dan didukung oleh sikap kerja yang ditetapkan oleh pekerjaan (Wibowo, 2010). Selain itu, kompetensi memiliki karakteristik yaitu menjadi karakter pribadi dan menjadi bagian dari perilaku seseorang dalam melaksanakan suatu tugas pekerjaan (Mangkunegara, 2007). Berdasarkan Keputusan Menteri Pendidikan Nasional Republik Indonesia Nomor 045/u/2002 tentang kurikulum inti pendidikan tinggi pasal 2, elemen-elemen kompetensi terdiri atas : Landasan kepribadian, penguasaan ilmu dan keterampilan, kemampuan berkarya, sikap dan perilaku dalam berkarya menurut tingkat keahlian berdasarkan ilmu dan keterampilan yang dikuasai, dan pemahaman kaidah berkehidupan bermasyarakat sesuai dengan pilihan keahlian dalam berkarya (Kemendiknas, 2002). Oleh sebab itu, orang yang berkompeten adalah orang yang memiliki pengetahuan, keterampilan dan sikap kerja yang baik terhadap pekerjaannya dan menjadi karakteristik pribadi orang tersebut. Fasilitator kegiatan *outdoor* merupakan sebuah profesi yang menuntut fasilitator tersebut memiliki pengetahuan, keterampilan dan sikap kerja yang baik terhadap profesinya.

Profesi dalam memandu para peserta dalam kegiatan *outdoor* menggunakan metode EL dalam melaksanakan kegiatan haruslah dipandu oleh fasilitator yang kompeten. Interaksi pengalaman dengan refleksi bergantung pada kekuatan yang mendorong interaksi seperti intervensi eksternal seorang guru, motivasi internal dari pembelajar atau tindakan acak dari pihak ketiga (Fowler 2008). Oleh sebab itu, Fasilitator harus mempunyai kompetensi yang diakui oleh lembaga atau badan yang berhak mengeluarkan sertifikat suatu profesi dalam hal ini adalah BNSP. Adapun 9 kompetensi inti dalam profesi sebagai fasilitator EL harus ditampilkan dalam pengetahuan, keterampilan dan sikap seorang fasilitator EL. Oleh sebab itu, fasilitator yang mampu menampilkan sikap kerja, keterampilan dan pengetahuan terhadap metode EL bisa dikatakan kompeten dalam memandu kegiatan *outdoor*.

Efektivitas hasil program pembelajaran dalam kegiatan *outdoor* menggunakan metode

EL tidak terlepas dari kompetensi fasilitator. Banyak penelitian menunjukkan efektifitas metode EL dalam menyampaikan pembelajaran kegiatan dalam kegiatan *outdoor*. Selain itu, institusi pendidikan yang mengembangkan metode EL dalam penyampaian materi pembelajaran juga memperlihatkan perkembangan yang positif. Hasil menunjukkan bahwa institusi pendidikan yang menerapkan metode *experiential learning* dalam kurikulum pembelajaran mampu meningkatkan pemahaman peserta didik lebih baik pada mata pelajaran tertentu (W. Porter et al, 2012; Bath and Bourke, 2011). Pendidikan *outdoor* berdasarkan pengalaman di sekolah jelas merupakan suatu keharusan dalam kurikulum (James and Williams 2017). Pendekatan pembelajaran EL dengan menggunakan metode campuran *metaphorik* dalam pelaksanaan *debriefing* menjadi lebih efektif dalam program pengembangan peserta kegiatan *outdoor* (Gass and Priest, 2006). Oleh sebab itu, metode EL ini cocok digunakan dalam gaya pembelajaran yang kooperatif, pembelajaran yang terintegrasi, pembelajaran berbasis kerja dan praktikum (Rowe, MacKaway, and Winchester-Seeto, 2012).

Selain itu, EL yang diterapkan dalam kegiatan *outdoor* mampu memperbaiki sikap kepemimpinan dan kerja tim peserta yang mengikuti tersebut (Juriza et al, 2011). Persepsi guru tentang potensi pendidikan pengajaran luar ruangan termasuk terhadap peningkatan motivasi, komunikasi, dan partisipasi di antara para siswa. Persepsi lain di antaranya adalah peningkatan pengalaman secara bersama-sama di lingkungan luar oleh siswa dapat menjadi titik awal yang berharga untuk pembelajaran dan pengajaran luar kelas dapat memperluas dan memperkuat pengajaran dalam ruangan. Tantangan dengan pengajaran luar ruangan juga dirasakan oleh para guru seperti fakta bahwa siswa membutuhkan waktu untuk menyesuaikan diri dengan lingkungan belajar yang baru (Jose et al, 2017). Kemudian, disimpulkan bahwa pembelajaran pendidikan luar ruangan berpotensi dalam mengembangkan sikap sosial sehingga kegiatan ini menciptakan sebuah keharusan untuk dimasukkan dalam institusi pendidikan (Warren, 2005). Berdasarkan beberapa hasil penelitian di atas jelas metode EL

berpengaruh penting dalam proses pembelajaran baik pada institusi pendidikan maupun kegiatan *outdoor*. Menurut siklus belajar Kolb, pengalaman konkret, observasi refleksi, konseptualisasi abstrak dan eksperimen aktif, telah terbukti mengubah dan menginternalisasi pengalaman belajar siswa sehingga mencapai berbagai hasil pembelajaran yang baik. Selain itu, metode EL juga mampu mengeksplorasi pembelajar dengan pengalaman belajar yang dilakukan secara mendalam dan mengembangkan atribut lulusan dari program pembelajaran tersebut sesuai dengan yang diinginkan (Sato and Laughlin, 2018).

Berkaitan dengan kegiatan olahraga, kerangka *Experiential Learning Theory* (ELT) sangat cocok untuk kelas psikologi olahraga. Untuk memaksimalkan efektivitas belajar siswa, para peneliti memainkan peran penting dalam melibatkan siswa melalui empat mode pembelajaran (yaitu, mengalami, merefleksikan, membuat konsep, dan bereksperimen) yang digariskan dalam kerangka ELT. Dari metode ini para peneliti menemukan bahwa terdapat integrasi yang sukses dari siswa yang dipimpin oleh pembelajaran ELT dalam mengendalikan proses belajar dan mengembangkan kemampuan diri sendiri (Warren, 2005). Program EL yang di terapkan menjadi pemicu dalam menciptakan puncak pengalaman yang emosional bagi pembelajar. Saat merancang pembelajaran kursus, praktisi harus sadar akan pengalaman dan kepekaan hidup pelajar, dan apa yang mungkin memicu emosi tinggi bagi pembelajar. Memahami pemicu emosi tinggi mungkin

bermanfaat bagi pendidik yang berusaha mengenali dan menemukan cara untuk memanfaatkan dan memfasilitasi pengalaman emosional yang bermakna dalam lingkungan belajar (Zeivots, 2018).

Experiential learning dalam kegiatan *outdoor* terbagi dalam empat jenis kegiatan yaitu rekreasi, edukasi, *development* dan *redirecting* (Priest, Simon, & Gass, 1992). Empat jenis kegiatan ini memiliki tujuan yang berbeda-beda. Berikut ditampilkan pada Tabel 7.

Program EL dengan empat jenis tujuan ini memiliki target perubahan yang berbeda. Kegiatan rekreasi; target perubahan yang dicapai adalah perubahan perasaan sebagai contoh yaitu perasaan senang yang timbul dari kegiatan yang dilaksanakan. Untuk program edukasi; target perubahan yang didapat dari peserta kegiatan adalah perubahan pada pemikiran. Peserta dipandu untuk melakukan kegiatan dengan tujuan untuk mencapai perubahan pada pola pemikiran, tidak menutup kemungkinan juga terjadi perubahan perasaan. Dalam kegiatan *development*, peserta ditargetkan mengalami perubahan perilaku disamping terjadinya perubahan perasaan dan pemikiran. Perilaku ini ditampilkan dalam merespon hal yang dahulu menjadi kebiasaan negatif setelah melakukan kegiatan EL dengan tujuan *development* maka perilaku peserta terhadap sesuatu bisa menjadi lebih baik (positif). Sedangkan untuk program EL untuk *redirection* bertujuan untuk merubah kebiasaan seseorang dalam kehidupan sehari-hari. Hal ini tidak terlepas dari perubahan

Tabel 7 . Tujuan Program Experiential Learning Terbagi dalam Empat Jenis (Priest, Simon & Gass, 1992)

Program	Rekreasi	Pendidikan	Pengembangan	Redirection
Perubahan Pembelajaran Eksperimental. cycle	perasaan Aksi & kegiatan	berpikir Refleksi dan diskusi	bertingkah laku Integrasi & Metafora	Menolak Kelanjutan & Dukungan
Teknik fasilitasi	Tidak dibutuhkan	Fundamental & funneling	Pemuatan depan dan pembekuan kontekstual	Membentengi & fokus pada solusi isomorfis
Peningkatan Diagnosa Desain & fokus pengiriman	fantasi percakapan Selamat menikmati, menyenangkan & bermain	+ survei Konsep dan kesadaran	+ wawancara Kebiasaan fungsional	+ Observasi Perilaku disfungsi
Melakukan/tanya jawab (debrief)	100% / 0%	75% / 20%	50% / 50%	25% / 75%
Keberangkatan Mengikuti	Jangkar Reuni	+ evaluasi Pemeriksaan	+ rencana aksi Pendorong	+ diberdayakan Sedang berlangsung

perasaan, perubahan pemikiran dan perubahan perilaku.

Siklus pembelajaran EL berdasarkan empat jenis kegiatan yang dilakukan. Kegiatan rekreasi memiliki siklus pembelajaran yang ditampilkan merupakan sebatas aksi dan kegiatan, karena terkait dengan perubahan yang ingin didapatkan sebatas perubahan perasaan. Sedangkan kegiatan edukasi, siklus pembelajaran yang dilakukan selain aksi dan kegiatan juga dilakukan refleksi dan diskusi. Diskusi ini berfungsi untuk menggali dan memaknai kegiatan yang sudah dilakukan sebelumnya. Selanjutnya kegiatan pengembangan siklus pembelajaran dimulai dengan melakukan kegiatan, refleksi sampai dengan pada integrasi dan metafora dalam kehidupan nyata seseorang. Selanjutnya pada jenis kegiatan *redirection*, peserta dilibatkan dalam siklus pembelajaran yang meliputi kegiatan, refleksi, integrasi dan berkelanjutan sehingga terjadi perubahan pandangan terhadap pemikiran dan perbuatan serta kebiasaan terdahulu.

Dilihat dari teknik fasilitasi berdasarkan jenis kegiatan. Kegiatan rekreasi tidak membutuhkan teknik khusus untuk memandu kegiatan rekreasi. Berbeda dengan tiga jenis kegiatan lainnya, kegiatan edukasi membutuhkan teknik fasilitasi fundamental dan *funneling*. Teknik ini didasarkan pada bagaimana pembelajar mampu memaknai kegiatan secara mandiri dengan menggali nilai-nilai dasar. Dalam teknik fasilitasi pada kegiatan pengembangan, yaitu pemuatan dan pembekuan. Artinya peserta diajak berusaha menggali nilai-nilai yang terkandung dalam kegiatan kemudian mengintegrasikannya pada rutinitas sehari-hari peserta. Teknik selanjutnya yaitu membentengi dan fokus pada solusi. Teknik ini digunakan dalam jenis kegiatan *redirection* yang mana tujuannya fokus pada perubahan dan menjaga perbuatan tersebut agar tidak kembali lagi seperti pada sebelum kegiatan dilakukan.

Berdasarkan pembedaan kegiatan, empat jenis kegiatan EL didesain secara berbeda. Kegiatan rekreasi didesain dengan konsep fantasi, sedangkan kegiatan edukasi didesain berdasarkan konsep realita. Kegiatan pengembangan didesain berdasarkan kontekstual dan kegiatan *redirection* didesain berdasarkan pada isomorfis yaitu pembedaan kegiatan yang berada pada kegiatan

yang sepadan.

Dilihat dari sisi pelaksanaan pembelajaran EL dapat dibedakan berdasarkan persentasi antara kegiatan dan debrief. Debrief merupakan suatu teknik refleksi pengalaman dalam menggali makna. Dalam kegiatan rekreasi, 100% peserta hanya melaksanakan kegiatan tanpa ada adanya debrief. Untuk kegiatan edukasi 75% pelaksanaan kegiatan dan 25% merupakan debrief, sedangkan untuk kegiatan *development*, 50% kegiatan merupakan aktivitas lapangan dan 50% pelaksanaan debrief. Untuk kegiatan jenis kegiatan *redirection*, hanya 25% peserta melaksanakan aktivitas fisik dan 75% pelaksanaan debrief. Disimpulkan bahwa setiap persentasi aktivitas kegiatan dan debrief dari empat jenis kegiatan EL tersebut memiliki persentasi yang berbeda-beda

Semua kegiatan EL didasarkan pada pengalaman kongkret langsung. Pengalaman kongkret langsung merupakan dasar dalam pelaksanaan observasi dan refleksi. Misalnya, seorang anak menyentuh kompor gas pada saat menyala dan dikaitkan dengan rasa sakit, ketidaksenangan dan ketakutan atas observasi tersebut diasimilasi menjadi ide atau teori untuk menyimpulkan suatu tindakan. Implikasi atau hipotesis kemudian berfungsi sebagai panduan dalam bertindak untuk menciptakan pengalaman baru. Efektifitas pembelajar membutuhkan empat kemampuan yang berbeda yaitu keterampilan dan pengalaman yang konkrit, keterampilan dalam melakukan observasi dan reflektif, keterampilan dalam konseptualisasi abstrak, dan keterampilan dalam melakukan eksperimen secara aktif. Artinya, pembelajar harus dapat terlibat penuh, terbuka, dan tanpa bias dalam pengalaman yang baru yaitu untuk merenungkan dan menafsirkan pengalaman ini dari perspektif yang berbeda, untuk menciptakan konsep yang mengintegrasikan pengamatan ini secara logis dengan menggunakan teori-teori ini, untuk membuat keputusan dan memecahkan masalah yang mengarah ke pengalaman baru (Fry and Kolb, 1979). Pengalaman yang baru merupakan konsep yang tertanam dari pengalaman yang dilaksanakan oleh pembelajar dan menjadi bingkai konsepsi struktur pengetahuan, emosi dan pembelajaran dan pendekatan dalam proses belajar (Moon, 2004)

Berdasarkan uraian dapat disimpulkan bahwa program EL perlu dikembangkan baik dalam institusi pendidikan maupun provider penyedia jasa kegiatan *outdoor* dengan mempersiapkan fasilitator yang kompeten dan dibuktikan dengan sertifikasi profesi. Tujuan dari sertifikasi pada fasilitator EL ini adalah untuk menjaga kualitas pembelajaran yang ditekankan pada porses pembelajaran sesuai dengan tujuan kegiatan. Dalam pelaksanaan *outbound training* di Sumatera Barat dengan adanya standarisasi fasilitator EL ini menjadi bukti bahwa Sumatera Barat sangat serius dalam pengembangan pariwisata dengan menyiapkan pelaku usaha *outbound training* yang memiliki kompetensi.

PENUTUP

Fungsi dan persepsi fasilitator EL melalui program workshop Asosiasi *Experiential learning* Indonesia (AELI) mampu menggambarkan tingkatan fasilitator EL kemudian dinyatakan kompeten dalam memandu kegiatan EL oleh BNSP. Oleh sebab itu, institusi jasa yang menggunakan metode EL dalam kegiatan pembelajarannya hendaknya mengajukan program workshop EL kepada AELI dan mengikuti uji kompetensi melalui BNSP.

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ANALISIS FAKTOR YANG MEMPENGARUHI CAPAIAN KELULUSAN UJI KOMPETENSI NERS MAHASISWA PROGRAM PROFESI NERS

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Abstrak: Uji kompetensi dilaksanakan untuk mencapai lulusan yang memenuhi standar kompetensi kinerja. Kompetensi perawat berorientasi terhadap kualitas kinerja dalam memberikan pelayanan keperawatan secara komprehensif. Penelitian bertujuan untuk mengetahui faktor-faktor yang mempengaruhi capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletahan Serang. Penelitian berjenis kuantitatif dengan rancangan korelasi analitik melalui pendekatan *Cross Sectional*. Sampel penelitian sebanyak 106 responden yang diambil dengan teknik total sampling. Data dikumpulkan lewat angket. Analisis data dilakukan dengan menggunakan *Chi Square* dan regresi logistik sederhana model prediksi. Hasil analisis uji *Chi Square* dengan $\alpha = 0.05$, ketiga variabel diperoleh *p value* sebesar 0,804 (kecemasan dan dukungan keluarga), serta 1,00 (dukungan teman sebaya). Hasil analisis ketiga variabel lainnya diperoleh *p value* sebesar 0.034 (IPK Akademik), 0.000 (keaktifkan), dan 0.000 (*try out* nasional). Hasil analisis regresi logistik, teridentifikasi *Odds-Ratio* (OR) dari variabel keaktifkan adalah 156.734. Hasil ini dapat dijadikan evaluasi dalam peningkatan capaian kelulusan UKNI yang merupakan tolak ukur dalam penyelenggaraan penjaminan mutu perguruan tinggi.

Kata kunci : *capaian kompetensi, kompetensi perawat, uji kompetensi Ners, progra profesi Ners*

THE ANALYSIS OF FACTORS INFLUENCING GRADUATION ACHIEVEMENT IN NURSE COMPETENCE TEST OF NURSE PROFESSION PROGRAM

Abstract: Competence test is conducted to fulfil the graduates' performance competence standards. Nurse competence is oriented to the performance quality in giving a comprehensive care. Study intends to identify factors influencing graduation achievement in UKNI of Nurse Profession Program students of STIKes Faletahan Serang. It is a quantitative study with analytical correlational design and cross sectional approach. Samples are 106 respondents who were selected by using total sampling technique. The statistical used are Chi Square and simple logistic regression prediction model. The Chi Square analysis result with $\alpha = 0.05$ finds *p value* of the three variables are 0.804 (anxiety and family support), and 1.000 (peers support). Besides, the analysis result of other three variables obtains *p value* of 0.034 (GPA), *p value* of 0.000 (liveliness), and *p value* of 0.000 (try out result). The analysis result of simple logistic regression shows that Odds Ratio (OR) of liveliness variable is 156.734. The research results can be an evaluation material to increase graduation achievement in UKNI are the benchmark of improving the implementation of university quality assurance.

Keywords: *capaian kompetensi, kompetensi perawat, uji kompetensi Ners, progra profesi Ners*

PENDAHULUAN

UU No.12/2012 tentang Pendidikan Tinggi, Pemerintah Indonesia telah menyelenggarakan sistem penjaminan mutu pendidikan tinggi bidang kesehatan diantaranya adalah uji kompetensi, kebijakan utama Pemerintah dalam melaksanakan penjaminan mutu pendidikan tinggi adalah penyelenggaraan uji kompetensi secara nasional (Kemendiknas, 2016).

Tujuan dilaksanakannya uji kompetensi untuk mencapai standar kompetensi lulusan yang

memenuhi standar kompetensi kinerja, yang dalam hal ini adalah kompetensi Ners generalis seperti apa yang tertuang pada UU No.38 Tahun 2014 Pasal 16 Ayat 3.

Data kelulusan UKNI periode IV Tahun 2015 dari total peserta yang mengikuti Uji Kompetensi Nasional sebanyak 10.009 mahasiswa program profesi ners, teridentifikasi sejumlah 6.223 peserta ujian (62.17%) dinyatakan kompetensi dan sebanyak 3.786 (37.83%) dinyatakan tidak kompeten. Pada Uji Kompetensi Ners Nasional

periode V Tahun 2016 mengalami penurunan dari total peserta ujian sebanyak 14.873 mahasiswa, teridentifikasi sebanyak 7.466 (50.19%) dinyatakan kompeten dan sisanya sebanyak 7.407 (49.81%) dinyatakan tidak kompeten. Dimulai periode V tahun 2016 sampai dengan periode VIII 2017, Uji Kompetensi Ners Indonesia setiap perodenya mengalami penurunan tingkat kelulusan, diantaranya tingkat kelulusan Periode VI tahun 2016 sebesar 47,16% dinyatakan kompetensi, periode VII tahun 2017 diperoleh sebesar 44.62% dinyatakan kompeten dan periode VIII tahun 2017 diperoleh sebesar 41.12% (ukners.dikti.go.id).

Beraneka ragam faktor yang dapat mempengaruhi atau menjadi hambatan dalam capaian kelulusan uji kompetensi ners, seperti halnya dengan apa yang telah ditemukan peneliti sebelumnya oleh Manalu dan Pitono (2016), dalam penelitiannya yang mengidentifikasi tingkat kelulusan UKNI berdasarkan nilai Try Out Nasional, diperoleh hasil bahwa sebanyak 86,4 % peserta yang lulus UKNI memiliki nilai TO lebih tinggi atau sama dengan nilai kelulusan UKNI. Sementara 87,9 % peserta yang tidak lulus UKNI memiliki nilai TO lebih rendah dari nilai kelulusan UKNI. Hal serupa telah diidentifikasi oleh peneliti yang sama bahwa Lulusan dengan nilai TO lebih tinggi atau sama dengan nilai kelulusan UKNI memiliki peluang 3,4 kali lebih besar ($IK\ 95\% = 2,1 - 5,7$) untuk lulus UKNI dibandingkan dengan lulusan dengan nilai TO lebih rendah dari nilai kelulusan UKNI (Pitono & Istianah, 2016).

Faktor lainnya yang menjadi hambatan capaian kelulusan UKNI adalah nilai IPK, hal ini seperti apa yang telah dikemukakan oleh Tanzila dan Zalika (2017), dalam penelitiannya pada mahasiswa program profesi dokter didapatkan hasil bahwa adanya korelasi yang signifikan antara IPK dan kelulusan UKMPPD dengan nilai $p = 0,008$ ($p < 0,05$) serta didapatkan korelasi yang signifikan antara nilai Ujian Komprehensif dengan kelulusan UKMPPD dengan nilai $p = 0,010$ ($p < 0,05$).

Hasil studi awal peneliti terkait data kelulusan uji kompetensi ners mahasiswa Program Studi Profesi Ners STIKes Faletahan Serang menunjukkan bahwa persentase kelulusan mahasiswa program Profesi Ners tahun 2016 mengalami penurunan, dimana didapatkan prosentasi kelulusan tahun 2016 sebesar 49.65% bila dibandingkan dengan persentase kelulusan tahun 2015 sebesar 72,14%. Pada tahun 2017 persentase kelulusan diperoleh sebesar 35.21%. Persentase

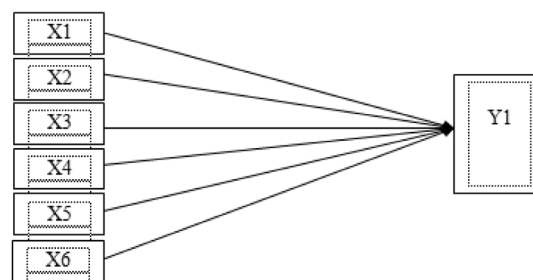
kelulusan alumni program profesi ners STIKes Faletahan Serang dari tahun 2015-2017 mengalami penurunan dan sangat jauh dari target yang diharapkan.

Rendahnya persentase kelulusan mahasiswa pada ujian kompetensi ners, selayaknya menjadi bahan evaluasi institusi pendidikan STIKes Faletahan Serang dalam mengidentifikasi hambatan atau faktor yang mempengaruhi capaian kelulusan mahasiswa program profesi ners juga merupakan salah satu langkah sebagai upaya dalam melakukan evaluasi guna menjadi dasar perbaikan dalam menghadapi UKNI yang akan datang.

Secara rinci berdasarkan hasil studi awal lainnya melalui wawancara dengan mahasiswa program profesi ners yang akan mengikuti UKNI serta lulusan ners yang tidak lulus UKNI mengatakan bahwa ketidakkelulusan UKNI bukan karena tidak bisa menjawab melainkan dikarenakan ketidakahirannya dalam pengoperasian ujian berbasis *computer based test*. Data lain yang mereka ungkapkan adalah perasaan cemas yang saat menghadapi uji kompetensi, serta kurangnya pemahaman dalam menganalisis dan menjawab soal-soal uji kompetensi. Berdasarkan uraian diatas tersebut peneliti tertarik untuk melakukan penelitian tentang analisis faktor yang mempengaruhi pencapaian kelulusan uji kompetensi ners pada Program Profesi Ners STIKes Faletahan Serang.

METODE

Penelitian ini berjenis kuantitatif dengan rancangan penelitian korelasi analitik melalui pendekatan *Cross Sectional*, yaitu pengukuran atau pengambilan data variabel dependen dan variabel independen dilakukan pada saat yang sama dan sifatnya sesaat (Dahlan, 2014).



Gambar 1. Rancangan Penelitian

Sampel dalam penelitian ini adalah Mahasiswa Program Profesi Ners STIKes Faletahan

Serang sebanyak 106 mahasiswa. Teknik pengambilan sampel menggunakan total sampling. Total sampling adalah dimana jumlah sampel sama dengan jumlah populasi (Sabri & Hastono, 2014).

Alat pengumpulan data ini menggunakan alat ukur berbentuk kuesioner yang diberikan kepada mahasiswa program profesi ners STIKes Faletehan Serang. Kuesioner dari lima bagian, yaitu sebagai berikut. (1) Kuesioner A, berisi tentang data nilai Indeks Prestasi Kumulatif (IPK) Akademik Mahasiswa Program Profesi Ners STIKes Faletehan Serang; (2) Kuesioner B, berisi tentang pernyataan Tingkat Kecemasan dalam menghadapi uji kompetensi ners. Terdiri dari 42 item pertanyaan dengan menggunakan skala likert dengan rentang skor 1-4. Hasil uji validitas menggunakan Korelasi *Product Moment* didapatkan nilai terendah 0.483 dan nilai tertinggi 0.768, dengan nilai reliabilitas sebesar 0.906. (3) Kuesioner C, berisi tentang dukungan keluarga dan teman sebaya terhadap uji kompetensi ners. Kuesioner dukungan keluarga terdiri dari 10 item pertanyaan dengan menggunakan skala likert dengan rentang skor 1-4. Hasil uji validitas menggunakan Korelasi *Product Moment* didapatkan nilai terendah 0.458 dan nilai tertinggi 0.683, dengan nilai reliabilitas sebesar 0.932. Sedangkan untuk kuesioner Dukungan teman sebaya berisikan 40 item pertanyaan didapatkan nilai reliabilitas sebesar 0.896. (4) Kuesioner D, berisikan tentang keaktifan yang dinilai dari persentase kehadiran dalam program pembekalan, pengkayaan analisis soal-soal serta prosentasi kehadiran dalam praktik profesi ners. (5) Kuesioner E, berisikan tentang nilai hasil tryout Nasional uji kompetensi ners mahasiswa program profesi ners STIKes Faletehan Serang, (6) Kuesioner F, berisikan tentang nilai hasil kelulusan uji kompetensi Ners yang diperoleh dari Hasil pengumuman Uji Kompetensi Ners Periode XI 2017.

Analisis data dilakukan lewat statistik univariat, analisis bivariat dan analisis multivariat. Analisis bivariat menggunakan uji *Chi-Square*, sedangkan analisis multivariat menggunakan uji analisis regresi logistik sederhana dengan model prediksi. Hal demikian dikarenakan variabel terikat berupa variabel kategorik berskala dikotomi (Dahlan, 2014; Dharma, 2011). Tahapan yang dilakukan dalam melakukan analisis multivariat meliputi : 1) seleksi bivariat, 2) permodelan multivariat dengan menggunakan metode ENTER, dan 3) permodelan akhir multivariat.

HASIL DAN PEMBAHASAN

Hasil

Berbagai faktor yang memengaruhi capaian kelulusan mahasiswa Program Profesi Ners ditunjukkan pada Tabel 1.

Tabel 1. Gambaran Faktor yang Memengaruhi Capaian Kelulusan UKNI Mahasiswa Program Profesi Ners

Karakteristik Responden	Frekuensi (n)	Persentase (%)
Kecemasan		
0. Cemas	53	50,0%
1. Tidak Cemas	53	50,0%
IPK Akademik		
0. Sangat Memuaskan	44	41,5%
1. Cum Laude	62	58,5%
Dukungan Keluarga		
0. Negatif	53	50,0%
1. Positif	53	50,0%
Dukungan Teman Sebaya		
0. Negatif	53	50,0%
1. Positif	53	50,0%
Keaktifan		
0. Tidak Aktif	24	22,6%
1. Aktif	82	77,4%
Hasil TO Nasional		
0. Tidak Lulus	30	28,3%
1. Lulus	76	71,7%

Lewat Tabel 1 teridentifikasi bahwa setengah dari responden dengan persentase sebesar 50.0% berada pada kategori cemas, dukungan keluarga dengan kategori negatif serta dukungan teman sebaya dengan kategori negatif.

Berdasarkan gambaran predikat kelulusan melalui Indeks Prestasi Kumulatif Akademik, dari 106 responden yang diikutsertakan dalam penelitian ini, hampir sebagian besar responden dengan persentase sebesar 58.5%, memiliki predikat *cum laude*, dan sebagian besar responden 77.4% aktif dalam mengikuti rangkaian program profesi ners serta sebesar 71.7% dinyatakan lulus pada Try Out Nasional.

Tabel 2. Gambaran Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Capaian Kelulusan	Frekuensi (n)	Persentase (%)
1. Tidak Kompeten	20	18,9%
2. Kompeten	86	81,1%

Lewat Tabel 2 teridentifikasi bahwa sebagian besar responden mendapatkan predikat kompeten pada UKNI 2017.

Lewat Tabel 3 teridentifikasi bahwa responden yang berada pada kategori cemas yang kemudian mendapatkan predikat kompeten pada hasil UKNI 2017. Hasil uji statistik menggunakan uji Kai Kuadrat dengan $\alpha = 0.05$, ketiga variabel diperoleh *p value* sebesar 0.804 untuk variabel kecemasan, 0.804 untuk variabel dukungan keluarga dan 1.000 untuk variabel dukungan teman sebaya ($p\ value > \alpha / 0,05$), dengan demikian dapat disimpulkan bahwa ketiga variabel tersebut yaitu kecemasan, dukungan keluarga dan dukungan teman sebaya teridentifikasi tidak adanya hubungan

yang bermakna dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletehan Serang.

Selain itu, masih pada Tabel 3, diatas, teridentifikasi pula bahwa dari 62 responden yang memiliki predikat IPK Akademik *Cum Laude*, mendapatkan predikat kompeten pada hasil UKNI 2017 sebanyak 55 responden atau sebesar 88.7%, Selanjutnya, dari 82 responden yang berkategori aktif pada rangkaian program profesi ners, mendapatkan predikat kompeten pada hasil UKNI 2017 sebanyak 80 responden atau sebesar 97.6%.

Tabel 3. Hubungan Faktor yang Mempengaruhi Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Variabel	Capaian Kelulusan UKNI		Total	p Value	OR (Odd Ratio)
	Tidak Kompeten	Kompeten			
Kecemasan					
Cemas	9 (17,0%)	44 (83,0%)	53 (100,0%)	0.804	-
Tidak Cemas	11 (20,8%)	42 (79,2%)	53 (100,0%)		
Total	20 (18,9%)	86 (81,1%)	106 (100,0%)		
IPK Akademik					
Sangat Memuaskan	13 (29,5%)	31 (70,5%)	44 (100,0%)	0.034	3,295 (1,19 – 9,12)
Cum Laude	7 (11,3%)	55 (88,7%)	62 (100,0%)		
Total	20 (18,9%)	86 (81,1%)	106 (100,0%)		
Dukungan Keluarga					
Negatif	11 (20,8%)	42 (79,2%)	53 (100,0%)	0.804	-
Positif	9 (17,0%)	44 (83,0%)	53 (100,0%)		
Total	20 (18,9%)	86 (81,1%)	106 (100,0%)		
Dukungan Teman Sebaya					
Negatif	10 (18,9%)	43 (81,1%)	53 (100,0%)	1,000	-
Positif	14 (18,9%)	19 (81,1%)	33 (100,0%)		
Total	20 (18,9%)	86 (81,1%)	106 (100,0%)		
Keaktifan					
Tidak Aktif	18 (75,0%)	6 (25,0%)	24 (100,0%)	0.000	120,0 (22,3 – 643,8)
Aktif	2 (2,4%)	80 (97,6%)	82 (100,0%)		
Total	20 (18,9%)	86 (81,1%)	106 (100,0%)		
Hasil TO Nasional					
Tidak Lulus	14 (46,7%)	16 (53,3%)	30 (100,0%)	0.000	10,20 (3,39 – 30,6)
Lulus	6 (7,9%)	70 (92,1%)	76 (100,0%)		
Total	20 (18,9%)	86 (81,1%)	106 (100,0%)		

Tabel 4. Hasil Seleksi Bivariat Faktor yang Memengaruhi Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Variabel	p Value	Nilai OR Exp (B)	95% CI Exp (B)
Kecemasan	0,619	0,781	0,294 – 2,075
IPK Akademik	0,019	3,295	1,190 – 9,127
Dukungan Keluarga	0,619	1,280	0,482 – 3,402
Dukungan Teman Sebaya	1,000	1,000	0,378 – 2,646
Keaktifan	0,000	120,000	22,365 – 643,868
Hasil Try Out Nasional	0,000	10,208	3,399 – 30,662

Tabel 5. Hasil Permodelan Akhir Faktor yang Memengaruhi Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Variabel	p Value	Nilai OR Exp (B)	95% CI Exp (B)
IPK Akademik	0,331	0,332	0,036 – 3,069
Keaktifan	0,000	156,734	14,376 – 1708,842
Hasil Try Out Nasional	0,398	2,098	0,376 – 11,699

Korelasi antara hasil kelulusan *tryout* Nasional dengan capaian kelulusan UKNI 2017, diperoleh data bahwa dari 76 responden yang mendapatkan predikat lulus pada *Try Out* Nasional dengan nilai batas lulus 48.3, mendapatkan predikat Kompeten pada hasil UKNI 2017 sebanyak 70 responden atau sebesar 92.1%.

Hasil uji statistik menggunakan uji Kai Kuadrat dengan dengan $\alpha = 0.05$, ketiga variabel diperoleh p value sebesar 0.034 dengan *Odd Ratio* : 3.295 untuk variabel IPK Akademik, 0.000 dengan *Odd Ratio* : 120.0 untuk variabel keaktifan dan 0.000 dengan *Odd Ratio* : 10.20 untuk variabel hasil try out nasional ($p \text{ value} < \alpha / 0,05$), dengan demikian dapat disimpulkan bahwa ketiga variabel tersebut yaitu IPK Akademik, keaktifan dan hasil try out nasional, teridentifikasi adanya hubungan yang bermakna dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletahan Serang.

Hasil seleksi bivariat untuk variabel keceemasan, dukungan keluarga dan dukungan teman sebaya menghasilkan p value $> 0,25$, sedangkan variabel IPK Akademik, Keaktifkan dan Hasil Try Out Nasional menghasilkan p value $< 0,25$. Sehingga dengan demikian ketiga variabel (IPK Akademik, Keaktifan dan Hasil Try Out Nasional) diatas tersebut dapat langsung dianalisis kedalam tahapan permodelan multivariat.

Hasil dari analisis multivariat teridentifikasi data bahwa variabel yang memiliki hubungan bermakna dengan capaian kelulusan UKNI adalah variabel keaktifan. Sedangkan variabel Hasil try out nasional dan IPK Akademik adalah sebagai variabel *confounding*. Hasil analisis didapatkan *Odds Ratio* (OR) dari variabel keaktifan adalah

156.734, artinya responden yang tidak aktif dalam mengikuti rangkaian program profesi ners akan berisiko mengalami atau menghasilkan predikat tidak kompeten pada Uji Kompetensi Ners Indonesia sebesar 157 kali lebih tinggi dibandingkan responden dengan kategori aktif setelah dikontrol variabel hasil try out nasional dan IPK Akademik.

Pembahasan

Gambaran Faktor yang Memengaruhi Capaian Kelulusan UKNI Mahasiswa Program Profesi Ners

Kecemasan merupakan perasaan takut yang bersifat lama pada sesuatu yang tidak jelas dan berhubungan dengan perasaan yang tidak menentu dan tidak berdaya (Hartoyo, 2004). Individu yang cemas merasa bahwa kepribadiannya terancam, kepastian untuk menjadi cemas diperlukan untuk bertahan hidup, tetapi tingkat kecemasan yang parah tidak sejalan dengan kehidupan. Pengalaman-pengalaman yang menyebabkan kecemasan bermula ketika masa anak-anak dan akan berlanjut sepanjang hidup, dan akan berhenti dengan ketakutan terhadap sesuatu yang paling kuat yang tidak dikenali (Stuart & Laraia, 2008)

Dalam menghadapi ujian kebanyakan individu mengalami kecemasan, walaupun kecemasan menghadapi ujian merupakan hal yang normal, bahkan bisa menimbulkan motivasi kepada individu untuk lebih giat dalam belajar. Namun, rasa cemas yang berlebihan juga dapat mengganggu fokus dalam belajar bahkan bisa merusak konsentrasi pada saat ujian. Sejumlah penelitian menemukan ada beberapa faktor yang menimbulkan kecemasan menghadapi ujian yang menunjukkan

bahwa ciri-ciri utama ujian bisa menimbulkan kecemasan. Baker (2003) mengemukakan bahwa kecemasan disebabkan karena individu pada umumnya menganggap bahwa tes atau ujian bersifat *aversif* dan perasaan takut tersebut akan semakin meningkat dimana saat waktu ujian semakin dekat. Perasaan cemas yang timbul dikarenakan kekhawatiran terhadap hasil yang akan di peroleh pada saat uji kompetensi nanti.

Selain itu, hasil penelitian ini mengidentifikasi bahwa persentase antara dukungan keluarga dan teman sebaya kategori positif serta dukungan keluarga dan teman sebaya kategori negatif memiliki persentase yang sama, dimana keduanya memiliki persentase sebesar 50.0%. Keluarga, merupakan tempat pertama bagi perkembangan pribadi anak. Anak mulai belajar berbagai hal yang penting bagi kehidupannya baik sebagai makhluk sosial maupun sebagai makhluk individual dalam keluarganya. Bagaimana anak menjalankan perannya kelak, sedikit banyak ditentukan oleh apa yang didupakannya dari keluarga seperti pengalaman berbagi, memberi atau menerima, menjalankan nilai dan norma yang ada, membedakan mana yang baik atau buruk, benar atau salah. Melalui keluarga juga, anak belajar berbagai macam hal yang diperlukan dalam kehidupan sosialnya di masyarakat (Khaliq, Anjana, & Vanay, 2009).

Dukungan keluarga dan orang tua merupakan salah satu kebutuhan terhadap psikologis bagi anak yang memasuki usia remaja, jika kebutuhan ini tidak terpenuhi maka akan mengakibatkan seorang anak tidak banyak memiliki motivasi dalam belajar. Beberapa faktor prestasi hasil belajar yang dipengaruhi oleh dua faktor yaitu faktor internal dan faktor eksternal. Faktor internal yaitu faktor yang berasal dari dalam diri siswa yang terdiri dari faktor psikologis (inteligensi, sikap, bakat, minat, dan motivasi), dan faktor fisiologis (sakit atau cacat tubuh). Faktor eksternal yaitu faktor yang berasal dari luar diri siswa yang meliputi lingkungan sosial (orangtua/keluarga). Lingkungan keluarga yang dimaksud adalah bagaimana orangtua dapat memberikan dampak yang baik maupun buruk dalam kegiatan belajar dan hasil belajar siswa.

Teman sebaya merupakan komponen yang tidak dapat dipungkiri untuk prestasi seorang remaja. Teman sebaya memberikan pengaruh signifikan pada kehidupan seseorang. Papalia (2008), menyatakan bahwa kelompok teman sebaya

merupakan sumber afeksi, simpati, pemahaman, dan panduan moral, tempat bereksperimen, dan setting untuk mendapatkan otonomi dan independensi dari orang tua. Papalia, Olds, & Feldman (2009) mengemukakan bahwa keterlibatan remaja dengan teman sebayanya, selain menjadi sumber dukungan emosional yang penting sepanjang transisi masa remaja, namun sekaligus dapat menjadi sumber tekanan bagi remaja. Akibat dari teman sebaya yang cenderung tidak memberikan dukungan pada remaja adalah remaja cenderung tidak bersemangat dalam kehidupannya dan tidak mampu menghasilkan suatu prestasi yang signifikan

Predikat kelulusan untuk Program Profesi Ners ditentukan dengan hasil nilai IPK. Dimana predikat IPK merupakan gambaran dari keberhasilan akan prestasi belajar. Kategori predikat IPK pada program Profesi Ners terbagi diantaranya; *Cum Laude*, Sangat Memuaskan dan Memuaskan. Hasil penelitian ini menunjukkan data bahwa gambaran predikat kelulusan melalui Indek Prestasi Kumulatif Akademik, dari 106 responden yang diikutsertakan dalam penelitian ini, hampir sebagian besar responden dengan persentase sebesar 58.5% dengan predikat *Cum Laude*, dan hampir setengah dari responden dengan predikat Sangat Memuaskan dengan persentase sebesar 41,5%.

Sudah selayaknya seorang alumnus keperawatan Profesi Ners STIKes Faletehan Serang memiliki IPK tinggi, karena pada dasarnya keberhasilan dan kedatangan mereka sudah di tunggu oleh khalayak masyarakat banyak, tentunya dalam meningkatkan pelayanan keperawatan dan kesehatan. Mendapatkan IPK yang tinggi merupakan gambaran dari hasil seluruh rangkaian proses pembelajaran mahasiswa tersebut, dimana mahasiswa yang memiliki motivasi belajar tinggi serta tekun baik secara kognitif, afektif maupun psikomotor. Mahasiswa tersebut cenderung akan lebih menguasai konsep keperawatan yang nantinya akan diterapkan kepada masyarakat yang membutuhkan seperti halnya apa yang telah dikemukakan oleh Abdillah (2016), bahwasanya mahasiswa dengan IPK yang baik pada fase akhir belajar akan lebih mudah memahami konsep ataupun teori yang telah didapat dan juga akan lebih mudah mengingat sehingga kemampuan intelektualnya meningkat disertai dengan kemampuan teknikal yang meningkat.

Berdasarkan faktor keaktifan, pada penelitian ini pun mengidentifikasi bahwa sebagian

besar responden 77.4% aktif dalam mengikuti rangkaian program profesi ners, dan sisanya sebesar 22.6% mahasiswa tidak aktif dalam seluruh rangkaian program profesi Ners. Keaktifan mahasiswa dalam pembelajaran merupakan hal yang perlu diperhatikan mahasiswa dalam upaya mencapai prestasi belajar yang optimal. Mahasiswa yang belajarnya aktif dan memiliki motivasi yang tinggi akan mampu mencapai prestasi belajar yang tinggi akan mampu mencapai prestasi belajar yang tinggi. Hal demikian tentunya tidak terlepas dengan apa yang telah dibuktikan para mahasiswa bahwa dalam hasil penelitian ini pun menemukan data bahwa sebagian besar responden 71.7% dinyatakan lulus pada *try out* nasional yang diselenggarakan oleh AIPNI, dan sisanya sebesar 28.3% dinyatakan tidak lulus dalam *try out* nasional. Kelulusan tersebut tidak lain merupakan gambaran dari hasil usaha para mahasiswa dengan keaktifan dalam mengikuti rangkaian program pembelajaran yang telah dibuat dan disusun oleh program profesi ners STIKes Faletahan Serang.

Gambaran Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Kompetensi dapat diartikan sebagai kemampuan seseorang yang mencakup atas pengetahuan, keterampilan dan sikap dalam menyelesaikan suatu pekerjaan atau tugas dengan standar kinerja (*performance*) yang ditetapkan. Standar kompetensi perawat merefleksikan atas kompetensi yang diharapkan dimiliki oleh individu yang akan bekerja di bidang pelayanan keperawatan (PPNI, 2005). Kompetensi perawat inilah yang akan berorientasi terhadap kualitas kinerja yang akan menjamin mutu pelayanan keperawatan. Uji Kompetensi merupakan salah satu instrumen yang diwajibkan pemerintah untuk memastikan kualitas lulusan yang berkualitas. Pada uji kompetensi terdapat suatu proses untuk mengukur pengetahuan, keterampilan, dan sikap tenaga kesehatan sesuai dengan standar profesi

Hasil penelitian mengidentifikasi bahwa sebagian besar responden mendapatkan predikat kompeten pada UKNI 2017 sebanyak 86 responden dengan persentase sebesar 81.1%, dan sebanyak 20 responden atau sebesar 18.9% mendapatkan predikat tidak kompeten pada UKNI 2017. Angka kelulusan tersebut, tentunya tidak terlepas dari berbagai upaya serta program-program yang telah disusun, guna mencapai kelulusan UKNI 2017.

Program Profesi Ners STIKes Faletahan Serang, telah menyusun beberapa program dalam pencapaian kelulusan UKNI, diantaranya adalah penerbitan buku latihan soal-soal UKNI, pengkayaan dan pembekalan analisis soal serta *try out* lokal dan komprehensif pada setiap mata kuliah. Hal ini dilatarbelakangi bahwa setiap mahasiswa yang dinyatakan lulus dan telah mengikuti semua proses pembelajaran pada program profesi ners, diharuskan untuk mengikuti Uji Kompetensi Ners Nasional (UKNI) serta lulus dalam ujian tersebut. Uji Kompetensi ini merupakan salah satu instrumen yang diwajibkan pemerintah untuk memastikan kualitas lulusan yang berkualitas, sehingga pada akhirnya mahasiswa akan akan kompeten dan bekerja secara profesional saat mulai terjun dan berhadapan dengan masyarakat baik dalam tatanan layanan keperawatan di rumah sakit maupun komunitas.

Hubungan antara Kecemasan dengan Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Hasil penelitian ini sejalan dengan apa yang telah ditemukan oleh Rahadian, Iskandar, & Riyadi (2017) dalam penelitiannya mengidentifikasi bahwa sebagian besar responden dalam kategori cemas tinggi dan lulus uji kompetensi. Namun, hasil penelitian ini bersinggungan dengan apa yang telah ditemukan oleh Atik (2016), dalam penelitiannya bahwa kecemasan dapat mempengaruhi hasil ujian, semakin kecil nilai ujian semakin tinggi tingkat kecemasan yang mempengaruhi proses belajar. Begitupun dengan apa yang dikemukakan oleh peneliti sebelumnya oleh Yanti, Erlamsyah, & Zikra (2013) bahwa Kecemasan atau *anxiety* merupakan salah satu bentuk emosi individu yang berkenaan dengan adanya rasa terancam oleh sesuatu, biasanya dengan objek ancaman yang tidak begitu jelas. Kecemasan dengan intensitas wajar dapat dianggap memiliki nilai positif sebagai motivasi, tetapi apabila intensitasnya tinggi dan bersifat negatif dapat menimbulkan kerugian dan dapat mengganggu keadaan fisik dan psikis individu yang bersangkutan.

Dari hasil penelitian ini menggambarkan bahwa kecemasan bukan merupakan faktor utama yang dapat mempengaruhi ketidakkelulusan para mahasiswa dalam menghadapi ujian kompetensi. Kecemasan akan sering terjadi pada siswa yang akan menghadapi Ujian Nasional, hal demikian

merupakan kondisi normal, namun sejauh mana siswa tersebut dapat mengatasi rasa cemasnya, tergantung pada kemampuan siswa tersebut untuk merespon kecemasan yang dialaminya, seperti halnya mahasiswa lebih meningkatkan frekuensi belajar dengan mengikuti bimbingan belajar atau dengan mengadakan belajar kelompok. Fenomena diatas merupakan kondisi yang nyata pada lingkungan program profesi ners STIKes Faletahan Serang, dimana temuan dalam penelitian ini, mahasiswa merasakan perasaan cemas yang meningkat, terlebih lagi saat waktu ujian semakin dekat, namun sisi positif yang muncul dari kecemasan tersebut, seringkali mahasiswa lebih banyak mencari alternatif untuk menurunkan kecemasannya seperti halnya seringkali menanyakan kepada para dosen pengampu terkait rancangan program yang akan diberikan kepada mahasiswa untuk mencapai kelulusan pada UKNI, selain itu mahasiswa seringkali berdiskusi mengenai temuan kasus-kasus klinik yang mereka temukan saat dilaksanakannya praktik.

Keadaab diatas merupakan bentuk mekanisme coping yang positif dari para mahasiswa untuk menurunkan intensitas kecemasan yang dialaminya dalam menghadapi ujian kompetensi, sehingga pada akhirnya, dalam hasil penelitian ini teridentifikasi setengah dari responden (50.0%) mengalami kecemasan, namun sebagian besar responden mendapatkan predikat kompeten pada UKNI 2017.

Hubungan IPK Akademik dengan Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Hasil penelitian ini sejalan dengan apa yang telah ditemukan oleh penelitian yang serupa oleh Pusparini dkk (2016) bahwa adanya korelasi yang signifikan antara IPK Program Sarjana Kedokteran Dengan Nilai UKMPPD CBT dengan nilai signifikansi sebesar 0,00. Tingkat keeratan hubungan adalah kuat ditandai dengan nilai *Pearson Correlation* 0,625. Dengan besar koefisien determinasi adalah 39%. Namun disisi lain, hasil penelitian ini tidak sependapat dengan apa yang telah ditemukan oleh Rahadian dkk (2017) bahwa hasil tabulasi silang IPK profesi ners dengan kelulusan uji kompetensi didapatkan 4 responden berpredikat dengan pujian tidak lulus uji kompetensi perawat, dan hasil uji statistik menggunakan gamma antara IPK jenjang profesi ners dengan uji kompetensi didapatkan hasil *p value* 0,106.

IPK merupakan hasil evaluasi pelajaran yang diperoleh dari kegiatan belajar di sekolah atau perguruan tinggi yang bersifat kognitif dan biasanya ditentukan melalui pengukuran dan penilaian. Hasil prestasi akademik pada Program Profesi Ners STIKes Faletahan Serang ditentukan berdasarkan Nilai Indeks Prestasi Kumulatif. Penentuan IPK sendiri didasarkan dari semua komponen penilaian pada 9 mata kuliah yang ada di Program Profesi Ners dengan total SKS 36 meliputi Keperawatan Medikal Bedah, Maternitas, Anak, Gerontik, Manajemen Keperawatan, Keperawatan Jiwa, Gawat Darurat dan Kritis serta Keperawatan Komunitas dan Keluarga.

Masing-masing mata kuliah memiliki komponen bobot penilaian, dimana item-item bobot penilaian yang ada di setiap mata kuliah diantaranya; penilaian kinerja klinik, sikap, penilaian laporan kasus, serta penilaian ujian praktik klinik. Penilaian masing masing komponen menggunakan format yang sudah distandarkan berdasarkan Standar Mutu Penjaminan Internal (SPMI) STIKes Faletahan Serang, hal demikian bertujuan untuk masing masing setiap dosen pengampu dapat memberikan penilaian secara objektif terhadap para mahasiswanya.

Melalui penilaian secara objektif, maka para mahasiswa akan mendapatkan IPK yang berbeda beda, bergantung dari prestasi dan aktivitas yang dimiliki oleh masing-masing mahasiswa dalam rangkaian praktik profesi ners yang merupakan *output* dari proses pembelajaran. Uraian diatas sejalan dengan apa yang dikemukakan oleh Sukmadinata (2005) yang menjelaskan bahwa prestasi atau hasil belajar (*achievement*) merupakan realisasi dari kecakapan-kecakapan potensial atau kapasitas yang dimiliki seseorang. Penguasaan hasil belajar dapat dilihat dari perilakunya, baik perilaku dalam bentuk penguasaan pengetahuan, keterampilan berpikir maupun keterampilan motorik.

Kuh dkk (2006), mengemukakan bahwa jika dilihat berdasarkan faktanya, prediktor terbaik dari nilai (IPK) perkuliahan adalah kombinasi antara persiapan akademis individu, nilai (IPK), cita-cita dan motivasi mahasiswa. Hal ini pun sejalan dengan apa yang dikemukakan oleh Newton dan Moore (2009), hasil penelitiannya menunjukkan bahwa skor *Undergraduate Grade Point Average* (UGPA) dan test bakat akademis *Graduate Record Examination* (GRE) adalah prediktor yang baik dalam menilai kesuksesan

sekolah tingkat selanjutnya, tetapi UGPA diduga merupakan prediktor yang lebih baik. Hasil penelitian-penelitian terdahulu secara konsisten menyatakan bahwa nilai IPK S1 merupakan *key predictor* dalam menentukan kinerja akademik.

Hubungan antara Dukungan Keluarga dengan Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Kelulusan UKNI pada mahasiswa Program Profesi Ners merupakan salah satu bentuk keberhasilan dalam prestasi belajar mahasiswa perawat, dimana keberhasilan belajar tidak pernah terlepas dari dukungan beberapa faktor internal maupun eksternal. Salah satunya adalah dukungan keluarga/orang tua. Dukungan keluarga dan orang tua merupakan salah satu kebutuhan terhadap psikologis bagi anak yang memasuki usia remaja, jika kebutuhan ini tidak terpenuhi maka akan mengakibatkan seorang anak tidak banyak memiliki motivasi dalam belajar.

Hasil penelitian ini menunjukkan bahwa dukungan keluarga teridentifikasi tidak memiliki hubungan yang bermakna dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletahan Serang. Hasil penelitian ini tidak sependapat dengan apa yang telah ditemukan pada penelitian serupa sebelumnya oleh Syarafuddin (2012), mengidentifikasi bahwa siswa yang mendapatkan dukungan orang tua yang positif mampu meningkatkan hasil belajar secara positif. Sebaliknya, tidak adanya dukungan orangtua maka hasil belajar siswa akan menurun. serta penelitian yang telah dikemukakan oleh Rohmah (2010), bahwa adanya hubungan antara motivasi belajar dengan prestasi belajar mata kuliah Askeb 3 mahasiswa DIV Kebidanan FK UNS. Motivasi belajar mempunyai korelasi positif dan meyakinkan terhadap prestasi belajar sebesar 0,570, sedangkan motivasi belajar mempunyai sumbangan efektif sebesar 32,49% terhadap prestasi belajar.

Adanya perbedaan hasil penelitian ini dengan peneliti-peneliti sebelumnya yang mengindikasikan bahwa adanya korelasi antara dukungan orangtua terhadap motivasi belajar, tidak terlepas dari hasil studi awal serta asumsi peneliti. Pada dasarnya para orangtua mahasiswa Program Profesi Ners STIKes Faletahan ini telah memberikan dukungan besar kepada para anaknya untuk belajar dengan sungguh-sungguh, namun dukungan tersebut tidak berbersifat menyeluruh, hanya

sebatas mengingatkan kepada para anaknya untuk tetap belajar, memfasilitasi kebutuhan belajar serta membiayai kebutuhan-kebutuhan finansial para mahasiswa. Adapun dorongan terkait capaian kelulusan UKNI, para orangtua belum sepenuhnya. Hal demikian dikarenakan masih banyak orang tua belum mengenal jauh serta memahami terhadap UKNI.

Uji coba UKNI diperkenalkan pada tahun 2013, dimana pelaksanaan UKNI pertama kali dilaksanakan pada tahun 2015 sehingga sudah sewajarnya para orang tua/keluarga belum begitu banyak tahu/mengenal UKNI. Masih tampak banyak para orangtua mahasiswa memahami jenjang pendidikan hanya sampai kepada program Sarjana Keperawatan yang kemudian dilanjutkan Program Profesi Ners. Terkait dengan persyaratan yang harus dimiliki oleh para mahasiswa ketika selesai menjalani Program Profesi Ners adalah Lulus Uji Kompetensi dengan dibuktikan terbitnya Surat Tanda Registrasi (STR), para orang tua belum banyak memahaminya. Oleh sebab itu, perlu adanya peningkatan sosialisasi terkait UKNI kepada keluarga/orangtua mahasiswa.

Hubungan antara Dukungan Teman Sebaya dengan Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Teman sebaya merupakan komponen yang tidak dapat dipungkiri untuk prestasi seorang remaja. Teman sebaya memberikan pengaruh signifikan pada kehidupan seseorang. Papalia dkk (2009), menyatakan bahwa kelompok teman sebaya merupakan sumber afeksi, simpati, pemahaman, dan panduan moral, tempat bereksperimen, dan *setting* untuk mendapatkan otonomi dan independensi dari orang tua. Di lain pihak, Papalia dkk (2009), juga mengemukakan bahwa keterlibatan remaja dengan teman sebayanya, selain menjadi sumber dukungan emosional yang penting sepanjang transisi masa remaja, namun sekaligus dapat menjadi sumber tekanan bagi remaja.

Hasil penelitian ini menemukan bahwa dukungan teman sebaya teridentifikasi tidak memiliki hubungan yang bermakna dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletahan Serang. Hasil penelitian ini pun berbeda dengan apa yang telah dikemukakan Kail & Cavanaugh (2000), bahwa dukungan sosial sebagai sumber emosional, informasional atau pendampingan yang diberikan oleh orang-orang di sekitar individu untuk menghadapi setiap

permasalahan dan krisis yang terjadi sehari-hari dalam kehidupan. Dukungan kelompok yang adekuat menjadikan lulusan ners lebih mudah dalam penyesuaian diri dengan lingkungannya sehingga menimbulkan ketenangan saat mengikuti UKNI. Hal yang sama dikemukakan oleh Carrick (2011), bahwa terdapat beberapa intervensi yang dapat meningkatkan hasil NCLEX-RN yaitu dukungan kelompok pada saat NCLEX-RN berlangsung.

Kondisi di lapangan, antara kelompok para mahasiswa Program Profesi Ners STIKes Faletehan Serang, saling memberikan dukungan terhadap temannya, khususnya terkait Uji Kompetensi Ners Nasional (UKNI). Namun, disisi lain, mereka pun dalam situasi yang sama, yaitu mempersiapkan diri untuk mencapai predikat kompeten pada UKNI 2017. Sehingga dukungan yang diberikan oleh teman kelompok / teman sebaya tidak sepenuhnya, asumsi ini sesuai dengan studi awal peneliti, beberapa mahasiswa mengatakan bahwa kecemasan serta kekhawatiran pada diri mahasiswa untuk mencapai kelulusan UKNI sangat tinggi, sehingga para mahasiswa lebih banyak menghabiskan waktunya untuk persiapan diri sendiri, namun motivasi untuk teman kelompoknya tetap dilaksanakan sebatas mengingatkan. Oleh karena itu pada hasil penelitian ini teridentifikasi bahwa responden yang berada pada kategori dukungan teman sebaya negatif maupun positif dengan persentase sebesar 81.1% keduanya mendapatkan predikat kompeten pada hasil UKNI 2017.

Hubungan Keaktifan dengan Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Keaktifan merupakan keterlibatan intelektual emosional siswa dalam kegiatan belajar mengajar yang bersangkutan, asimilasi dan akomodasi kognitif dalam pencapaian pengetahuan, perbutan serta pengalaman langsung terhadap balikkannya (*feed back*) dalam pembentukan sikap (Usman, 2007). Hasil penelitian ini menemukan bahwa keaktifan teridentifikasi memiliki hubungan yang bermakna dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletehan Serang.

Komponen keaktifan pada penelitian ini dinilai berdasarkan keikutsertaan para mahasiswa dalam rangkaian program tambahan dalam mencapai kelulusan UKNI yang merupakan bentuk

upaya Program Studi Profesi Ners STIKes Faletehan. Beberapa rancangan program yang telah di susun diantaranya; penerbitan buku latihan soal uji kompetensi yang dikumpulkan dari setiap dosen pengampu, program pembekalan dan pengkayaan soal uji kompetensi, program *try out* lokal serta *try out* komprehensif saat mendekati ujian UKNI. Program tersebut dimulai saat awal para mahasiswa memulai Program Profesi Ners sampai kepada stase akhir, dimana para mahasiswa harus mengikuti UKNI Oktober tahun 2017.

Di sisi lain, ditemukannya sebesar 22.4% mahasiswa yang tidak aktif dalam seluruh rangkaian program ini dikarenakan beberapa alasan, seperti halnya absen pada 1 atau 2 kegiatan yang sudah dijadwalkan. Namun mahasiswa tersebut tetap diberikan penugasan oleh dosen pengampu untuk menyesuaikan hal-hal yang tertinggal. Keaktifkan para mahasiswa dalam seluruh rangkaian program tidak tercapai dari beberapa faktor diantaranya adalah keefektifan proses pembelajaran dengan menciptakan suasana nyaman bagi para mahasiswa seperti halnya menciptakan suasana kelas dengan menambahkan aroma terapi. Papastavrou dkk (2010) menjelaskan bahwa keefektifan suatu pembelajaran pada mahasiswa dipengaruhi pula oleh dukungan fasilitas untuk menjadi bagian dari suatu tim. Jika lingkungan tidak terstruktur dengan baik, hal ini dapat membuat mahasiswa mudah terancam dan mengalami kecemasan. Dimana untuk hal tersebut juga sudah diatur dalam Kemenkes RI. (2010), mengenai manajemen iklim pembelajaran laboratorium. Faktor lingkungan fisik merupakan faktor dimana pengajaran dilakukan sehingga membuat proses belajar menjadi menyenangkan atau menjadi suatu pengalaman yang menyulitkan. Dalam hal ini, harus memilih lingkungan yang membantu untuk memfokuskan diri pada tugas pembelajaran. Jumlah peserta yang diajar, kebutuhan untuk ketenangan, temperatur ruangan, pencahayaan, kebisingan, ventilasi udara, dan perabot ruangan sangat penting ketika memilih tempat (Potter & Perry, 2010).

Berdasarkan uraian diatas, peneliti berasumsi bahwa keaktifan mahasiswa dalam mengikuti proses rangkaian program yang telah ditetapkan Program Studi merupakan salah satu faktor yang mempengaruhi keberhasilan mahasiswa dalam mencapai kelulusan UKNI, karena didalam program tersebut melibatkan proses pembelajaran yang tentunya meningkatkan kem-

bali pemahaman kepada para mahasiswa untuk menjawab soal-soal UKNI. Hal ini sesuai dengan apa yang telah dikemukakan Usman (2007) bahwa keaktifan dapat ditingkatkan dan diperbaiki dalam keterlibatan siswa pada saat belajar, untuk memperbaiki keterlibatan siswa diantaranya yaitu abadikan waktu yang lebih banyak untuk kegiatan belajar mengajar, tingkatkan partisipasi siswa secara efektif dalam kegiatan belajar mengajar, serta berikanlah pengajaran yang jelas dan tepat sesuai dengan tujuan mengajar yang akan dicapai

Hubungan Hasil Nilai Try Out Nasional dengan Capaian Kelulusan UKNI 2017 Mahasiswa Program Profesi Ners

Uji kompetensi merupakan bagian dari penilaian hasil belajar mahasiswa di bidang kesehatan dan dibagi dalam dua tahap yaitu uji tertulis dan uji praktek. Berdasarkan Surat Edaran yang dikeluarkan oleh Direktorat Jenderal Dikti uji kompetensi ini dapat dilaksanakan pada tahap akhir setelah menyelesaikan seluruh tahap pendidikan sebagai *exit exam* dimana hal tersebut tidak terlepas dalam memperhatikan pentingnya lingkungan akademik secara profesional (Kemristek Dikti, 2013). Uji kompetensi diselenggarakan untuk menghasilkan tenaga kesehatan yang kompeten sesuai dengan standar kompetensi lulusan dan standar kompetensi kerja (PBM No. 36 tahun 2013).

Uji coba uji kompetensi adalah tahap uji coba pengerjaan soal sebelum melaksanakan uji kompetensi yang sesungguhnya. Asosiasi Institusi Penyelenggara Pendidikan Ners Indonesia (AIPNI) tahun (2015) menjelaskan bahwa uji kompetensi ners adalah suatu keharusan sesuai dengan peraturan perundangan yang berlaku, salah satu komponen penting dalam kegiatan tersebut adalah pengembangan soal uji untuk memperoleh soal yang berkualitas baik dan sesuai dengan kardah pengembangan soal sebagai alat uji, untuk itu maka perlu dilaksanakan *try out* bagi para calon lulusan ners.

Hasil penelitian ini mengidentifikasi bahwa bahwa hasil *try out* nasional teridentifikasi memiliki hubungan yang bermakna dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletahan Serang.

Hasil ini sejalan dengan apa yang ditemukan oleh peneliti sebelumnya Manalu dan Pitono (2016) dalam penelitiannya yang mengidentifikasi tingkat kelulusan UKNI berdasarkan nilai *Try*

Out Nasional, diperoleh hasil bahwa sebanyak 86,4 % peserta yang lulus UKNI memiliki nilai TO lebih tinggi atau sama dengan nilai kelulusan UKNI. Sementara 87,9 % peserta yang tidak lulus UKNI memiliki nilai TO lebih rendah dari nilai kelulusan UKNI. Lulusan dengan nilai TO lebih tinggi atau sama dengan nilai kelulusan UKNI memiliki peluang 3,4 kali lebih besar (IK 95% = 2,1-5,7) untuk lulus UKNI dibandingkan dengan lulusan dengan nilai TO lebih rendah dari nilai kelulusan UKNI (Pitono & Istianah, 2016).

Mahasiswa Keperawatan pada akhir proses pendidikan harus mengikuti Uji Kompetensi Nasional sesuai dengan amanat UU 38 Tahun 2014 pasal 16. Mahasiswa Keperawatan sebelum mengikuti Uji Kompetensi Nasional akan mengikuti *Try out* Uji Kompetensi Ners. Pada Program Profesi Ners STIKes Faletahan Serang, Dalam rangkaiannya, mahasiswa tersebut diharuskan mengikuti *Try Out* Nasional sebanyak 2 kali dalam 1 tahun. Hal demikian bertujuan agar selain persiapan proses pembelajaran untuk mencapai kelulusan UKNI, mahasiswa pun dipersiapkan dengan uji coba / *try out* Nasional yang diadakan oleh AIPNI dengan tujuan untuk mempersiapkan calon lulusan yang akan menghadapi uji kompetensi pada tahap akhir kelulusan, dan juga *try out* uji kompetensi merupakan bagian dari siklus uji kompetensi yang sangat diperlukan sebagai upaya untuk memberikan pengalaman dan mempersiapkan mental serta berlatih mahasiswa dalam menghadapi Uji Kompetensi yang terstandar.

Pada hasil *try out* Nasional, setiap mahasiswa mendapatkan lembaran hasil yang dilengkapi dengan 7 tinjauan pada soal-soal UKNI. Dimana dalam 7 tinjauan tersebut terlihat item mana yang perlu di tingkatkan oleh para mahasiswa serta para dosen pengampu seperti halnya peningkatan terkait menjawab soal-soal diagnosa keperawatan, soal soal dari masing-masing mata kuliah, sehingga hal ini memungkinkan mahasiswa untuk dapat meningkatkan kembali persiapan serta belajarnya untuk ujian sebenarnya yaitu UKNI. Hal ini sesuai dengan apa yang telah diungkapkan oleh Wijaya dkk (2017), bahwa kaitan hasil *try out* UKNI dapat dijadikan evaluasi terhadap akar permasalahan keberhasilan capaian hasil UKNI dan dapat dicarikan solusi yang tepat sebagai bentuk penjaminan mutu penyelenggaraan pendidikan keperawatan yang berkelanjutan.

Keaktifan Mengikuti Rangkaian Program Profesi Ners

Keaktifan mahasiswa dalam pembelajaran merupakan hal yang perlu diperhatikan mahasiswa dalam upaya mencapai prestasi belajar yang optimal. Mahasiswa yang belajarnya aktif dan memiliki motivasi yang tinggi akan mampu mencapai prestasi belajar yang tinggi akan mampu mencapai prestasi belajar yang tinggi. Hasil dari analisis multivariat pada penelitian ini teridentifikasi data bahwa variabel yang memiliki hubungan bermakna dengan capaian kelulusan UKNI adalah variabel keaktifan. Sedangkan variabel hasil *try out* nasional dan IPK Akademik adalah sebagai variabel *confounding*. Hasil analisis didapatkan *Odds Ratio* (OR) dari variabel keaktifan adalah 156.734, artinya responden yang tidak aktif dalam mengikuti rangkaian program profesi ners akan berisiko mengalami / menghasilkan predikat tidak kompeten/lulus pada UKNI sebesar 157 kali lebih tinggi dibandingkan responden dengan kategori aktif setelah dikontrol variabel hasil *try out* nasional dan IPK Akademik. Secara sama dapat diinterpretasikan untuk variabel yang lain.

Djamarah dkk (2010), mengemukakan bahwasanya dalam proses belajar mengajar, aktivitas siswa yang diharapkan tidak hanya aspek fisik, melainkan juga aspek mental. Kedua pendapat tersebut diperkuat oleh pendapat Goodwin, & Webb (2014) dalam *Research in Higher Education Journal* yaitu: “*constructivism is characterized by teachers who us active, engaging learning activities to cause students to create knowledge, and them to reflect and talk about what they are doing as their understanding changes*”.

Keterkaitan motivasi para mahasiswa untuk dapat aktif dalam rangkaian program pembelajaran, tentunya tidak terlepas dari beberapa item yang telah banyak dilakukan oleh pada dosen pengampu, seperti halnya; memberikan kesempatan, peluang seluas-luasnya kepada siswa untuk berkreativitas dalam proses belajarnya, memberi tugas individual dan kelompok yang kemudian di bahas secara bersama sehingga menemukan hal yang perlu dikoreksi bersama, serta menggunakan berbagai metode dan multi media di dalam pembelajaran.

Seperti apa yang telah uraikan sebelumnya pada hasil penelitian ini, bahwa komponen keaktifan pada penelitian ini dinilai berdasarkan keikutsertaan para mahasiswa dalam rangkaian program tambahan dalam mencapai kelulusan

UKNI yang merupakan bentuk upaya Program Studi Profesi Ners STIKes Faletahan. Beberapa rancangan program yang telah disusun diantaranya; penerbitan buku soal-soal uji kompetensi yang dikumpulkan dari setiap dosen pengampu, program pembekalan dan pengkayaan soal-soal uji kompetensi, program *try out* lokal setiap akhir stase mata kuliah serta program persiapan *try out* komprehensif saat mendekati ujian UKNI. Program tersebut dimulai saat awal para mahasiswa memulai Program Profesi Ners sampai kepada stase akhir, dimana para mahasiswa harus mengikuti Uji Kompetensi Ners Nasional (UKNI) Indonesia pada tahun 2017.

Dengan demikian, para mahasiswa yang aktif terhadap seluruh rangkaian proses pembelajaran khususnya terkait capaian kelulusan UKNI, secara otomatis akan mampu memahami, dan mempelajari dinamika, serta kiat-kiat dalam menghadapi soal UKNI. Para mahasiswa yang aktif akan mampu menemukan beraneka ragam macam kasus-kasus dalam tatanan pelayanan keperawatan serta menentukan diagnosa keperawatan. Usman (2007) bahwa cara untuk memperbaiki keterlibatan siswa diantaranya yaitu abadikan waktu yang lebih banyak untuk kegiatan belajar mengajar, tingkatkan partisipasi siswa secara efektif dalam kegiatan belajar mengajar, serta berikanlah pengajaran yang jelas dan tepat sesuai dengan tujuan mengajar yang akan dicapai. Selain memperbaiki keterlibatan siswa juga dijelaskan cara meningkatkan keterlibatan siswa atau keaktifan siswa dalam belajar.

PENUTUP

Berdasarkan hasil penelitian dan pembahasan dapat disimpulkan bahwa tidak adanya hubungan yang signifikan antara kecemasan, dukungan keluarga dan dukunga teman sebaya dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletahan Serang. Sementara hasil lainnya hubungan antara IPK Akademik, keaktifan dan hasil *try out* nasional, teridentifikasi adanya hubungan yang bermakna dengan capaian kelulusan UKNI mahasiswa Program Profesi Ners STIKes Faletahan Serang. Hasil dari analisis regresi logistik sederhana model prediksi, teridentifikasi didapatkan *Odds Ratio* (OR) dari variabel keaktifan adalah 156.734. Hal itu berarti keaktifan memiliki pengaruh yang dominan terhadap capaian kelulusan UKNI Program Profesi Ners STIKes Faletahan setelah

dikontrol variabel hasil *try out* nasional dan IPK Akademik.

Hendaknya hasil penelitian ini dapat dijadikan bahan evaluasi dalam peningkatan capaian kelulusan UKNI Mahasiswa Program Profesi NERS selanjutnya, Peningkatan capaian lulusan yang diperoleh para mahasiswa merupakan tolak ukur/ gambaran pelaksanaan proses pembelajaran yang optimal serta peningkatan dalam upaya penyelenggaraan penjaminan mutu perguruan tinggi.

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PENGEMBANGAN PEMBELAJARAN BERBASIS *WEB* UNTUK MENINGKATKAN KEMAMPUAN MENULIS KREATIF MAHASISWA PGSD

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Abstrak: Penelitian ini bertujuan mengembangkan pembelajaran berbasis *web* yang layak dan efektif dalam meningkatkan kemampuan menulis kreatif mahasiswa PGSD. Metode penelitian ini adalah *Research and Development* (R&D) yang dikembangkan Borg and Gall. Data dikumpulkan dari penilaian ahli materi, angket mahasiswa, dan tes kemampuan menulis kreatif. Pengembangan pembelajaran berbasis *web* dilakukan dengan mengembangkan perangkat pembelajaran yang meliputi silabus, satuan acara perkuliahan, media pembelajaran berbasis *web*, dan penilaian menulis kreatif. Teknik pengumpulan data dilakukan lewat angket untuk validasi produk dan tes untuk uji coba di lapangan, sedang teknik analisis data dilakukan lewat teknik statistik deskriptif dan t-tes untuk uji beda mean lewat bantuan SPSS 16. Hasil penelitian menunjukkan bahwa perangkat pembelajaran yang dikembangkan layak dan efektif untuk digunakan dalam proses pembelajaran. Kelayakan tersebut dilihat dari penilaian ahli materi dan respon mahasiswa yang sama-sama menilai baik. Sementara itu, keefektifan pembelajaran berbasis *web* dalam meningkatkan kemampuan menulis kreatif didasarkan adanya peningkatan dan perbedaan rata-rata kemampuan menulis kreatif mahasiswa yang signifikan setelah perlakuan.

Kata kunci: *pengembangan pembelajaran, pembelajaran berbasis web, menulis kreatif, PGSD*

THE DEVELOPMENT OF A WEB-BASED LEARNING TO IMPROVE OF A CREATIVE WRITING ABILITY OF PGSD STUDENTS

Abstract: This research was aimed to develop a feasible and effective web-based learning in improving a creative writing ability for PGSD students. This was a research and development (R&D) study developed by Borg & Gall. Data was gathered from assessment of material experts, student questionnaire and a creative writing ability test. The development of a web-based learning was conducted by developing learning equipment that cover syllabus, class event unit (SAP), web-based learning media and a creative writing assessment. The research results showed that learning equipments developed were feasible and effective to be used in a learning process. That feasibility was seen from material expert assessment and students' response with a same good assessment. Meanwhile, the effectiveness of a web-based learning in improving a creative writing ability was based on the improvement and average difference of student creative writing ability that is significant after treatment.

Keywords: *learning development, Web-Based Learning, creative writing, PGSD*

PENDAHULUAN

Di era teknologi informasi dan komunikasi yang serba maju dan canggih dewasa ini, diperlukan pembelajaran yang dapat mengimplementasikan kemajuan teknologi tersebut. Pembelajaran berbasis *web* merupakan salah satu pilihan pembelajaran yang dapat digunakan. Pembelajaran berbasis *web* dilakukan dengan memanfaatkan halaman *web* baik dalam hal perolehan informasi maupun pengolahan halaman *web* tersebut. Pada umumnya, halaman *web* memuat berbagai informasi yang diakses menggunakan

internet didalamnya dapat memuat tulisan, gambar, suara, bahkan video.

Kemudahan dalam mengakses, tampilan yang menarik, serta muatan konten informasi yang beragam membuat *web* cocok digunakan dalam proses pembelajaran. Pembelajaran berbasis *web* juga dapat mendukung hasil belajar siswa. Hal ini didukung oleh penelitian Sunwianti dan Suwito (2016) yang menunjukkan bahwa rata-rata hasil belajar yang dilakukan dengan menggunakan pembelajaran berbasis *web* lebih tinggi dibandingkan pembelajaran yang tidak berbasis *web*.

Mahasiswa juga dapat dikatakan sebagai pengguna *web* yang aktif, terutama dalam menyelesaikan tugas perkuliahan. Hal ini dapat dilihat dari makalah-makalah yang dibuat kebanyakan bersumber dari internet dengan alamat *web* tertentu. Mengerjakan tugas dengan hanya mengandalkan halaman *web* tertentu tentu menimbulkan dampak yang kurang baik, seperti tingginya tingkat plagiasi. Selain itu, juga dapat mengakibatkan ketergantungan dalam pemanfaatan *web* sehingga dapat mengakibatkan matinya kreativitas dan hilangnya kekritisannya dalam diri mahasiswa. Dengan demikian, untuk mengatasi hal tersebut diperlukan pembelajaran berbasis *web* yang tidak hanya memperoleh informasi dari dalamnya, tetapi juga turut aktif dalam pengelolaan *web* tersebut.

Pengolahan *web* untuk mendukung proses pembelajaran masih jarang dilakukan. Pengelolaan *web* dapat memanfaatkan domain gratis, seperti blogspot atau wordpress. Penggunaan domain yang gratis ini mempermudah orang lain dalam mengaksesnya. Orang tidak lagi terbentur dengan masalah biaya untuk dapat mengaksesnya. Pembelajaran berbasis *web* dengan memanfaatkan blog merupakan inovasi dalam kegiatan pembelajaran dapat diterapkan di perguruan tinggi.

Blog dapat dikatakan sebagai media pilihan dalam menuangkan gagasan dalam bahasa tulis. Krisianto (2014:183) mengemukakan bahwa aktivitas utama *blogging* adalah membuat artikel dan meletakkannya dalam blog atau istilah yang sering digunakan adalah *posting*. Pembelajaran berbasis *web* akan memberikan ruang lebih kepada mahasiswa untuk dapat mengemukakan gagasan dalam bahasa tulis, sehingga keterampilan menulis mahasiswa akan semakin terasah.

Menulis sebagai salah satu keterampilan berbahasa kerap menjadi momok yang menakutkan bagi mahasiswa karena dianggap sulit. Kesulitan ini biasanya dijumpai lantaran beberapa hal, tetapi yang paling dominan yaitu kesulitan dalam mengemukakan gagasan melalui bahasa tulis. Hal ini sesuai dengan hakikat menulis sebagaimana dikemukakan Dalman (2016:4) bahwa menulis adalah proses penyampaian pikiran dalam bentuk lambang atau tanda atau tulisan yang bermakna. Kebermaknaan tulisan manakala tulisan dapat dipahami dengan baik oleh orang yang membacanya. Kesulitan dalam menuangkan gagasan tersebut biasanya terjadi

karena kurangnya latihan dalam menulis. Padahal, menulis merupakan sebuah keterampilan, yang akan bisa dikembangkan manakala ada latihan yang terus-menerus.

Mahasiswa perlu memiliki kemampuan menulis yang baik bukan hanya untuk memenuhi tuntutan akademik. Akan tetapi, juga diperlukan agar dapat membuat karya kreatif yang memiliki nilai manfaat bagi sesama. Hal ini sesuai dengan hakekat pembelajaran yang dikemukakan oleh Corey (Sagala, 2011:61) bahwa pembelajaran sebagai proses yang dikelola secara sengaja sehingga menghasilkan respon tertentu. pembelajaran menulis juga dapat dikatakan sebagai suatu proses yang sengaja dilakukan agar dapat meningkatkan kemampuan menulis.

Proses menulis secara umum melewati tiga tahapan, yaitu persiapan, menulis, dan publikasi. Secara rinci, Tomkins & Hoskisson (1995: 212) menyebutkan lima tahap dalam menulis, yaitu: a) *prewriting*, b) *drafting*, c) *revising*, d) *editing*, e) *publishing*.

Pada tahap pra penulisan dilakukan beberapa hal, yaitu: 1) memilih topik; 2) mempertimbangkan fungsi tulisan; 3) identifikasi pembaca; 4) mempertimbangkan bentuk tulisan; dan 5) mengorganisir ide. Pada tahap selanjutnya, yaitu tahap penyusunan merupakan waktu untuk menuangkan ide atau gagasan tanpa memperdulikan ejaan, tanda baca, dan kesalahan teknis lainnya. Pada tahap ketiga yaitu revisi adalah waktu untuk membaca kembali draf dan berbagi draf, kemudian memperbaiki draf berdasarkan umpan balik atau masukan yang telah didapatkan.

Tahap keempat, yaitu edit adalah waktu untuk memperbaiki naskah secara total. Tahap terakhir, yaitu menerbitkan tulisan adalah tahap yang dilakukan agar orang lain dapat membaca tulisan yang sudah baik, sehingga dapat memberi nilai manfaat bagi orang lain.

Menulis memunyai beberapa tujuan, salah satunya adalah menulis kreatif. Menulis kreatif yang dimaksud berkaitan dengan penulisan karya sastra. Penulisan karya sastra dalam penelitian ini difokuskan pada penulisan cerita anak. Nurgiantoro (2015:220) mengemukakan bahwa cerita anak pada umumnya berisi cerita kehidupan, tetapi cerita yang disajikan disesuaikan dengan tingkat perkembangan anak.

Cerita anak selain memuat cerita tentang kehidupan yang disajikan sesuai perkembangan anak, biasanya juga memuat nilai karakter dan

ajaran moral yang baik. Nilai karakter dan ajaran moral yang tersisip dalam cerita anak akan membantu siswa bersikap sesuai dengan aturan. Dengan demikian, cerita anak akan memberikan dua hal sekaligus kepada siswa yaitu memacu minat baca serta pengembangan karakter dalam diri siswa dengan cara-cara yang menyenangkan (Mustadi dkk, 2017). Oleh sebab itu, mahasiswa Pendidikan Guru Sekolah Dasar (PGSD) sebagai calon guru Sekolah Dasar (SD) harus memiliki kemampuan menulis cerita anak yang baik.

Pembelajaran menulis kreatif sebagai salah satu pokok bahasan dalam mata kuliah keterampilan bahasa dan sastra Indonesia, dapat dilakukan dengan menerapkan pembelajaran menulis berbasis *web*. Pembelajaran menulis tersebut menerapkan tahap menulis yang dikemukakan oleh Tomkins & Hoskisson seperti yang telah diuraikan sebelumnya. Hanya saja dalam prosesnya mengkombinasikan dengan pengolahan *web*. Adapun alur pelaksanaan pembelajaran tersebut secara jelas dapat disajikan dalam Gambar 1.

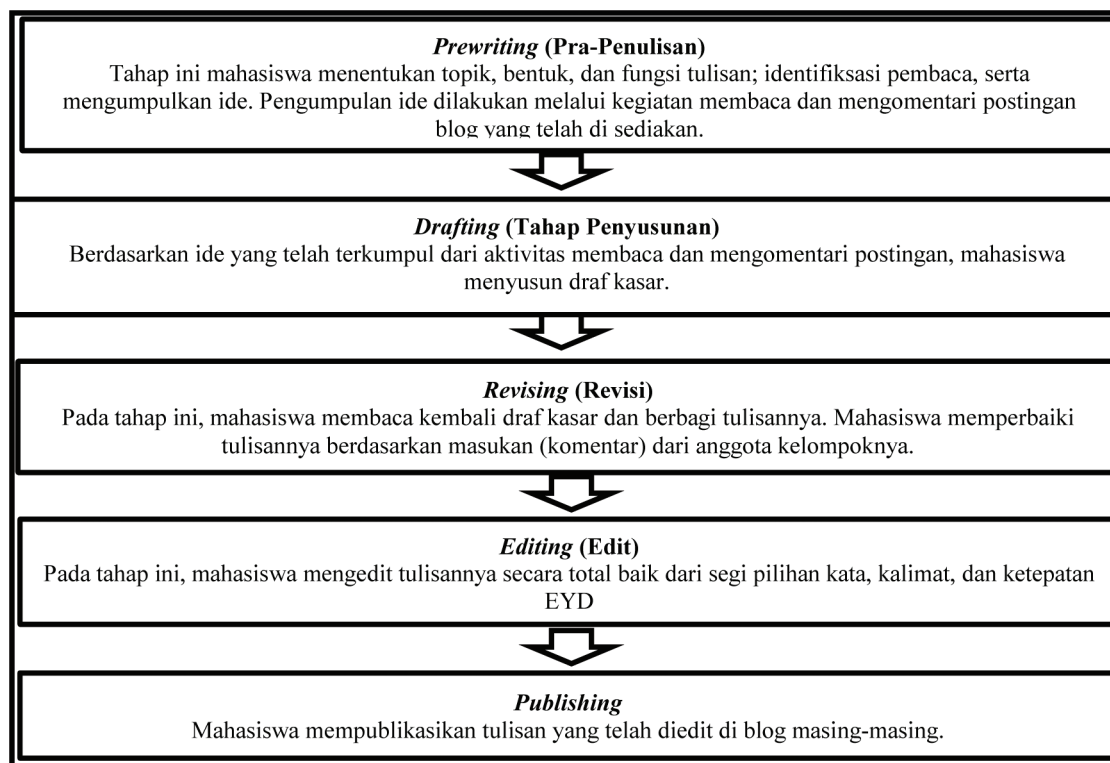
Pembelajaran menulis kreatif berbasis *web* dilakukan dengan mengomentari postingan yang telah disediakan kemudian mengolah *web* dengan memposting tulisan yang telah melalui tahap edit. Kemampuan menulis kreatif maha-

siswa dalam bentuk cerita anak dapat diketahui sejauh mana peningkatannya setelah dilakukan penilaian.

Secara umum, Arikunto (2009:3) menerangkan bahwa penilaian adalah pengambilan keputusan berdasarkan pertimbangan baik buruk yang dilakukan secara kualitatif. Penilaian dalam menulis agar dapat diambil keputusan mengenai baik atau buruknya tulisan tersebut, meliputi beberapa komponen.

Komponen penilaian menulis kreatif cerita anak mencakup unsur-unsur intrinsik dalam cerita. Unsur intrinsik tersebut meliputi tokoh, penokohan, alur, setting, dan tema. Hal ini seperti yang dikemukakan oleh Nurgiantoro (2015:68) mengenai penilaian tulisan sastra anak yang meliputi tujuh hal, yaitu: a) alur cerita, b) penokohan, c) tema dan moral, d) latar, e) stile, f) ilustrasi, dan g) format. Penilaian dilakukan dengan mengacu pada rubrik penilaian cerita anak yang terdapat pada Tabel 1.

Ada dua aspek yang tidak masuk dalam rubrik penilaian, yaitu ilustrasi dan format. Hal ini disebabkan yang menjadi fokus penilaian dalam penelitian ini adalah tulisan sehingga kedua hal tersebut tidak masuk dalam kategori penilaian. Pertimbangan kesederhanaan alur yang menjadi salah satu indikator dalam aspek terse-



Gambar 1. Proses Pembelajaran Menulis Kreatif Berbasis Web

Tabel 1. Rubrik Penilaian Cerita Anak*)

No.	Aspek	Indikator
1	Alur Cerita	a. Berkaitan dengan dunia anak b. Alur yang sederhana dan pengembangannya sesuai kaidah
2	Penokohan	a. Tokoh cerita membawa kualifikasi tertentu b. Pengungkapan karakter tokoh diuraikan secara langsung
3	Tema dan Moral	a. Tema mengusung kebenaran, moral memberikan ajaran b. Disampaikan secara konkret lewat sikap tokoh cerita
4	Latar	a. Penggambaran latar dilakukan secara konkret b. Latar disampaikan dengan jelas, tidak berbelit-belit
5	Stile	a. Bahasa yang digunakan sederhana b. Cerita mudah dipahami dan memiliki daya tarik

*) Ditulis dengan mengacu Nurgiyantoro (2015) *Sastra Anak* pada bab "Penilaian Sastra Anak".

but meliputi beberapa hal, yaitu: (a) konflik yang dikisahkan berkisar pada permasalahan anak; (b) hubungan; (c) hubungan antar peristiwa jelas; dan (d) peristiwa disajikan secara runtut. Sementara itu, indikator yang ketiga pada aspek yang sama, terkait kaidah pengembangan alur meliputi: (a) cerita yang dikisahkan dapat diterima logika; (b) menjaga rasa ingin tahu; (c) cerita mampu menghasilkan kejutan; dan (d) cerita yang disajikan menyajikan cerita secara utuh.

Tujuan penelitian ini adalah menghasilkan perangkat pembelajaran berupa silabus, sap, media pembelajaran berbasis *web*, dan instrumen penilaian menulis kreatif yang layak dan efektif dalam meningkatkan kemampuan menulis kreatif mahasiswa PGSD. Pengembangan produk berupa perangkat pembelajaran yang terdiri dari silabus, Satuan Acara Perkuliahan (SAP), media pembelajaran berbasis *web* dan instrumen penilaian menulis kreatif.

METODE

Penelitian ini menggunakan model *Research and Development* (R&D), versi Borg and Gall (1983) yang terdiri atas sepuluh tahap, yaitu: 1) penelitian dan pengumpulan informasi; 2) perencanaan; 3) pengembangan draf produk; 4) uji coba awal; 5) merevisi hasil uji coba; 6) uji coba lapangan; 7) penyempurnaan produk hasil uji coba lapangan; 8) uji coba lapangan operasional; 9) penyempurnaan produk akhir; 10) diseminasi dan implementasi. Tahap pengembangan dilakukan sampai tahap penyempurnaan produk akhir.

Subjek penelitian terlibat dalam uji coba awal, uji coba lapangan, dan uji coba lapangan operasional. Subjek uji coba awal terdiri atas

empat mahasiswa PGSD semester IV, sedang-subjek uji coba lapangan terdiri atas sepuluh mahasiswa PGSD semester IV diluar mahasiswa yang telah terlibat dalam ujicoba awal. Subjek uji coba lapangan operasional adalah mahasiswa PGSD semester II yang menempuh matakuliah keterampilan bahasa dan sastra Indonesia.

Subjek uji coba lapangan operasional berjumlah 38 mahasiswa yang terbagi menjadi dua kelompok kelas. Kelas A dengan jumlah 18 mahasiswa dan kelas B dengan jumlah 20 mahasiswa. Pada subjek uji coba lapangan operasional ini, dua kelompok tersebut diambil sampelnya dengan menggunakan teknik *cluster random sampling*. *Cluster random sampling* adalah pengambilan sampel berdasarkan wilayah tertentu, kelas yang dijadikan sampel atau diberi perlakuan yaitu kelas A yang berjumlah 18 mahasiswa. Kelas B dijadikan kelas kontrol.

Instrumen penelitian menggunakan validasi ahli, angket mahasiswa, dan tes kemampuan menulis. Validasi ahli yang dimaksud adalah validasi ahli materi. Angket mahasiswa berupa angket terbuka untuk menilai proses pembelajaran berbasis *web* yang telah dilaksanakan kepada semua subjek uji coba. Sementara itu, tes kemampuan menulis merupakan tes esai menulis yang diberikan sebelum dan sesudah perlakuan pada subjek uji coba lapangan operasional.

Teknik analisis data yang digunakan adalah deskriptif kualitatif, yaitu memaparkan pengembangan produk perangkat pembelajaran berbasis *web* untuk meningkatkan kemampuan menulis kreatif mahasiswa pada tahap uji coba awal dan uji coba lapangan. Pada subjek uji coba lapangan operasional, terdapat tambahan yaitu teknik kuantitatif. Pada teknik tersebut dilaku-

kan uji hipotesis *independent sample t test* pada aplikasi SPSS 16 dengan signifikansi 0,05. Uji beda rata-rata hitung dilakukan untuk menganalisis kelompok data pretes dan postes kelompok kontrol, pretes dan postes kelompok eksperimen, dan postes kelompok kontrol dan eksperimen.

HASIL DAN PEMBAHASAN

Hasil

Pengembangan pembelajaran berbasis *web* untuk meningkatkan kemampuan menulis kreatif mahasiswa PGSD melewati sembilan tahap pengembangan, yang meliputi 1) penelitian dan pengumpulan informasi; 2) perencanaan; 3) pengembangan draf produk; 4) uji coba awal; 5) merevisi hasil uji coba; 6) uji coba lapangan; 7) penyempurnaan produk hasil uji coba lapangan; 8) uji coba lapangan operasional; dan 9) penyempurnaan produk akhir. Tahapan tersebut dapat dijelaskan berdasarkan hasil penelitian yang telah dilakukan sebagai berikut.

Tahap Pengumpulan Informasi

Pada tahap ini diperoleh informasi awal bahwa kemampuan menulis kreatif mahasiswa masih rendah. Hal ini dapat dilihat dari rata-rata hasil pretes menulis kreatif mahasiswa sebesar 63,32. Permasalahan yang kerap dihadapi mahasiswa pada saat menulis kreatif, yaitu: 1) minimnya ide atau gagasan yang dimiliki; 2) kesulitan menuangkan ide dalam bahasa tulis; serta 3) minimnya pembelajaran menulis kreatif yang telah dilakukan.

Berdasarkan permasalahan yang telah diuraikan kemudian dilakukan pengembangan pembelajaran berbasis *web* berupa perangkat pembelajaran yang terdiri dari silabus, SAP, instrumen penilaian menulis kreatif, dan media pembelajaran berbasis *web*. Hal ini diperlukan agar dapat mendukung kemampuan menulis yang baik mahasiswa. Kemampuan menulis yang baik dapat digunakan untuk menunjang kebutuhan akademik dan mahasiswa dapat menyediakan bahan bacaan yang berkualitas bagi siswanya.

Tahap Perancangan

Pembelajaran berbasis *web* untuk meningkatkan kemampuan menulis kreatif yang dikembangkan harus memperhatikan berbagai aspek agar dapat diterapkan di lapangan. Terdapat beberapa langkah yang dilakukan dalam tahap pe-

rancangan ini, *langkah pertama* yaitu menyusun peta kebutuhan pengembangan pembelajaran berbasis *web* dengan mengacu pada hasil yang diharapkan yaitu, meningkatnya kemampuan menulis kreatif mahasiswa.

Langkah kedua yaitu perumusan tujuan perkuliahan, indikator capaian, dan pokok bahasan dalam silabus. *Langkah ketiga* yaitu perencanaan skenario pembelajaran dalam SAP pertemuan ke 13, 14, dan 15. *Langkah keempat* yaitu penyusunan instrumen penilaian menulis kreatif. silabus dan SAP diketik di kertas A4 dengan spasi 1,5 sedangkan penilaian menulis kreatif diintegrasikan dalam media pembelajaran berbasis *web*.

Langkah kelima yaitu penyusunan media berbasis *web*. Media pembelajaran berbasis *web* yang digunakan dalam pembelajaran menulis kreatif dibuat dengan memanfaatkan domin gratis yaitu *wordpress*. Hal ini karena domain tersebut lebih mudah untuk diolah dan digunakan dalam proses pembelajaran. Halaman *wordpress* yang digunakan sebagai media pembelajaran diakses di alamat <http://calongurunulis.wordpress.com>. Adapun tampilan awal halaman *web* tersebut ditunjukkan pada Gambar 2.



Gambar 2. Halaman Awal Media Pembelajaran Berbasis Web

Media pembelajaran berbasis *web* seperti yang ditampilkan pada gambar 2 terdiri dari beberapa menu, meliputi: 1) petunjuk, 2) prapenulisan, 3) penyusunan, 4) revisi, 5) editing, 6) publikasi.

Pada proses pembelajaran berbasis *web* ini, mahasiswa harus mengikuti setiap tahapan menu secara urut dari nomor 2 sampai dengan 6. Pada menu pertama yaitu petunjuk berisi petunjuk secara umum untuk pembelajaran berbasis *web* tersebut. Akan tetapi, pada menu lain juga dilengkapi dengan petunjuk. Menu nomor 2 sampai 6 merupakan tahap menulis kreatif yang

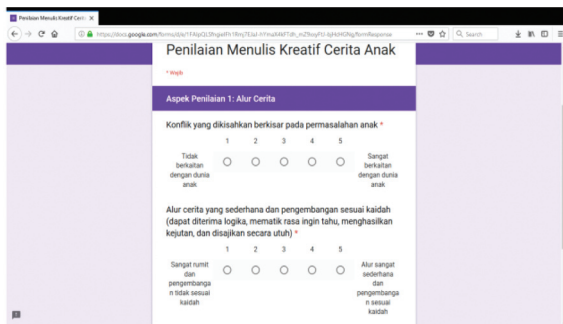
harus dilalui mulai dari pra penulisan, penyusunan, revisi, editing, dan publikasi. Adapun contoh petunjuk dalam salah satu menu ditunjukkan pada Gambar 3.



Gambar 3. Contoh Petunjuk dalam Salah Satu Menu

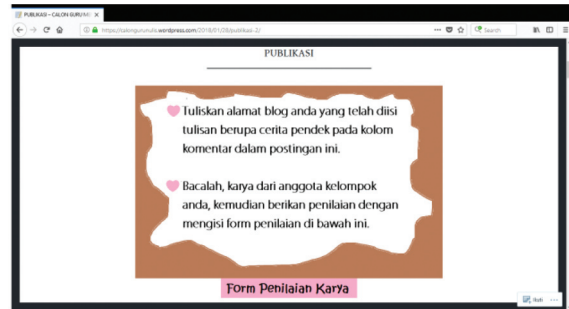
Petunjuk menu seperti pada Gambar 3 tersebut, ditulis agar dapat memudahkan mahasiswa dalam mengikuti proses pembelajaran menulis kreatif berbasis *web*. Petunjuk ini berfungsi sebagai penjelas saat dosen menjelaskan prosedur untuk setiap tahap pembelajaran tersebut.

Instrumen penilaian dibuat dengan mengacu pada aspek-aspek penilaian cerita yang ditulis oleh Nurgiantoro. Instrumen tersebut kemudian dibuat dalam *google formulir*. Adapun format penilaian dalam *google formulir* menggunakan skala 5, dengan contoh tampilan seperti pada Gambar 5.



Gambar 4. Form Penilaian Menulis Kreatif

Selanjutnya, untuk mempermudah dalam penggunaan media, maka *google formulir* diintegrasikan kedalam media pembelajaran berbasis *web*. Adapun tampilannya seperti pada Gambar 5.



Gambar 5. Halaman *Web* yang Memuat Form Penilaian Keterampilan Menulis

Form penilaian karya seperti gambar 5 telah dihubungkan dengan *google formulir* yang memuat penilaian kreatif. Setelah mempublikasikan tulisan, mahasiswa dapat menilai tulisan teman-temannya dengan mengeklik tombol Form Penilaian Karya. Penilaian dilakukan dengan memberikan skor pada setiap aspek. Adapun pengisian formulir tersebut dilakukan dengan mengikuti petunjuk yang terdapat dalam form tersebut.

Tahap Pengembangan Draft Produk

Tahap pengembangan draf produk adalah tahap yang bertujuan untuk menghasilkan produk akhir setelah validasi yang dilakukan oleh ahli materi. Validasi oleh ahli materi dilakukan agar dapat digunakan sebagai bahan masukan dalam perbaikan produk, sehingga produk yang dihasilkan sesuai standar. Adapun hasil penilaian dari ahli materi dapat dilihat pada tabel 2.

Produk yang dikembangkan mencakup silabus, SAP, penilaian menulis kreatif, dan media pembelajaran berbasis *web* dikategorikan baik dengan skor 82.

Adapun saran dari ahli materi terkait produk yang dikembangkan yaitu pada bagian

Tabel 2. Penilaian Ahli Materi Setiap Aspek

No.	Aspek	Total Skor
1	Kesesuaian materi pada silabus keterampilan matakuliah BSI	16
2	Kesesuaian cakupan materi dan skenario pembelajaran pada SAP	26
3	Ketepatan aspek yang dinilai dalam instrumen penilaian menulis kreatif	16
4	Kejelasan materi dan bahasa pada media pembelajaran berbasis <i>web</i>	24
Nilai = Jumlah skor setiap aspek		82

instrumen penilaian menulis kreatif perlu ditambah kriteria penilaiannya, sehingga penilai dapat menilai dengan patokan yang jelas.

Uji Coba Awal dan Perbaikan Produ

Setelah melewati proses validasi dan dinyatakan layak oleh ahli materi, kemudian diuicobakan kepada mahasiswa. Uji coba tersebut terbatas pada empat mahasiswa semester IV. Keempat mahasiswa tersebut mengikuti proses pembelajaran menulis kreatif berbasis *web*, kemudian diminta untuk mengisi angket terbuka berupa masukan terkait pembelajaran tersebut. Berdasarkan uji coba yang telah dilakukan tersebut, diperoleh beberapa masukan, yaitu: 1) prosedur pembelajaran perlu disederhanakan agar mudah diikuti; 2) bagian pra-penulisan perlu disesuaikan isinya dengan alokasi waktu yang disediakan. Dengan demikian, perbaikan produk meliputi skenario pembelajaran yang tertuang dalam SAP dan materi dalam tahap prapenulisan dalam media pembelajaran berbasis *web*.

Uji Coba Lapangan dan Perbaikan Produk

Uji coba lapangan dilaksanakan setelah dilakukan perbaikan produk sesuai dengan masukan pada saat uji coba awal. Subjek uji coba lapangan adalah sepuluh mahasiswa selain mahasiswa yang telah dijadikan subjek uji coba awal. Pada saat uji coba lapangan, mahasiswa juga mengikuti proses pembelajaran menulis kreatif berbasis *web* seperti halnya subjek uji coba awal. Kemudian, diakhir diminta untuk mengisi angket terbuka berupa masukan terkait pembelajaran berbasis *web*.

Pada tahap uji coba lapangan diperoleh masukan yaitu perlu ada perbaikan dalam aplikasi penilaian didalam media berbasis *web* tersebut agar mudah diakses. Perbaikan produk yang dimaksud yaitu perbaikan aplikasi penilaian menulis kreatif yang terdapat dalam halaman *web*. Dengan demikian, perbaikan tersebut mencakup media pembelajaran berbasis *web* pada bagian publikasi yang menghubungkan dengan *google formulir*.

Uji Coba Lapangan Operasional dan Penyempurnaan Produk Akhir

Uji coba lapangan operasional dilakukan setelah produk diperbaiki berdasarkan masukan

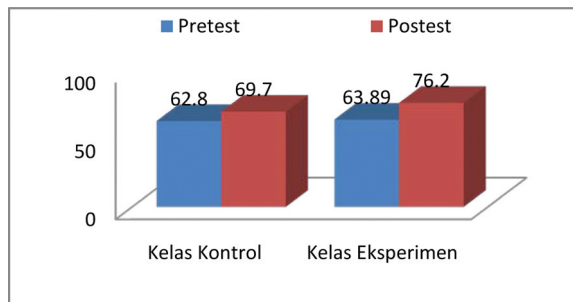
pada saat uji coba lapangan. Subjek uji coba lapangan operasional adalah mahasiswa semester II yang sedang menempuh mata kuliah Keterampilan Bahasa dan Sastra Indonesia. Subjek berjumlah 38 mahasiswa yang terbagi menjadi dua kelompok, satu kelompok dijadikan kelas kontrol dan kelompok yang lain dijadikan kelas eksperimen yang ditentukan secara acak.

Sebelum dilakukan uji coba lapangan operasional, subjek diberikan pretes. Pretes tersebut dilakukan untuk mengetahui kemampuan awal menulis kreatif mahasiswa sebelum diberi perlakuan berupa pembelajaran berbasis *web*. Berdasarkan hasil pretes yang telah dilaksanakan diketahui rata-rata nilai menulis kreatif kelas kontrol adalah 62,8, sedangkan rata-rata di kelas eksperimen sebesar 63,89.

Antara kelas kontrol dan kelas eksperimen juga tidak terdapat perbedaan rata-rata yang signifikan, yang berarti kemampuan menulis kreatif antara kelas kontrol dan kelas eksperimen dapat dikatakan sama. Hal ini sesuai dengan hasil uji hipotesis yang dilakukan terhadap data hasil pretest kelas kontrol dan eksperimen.

Pengajuan hipotesis yang dilakukan yaitu Ho: tidak terdapat perbedaan rata-rata antara dua kelompok dan Ha: terdapat perbedaan rata-rata antara dua kelompok. Setelah dilakukan uji prasyarat hipotesis dan diketahui kedua kelompok data berdistribusi normal dan homogen, selanjutnya dilakukan uji hipotesis antara kedua kelompok tersebut. Berdasarkan uji hipotesis diperoleh diperoleh taraf signifikansi (*2-tailed*) sebesar 0,741 yang lebih dari 0,05 (taraf signifikansi yang digunakan). Hal ini berarti Ho diterima dan Ha ditolak. Dengan demikian, dapat disimpulkan bahwa tidak terdapat perbedaan rata-rata yang signifikan antara dua kelompok tersebut.

Setelah dilakukan pretes, kelas eksperimen diberi perlakuan pembelajaran menulis kreatif berbasis *web*. Tahap akhir setelah perlakuan adalah mahasiswa dari kedua kelompok diberikan posttest. Berdasarkan hasil posttest yang telah dilaksanakan, diketahui bahwa terdapat peningkatan rata-rata kemampuan menulis kreatif mahasiswa setelah diberi perlakuan, di kelas kontrol sebesar 69,7 sedangkan di kelas eksperimen sebesar 76,2. Adapun peningkatan rata-rata tersebut dapat ditunjukkan dalam diagram batang pada Gambar 6.



Gambar 6. Rata-Rata Nilai Pretes Postes Kelas Kontrol dan Eksperimen

Jadi, terdapat peningkatan tersebut terjadi pada kelas kontrol dan kelas eksperimen setelah diberi perlakuan. Kenaikan kemampuan menulis kreatif yang terjadi pada kelas kontrol sebanyak 6,9. Kenaikan kemampuan menulis kreatif yang terjadi di kelas eksperimen sebesar 12,31. Selain itu, juga terdapat perbedaan rata-rata pada kelompok beberapa data, yaitu: 1) pretes postest kelas kontrol; 2) pretes dan postest kelas eksperimen; 3) postes kelas kontrol dan eksperimen. Perbedaan rerata antara ketiga kelompok tersebut dapat diketahui setelah dilakukan uji hipotesis.

Sebelum uji hipotesis, dilakukan uji prasyarat hipotesis yang terdiri dari uji normalitas dan uji homogenitas. Uji normalitas dilakukan dengan menggunakan SPSS 16. Adapun hasil uji normalitas dilakukan untuk seluruh kelompok data, yang meliputi: 1) data hasil pretest kelas kontrol dan eksperimen; 2) data hasil postest kelas kontrol dan eksperimen. Hipotesis yang diajukan untuk uji normalitas, yaitu H_0 : data berdistribusi normal dan H_a : data tidak berdistribusi normal. Hasil uji normalitas tersebut tersaji dalam Tabel 3.

Berdasarkan data pada Tabel 3, dapat disimpulkan semua data berdistribusi normal.

Setelah dilakukan uji normalitas kemudian dilakukan uji homogenitas. Hipotesis yang diajukan untuk uji homogenitas, yaitu H_0 : varians data homogen dan H_a : varians data tidak homogen. Uji homogenitas yang dilakukan terhadap

Tabel 3. Uji Normalitas Pretest dan Postest Kelas Kontrol dan Eksperimen

KELOMPOK		Tests of Normality					
		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	Df	Sig.
NILAI	Pretest Kontrol	.180	20	.088	.932	20	.170
	Pretest Eksperimen	.168	18	.194	.924	18	.152
Postest Kontrol		.222	20	.011	.940	20	.240
	Postest Eksperimen	.157	18	.200*	.913	18	.098

beberapa kelompok data, yaitu: 1) pretest dan postes kelas kontrol; 2) pretes dan postest kelas eksperimen; serta 3) postes kelompok kontrol dan eksperimen. Adapun hasil uji homogenitas data pretes dan postes kelompok kontrol tersaji dalam tabel 4 sebagai berikut.

Tabel 4. Uji Homogenitas Pretes dan Postes Kelas Kontrol

Test of Homogeneity of Variances			
NILAI			
Levene Statistic	df1	df2	Sig.
.099	1	38	.755

Berdasarkan tabel 4 dapat diketahui bahwa signifikansi yang diperoleh sebesar 0,755 lebih besar dari 0,05 (taraf signifikansi yang digunakan). Hal ini berarti, H_0 diterima dan H_a ditolak. Dengan demikian, disimpulkan data pretest dan postest kelas kontrol adalah varians yang homogen.

Uji homogenitas selanjutnya dilakukan terhadap data hasil pretest dan post test kelas eksperimen. Adapun hasil uji homogenitas tersebut terdapat pada tabel 5 sebagai berikut.

Tabel 5. Uji Homogenitas Prete dan Postes Kelas Eksperimen

Test of Homogeneity of Variances			
NILAI			
Levene Statistic	df1	df2	Sig.
.023	1	34	.881

Berdasarkan Tabel 5 dapat diketahui bahwa H_0 diterima dan H_a ditolak. Dengan demikian, dapat disimpulkan bahwa varians data homogen.

Uji homogenitas yang terakhir dilakukan terhadap data hasil postest kelas kontrol dan eksperimen. Adapun hasil uji homogenitas tersebut terdapat pada tabel 6.

Tabel 6. Uji Homogenitas Postes Kelas Kontrol dan Eksperimen

Test of Homogeneity of Variances			
NILAI			
Levene Statistic	df1	df2	Sig.
.031	1	36	.861

Berdasarkan tabel 6 dapat diketahui bahwa Ho diterima dan Ha ditolak. Dengan demikian, dapat disimpulkan bahwa varians data tersebut adalah homogen.

Setelah semua data dinyatakan berdistribusi normal dan homogen, uji hipotesis dilakukan terhadap tiga kelompok data, yaitu: 1) pretest dan posttest kelas kontrol; 2) pretest dan posttest kelas eksperimen; 3) posttest kelas kontrol dan eksperimen. Uji hipotesis dilakukan dengan menggunakan SPSS 16. Pengajuan hipotesis terhadap uji hipotesis ini yaitu Ho: tidak terdapat perbedaan rata-rata antara dua kelompok dan Ha: terdapat perbedaan rata-rata untuk dua kelompok. Adapun hasil uji hipotesis yang telah dilakukan terhadap data pretest dan posttest kelas kontrol terdapat pada tabel 7.

Hasil uji hipotesis pretes dan postes kelompok kontrol menunjukkan bahwa taraf signifikansi (*2-tailed*) sebesar 0,035 yang lebih kecil dari 0,05 (signifikansi yang digunakan), artinya Ho ditolak dan Ha diterima. Dengan demikian,

dapat disimpulkan bahwa terdapat perbedaan rata-rata antara data hasil pretest dan posttest kelompok kontrol.

Uji hipotesis selanjutnya dilakukan terhadap data pretest dan posttest kelompok eksperimen. Adapun hasil uji hipotesis yang telah dilakukan terdapat pada Tabel 8.

Hasil uji hipotesis menunjukkan Ho ditolak dan Ha diterima. Dengan demikian, dapat disimpulkan bahwa terdapat perbedaan rata-rata antara data hasil pretes dan postes kelompok eksperimen.

Uji hipotesis yang terakhir dilakukan terhadap data hasil postes kelas kontrol dan kelas eksperimen. Adapun hasil uji hipotesis tersebut terdapat pada Tabel 9.

Jadi, dapat disimpulkan bahwa terdapat perbedaan rata-rata antara data hasil posttest kelas kontrol dan kelas eksperimen.

Selanjutnya, setelah dilakukan uji coba lapangan operasional, dilakukan penyempurnaan produk akhir. Penyempurnaan dilakukan terhadap keseluruhan produk yang dikembangkan, meliputi: 1) silabus, 2) SAP, 3) penilaian menulis kreatif, dan 4) media pembelajaran berbasis *web*. Penyempurnaan tersebut kebanyakan terdapat pada media pembelajaran berbasis *web* yang meliputi penyederhanaan petunjuk, keefektifan kalimat, serta perbaikan dan pengecekan

Tabel 7. Uji Hipotesis Pretes dan Postes Kelas Kontrol

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
NILAI	Equal variances assumed	.099	.755	-2.185	38	.035	-6.900	3.158	-13.293	-.507
	Equal variances not assumed			-2.185	37.417	.035	-6.900	3.158	-13.296	-.504

Tabel 8. Hasil Uji Hipotesis Pretes dan Postes Kelas Eksperimen

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower		Upper
NILAI	Equal variances assumed	.023	.881	-3.901	34	.000	-12.333	3.162	-18.759	-5.908
	Equal variances not assumed			-3.901	34.000	.000	-12.333	3.162	-18.759	-5.908

Tabel 9. Hasil Uji Hipotesis Posttest Kelas Kontrol dan Eksperimen

		Independent Samples Test									
		Levene's Test for Equality of Variances			t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
NILAI	Equal variances assumed	.031	.861	-2.132	36	.040	-6.522	3.060	-12.728	-.316	
	Equal variances not assumed			-2.130	35.443	.040	-6.522	3.063	-12.737	-.307	

linkdalam media tersebut agar tidak terjadi aplikasi *error* saat digunakan.

Pembahasan

Kelayakan Pembelajaran Berbasis Web

Kelayakan pembelajaran berbasis *web* berupa perangkat pembelajaran yang terdiri dari silabus, sap, penilaian menulis kreatif, dan media pembelajaran berbasis *web* dapat dilihat dari penilaian yang dilakukan ahli materi, adapun skor total yang diperoleh untuk setiap aspek sebesar 82. Skor 82 dapat dikatakan baik, hal ini sesuai dengan standar nilai dengan rentang enam seperti yang dikemukakan oleh Arikunto (2009: 249) pada Tabel 10.

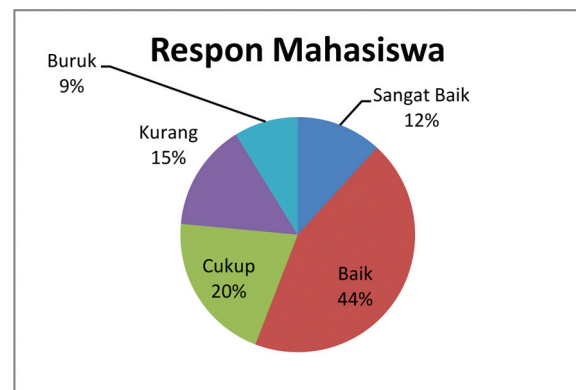
Tabel 10. Standar Nilai

Standar Enam	Interpretasi
9	Baik Sekali
8	Baik
7	Lebih dari cukup
6	Cukup
5	Kurang
4	Kurang Sekali

Skor 82 terdapat pada standar 8 yang berarti baik. Hal ini berarti semua produk yang dikembangkan, meliputi silabus, sap, penilaian menulis kreatif, dan media berbasis web, dapat dikatakan telah memenuhi standar kelayakan dengan nilai baik. Produk yang telah memenuhi standar kelayakan tersebut, masih memerlukan penyempurnaan di beberapa bagian, hingga benar-benar dikatakan siap untuk diujicobakan.

Selain itu, kelayakan pembelajaran berbasis web juga dinilai dari respon mahasiswa yang dijadikan sebagai subjek uji coba terbatas, uji coba lapangan, dan uji coba lapangan operasional (kelompok eksperimen). Sebanyak 34 maha-

siswa yang dimintai respon terkait pembelajaran berbasis *web*. Penilaian tersebut dilakukan dengan lembar angket skala lima, dengan kriteria: 1) sangat baik, 2) baik, 3) cukup, 4) kurang, dan 5) buruk. Adapun penilaian kelayakan dari respon mahasiswa dapat dilihat dari Gambar 7.

**Gambar 7. Respon Mahasiswa Terkait Pembelajaran Berbasis Web**

Jadi, pembelajaran berbasis *web* dinilai baik oleh sebagian besar mahasiswa, yaitu sebanyak 4 mahasiswa menilai sangat baik, 15 mahasiswa menilai baik, 7 mahasiswa menilai cukup, 5 mahasiswa menilai kurang, dan 3 mahasiswa menilai buruk.

Penilaian yang baik oleh sebagian besar subjek menunjukkan bahwa pembelajaran berbasis *web* dapat dikatakan layak, digunakan dalam proses pembelajaran, khususnya dalam pembelajaran menulis kreatif. Sementara itu penilaian yang kurang dan buruk oleh sebagian kecil mahasiswa disebabkan adanya permasalahan dalam akses internet. Hal ini mengakibatkan terhambatnya pembelajaran berbasis *web* bagi sebagian kecil mahasiswa.

Kelayakan pembelajaran berbasis *web* dinilai oleh mahasiswa berdasarkan dua hal. Kedua hal tersebut, yaitu: 1) kemudahan dalam

penggunaannya; dan 2) dapat meningkatkan kemampuan menulis kreatif mahasiswa.

Keefektifan Pembelajaran Berbasis Web

Keefektifan pembelajaran berbasis *web* dalam meningkatkan kemampuan menulis kreatif mahasiswa dapat dilihat dari hasil uji coba lapangan operasional. Hasil tersebut menunjukkan perbedaan rata-rata yang signifikan antara rata-rata pretest-posttest menulis kreatif di kelas kontrol; pretest-posttest menulis kreatif di kelas eksperimen; serta posttest menulis kreatif di kelas kontrol dan eksperimen. Seperti yang telah diuraikan di hasil penelitian bahwa perbedaan rata-rata yang signifikan tersebut, juga diikuti oleh peningkatan rata-rata kemampuan menulis kreatif mahasiswa setelah diberi perlakuan, yaitu pembelajaran berbasis *web*.

Pembelajaran berbasis *web* merupakan salah satu inovasi pembelajaran yang dapat digunakan dalam melatih kemampuan menulis kreatif mahasiswa. Melalui pembelajaran tersebut, mahasiswa akan turut serta berproses memaksimalkan seluruh kemampuan otaknya, untuk dapat menuangkan gagasan dalam bahasa tulis. Hal ini sesuai dengan hakikat menulis yang dikemukakan oleh Deporter & Hernacki (2009:179) bahwa menulis merupakan proses yang melibatkan seluruh belahan otak manusia. Setiap belahan otak bekerja sama dalam mengumpulkan informasi, kemudian belahan otak yang lain menterjemahkan agar dapat dituangkan dalam bahasa tulis. Hal ini berarti menulis sebagai suatu proses tidak akan muncul dengan sendirinya, diperlukan proses dan latihan yang terus menerus.

Proses belajar dan latihan yang terus menerus akan dapat meningkatkan kemampuan menulis kreatif. Hal ini sesuai dengan hasil penelitian Zulaeha (2013) bahwa kemampuan menulis meningkat setelah dilakukan pembelajaran menulis. Secara otomatis, kemampuan menulis kreatif mahasiswa juga meningkat, setelah diterapkannya pembelajaran berbasis *web*.

Pembelajaran berbasis *web* yang memanfaatkan akses internet memunyai keunggulan. Hal ini seperti yang dikemukakan oleh Marisa (2014:8.8) bahwa kualitas belajar mahasiswa menjadi lebih baik yang diikuti semangat dan motivasi mengikuti pembelajaran. Semangat dan motivasi merupakan kunci dalam meningkatkan kualitas belajar mahasiswa, khususnya kualitas menulis kreatifnya.

Pembelajaran berbasis *web* yang dikembangkan dalam penelitian ini mengintegrasikan pengolahan blog dalam proses pembelajaran. Pengolahan blog tersebut akan melatih mahasiswa menuangkan gagasannya dalam bahasa tulis. Dengan demikian, pembelajaran berbasis *web* juga meningkatkan kemampuan menulis kreatif mahasiswa.

Pembelajaran berbasis *web* selain mengimplementasikan teknologi dalam proses pembelajaran, juga efektif dalam meningkatkan hasil belajar siswa. Hal ini didukung dari hasil penelitian yang dilakukan oleh Sunwinarti dan Suwito (2016) yang menunjukkan bahwa rata-rata hasil belajar yang dilakukan dengan menggunakan pembelajaran berbasis *web* lebih tinggi dibandingkan pembelajaran yang tidak berbasis *web*. Peningkatan rata-rata nilai pretest posttest kelas kontrol; pretest dan posttest kelas eksperimen; serta nilai rata-rata yang lebih tinggi kelas eksperimen dibanding kelas kontrol menunjukkan bahwa pembelajaran berbasis *web* efektif dalam meningkatkan kemampuan menulis kreatif mahasiswa.

PENUTUP

Hasil pengembangan pembelajaran berbasis *web* dinyatakan layak digunakan dalam proses pembelajaran. Mahasiswa juga memberikan respon yang positif terhadap pembelajaran berbasis *web*. Selain itu, pembelajaran berbasis *web* juga efektif dalam meningkatkan kemampuan menulis kreatif mahasiswa. Hal ini dapat dilihat dari perbedaan rata-rata yang signifikan antara dua kelompok sebelum dan sesudah diberikan perlakuan.

Produk yang dikembangkan memiliki keunggulan, yaitu dapat dimanfaatkan oleh semua kalangan secara gratis, karena menggunakan domain gratis. Dosen dan mahasiswa otomatis memperoleh pengalaman mengajar dan belajar dengan menerapkan teknologi informasi dengan lebih baik. Selain itu, pembelajaran berbasis *web* juga dapat menyiapkan mahasiswa untuk memanfaatkan kemajuan teknologi dalam kehidupannya sehari-hari.

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FOSTERING CRITICAL THINKING SKILLS THROUGH ARGUMENTATIVE WRITING

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Abstract: The urgency for developing students' critical thinking (CT) abilities has left English as a Foreign Language (EFL) teachers trying hard to integrate CT into their teaching practices. This study highlights the role of language as a way of thinking, judging and assessing. It seeks to investigate how the elements of CT are displayed in students' essay so as to reveal the development of their CT skills. The data are in the form of essay written by the fourth semester Indonesian students taking essay writing course. The analysis is based on Stapleton's criteria of CT (2001), i.e. claims, kinds of reasoning, the extent of evidence, recognition of opposing arguments and refutation, and fallacies. The results show that there are many weak arguments in the essays due to the insufficiency of reasons and evidence. It is highly possible for an essay to have multiple arguments. However, the logical correlations between them are not clearly articulated in the essays and many students fail to show them. Students also lack of refutation skills as they tend to accept a claim from other sources without trying to judge and evaluate it. While most conclusions are in the form of suggestion, they can be made better by clearly showing the position of the writer in relation the arguments posed in the essay. Fallacies are mostly found in the form of generalization and over-simplification. The results are expected to give insights to teachers about how CT skills could be effectively taught and improved in writing classes.

Key words: *argumentative writing, critical thinking (CT), English as a Foreign Language (EFL)*

MENGEMBANGKAN KEMAMPUAN BERPIKIR KRITIS MELALUI MENULIS ARGUMENTATIF

Abstrak: Pentingnya mengembangkan kemampuan berpikir kritis (critical thinking atau CT) mahasiswa telah membuat para pengajar English as a Foreign Language (EFL) berusaha keras mengintegrasikan kemampuan berpikir kritis dalam pengajaran mereka. Penelitian ini menggaris bawahi peran bahasa sebagai sarana berpikir, menilai, dan mengevaluasi. Penelitian bertujuan untuk menggali bagaimana elemen-elemen berpikir kritis ditunjukkan dalam teks dan mengkaji perkembangan berpikir kritis dalam teks. Data berbentuk teks essay yang ditulis oleh mahasiswa semester 4 yang mengambil matakuliah Essay Writing. Data dianalisis berdasarkan kriteria Critical Thinking (CT) oleh Stapleton (2001), yaitu *argument, reason, evidence, opposition and refutation, conclusion, dan fallacy*. Hasil penelitian menunjukkan bahwa argumen sering lemah karena tidak didukung oleh alasan dan bukti yang cukup. Suatu esai sangatlah mungkin mengandung banyak argumen. Namun demikian, hubungan logis antar argumen tersebut tidak jelas dalam esai dan bahkan banyak mahasiswa gagal menunjukkan hubungan tersebut. Mahasiswa juga lemah dalam hal *refutation skill* karena mereka cenderung menerima klaim dari sumber lain begitu saja tanpa mencoba mengevaluasi dan mempertanyakannya. Kebanyakan kesimpulan berbentuk saran dan bisa dibuat lebih baik dengan menyatakan dengan jelas posisi penulis dalam menanggapi argumen-argumen yang dikemukakan di awal. *Fallacy* kebanyakan dalam bentuk generalisasi dan penyederhanaan berlebihan. Hasil penelitian ini diharapkan dapat memberikan masukan tentang bagaimana kelas menulis dapat dirancang secara efektif supaya dapat menumbuhkan baik kemampuan berpikir kritis maupun kemampuan berbahasa.

Kata kunci: *tulisan argumentatif, berpikir kritis, English as Foreign Language (EFL)*

INTRODUCTION

This study seeks to foreground the interconnections between critical thinking (CT) and language. The close correlation between

thinking (cognition) and language development has long been recognized by scholars and educators, because it is through language people come to know the world and express what

they think about. It is particularly relevant for argumentative writing in the English as a Foreign Language (EFL) context, because to make an argumentative writing people need to have both higher-order thinking skills and higher levels of foreign language proficiency (see Atkinson, 1997; Chamot, 1995; Tarvin & Al-Arishi, 1991).

Critical thinking (CT) has been widely considered as an essential skill in the twentieth century particularly in the area of language education. Although CT itself is a complex concept and is not easy to define, it is an identifiable thinking skill and thus can be practiced. Facione defines critical thinking as “purposeful, self-regulatory judgment that results in interpretation, analysis, evaluation, and inference, as well as explanation of the evidential, conceptual, methodological, criteriological, or contextual considerations upon which that judgment is based” (1990, p. 3).

Beyer defines it as the ability to make “reasoned judgments” (1995, p. 8). Critical thinkers thus should be able to judge, evaluate, and question an idea or thought based on reliable evidence by establishing logical relationships among statements or data. Such ability is crucial in developing language competence especially in constructing arguments and inferring a conclusion from one or multiple premises.

Premised on the intertwined correlations between CT and language and the aspects of CT abilities proposed by scholars (see Facione, 1990 and Beyer, 1995), this study focuses on ‘developing CT through and in writing’. The development of critical thinking skills of EFL learners through writing has not gained much attention, although there have been numerous research on critical thinking skills. This study particularly takes into account argumentative writing, a type of writing which requires high thinking skills and is thus believed effective to improve students’ CT (see Langer & Applebee, 1987).

A writing course which stimulates students to engage in critical thinking is believed more effective than traditional methods of writing. The integration of CT into argumentative writing can be premised on the tenets that, firstly, CT is an integral part of argumentative writing, in combination with other important language aspects of writing. To write is to argue and to argue is to think. Argumentative writing thus

requires a complex skill involving not only practical but also cognitive and social aspects and thus requires students to have sufficient background knowledge about the issue being written about.

Secondly, writing can significantly help students develop both their CT skills and language competence. Writing is the verbal manifestation of CT. Critical thinkers need to master multiple writing skills and abilities, i.e. to analyze facts, generate and organize ideas, defend opinions, make comparisons, draw inferences, evaluate arguments and solve problems (Chance, 1986, p.6).

Stapleton (2001) highlights the strong correlations between thinking and writing. A thinking mind should be reflected in writing. Stapleton (2001, pp. 536-539) proposes six critical thinking elements in a written text.

- a. Arguments: claims which are supported by a reason. In academic writing, an argument is usually a main idea, often called a “claim” or “thesis statement”.
- b. Reasons: statements which are used to support claims and generally answer why the claim should be believed.
- c. Evidence: statements or assertions serving to strengthen the argument.
- d. Recognition of Opposition and Refutation: Opposing viewpoints that run counter or offer alternative interpretations to those expressed in the claim.
- e. Conclusion: a statement or series of statements in which a writer sets out what she wants the reader to believe.
- f. Fallacies: errors in reasoning.

The outline of the essay writing course that becomes the setting of the study places CT as an important learning outcome. In doing so, multiple-step writing processes are applied on the basis that the more they write, the more they practice, the more they think. Weekly writing tasks are used to easily trace and identify the progress. The steps basically involve the planning, writing, and revising. While the main writing process itself is not unimportant, the planning (researching, brainstorming, and outlining) and post-writing (feedback and revision) are crucial for improving writing performance and CT.

This study particularly highlights the need for (1) the planning or pre-writing stage which

allows students do enough reading, research and exploration on the issue being assigned and plan their writing (brainstorming and outlining) and (2) continuous feedback from the lecturer to allow them do self-reflection and revise their texts. This is to say that comprehending the concept they need to write and evaluating/revising their own writing are crucial for sharpening their CT skills.

Closely related to the writing steps, topic is an important aspect that determines the goal, nature and structure of writing. Thus the topic chosen in this study is the one that can stimulate students' argumentative skills. The topic is carefully selected by considering the CT elements, as students need to have something to think critically about, and the language aspect, as students at the same time need to learn how to use various language resources to construct their arguments. By doing so, students are able to develop their English language skills while simultaneously becoming more knowledgeable about the issues in the world they live in.

METHODS

The setting of the study is an essay writing course taken by the 4th semester students of the English literature study program. The language of instruction is English and all of the students are Indonesians. Their English language levels and abilities vary and they frequently lack of confidence. This situation is similarly described in a study by Tsui (1996) which also reveals that the cause is the lack of opportunities and willingness to use English in everyday context.

The data were the collection of students' argumentative essays. The course ran for 16 weeks which were used mostly for writing practices. Each week students attended 2 classes which ran for 100 minutes each. In the second class students wrote independently based on the topic assigned to them. The teaching method was generally communicative and learner-centered, in which lecturer talked to students intensively to discuss and give feedback to their writing. Such method was intended to stimulate students' writing productivity and improve their confidence in writing, both in the content and language aspects. The feedback and evaluation focused on the writing progress by paying attention to each CT element.

At the first two weeks the classes were focused on the 'the what' and 'the how' an argumentative essay could be written. It included the nature, types, content, structure and language of an essay. It was found from the discussion that students particularly did not have enough understanding about the critical nature of an essay they needed to produce during the course and about the language expressions that could help construct their critical arguments.

The tasks were broken down weekly into a series of stages using various topics, to allow students learn specific CT skills or elements suggested by Stapleton (2001). The writing process was done systematically. Students were given instructions and given time to brainstorm and develop their outlines, given opportunities to do peer-review and given feedback on the process. This was surely time-consuming, yet the intention was to maximize the quality of students' writing.

Various topics about social life were selected on the basis that they could stimulate and elicit students' personal and intellectual arguments as well as sharpen their awareness to current social phenomena. The topics would need students to collect enough information and to decide what kind of arguments they would construct, including problem solving, cause and effect, decision making, social criticism. For the final assignment, students were particularly asked to write about 2019 presidential election in Indonesia. Students were allowed to develop or break down the topic into more specific sub-topics they were most interested in.

The process of analysis was done through a close look at each essay. Each element was identified and the key clauses indicating the CT element was highlighted. To achieve validity, each essay was examined by two raters.

RESULTS

The discussion that follows focuses not only on how each element is displayed but also on how the linguistic choices are effective to show each element. However, it is necessary to note that the data may contain grammatical mistakes.

Table 1 shows the distribution of each CT element in 30 essays.

1. Arguments

Table 1. CT elements in students' essays

	argument	reason	evidence	Opposition and refutation	conclusion	fallacies
Rater 1	138	69	57	25	29	11
Rater 2	128	82	56	18	30	8

Feldman (1998) argues that a good argument should be purposeful, clear, and concise. The results indicate that crafting an argument is a challenge for the students. There are two interesting phenomena that can be learnt from students' essays. Firstly, most opening sentences in the essays are used to pose a problem, that is the main argument. However, not all of them are directly followed by definition or clarification of what they mean in the argument. If the definition is present, it mostly uses simple present tense. Modal auxiliary such as "may", "might" and verbs like "suggest", "show" "demonstrate" "indicate" are not used often.

Extract 1

Press or social media has a very important role in the life of a nation. Press plays an important role in the process of creating the character of society and developing national insight. Besides, press is an important component in the process of mass communication. According to Jalaludin Rachmad: mass media is the medium used for channelling communications to the public such as the press, radio, television, movies and so on. As a means of communication for dissemination information and ideas to the public, the mass media has an important role in human life in various fields, such as political, economic, social, and cultural fields, etc (Jalaludin Rakhmat, 1990: 135) (Student A).

In this opening paragraph (extract 1), A writes an argument repeatedly in the first three sentences to show his standing on the importance of the press. In the fourth sentence, he provides the definition of the proposed claim using a quotation in the form of present tense sentence cited from an expert in the area. By doing so, thereaders are being orientated to the point that the rest of the text would tell about to what extent the press is important, particularly in the areas suggested in the last two lines. This is to say that the whole text would be merely explanatory and descriptive and thus less critical in nature.

Secondly, one student usually has multiple arguments in one essay (138 arguments in 30 essays). However, they are rarely well-connected.

Sub-arguments do not support the main argument stated earlier in the first paragraph. Conjunctions showing inter-clause relationship are not used often. In a nutshell, there are times when students write various arguments which seem connected but they fail to show the relationship between them.

Looking at the details, the paragraphs in A's writing are dominated by description of the press (1 paragraph), the history the Indonesian press (1 paragraph) and the rest (7 paragraphs) is all about the freedom of speech as part of the functions of the press as a political vehicle, completed with definition and examples. The argument constructed in the first paragraph thus should specifically about the political role of the press or the freedom of speech in politics. Having said this, the main argument is not well represented throughout the text.

Extract 2

The Indonesian election day is coming with more figures and political parties nominated in the candidate list. With that in mind, it is necessary for all active voters to make themselves prepared by being more critical to political issues and candidates they are about to vote. An attempt to think critical about politic might help citizens to build a wiser way of thinking responding to the complicated political condition in Indonesia. Following the critical attitude toward political issue, open minded voters might be more considerate about their vote as to avoid random vote and political party domination in a particular society (student B).

In B's first paragraph (extract 2), the main argument is well constructed in the first two sentences. While the first sentence is more general and provides the context of the main argument, that is about the growing number of political figures and parties, the second is an argument in the form of suggestion, with a conjunction 'with that in mind', about how to deal with such political phenomenon. This argument shows the writer's standing about being critical voters. The use of several adjectives in the paragraph strengthens the force of the main argument. In

the last two sentences in extract 2 the writer addresses briefly about being a wise and open-minded voter. The readers are orientated that the rest of the text would be about the qualities of a critical voter.

2. Reasons

Supporting reasons are indispensable to an argument. In other words, a claim can not stand alone without a convincing reason. Otherwise, it is called an opinion. Critical thinkers should provide the 'why' aspect of the proposed argument (see Crosswhite, 2012) in order to make people convinced and believe in what we have claimed in the argument. A well-written reason can help readers understand and accept the writer's position.

Langer & Applebee (1987) suggest that "the greatest variety of reasoning operations occur during essay writing, suggesting that this type of activity provides time for students to think most flexibly as they develop their ideas" (p. 100). Through essay writing students have the opportunities to develop arguments based on the interconnections between many claims from various resources.

The reasons need to show a direct logical relationship with the argument. A's paragraph (extract 1) mostly argues that the Indonesian press has been used widely as a political means. However, he does not provide any logical reason why this takes place within the context of Indonesia. The majority of the paragraphs explain the topic by providing definition (by quoting some sources), history and examples. Thus A's text lacks of the quality of an argument.

B's argument (extract 2 sentence 2) is directly followed by two sentences indicating the reasons. They do not use such conjunctions like 'because' and 'for', yet the clauses indicate relationships that answer the question 'why'. The next paragraphs also contain some reasons supporting his argument.

In general, students display weak reasoning skills. If the reasons present, the students fail to show the logical relationship between the argument and reasons. Conjunctions indicating cause and effect relationship are helpful, but they are rarely used. Therefore, the readers are left wondering about the relationship between many unorganized claims in their essay.

3. Evidence

The findings show that there are a huge number of arguments. However, the number of reasons and evidence is not as many as that of the arguments. In a nutshell, the arguments are weak due to the lack of supporting reasons and evidence.

Ramage and Bean (1999) state that evidence can be in the form of personal experience, research studies, statistics, citing authorities, comparisons and analogies, pointing out consequences, facts, logical explanations, and defining words. The evidence given by A (extract 1) is in the form of facts. Most of them specifically support the argument about the political role of media. They are not in line with the main argument in the first paragraph.

Extract 3

For example is TvOne which is led by Ardi Bakrie, the son of the general chairman of party Golkar, Aburizal Bakrie (student A)

Extract 4

The example of the case is the president election in 2004 (student A)

Research studies and statistics are rarely used although such data are available in many online and printed sources. This shows that students do not do intensive research through such existing resources prior to the writing process.

4. Opposition and refutation

The descriptive nature of most students' texts indicates the lack of abilities to counter the argument at hand. They hardly have the sense of "judging" and "questioning" (see Beyer, 1995). On the other hand they just copy information from other sources without any evaluation.

The lack of evaluation is indicated through the less use of adjectives as well as subjective judgments. Extract 1 shows that rather than writing a critical thesis statement in the introductory paragraph, the writer makes mere descriptive claims by giving definition and examples of the press, i.e. radio, television, and movies and the areas that may be affected by the press. The argument is not effective either due to the repetition of the same word 'important role' four times in the same paragraph.

As indicated in the first paragraph, it is not surprising that A displays a low refutation skill. A's argument in extract 1 contain a strong and concise message. However, in the following sentences the writer does not propose any potential conflict in relation to the claim. Instead of questioning the validity of ideas in texts or judge the ideas of other people, A's text contains a lot of definition taken from various sources.

Refutation is considered as the weakest element in students' texts. It can hardly be seen that students are able to filter knowledge of all sorts through their reasoning and to find logical flaws instead of accepting them as they are. The so-called 'healthy skepticism' (Lipman, 1991), requires students to possess reasonable and reflective thinking before deciding what to believe and do. However, the data show that students need to improve their ability to present logical linkage between different (opposing) views.

5. Conclusions

Conclusion should restate and reconfirm the writer's position and show the correlations between all the CT elements in the given essay (see Halpern, 2013). Most importantly it should contain the writer's critical point of view about the earlier claims in the essay.

Extract 5

The press should not be used as a political device, but as a device that gives information to the public in order to make them receive a good political education and to know the development of the nation (student A)

A's conclusion is clear and indicates his standing that, through the use of 'should not' he strongly disagrees with the employment of the press for political purpose. He also inserts a concluding personal statement suggesting the better way of using the press. The conclusion reconfirms the arguments stated earlier. Nevertheless, the focus is more specific than the main argument stated in the first paragraph (see my earlier explanation on argument). B's conclusion is also in the form of suggestion in relation to the earlier arguments (extract 6).

Most essays have conclusions, which usually contain suggestion. However, not all of them use explicit expressions like 'in conclusion'

as used in extract 6. In most cases, the readers are left wondering about the interconnection between all the arguments proposed by the writer and, thus, have to figure out the relevance of the concluding sentence in the last paragraph.

Extract 6

That way, we will not be easily framed to a certain way of thinking by individuals who want to steal our right to vote in freedom. We have to stand in our own perspective and assumption to maintain the principle of election in Indonesia. In conclusion, we have to be more critical and more concerned about political condition in Indonesia. As an eligible voter, our vote will contribute to the future of Indonesia, so we have to use it with responsibility and full consciousness (student B).

6. Fallacies

Defined as flaws of reasoning, fallacies detract the overall value of an argument. Thinking critically means finding logical fallacies, the situation when the reason does not adequately support the claim in a number of ways.

The fallacies found in this study show that not all arguments are valid or even logical. This is in line with the findings on the refutation skill discussed earlier suggesting that students do not put enough efforts to always critically think and examine the argument they confront.

The main types of fallacies found in the essays are generalization and over-simplification. The writer tends to undermine the complexity in an argument. The main cause of fallacies found in this study is the insufficient evidence to support the argument.

Extract 7

It suggests that social media is dangerous for guiding people's assumption and that is way the politics in Indonesia is always controlled by certain people (student C).

In extract 7 the writer generalizes the idea of the danger of social media, and, at the same time, switches the discussion away from social media to the Indonesian politics which is not directly related to the first claim. The writer over-simplifies the claim although it contains a complex argument. The absence of evidence of the danger of social media weakens the

argument and makes the readers wonder about the relationship between the two clauses.

DISCUSSION

It is particularly interesting that participants might come to the classrooms with presumably low critical thinking skills, yet they understand that the essay they write are supposed to be argumentative. They are expected to understand and apply the major tenets of argumentation as a type of writing which requires high critical thinking (see Rottenberg, 1991).

The data provide fruitful insights into understanding students' CT abilities. Firstly, apart from the absence of certain elements in some essays, some students are not able to show the correlations among CT elements. The elements should be mutually informing, yet students fail to show their interconnection in the essay. This can be due to students' lack of linguistic competence, particularly in the use of conjunctions. While it is highly possible for a text to have multiple arguments, they have to support each other and construct the main argument postulated in the first paragraph. Irrelevant or absent conclusions are part of this inability. Thus, a critical thinker should be able to generate logical correlations among various elements. To draw logical relations needs students to do critical reflection in a way they have to be able to construct their own ideas and develop sound standards for analyzing and assessing them.

Secondly, while students are encouraged to think critically, they seem to be prone to receive any information without questioning. They tend to transfer the sentences from the sources to their essay without any attempt to evaluate and digest them. This is to say that the essay has not gone through a critical thinking process. As suggested in the low result of refutation skills discussed earlier, questioning a claim seems an unacceptable attitude in the existing traditional writing course.

Thirdly, the insufficient reasons and evidence to support an argument may indicate the lack of students' background knowledge on the essay topic. Topic familiarity becomes an issue here as students are not able to connect the topic to the world and their real life experience. This may also due to students' low reading habits. Further research should focus on the correlations between writing and reading in shaping CT.

Overall, the results highlight that the course needs to be well-designed in order to foster students' skills in displaying each element in their essay. In this case, firstly, CT and how its elements can be displayed through texts should be clearly stated in the course objectives and students should understand from the very beginning that CT is part of the learning goals. Secondly, its outline needs to give clear instructions which aim to practice and sharpen each CT element. The learning goals and design should go beyond linguistics aspects and pay bigger attention at the development of students' CT (see Brown, 2004).

CONCLUSIONS

Since higher-order thinking skills are increasingly required for success in a knowledge-based society, it is crucial to develop CT skills so as to improve students' exposure to the use of English in academic and day to day use and to the world they live in. The study suggests that the integration of CT aspects in EFL argumentative writing has helped the students develop not only their critical thinking skills but also their English language competence. Without adequate practice in critical thinking, EFL students may lack confidence in their academic life and miss the opportunity to advance up the ladder in the global workplace which has become more challenging.

The lack of critical thinking in an EFL writing course as suggested by the results of this study imply that the course design needs to be reconstructed in such a way in order to foster the ability to engage critical thinking. The reconstruction may include the material development and the teaching and learning techniques. The course can be a shift from traditional course, which focuses merely on language skills, to a more integrated and comprehensive course which can simultaneously develop both CT and language skills.

Focusing on this reconstruction, further research should also take into account on how to improve students' awareness on the importance of background knowledge through reading. Without such knowledge students will not be able to find ways in their writing to make meaningful connections between their writing and their world. The research can also take into account the role of reading for shaping CT in writing.

The natural way to improve one's writing is to cultivate the habit of reading for pleasure. Reading can be the most effective, convenient and enjoyable way to better writing.

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