Artikel Pa Teguh

by Mumun Syaban

Submission date: 29-Jun-2018 04:45PM (UTC+0700)
Submission ID: 979340842
File name: Artikel_Teguh_Imam_Agus_Hidayat-2.docx (100.14K)
Word count: 4125
Character count: 22868

JIML Journal of Innovative Mathematics Learning
Volume 1, No. 1, March 2018
ISSN xxxx-xxxx (print)
ISSN xxxx-xxxx (online)

DOI 10.XXXXX/jiml.vXiX.XX-XX

INDUCTIVE-DEDUCTIVE LEARNING APPROACH TO DEVELOP STUDENTS' MATHEMATICAL PROBLEM SOLVING SKILLS AND SELF EFFICACY

Teguh Imam Agus Hidayat[1], Jozua Sabandar[2], Mumun Syaban[3]

[1] Klinik Pendidikan MIPA, Bogor
[2]IKIP Siliwangi, Bandung
[3]Universitas Langlangbuana, Bandung
[1]teguh.hidayat.tiah85@gmail.com, [2]jsabandar@yahoo.com, [3]mumunsyaban58@gmail.com

Received: XXXXXX, XXXX; Accepted: XXXXXX, XXXX

Abstract

This study was a pretest-posttest designed control group experiment, aimed at reviewing the role of inductive-deductive approach on Islamic Junior High School students' skills in mathematical problem solving and self efficacy. This research involved 56 grade eight students, a set of problem solving ability tests and a set of self efficacy scale. The result found that in the enhancement of mathematical problem solving skills and self efficacy, students who received problem solving-based learning achieved better quality than students who received conventional learning, either overall or based on the early mathematical ability (EMA). The interaction between learning and EMA in achieving and increasing problem solving skill showed no significant difference. Other than that, we found robust association between mathematical problem solving skills and self efficacy.
Key words: Problem Solving Skills, Self-Efficacy, Inductive-Deductive Approach

Abstrak

Penelitian ini adalah suatu eksperimen berdisain pretes-postes kelompok kontrol, bertujuan menelaah peranan pendekatan induktif-dediuktif terhadap kemampuan pemecahan masalah matematis dan *self efficcay* siswa MTs. Penelitian melibatkan sebanyak 56 siswa kelas delapan, satu set tes kemampuan pemecahan masalah dan satu set skala *self efficacy*. Penelitian ini menemukan bahwa dalam kemampuan pemecahan masalah matematik dan self efficafy siswa yang mendapat pembelajaran berbasis masalah mencapai mutu yang lebih baik dari pada siswa yang mendapat pembelajaran biasa baik secara keseluruahan maupun berdasarkan kemampuan awal matematik (EMA). Interaksi antara pembelajaran dan EMA dalam pencapaian dan peningkatan kemampuan pemecahan masalah tidak menunjukkan hubungan yang signifikan. Sedangkan terhadap pencapaian *self efficacy* menunjukkan perbedaan yang signifikan. Selain itu ditemukan pula asosiasi yang kuat antara kemampuan pemechan masalah matematik dan *self efficacy*.
Kata Kunci: Kemampuan Pemcahan Masalah, *Self-Efficacy,* Pendekatan Induktif-Deduktif

INTRODUCTION

Mathematical problem solving skills (MPPS) is important and must be possessed by students of secondary schools. This is as proposed by the NCTM (2000) and the Ministry of Education (2016). According to Raynal and Rieunier (Capriora 2015), problem is a question or difficulty that must be solved, while solution is reacting in the satisfactory manner to solve a

problem using one's own possessed knowledge. Problem solving is a process to overcome difficulties encountered in order to achieve a perceived objective or goal (Sumarmo, 2000). Mean while, Turmudi (2008), states that problem solving ability in mathematics involves non -standard and unknown methods and settlements. Thus, mathematical problem solving is a students' process in solving non-routine issues, in this case means unusual or even never before solved by students, not algorithm, in which problems are solved not directly using formulas, but the students need to find their own formulations of the problem; and *open-ended* in nature because the solutions can be differ for each students, depend on their previous knowledge.

The steps to problem solving according to Polya (1981) are: 1) understand the problem, 2) devise a plan, 3) carry out the plan, 4) look back at the obtained results. By implementing Polya's steps, the learning is expected to be effective and students can be emphasized to solve challenging problems to train them solving problems in sequential order and systematic manner. According to Limjap (2009), that if these steps are effectively conducted, a problem solver will then be succeed in overcoming extant problems. Students must use their previous knowledge, applying their obtained mathematical skills, understanding the context of the problem, and selecting appropriate strategies to cope with the problem.

Early mathematical ability (EMA) is an early ability possessed by students as requirements before committing in learning. Because basically, mathematic is systematically structured in nature. One material is prequisite for next materials. In mathematic learning, EMA is a one of the factors that influence students successfulness in learning. Due to different EMA possessed by different students, then EMA is divided in three categories, which are high, medium and low. This division is proposed to investigate more detail on the influence of learning in each category of EMA and also to find out if there is a joint interaction between EMA-based learning on the enhancement of mathematical problem solving ability.

Other than MPPS, Self Efficacy (SE) is one of the elements need to be developed. Bandura and Ormord (Aulia, 2017) states that SE refers to one's self confidence on his ability in solving a problem to achieve the perceived objectives. Maddux (in Sudrajat, 2008) explained the meaning and characteristics of SE, a skill relating to what one believes or conviction in his own ability to commit or accomplish something with his own skill under certain situation or condition which describes to productive behaviour/manner and will develop over time with experience. Therefore Self Efficacy needs to be possessed by students to increase achievement, develop internal motivation, and enable students to achieve more challenging goals (Bandura, 2006).

One of the facts occuring in mathematical learning in schools, is that it is too formal, lack of links to meaning, understanding and application of mathematic concepts, and fail to pay enough attention on problem solving. Generally, teachers only transfer what is written in the text book and less accommodate to their own students' ability. This creates barrier in the students' MPPS development. It is necessary for teachers to invent an innovative learning approach to build and develop the MPPS, one of them is by implementing inductive-deductive learning approach because it gives the students opportunity to actively involve in the learning. Several studies (Dewanto, 2003, Amri, 2009, Sumaryati and Sumarmo, 2013, Winarso, 2014) report that by implementing the inductive-deductive learning approach (IDL), students' mathematical ability is found to be improving compared to the conventional learning (CL) and can also increase the students' mathematical ability into higher level. These findings indicate that the use of innovative learning approach gives students more prospect to be more active and increase the MPPS and other mathematical skills, better than the conventional learning.

IDL begins with inductive which is the presentation of examples, then students identify, differentiate, interpret, generalize, and finally conclude. Next step, deductively, students give examples of generalization (Sumaryati & Sumarmo, 2013). Taba (Joyce & Weil, 2000) develop IDL based on three assumptions, they are: learnable thinking process, thinking process is an

active transaction between an individual and data, to develop thinking process in orderly manner. The implication of this learning is the production of spirits to invent, the existence of awareness to the nature of knowledge, and the development of logical thinking.

Karli (2003) said that there are four steps of activities in the inductive-deductive learning, 1) Introduction, 2) Exploration, 3) Conceptual Development, and 4) Conceptual Implementation. Introduction step is an apperception and motivational activities given by teachers. Exploration is a phase where students in groups actively involve with other classmates identifying examples, observing, taking notes, communicating, finding conjectures, and making definitions with their own words. Conceptual development phase is where students find conjectures obtained in the exploration phase and producing definitions agreed by other classmates and deductive proofing. Conceptual implementation phase is conducted to implement deductive thinking pattern, expecting students to be trained in solving problems related to the concepts and theories found and agreed by students in the conceptual development.

Observing the IDL learning, the characteristics of MPPS and SE, is what motivate us to conduct this research purposed to: 1) analyze the role of IDL in increasing MPPS and SE, both viewed overall and based on EMA, 2) to analyze the interaction between both learning approach (IDL and CL) and EMA on the achievement and development of MPPS and SE, and 3) to analise the association between MPPS and SE.

METHOD

The method used in this research was quasi experimental research involving two groups namely experimental group and control group. The experimental group received mathematic learning using IDL and control group receive CL as treatment. Both groups given pretest and post test to obtain the increasing of students MPPS and then given attitude scale to obtain students SE. We choose this method to see the effect of application of learning with IDL on students' MPPS and SE.

The study was conducted in one of public MTs in the Southern of Jakarta. Samples consists of grade VIII chosen randomly from two classes with same level of early skills. Experiment class consisted of 29 students and control class consisted of 27 students. For the purposes of the data, this study used the instrument in the form of ability test of early math as much as 20 points, the description of MPPS test as much as 5 items and scale SE as 30 points scale.

The administering of early mathematical ability test to students was aimed to discover the ability of students before learning. The students' initial ability tests are obtained through a set of test questions that included previously learned material. The result of this EMA test was then used to group students based on the categories of high, medium, or low in the data analysis as seen on Table 1.

Characteristics of MPPS instruments are: content validity by expert (supervisor), validity test, reliability test r = 0.78 (high), distinguishing power and difficulty level of items questioned. As for the attitude scale 27 points were obtained of valid scale with reliability r = 0.89 (high). From the test results, we came up with 5 question items of MPPS and 27 items of SE scale (as seen on Table 2).

Table 1. Sample Spreads Based on the Early Ability

Teaching Approach	Students' EMA Level			Sum
	High	Medium	Low	
IDL	8	17	4	29
CL	8	15	4	27

Total	16	32	8	56

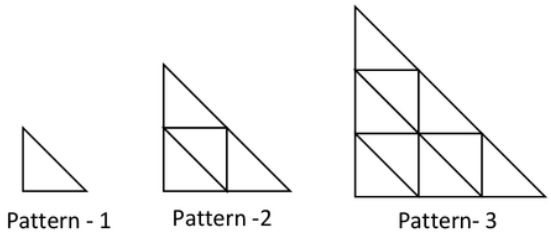
Table 2. Recapitulation of MPPS Test

No Tes	V	DP	TK	Conclusions
1	0.77 (High)	0.36 (Fair)	0.41 (Medium)	Accepted
2	0.83 (Very High)	0.58 (Good)	0.22 (Medium)	Accepted
3	0.78 (High)	0.33 (Fair)	0.81 (Easy)	Accepted
4	0.72 (High)	0.47 (Good)	0.39 (Medium)	Accepted
5	0.92 (Very High)	0.38 (Fair)	0.56 (Medium)	Accepted

The following is a sample of instrument in this research.

Sample questions of MPPS

1. One day, Zain and Fattah plan on a vacation trip to the beach. Zain picks up Fattah to go together to the beach. Zain's house is in the western part of Fattah's house, and the beach they are going to visit is located at exactly in the northern direction from Fattah's house. The distance of Zain's and Fattah's house is 15 KM, while the the distance of Fattah' house to the beach is 20 KM. Determine the difference of distance Zain has to go through between picking up Fattah first or going alone directly to the beach. Solve the problem by following these steps:
   a. write down the known and questioned data
   b. devise plans for solving the problem
   c. solve the problem
   d. recheck

2. 

   Yuha draws a picture of an isosceles right triangle as pictured above. The length of hypothenuse in the first pattern is 8cm. Determine the area of the third pattern using the following steps:
   a. write down the known and questioned data
   b. devise plans for solving the problem
   c. solve the problem
   d. recheck

Table 3. Examples of Students SE Scale Question Items

No.	Statements	Strongly Agree	Agree	Disagree	Strongly Disagree
1	I am confident I can solve questions about Pythagoras and circles materials				

2	I feel worry when my teacher ask me questions about materials of pythagoras and circles that I have not yet understand
3	I dare to ask my friends questions about pythagoras and circles
4	I am excited to learn the materials of pythagoras and circles

RESULT AND DISCUSSION

Result

The MPPS data were obtained from the pretest, posttest and then searched for normalized gain values. The following section describe the data as presented in Table 4.

Table 4. Descriptive Statistics of Students MPPS Test

Class	MPPS	High			Medium			Low			Total		
		$\bar{x}$	%	S	$\bar{x}$	%	S	$\bar{x}$	%	S	$\bar{x}$	%	s
IDL	Pretest	13.75	27.50	2.19	9.41	18.82	2.00	6.25	12.50	0.96	10.17	20.34	3.13
	Posttest	43.38	86.76	2.67	37.11	74.22	3.02	27.00	54.00	1.41	37.45	74.90	5.74
	N-Gain	0.82		0.07	0.68		0.07	0.48		0.03	0.70		0.12
	N		8			17			4			29	
CL	Pretest	13.38	26.76	3.34	9.00	18.00	1.25	7.75	15.50	0.96	10.11	20.22	2.97
	Posttest	39.63	79.26	5.10	30.33	60.66	2.47	25.75	51.50	1.50	32.41	64.82	5.99
	N-Gain	0.72		0.13	0.52		0.06	0.43		0.03	0.57		0.14
	N		8			15			4			27	

Notes: MPPS: Mathematical Problem Solving Skill, Ideal Score: 50

Based on the table 4, overall average scores of MPPS pretest on IDL class is better compared to the CL class with 0.06 difference. This indicates that there are no pretests difference between both classes. Each category of these classes is in the lower level category (20.34% and 20.22% from the ideal score). From this perspective, the standard deviation value of the diversity score of IDL class is the same as CL class. When viewed at EMA level, IDL class pretest is higher than CL class in higher and medium category. While in the lower level EMA category CL class is better than the IDL class. Differences in the pretest score of each level between the IDL class and the CL class are not more than 3%.

The average overall score for MPPS posttest for IDL class is better than the CL class with 5.08 or 10.08% difference. The difference can be considered quite high. The category of each classes is in the medium (74.90% and 64.82% from the ideal score). When viewed from the standard deviation value, the score diversity of posttest for both IDL class and CL class are equal. Based on the posttest score description, we can say that MPPS posttest score for IDL is better than the CL's. Based on the EMA level, the posttest for IDL is higher than the CL at all level of EMA. Students with low level of EMA in CL class initially have higher pretest score, but in the posttest resulted in lower level than the IDL.

The average N-gain score of MPPS in IDL class overall is better than IDL with 0.13 or 13% difference. N-Gain category of each class are in the medium category (0.70 and 0.57). Viewed from the standard deviation, the diversity posttest scores for IDL and CL are equal. Based on the description of the N-Gain score, we can say that the increase of MPPS in IDL

class is better than in the CL class. The N-gain level of EMA for IDL class is higher than the CL at all level.

Mean while, the data of SE scale were obtained form the students posttest. The description is as presented in Table 5.

Table 5. Descriptive Statistics of Students SE Tests

Class	SE	High			Medim			Low			Total		
		$\bar{x}$	%	S	$\bar{x}$	%	S	$\bar{x}$	%	S	$\bar{x}$	%	s
IDL	Post scale	84.88	78.59	4.80	71.35	66.06	5.51	55.75	51.62	2.06	72.93	67.53	10.39
	N		8			17			4			29	
CL	Post scale	72.75	67.36	10.94	65.47	60.62	6.31	61.50	56.94	3.70	67.04	62.07	8.45
	N		8			15			4			27	

Notes: SE: Self Efficacy, Ideal Score: 108

The average post scale score for overall SE in IDL class is better than in the CL class with 5.89 or 5.46% difference. The category of each class post scale is in the medium category (67.53% and 62.07%). From the standard deviation perspective, the score of post scale SE achieved by IDL class is better than that of CL class. Based on the post scale score description it can be said that IDL achievement of SE is better than CL class. From the EMA level post scale point of view, IDL class is higher than CL and it is in the high and medium level. While in the category of lower EMA level, the CL is better than the IDL.

Statistical testings were used to analize the data. After testing the data's relevant normality and homogeneity, the hypothetical testing of the students' learning results (pretest and posttest) are presented in the Table 6.

Table 6. Hypothetical Testing of Average Score Difference of MPPS and SE in Both Groups of Students

Ability	Sig(2-tailed)	Sig(1-tailed)	Interpretation
MPPS	0.002	0.001 < 0.05	MPPS $_{IDL}$ > MPPS $_{CL}$
N-Gain MPPS	0.001	0.0005 < 0.05	N-Gain MPPS $_{IDL}$ > N-Gain MPPS $_{CL}$
SE	0.024	0.014< 0.05	SE $_{IDL}$ > SE $_{CL}$

Based on the Table 6 above, it can be concluded that the achievement and the increasing of MPPS for students using IDL is better than the students using CL. Other than that, the students' SE achievement also better in the IDL class than that of CL class.

To discover the interaction between the learnings and EMA level on students' MPPS and SE, a 2-track anova test was conducted and the result is presented in Table 7.

Table 7. Result of 2-Track Anova Test on N-Gain MPPS and SE

Variables	Source	Type III Sum of Squares	Df	Mean Square	F	Sig.

Posttest MPPS	Class	158.62	1	158.62	16.676	0
	EMA	1322.336	2	661.168	69.509	0
	Class * EMA	59.534	2	29.767	3.129	0.052
N-Gain MPPS	Class	0.109	1	0.109	18.711	0
	EMA	0.596	2	0.298	51.038	0
	Class * EMA	0.026	2	0.013	2.221	0.119
SE	Class	171.72	1	171.72	4.097	0.048
	EMA	2358.282	2	1179.14	28.132	0
	Class * EMA	426.29	2	213.145	5.085	0.01

Based on the table we concluded that there are no reaction between the learning and level of EMA on the achievement and the increasing of the students EMA level.

To ascertain the association between MPPS and SE, a Contingency Table as Table 8 was used. We then chi-square tested using SPSS 16 software and produced a sig value = 0.000. Due to both groups' sig $< \alpha = 0.05$, H_0 was rejected. This indicates that there was a significant association between MPPS and SE with coefficient contigency C = 0.691. The produced value respresented a robust connection between MPPS and SE.

Table 8. The Amount of Students Based on the MPPS and SE Criteria of High, Medium and Low in IDL Class

MPPS	SE			
	High	Medium	Low	Sum
High	7	10	0	17
Medium	0	8	1	9
Low	0	0	3	3
Total	7	18	4	29

DISCUSSION

Based on the research results, when viewed from overall perspective, MPPS and SE for students group using IDL were always better than those of group of students using CL. The value of students' MPPS in both classes were in medium category. The same result also obtained from the students' N-Gain score. In the IDL class' SE, we obtained a good level, while the students in CL class achieved medium level. The discussion on EMA level category and the increasing of students' MPPS using IDL was better than students' using CL at all EMA level. This means that IDL appropriately facilitated students at all EMA level, thus resulting in better MPPS increased.

The aforementioned results described that the applied learning approaches had significant effect on the students' MPPS and SE, nonetheless optimal as expected. This was due to the fact that IDL learning gave more access to students to solve mathematical questions independently, and allowed them to actively observe, finding patterns, finding proper definitions and conjectures which finally led to students finding their own accurate conceptual understanding. Additionally, students were trained to solve problems related to found concepts, and this was agreed by other students and resulted in meaningful learning. The learning also gave effect on the students' SE. If students already felt that they found meaning from the learning, they will feel confident in their own ability to solve the assignment given in the problem solving tests, and this means that the students' SE was increasing.

The findings on students' MPPS from this research is similar to other research findings Jusra (2013), Shodikin (2015), Mardiana (2016), Sunaryo dan Nuraida (2017), all found that MPPS of students using innovative learning are better than that of the conventional learning. Similar result found on SE that students using innovative learning is better than conventional learning as seen in the research of Laksmi (2017), Sunaryo dan Nuraida (2017).

Next discussion is related to interaction between learning and EMA level showed that both interaction did not give significant effect on the students' achievement and MPPS increase. More detail description for each factors are for Class factor (IDL and CL) and EMA level factor (high, medium, low) gave significant effect on the difference of achievement and MPPS increase. The finding was supported by the average score gained from the students' MPPS post test either using IDL or CL, the connection showed that the higher the EMA level, the larger the MPPS increase. Conversely with the interaction between learning and EMA level, the result show that both interactions gave significant impact on the students SE achievement. This can be seen from the achievement of SE in CL class on lower level EMA is higher than that of IDL class. The contrasting result found in higher and medium EMA.

Relating the association between MPPS and SE variables, we found a strong association between the two variables. This indicates the higher the students' confidence in the mathematical skill, the higher the students cognitive skills, especially in the MPPS.

CONCLUSION

Based on the results and discussions, we can conclude that the achievement and enhancement of students' MPPS using IDL is proven better than students using conventional learning, either overall or based on the EMA level despite the fact that the value of MPPS in the second class is still in the lower level, not meeting our expectations. While the interaction between both learning approaches (IDL and conventional learning) do not effect significantly on the improvement of MPPS. Different result is obtained on the students' SE achievement. Additionally, there is a robust association between students' MPPS and SE.

To increase better students' MPPS. We suggest teachers to prepare an innovative learning such as IDL. Other than that, students' knowledge of required materials also needs to be paid attention to, before the next material is given. Teachers must also motivate students to solve challenging mathematical problems. Nonetheless, to develop better SE, students must be aware of possessing SE and characters suitable with SE, which are *magnitude, generality and strength,* and we also recommend teachers to motivate their students to believe that they can solve mathematical problems.

DAFTAR PUSTAKA

Amri. (2009). *Peningkatan Kemampuan Representasi Matematik Siswa SMP melalui Pembelajaran dengan Pendekatan Induktif-Deduktif*. Thesis at PPS UPI. Bandung: unpublished.

Aulia, Laksmi. (2017). *Peningkatan Kemampuan Komunikasi dan Koneksi Serta Self Efficacy Matematik Siswa SMP Melalui Strategi Think Talk.* Thesis at STKIP Siliwangi: Bandung.

Bandura. A. 2006.*Guide for Constructing Self-Efficacy Scales* in Frank Pajares & Tim Urdan (Ed)., Self-Efficacy Beliefs of Adolecents. [Online]. Available: http://www.des.emory.edu/mfp/self-efficacy.html#books.

Capriora, Daniela. 2015. Problem Solving – Purpose And Means Of Learning Mathematics In School. *Procedia - Social and Behavioral Sciences*, 191, 1859-1864.

Dewanto, S.P. (2003). *Upaya Meningkatkan Kemampuan Berpikir Tingkat Tinggi melalui Pembelajaran dengan Menggunakan Pendekatan Induktif-Deduktif*. Thesis at PPS UPI. Bandung: unpublished.

Jacob, C. (2003). *Pemecahan Masalah, Penalaran Logis, Berpikir Kritis & Pengkomunikasian.* Universitas Pendidikan Indonesia: Unpublished.

Joyce, B. and Weil, M. dan Calhoun, E. (2000). *Models of Teaching*. [EighthEdition]. Sydney: Pearson.

Jusra, H. (2013). *Meningkatkan Kemampuan Pemecahan Masalah Matematis dan Kemandirian Belajar Siswa SMP melalui Pendekatan Metacognitive Inner Speech.* Thesis at PPS UPI. Bandung: unpublished

Karli, H. (2003). *Implementasi Kurikulum Berbasis Kompetensi*. Bandung: Bina Media Informasi.

Kemendikbud. (2016). *Silabus Mata Pelajaran Sekolah Menengah Pertama/Madrasah Tsanawiyah (Smp/Mts) Mata Pelajaran Matematika*. Ministry of Education and Culture: Jakarta.

Limjap, A. A. (2009). Issues on Problem Solving: Drawing Implications for a Techno-Mathematics Curriculum at the Collegiate Level. Philippines: De La Salle University.

Mardiana, R. (2013). *Meningkatkan Kemampuan Pemahaman dan Pemecahan Masalah Matematik serta Kemandirian Belajar Siswa SMP melalui Metode Pemeblajaran berbasis Masalah.* Thesis at STKIP Siliwangi: Bandung. Unpublished.

Mulyana, T. (2005). *Upaya Meningkatkan Kemampuan Berfikir Kreatidf Matematik Siswa SMA Jurusan IPA melalui Pembelajaran dengan Pendekatan Induktif-Deduktif.* Tesis SPs UPI Bandung: Tidak Diterbitkan.

National Council of Teachers of Mathematics (NCTM). (2000). *Principle and Standars for School Mathematics*. NCTM.

Polya, G. (1981). *How to Solve It*. Zurich: Princeton University Press.

Shodikin, A. (2015). Peningkatan Kemampuan Pemecahan Masalah Siswa melalui Strategi Abduktif-Deduktif pada Pembelajaran Matematika . *Kreano,* 6(2), 101-110.

Sumarmo, U. (2000). *Pengembangan Model Pembelajaran Matematika untuk Meningkatkan Kemampuan Intelektual Tingkat Tinggi Siswa Sekolah Dasar*. Research Report at UPI. Unpublished.

Sumaryati, E dan Sumarmo, U. (2013). *Pendekatan Induktif-Deduktif Disertai Strategi Think-Pair-Square-Share Untuk Meningkatkan Kemampuan Pemahaman Berfikir Kritis Serta Disposisi Matematis Siswa SMA*. *Infinity*, 2(1), 26-42

Sunaryo, Y dan Nuraida, I (2017). Pengaruh penerapan model pembelajaran brain-based learning terhadap kemampuan pemecahan masalah matematik siswa. Journal of Educational Research and Mathematics Learning, 3(2), 89-96.

Turmudi. (2008). *Landasan Filsafat dan Teori Pembelajaran Matematika (Berparadigma Eksploratif dan Investigatif)*. Jakarta: Leuser Cipta Pustaka.

Winarso, Widodo. (2014). Membangun Kemampuan Berfikir Matematika Tingkat Tinggi Melalui Pendekatan Induktif, Deduktif, dan Induktif-Deduktif Dalam Pembelajaran Matematika. *EduMa,* 3(2), 95-118.

Artikel Pa Teguh

ORIGINALITY REPORT

14%	12%	7%	7%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	repository.upi.edu Internet Source	2%
2	a-research.upi.edu Internet Source	2%
3	cmj.bxb.ro Internet Source	1%
4	publikasi.stkipsiliwangi.ac.id Internet Source	1%
5	ejournal.uin-suska.ac.id Internet Source	1%
6	eprints.ums.ac.id Internet Source	1%
7	Submitted to Western Governors University Student Paper	<1%
8	Submitted to Pasundan University Student Paper	<1%
9	repositorio.unb.br Internet Source	<1%

10	e-journal.stkipsiliwangi.ac.id Internet Source	<1%
11	repo.iain-tulungagung.ac.id Internet Source	<1%
12	journal.unnes.ac.id Internet Source	<1%
13	eprints.unm.ac.id Internet Source	<1%
14	journal.fpmipa.upi.edu Internet Source	<1%
15	menulisbersamaaswir.blogspot.com Internet Source	<1%
16	Ratna Sariningsih. "PENDEKATAN KONTEKSTUAL UNTUK MENINGKATKAN KEMAMPUAN PEMAHAMAN MATEMATIS SISWA SMP", Infinity Journal, 2014 Publication	<1%
17	www.ijsre.com Internet Source	<1%
18	D S Sari, K Kusnandi, S Suhendra. "A Cognitive Analysis of Students' Mathematical Communication Ability on Geometry", Journal of Physics: Conference Series, 2017 Publication	<1%
	www.cdc.gov	

19	Internet Source	<1%
20	Roheni, T Herman, A Jupri. "Scientific Approach to Improve Mathematical Problem Solving Skills Students of Grade V", Journal of Physics: Conference Series, 2017 Publication	<1%
21	Ali Shodikin. "EFFECT OF LEARNING WITH ABDUCTIVE-DEDUCTIVE STRATEGY TOWARDS THE ACHIEVEMENT OF REASONING ABILITY OF HIGH SCHOOL STUDENTS", Infinity Journal, 2017 Publication	<1%
22	archives.math.utk.edu Internet Source	<1%
23	e-mosharafa.org Internet Source	<1%
24	www.scribd.com Internet Source	<1%
25	digilib.unimed.ac.id Internet Source	<1%
26	msceis.conference.upi.edu Internet Source	<1%
27	Pamela Anne Roberts, Katie Dunworth, Duncan Boldy. "Towards a reframing of student	<1%

support: a case study approach", Higher Education, 2017
Publication

28	Regional Conference on Science Technology and Social Sciences (RCSTSS 2014), 2016. Publication	<1%
29	Ghaith, Omar(Collins, S and Watts, M). "The impact of blended learning on female student-teachers in Kuwait", Brunel University School of Sport and Education PhD Theses, 2013. Publication	<1%
30	Submitted to Universitas Pendidikan Indonesia Student Paper	<1%
31	fpmipa.upi.edu Internet Source	<1%
32	www.mitrariset.com Internet Source	<1%
33	redfame.com Internet Source	<1%
34	N Priatna, B A P Martadiputra, Y Wibisono. "Developing geogebra-assisted reciprocal teaching strategy to improve junior high school students' abstraction ability, lateral thinking and mathematical persistence", Journal of Physics: Conference Series, 2018 Publication	<1%

Exclude quotes	Off	Exclude matches	Off
Exclude bibliography	Off		