Plagiarism Checker X Originality Report

Similarity Found: 15%

Date: Jumat, September 14, 2018
Statistics: 629 words Plagiarized / 4149 Total words
Remarks: Low Plagiarism Detected - Your Document needs Optional Improvement.

THE ROLE OF PROBLEM SOLVING APPROACH ON STUDENT'S MATHEMATICAL CRITICAL THINKING ABILITY AND DISPOSITION Asep Mulyana,Utari Sumarmo, Rudi Kurniawan Magister Mathematics Education of Post Graduate IKIP Siliwangi Bandung asep_mulyanaa1@yahoo.co.id ; utari.sumarmo@gmail.com; krudy41@yahoo.com Received: XXXXX X, XXXX; Accepted: XXXXX X, XXXX ABSTRACT This study was a pre test-post test experimental control group design having a goal to analyze the role of prior mathematics ability (PMA) and Problem Solving Approach (PSA) on student's mathematical critical thinking ability (MCTA) and disposition (MCTD).

The study involved 65 eleventh grade students, a prior mathematics ability (PMA), a MCTA test, a MCTD scale. The study found that PMA and PSA took roles on obtaining student's MCTA and MCTD, those were the higher student's PMA the study found the higher students MCTA and MCTD.

Beside that, on MCTA and its N Gain, entirely and with low and medium PMA students getting treatment with PSA attained better grades than the grades of students taught by conventional teaching (CT); and for entirely and with medium and high PMA, student recieving treatment with PSA obtained higher grades on MCTA and MCTD than student taught by CT and those grades were at good grade level.

The other findings, there was no association between MCTA and MCTD, and no interaction between PAM and teaching approaches toward MCTA and on MCTD and student learn actively during PSA Keyword: mathematical critical thinking ability, mathematical critical thinking disposition, problem solving approach Abstrak Penelitian ini adalah suatu eksperimen berdisain pre test-postes dengan kelompok kontrol bertujuan menganalisis peranan kemampuan awal matematika (KAM) dan problem

solving approach (PSA) terhadap kemampuan dan disposisi berpikir kritis matematik (KBKM dan DBKM). Penelitian melibatkan 63 siswa kelas-11, satu tes uraian KBKM, dan satu skala DBKM.

Penelitian menemukan dalam KBKM dan peningkatannya, serta dalam DBKM siswa yang memperoleh PSA mencapai mutu yang lebih baik daripada mutu siswa yang mendapat pembelajaran konvensional (PK), dan mutu KBKM dan mutu DBKM siswa tergolong pada level baik. Siswa yang mendapat PSA hampir tidak mengalami kesulitan dalam menyelesaikan tugas-tugas KBKM sedang siswa yang mendapat pembelajaran konvensional mengalami kesulitan dalam memeriksa kebenaran proses perhitngan dan dalam membuktikan berkenaan turunan fungsi.

Temuan lainnya, tidak terdapat asosiasi antara KBKM dan DBKM dan tidak terdapat interaksi antara KAM dan pembelajaran terhadap pencapaian KBKM dan DBKM. Selain itu siswa menunjukkan lebih aktif belajar selama PSA dibandingkan dalam pembelajaran konvensional. Kata Kunci: kemampuan dan disposisi berpikir kritis matematik, pendekatan pemecahan masalah How to Cite: Mulyana, A., Sumarmo, U, & Kurniawan, R (2018).

The Role Of Problem Solving Approach On Student's Mathematical Critical Thinking Ability And Disposition . JIML, X (X), XX-XX. _ _INTRODUCTION When writers observed a mathematics lesson, writers found two different impression namely, almost students could solve simple mathematics calculation problems without any difficulty.

Even if, many students failed to solve complex problem and they could not identify yet the rules used in each step of the solution process. The last student's condition ilustrated that students less capable to solve mathematics problem critically. Whereas, mathematics curriculum (Indonesia mathematics Curriculum, 2013) attached that mathematical critical thinking ability (MCTA) was an essential mathematics learning outcomes and it should be enchanced on high school student.

Beside that, some experts expressed that student should mastered MCTA, caused of as follow: a) When student thought critically, he solved problem effectively (Peter, 2012), was responsible on his opinion accompanied with logical reasoning, and did not accept information without checking its source. Some writers explained critical thinking term in different expressions, but they included similar meaning and completed each other, such as follow, critical thinking was: a) Ability to clarify what being considered (Fisher, 2009); b) Reasonable reflective thinking based on trusted activities (Ennis, as cited in Hassoubah, 2004); c) Thinking process to derive reasonable conclusion (Ennis,1993); d) Process of deriving conclussion connected with something should be trusted and be

done (Noer, 2009).

Further, as a guide for compiling instrument to assess student's MCTA, writers summerized some experts' ideas about indicators of MCTA as follow: a) MCTA contained five main activities namely: to give simple explanation, to build basic skill, to conclude, to clarify in depth and to manage strategy (Ennis, as cited in Costa, 1985); b) MCTA covered activities: to prove, to generalize, to solve problem (Glazer, 2004); c) MCTA was to determine credible resources, to differenciate relevant and unrelevant data, to identify and to evaluate unwritten asumption, happened bias, and viewpoint, to evaluate proof for supporting confession (Bayer, as cited in Hassoubah, 2004).

Those indicators of MCTA ilustrated that MCTA was classified as high order thinking in mathematics and it implied for excecuting MCTA tasks student should have strong soft-skill and interest in mathematics, and strong dedication in doing mathematics task. That strong dedication attitude in doing mathematics was defined as mathematical disposition.

Polking (as cited in Sumarmo, 2010, Hendriana & Sumarmo, 2014) stated that mathematical disposition (MD) was strong desire, awareness, and dedication for thinking and doing mathematics positively. During student excecuted MCTA task well, so student should have certain mathematical disposition named mathematical critical thinking disposition (MCTD).

Mathematics Curriculum 2013, proposed that mathematical hard-skill such as MCTA and mathematical soft-skil such as MCTD should be developed simoultaneously. Moreover, Polya (1985), stated that teacher's role not only to extend mathematics content but the most important things were: to act as students, to appreciate student's thinking, to help students to think and to construct new knowledge.

In other words, writers should select a kind of teaching approach that could comply with suggestion of Mathematics Curriculum 2013 and Polya's opinion for improving student's MCTA and MCTD. By reviewing activities during a lesson, writers estimated that problem solving approach (PSA) would conform to those suggestion. Some experts (Polya, 1985, Gagne, as cited in Ruseffendi, 2006, Sumarmo, 2010, as cited in Suryadi, Nurlaelah, Turmudi, Eds.,

2013) proposed that PSA contained some activities, namely: to understand the problem, to plan strategy, to execute the plan, and to examine process and solution. Afther writers analyzed those learning activities deeply, wirters estimated that PSA would fasilitate student to practice to identify the conformity data, to solve problem, to assess

the truth of process and solution and to promote student's CDM.

Those analysis supported writers' belief that PSA would take a good role on enchancing student's MCTA and MCTD Recently, there were limited studies analyzed MCTA and MCTD accordingly by using PSA. However, some studies examined MCTA, MCTD, and PSA variables separately. For example, Leader & Middleton (2004) reported PSA took a good role on promoting student's critical thinking disposition, and Farika (2012) by using problem solving approach student obtained critical thinking ability better grades than the grades of students taught by conventional teaching.

Other example, Effendi (2017) found that student getting treatment with PSA attained better MCTA grade than the grade of student taught by conventional teaching, but there was no different grades on student's believe on mathematics. Other study (Ramlah, 2016) reported advantage of PSA on improving student's mathematical communication and creative thinking abilities and mathematical habits of mind.

In addition, Rahman & Maslianti (2015) detected that Model Creative Problem Solving (CPS) in mathematics took better role than conventional teaching on attaining student' mathematical creative thinking ability. Beside that, some studies that involved student's PMA (Aminah, Kusumah, Suryadi, & Sumarmo, 2017, Kurniati, Kusumah, Sabandar, & Herman, 2015, Kurniawati, Kusumah, Sumarmo, & Sabandar, 2014, Nindiasari, Kusumah, Sumarmo, & Sabandar, 2014, Pujiastuti, Kusumah, Sumarmo, & Afgani, 2014, Setiawati, 2014, Widyaningtiyas, 2015) reported that student's PMA took a good role on obtaining student's various mathematical abilities.

The afforementioned arguments and findings, motivated writers to carry out a study for improving students' MCTA and CDM by using PSA and formulated research questions as follow. Were MCTA grade and its normalized gain, and CDM grade of students getting treatment with PSA better than the grades of students taught by conventional teaching for entire students and based on level of student's PMA? What were student's difficulties on solving MCTA tasks? Was there any association between MCTA and CDM? Was there any interaction between PMA and teaching approaches toward student's MCTA and toward student's CDM? METHOD This study was a pre test-post test experimental design which having a goal to analyze the role of scienctific approach on students' mathematical critical thinking ability and mathematical self confidence.

The study involved 65 eleventh grade students, an objective test of PMA, an essay MCTA test, a MCTD scale, and a perception on MPSA scale. The MCTA test consisted of 5 items, and by using Hendriana and Sumarmo (2014) it was obtained charactristic of MCTA test as follow: reliability test was .75; item validity were .38 (IV (.71; discriminat

power were .31 (DP (.68, and difficulty index were .27 (DI (.72.

In the following, we attached sample items of MCTA test, sample items of MCTD scale. RESULTS AND DISCUSSION Results Findings and Discussion Description of student's MCTA and MCTD were attached in Table 1. Table 1. Student's Mathematical Critical Thinking Ability, and Mathematical Critical Thinking Disposition on Both Teaching Approaches Variables _ PMA _Stat _Problem Solving Approach _Conventional Teaching (ET) _ _ _ _ _Pre-Test _Post-Test _N Gain _n _Pre-Test _Post-Test _N Gain _n _ _MCTA _ High __ _11.56 _37.67 _.69 _9 _12.67 _37.20 _.67 _10 _ _ _ _% _23 _75 _ _ _25 _75 _ _ _ _ _ _SD _4.67 _6.34 _.12 _ _1.51 _3.08 _.08 _ _ _ _ Medium __ _11.94 _36.76 _.66 _17 _11.93 _32.50 _.54 _14 _ _ _ _% _24 _74 _ _ _24 _65 _ _ _ _ _ _SD _4.42 _5.98 _.14 _ _4.62 _4.70 _.10 _ _ _ _ Low __ _9 _31.14 _.54 _7 _9.75 _28.38 _.47 _8 _ _ _ _% _18 _62 _ _ _20 _57 _ _ _ _ _ _SD _2.00 _5.67 _.12 _ _3.33 _4.66 _.08 _ _ _ _ Total __ _11.21 _35.82 _.64 _33 _11.59 _32.94 _.56 _32 _ _ _ _% _22 _72 _ _ _23 _66 _ _ _ _ _ _SD _4.17 _6.52 _.14 _ _3.81 _5.29 _.11 _ _ _ MCTD _ High __ _- _102.11 _- _9 _- _97.40 _- _10 _ _ _ _% _ _85 _ _ _ _81 _ _ _ _ _ _SD _ _5.75 _ _ _ _7.68 _ _ _ _ _ Medium __ _ _98.59 _ _17 _ _92.57 _ _14 _ _ _ _% _ _82 _ _ _ _77 _ _ _ _ _ _SD _ _6.04 _ _ _ _6.05 _ _ _ _ _ Low __ _ _83 _ _7 _ _84.38 _ _8 _ _ _ _% _ _70 _ _ _ _70 _ _ _ _ _ _SD _ _6.35 _ _ _ _4.98 _ _ _ _ _ Total __ _ _96.33 _ _33 _ _92.38 _ _32 _ _ _ _% _ _80 _ _ _ _77 _ _ _ _ _ _SD _ _9.09 _ _ _ _7.91 _ _ _ _Note: MCTA: Mathematical critical thinking ability, Ideal Score: 50 MCTD: Mathematical Critical Thinking Disposition Ideal Score: 120 From Table 1, in pre-test it found that there was no difference grades of MCTA of students in both teaching approaches, and the grades were at very low level.

Nevertheles, after learning process, on MCTA, its gain (N-<G>), and on MCTD students taught by PSA either entirely or based on level of PMA (high, medium, low) attained better grades than the grades of students taught by conventional teaching. The testing hypothesis of those data (for entirely students in each class) were attached in Tabel 2.

The good grade of student's MCTA in study was different with Sumarmo et.all which found that student's grade on MCTA was still at low-medium level. It might be mathematics content in Somarmo's et.all study was a difficult topic namely probabiity and trigonometry, while mathematical topic of this study was "sequence and serries" Further analysis, was concerning association between MCTA and MCTD. That association was analyzed by using contigency table such as in Table 3 and by using (2 testing such as in Table 4.

The analysis obtained value (2 = 8.290a and sig.(2 tailed-.082 > .005). This was meant that there was no association between MCTA and MCTD. Table 2. Testing Hypothesis of Mean Difference of Mathematical Critical Thinking Ability, And Mathematical Critical Thinking Disposition on Both Teaching Approaches Variables _Teaching Approach _ ??

_SD _n _Sig (2-tailed). _Sig (1-tailed). _Interpretation _ _ MCTA _PSA _35.82 _6.52 _33 _.048 _.024< .05 _MCTA PSA > MCTAct _ _ _CT _32.94 _5.29 _32 _ _ _ _ _N-Gain MCTA _PSA _.64 _.56 _33 _.000 _.000 < .05 _N-Gain MCTA SA > N-Gain MCTA CT _ _ _CT _.14 _.11 _32 _ _ _ _ _MCTD _PSA _96.33 _9.09 _33 _ .046 _.023 > .05 _MCTD PSA > MCTDct _ _ _CT _92.03 _9,79 _32 _ _ _ _ _ Note: Mathematical Critical Thinking Ability Ideal score: 50 Mathematical Critical Thinking Disposition Ideal score :120 Table 3.

Contigency Table of Mathematical Critical Thinking Ability And Mathematical Critical Thinking Disposition in PSA Class MCTD MCTA _High _Medium _Low _Total _ _High _10 _0 _0 _10 _ _Medium _10 _7 _1 _18 _ _Low _2 _3 _0 _5 _ _Total _22 _10 _1 _33 _ _ Table 4. Test of Pearson-Chi Square MCTA and MCTD Pearson-Chi Square ((2) _DF _Sig.(2-tailed) _ _8,290a _4 _0.082 _ _ This findings was similar to previous study (Sumarmo, et al, 2012), that there were no association between MCTA with MCTD.

This study obtained student's grade on SRL was at fairly good level. Concerning affective behavior, Sauri (2010) explained that MCTD or other affective behavior could not be taught directly such as taught a certain mathematical content. Improving better MCTD or other soft-skill in mathematics needed a long period of time, and through four ways namely: Be sure student to understand the meaning of MCTD and the important of owning MCTD in learning; Teacher should performed behavior that wished in MCTD; Familiarize students to behave the wished in MCTD; Carry out integrated and continous mathematics teaching-learning process.

Besides that, this study found that students performed more active learning in all four phases of problem solving approach (PSA) than in conventional teaching such as in the following figures (Figure 1, Figure 2, Figure 3, Figure 4). This study found that almost students' grades on MCTA were at fairly good to good level. Students realized few difficulties in solving MCTA problems. This findings was similar to Murni and Sugandi (2017) that student obtained at good grade level on MCTA.

Even if, this finding was different with studies' findings with yunior high school students, among other of Koswara (2017) that students attained at low grade level on MCTA. Table 5. Mean Score of Each Item of Mathematical Critical Thinking Ability of Students in The Both Teaching Approach Teaching approach _Desc. Stat. _No.1 _No 2. _No.3 _No.4 _No.5 _ _ _Ideal score _8 _8 _10 _12 _12 _ _ PSA _ X _5.64 _5.78 _7.03 _9.22 _8.46 _ _ _% of ideal score _70.50 _72.25 _70.30 _76.80 _70.50 _ _ CT _ X _5.62 _5.63 _6.52 _7.98 _6.36 _ _ _% of ideal score _70.30 _70.50 _65.20 _77.30 _50.4

_ _ Further analysis was about interaction between PMA and teaching approaches (PSA and conventional teaching) toward student's MCTA and MCTD. The analysisi was using

twopath Anova (Table 4) and Diagram (Figure 5 and Figure 5). Based on Table 4, it obtained sig .464 > .005. It meant that there was no interaction between PAM adan teaching approache (PSA and conventional teaching) toward student's MCTA and MCTD.

This finding was also ilustrated on Diagram interaction (Figure 5), that pointed out the lines didnot intercept. Table 6. Two-way Anova Test MCTA Based on Learning Methods and PMA Source _Type III Sum of Squares _Df _Mean Square _F _Sig. _ _Corrected Model _684.709a _5 _136.942 _5.041 _.001 _ _Intercept _68075.547 _1 _68075.547 _2505.758 _.000 _ _Metode _92.312 _1 _92.312 _3.398 _.048 _ _KAM _497.310 _2 _248.655 _9.153 _.000 _ _Metode * KAM _42.264 _2 _21.132 _.778 _.464 _ _Error _1602.891 _59 _27.168 _ _ _ _Total _79206.000 _65 _ _ _ _ _Corrected Total _2287.600 _64 _ _ _ _ _a. R Squared = .299 (Adjusted R Squared = .240) _ _ Figure 5. Interaction Between Learning Methods and PMA on MCTA Table 7.

Two-way ANOVA Test MCTA based on learning methods and PMA ource _Type III Sum of Squares _Df _Mean Square _F _Sig. _ _Corrected Model _2614.560a _5 _522.912 _13.589 _.000 _ _Intercept _511955.310 _1 _511955.310 _13303.840 _.000 _ _Metode _157.049 _1 _157.049 _4.081 _.048 _ _KAM _2226.407 _2 _1113.204 _28.928 _.000 _ _Metode * KAM _124.958 _2 _62.479 _1.624 _.206 _ _Error _2270.424 _59 _38.482 _ _ _ _Total _581860.000 _65 _ _ _ _ _Corrected Total _4884.985 _64 _ _ _ _ _a.

R Squared = .535 (Adjusted R Squared = .496) _ _ Figure 6.Interaction Between Learning Methods and PAM Against MCTD Discussion Based on findings and discussion, the study derived conclusion as follow. The problem solving approach and previous mathematical ability took better role than conventional teaching on improving students' mathematical critical thinking ability and its gain, and on mathematical critical thing disposition.

The students' mathematical critical thinking ability and mathematical critical thinikng disposition grades were at fairly good level. Students on both teaching approaches realized few difficulties in solving mathematical critical thinking ability problems. The other conclusion were that, students peformed more active learning in all four phases of problem solving approach, there was no association between mathematical critical thinking ability and mathematical critical thinking disposition, there was no interaction between previous mathematical abilitin CONCLUSION Based on the conclusion and discussion the study proposed some suggestion as follow.

The students' grade on mathematical critical thinking ability and in mathematical critical disposition in both classes were at fairly good level. Mathematical critical thinking was

classified as high order thinking (HOT) in mathematics. For obtaining HOT ability such as mathematical critical thinking abilty, firstly students should master prerequisite of mathematical process and content of mathematical critical thinking ability.

So, before teacher were going to explain a new mathematics topic or content or to conduct study on mathematical HOT ability, it was suggested to examine students' abilities of its prerequisite firstly. Besides that, students should be motivated to select and to solve more exercises by theirselfes on mathematical HOT ability and or on mathematical critical thinking ability.

In order students attained meaningfull mathematical critical thinking ability, it was suggested students asked to write the formulas and rules which used on each step in solving the problems as well. To improve better students' mathematical critical thinking disposition, it was suggested four ways as follow: Be aware of students to the importance of having mathematical critical thinking disposition; teacher should perform having behavior as wished in mathematical critical thinking disposition; students should be accustomized having behavior as wished in critical thinking disposition; teacher should carry out integrated and continous mathematics teaching process. REFERENCES Bandura, A.,

& Wessels, S. (1997). Self-efficacy (pp. 4-6). W.H. Freeman & Company. Baron, J. B. dan Sternberg, R.J. (Editor), (1987) Teaching Thinking Skill. New York: W.H. Freeman and Company Branca, N. A. (1980). Problem solving as a goal, process, and basic skill. Problem solving in school mathematics, 1, 3-8. Bernard, B..(2004). Self confidence: What We Have Learned. San Fransisco: WestEd. Fisher, R. (1995). Thinking Children to Think. Cheltenham, United Kingdom: Thornes Ltd. Costa, A.L.

(1985). Developing Minds. A resource Book for Teaching Thinking Association for Supervision and Curriculum Development. Virginia: Alexnadria. Effendi, A. (2017). Meningkatkan Kemampuan Berpikir Kritis dan Penalaran Matematis serta Belief Siswa SMP dengan Menggunakan Pendekatan Pemecahan Masalah. Unpublished Thesis at Post Graduate Study of STKIP Siliwangi. Ennis, R. H. (1993). Critical thinking assessment. Theory into practice, 32(3), 179-186. Fariha, M.

(2012). Kemampuan Berpikir Kritis Matematis Dan Kecemasan Matematika Dalam Pembelajaran Dengan Pendekatan Problem Solving (Studi Eksperimen Pada Kelas X Man Rukoh Kota Banda Aceh). Jurnal Peluang, 1(2). Fatmawati, H. dkk.(2014).

"Analisis Berpikir Kritis Siswa dalam Pemecahan Masalah Matematika Berdasarkan Polya pada Pokok Bahasan Persamaan Kuadrat. Paper pulished in Jurnal Elektronik

Pembelajaran Matematika ISSN: 2339-1685 Vol.2, No.9, pp 899-910, November 2014. Surakarta. Fisher, A. (2009). Berpikir Kritis: Sebuah Pengantar. Jakarta: Erlangga. Fitriani, N.(2013).

"Penerapan Pendekatan PMRI secara Berkelompok untuk Meningkatkan Kemampuan Pemecahan Masalah Matematis dan Self Confidence Siswa SMP". Jurnal Pendidikan Sigma Dikdaktik Vol. 1 No.2 Januari 2013. Hal. 176-183. Glazer, E. (2004). Technology Enhanced Learning Environment that are Conductive of Critical Thinking in Mathematics.[online]. Tersedia: http://www.lonestar.texas.net/-scifert/crit2.html 6 Desember 2009. Gokhale, A. A. (1995). Collaborative learning enhances critical thinking. Volume 7 Issue 1 (fall 1995). Hassoubah, Z. I. (2004).

Developing Creative and Critical Thinking Skills. Bandung: Yayasan Nuansa Cendikia. Hodson, D. (1996). Practical Work in School Science Exploring Some direction for Change. Toronto, Canada: Ontario Institute for Studies in Education. Klohnen E.C. (1996). "Conceptual Analysis and Measurement of The Construct of Ego-Self confidence". Paper published in Journal of Personality and Social Psychology .;70:1067–1079.

Koswara, D. (2017). Meningkatkan Kemampuan Berpikir Kritis dan Kreatif serta Resiliensi Matematik Siswa SMP melalui Pendekatan Saintifik. Unpublished Thesis at Post Graduate Study of STKIP Siliwangi. Bandung. Kurniasih, I. dan Sani, B. (2014). Implementasi Kurikulum 2013 Konsep dan Penerapan. Surabaya: Kata Pena. Kurniati, Kusumah, Y.S, Sabandar, Y. Herman, T. (2015). "Mathematical Critical Thinking Ability through Contextual Teaching and Learning Approach."

Paper published in Journal on Mathematics Education (IndoMS-JME). Vol.6.No.1. pp53-62 Kurniawati, L., Kusumah, Y. S., Sumarmo, U., & Sabandar, J. (2014). Enhancing Students' Mathematical Intuitive-Reflective Thinking Ability Through Problem-Based Learning with Hypoteaching Method. Journal of Education and Practice, 5(36), 130-135. Student Achievement". Paper published in National Forum Teacher Education Journal.21,(3), 1-9 . Leader, L. F.,

& Middleton, J. A. (2004). Promoting critical-thinking dispositions by using problem solving in middle school mathematics. RMLE Online, 28(1), 1-13. Murni, S., & Sugandi, A. I. (2018). THE ROLE OF MATHEMATICS REALISTIC EDUCATION APPROACH ON STUDENTS'MATHEMATICAL CRITICAL THINKING AND RESILIENCY. JIML-Journal of Innovative Mathematics Learning, 1(1), 41-52. National Council of Teachers of Mathematics (Ed.). (2000). Principles and standards for school mathematics (Vol.

1). National Council of Teachers of. Nindiasari, H., Kusumah, SK., Sumarmo, U., and

Sabandar, Y. (2014). “Pendekatan metakognitif untuk meningkatkan kemampuan berpikir Reflektif Matematis Siswa SMA” Edusentris Jurnal Ilmu Pendidikan dan Pengajaran, Vol.1, NO. 1, Maret 2014, pp 80-90. Noer, S. H. (2010).

Peningkatan Kemampuan Berpikir Kritis, Kreatif, Dan Reflektif (K2R) Matematik Siswa SMP Melalui Pembelajaran Berbasis Masalah. Unpublished Disertaion at Postgraduate UPI. Bandung Peraturan Menteri Pendidikan Nasional No. 81a Tahun 2013 tanggal 27 Juni 2013 tentang Implementasi Kurikulum Standar Isi. Peter, A. (2010). Critical Thinking: What It Is and Why It Counts.

[Online] Tersedia: http://www.telacommunications.com/nutshell/cthinking.htmlDiakses: 8 Januari 2011. Peter, E.E. (2012). “Critical Thinking: Essence for Teaching Mathematics and Mathematics Problem Solving Skills”. African Journal of Mathematics and Computer Science Research. 5, (93), pp 39-43. Polya, G. (1985). How to Solve It. A New Aspect of Mathematical Method (2nd ed.). New Jersey: Princenton University Press Pujiastuti, H.

, Kusumah, Y.S. , Sumarmo, U, Afgani J. D (2014). “Inquiry Cooperation Model Enchanching Yunior High School Students’ Mathematical Problem Solving Ability” Paper published in International Journal of Contemporary Educational Research. (IJCER). Volume 1, Number 1, January 2014, Page 51-60 ISSN: 2148-3868 . www.ijcer.net. Ramlah. (2016).

Meningkatkan Kemampuan Komunikasi dan Berpikir Kreatif Matematis serta Kebiasaan Berpikir Siswa MTS Melalui Pendekatan Problem Solving. Unpublished Thesis at Post Graduate Study of STKIP Siliwangi Rahman, A.F dan Maslianti. (2015). “Pengaruh Model Creative Problem Solving (CPS) Dalam Pembelajaran Matematika Terhadap Kemampuan Berfikir Kreatif Pada Siswa SMP”.

Paper published in EDU-MAT Jurnal Pendidikan Matematika, Volume 3, Nomor 1, April 2015, p. 67-74 Rosyada, D. (2004). Paradigma Pendidikan Demokratis. Jakarta : Primada Media. Ruseffendi, E. T. (2006). Pengajaran Matematika Untuk Meningkatkan CBSA. Bandung: Tarsito. Sauri, S. (2010). Membangun Karakter Bangsa melalui Pembinaan Profesionalisme Guru Berbasis Pendidikan Nilai. Jurnal Pendidikan Karakter. Vol.2. No.2. Sudarwan, D. (2013).

“Pengembangan Pembelajaran Berpendekatan Tematik Berorientasi Pemecahan Masalah Matematika Terbuka untuk Mengembangkan Kompetensi Berpikir Divergen, Kritis dan Kreatif”. Paper published in Jurnal Pendidikan dan Kebudayaan. No. 069 Vol. 13 Sukasno. (2002). Model Pembelajaran Pemecahan Masalah dalam Pembelajaran Trigonometri. Tesis pada PPS-UPI Bandung: Tidak dipublikasikan. Sumarmo, U. (2010).

"Berpikir dan Disposisi Matematik: Apa, Mengapa, dan Bagaimana Dikembangkan pada Peserta Didik".

[Online]. in http://www.docstoc.com/docs/ 62326333/Pembelajaran-Matematika. [5 Maret 2012]. Paper published in Sumarmo, U. (2013) and Suryadi, D. Turmudi, Nurlaelah, E . (Editors). Kumpulan Makalah Berpikir dan Disposisi Matematik serta Pembelajarannya. Mathematics Deparment of Faculty Mathematics and Science Education UPI. Bandung. (2013). 109– 122 Sumarmo, U., Hidayat, W., Zulkarnaen, R.,

Hamidah, Sariningsih, R. (2012). "Kemampuan dan Disposisi Berpikir Logis, Kritis, Dan Kreatif Matematis: Eksperimen terhadap Siswa SMA Menggunakan Pembelajaran Berbasis Masalah dan Strategi Think-Talk-Write". Paper published in Jurnal Pengajaran MIPA, Vol. 17, No.1, 17-33, April 2012. Sumarmo, U., & Hendriana, H. (2014). Penilaian Pembelajaran Matematika. Bandung: Refika Aditama.

Sutrisno (2017) Meningkatkan Kemampuan Berpikir Kritis dan Komunikasi Matematis serta Kepercayaan Diri Siswa dengan Menggunakan Pendekatan Berbasis Masalah. Unpublished Thesis at Post Graduate Study of STKIP Siliwangi. Widyaningtiyas, R. (2015). Pengaruh Pendekatan Pembelajaran Berbasis Masalah terhadap Kemampuan dan Disposisi Berpikir Kritis dan Kreatif Matematis Siswa SMA.

Unpublished Disertation at Post Graduate Study of Indonesia University of Education. .

INTERNET SOURCES:

---

http://www.themanufacturinginstitute.org/~/media/368372F6DA5946B095B1D0EBF8B88760/Implementation_of_a_Work-Based_Learning_Model.pdf
<1% - https://en.wikipedia.org/wiki/History_of_logic
<1% - https://bagawanabiyasa.wordpress.com/2013/05/02/
<1% - https://www.jstor.org/stable/j.ctt1s474j0
<1% - http://ejournal.upi.edu/index.php/ije/article/download/1726/1176
<1% - https://en.wikipedia.org/wiki/Science
<1% - https://en.wikibooks.org/wiki/Contemporary_Educational_Psychology/Constructivism:_Changes_in_How_Students_Think
<1% - https://www.edge.org/responses/q2013
<1% - http://scholar.harvard.edu/files/andrewho/files/a_pracitioners_guide_to_growth_models.pdf
<1% - http://www.iosrjournals.org/iosr-jrme/papers/Vol-7%20Issue-5/Version-7/D0705072126.pdf
<1% - https://www.noodle.com/articles/innovative-schools-2015
<1% - https://www.acamstoday.org/spotlight-mohammad-habibur-rahman/
<1% - https://www.criticalthinking.org/pages/critical-thinking-development-a-stage-theory/483
<1% - http://iopscience.iop.org/volume/1742-6596/948
<1% - https://files.eric.ed.gov/fulltext/EJ1124276.pdf
<1% - https://www.theatlantic.com/education/archive/2014/09/why-girls-get-better-grades-than-boys-do/380318/
<1% - http://article.sciencepublishinggroup.com/html/10.11648.j.ijalt.20150104.12.html
<1% - https://en.wikibooks.org/wiki/Cognition_and_Instruction/Problem_Solving,_Critical_Thinking_and_Argumentation
<1% - https://issuu.com/ceo-magazine/docs/ceo_17_-_complete_edition_-_final
<1% - https://www.researchgate.net/profile/Sarabi_Mk
<1% - http://www.tandfonline.com/doi/full/10.1080/02602938.2015.1048185
<1% - https://issuu.com/unescostatistics/docs/sdg4-data-digest
<1% - https://www.science.gov/topicpages/h/highly+effective+method.html
<1% - https://www.ukessays.com/essays/education/applying-the-anova-test-education-essay.php
<1% - https://www.sciencedirect.com/science/article/pii/S0732312305000301

<1% - http://onlinelibrary.wiley.com/doi/10.1002/ets2.12009/full
<1% -
https://www.scribd.com/document/357958801/Effects-of-Problem-Solving-Approach-on-Mathematics-Achievement-of-Diploma-in-Basic-Education-Distance-Learners-at-University-of-Cape-Coast-Ghana
<1% - http://ejournal.unkhair.ac.id/index.php/deltapi/article/download/97/65
<1% - https://files.eric.ed.gov/fulltext/ED476123.pdf
<1% -
https://www8.gsb.columbia.edu/rtfiles/emba/global/embaglobal-asia/LBS%20Elective%20Course%20Outlines.doc
<1% -
https://www.verywellmind.com/easy-steps-for-successful-problem-solving-2797567
<1% - https://www.researchgate.net/profile/Suzieleez_Syrene_Abdul_Rahim
<1% - https://www.ramapo.edu/provost/files/2013/04/GenEd-History-2006-9.doc
<1% - https://dl.acm.org/citation.cfm?id=2441216.2441219
<1% - http://www.loot.co.za/index/html/index1530.html
1% - http://ejournal.sps.upi.edu/index.php/edusentris/article/view/238
<1% - http://www.informatika.unsyiah.ac.id/umam/jurnalpeluang2013.pdf
<1% - http://conferences.uin-malang.ac.id/index.php/SIMANIS/article/view/42
<1% -
http://digilib.unimed.ac.id/1984/10/13-%208136122009%20-Daftar%20pustaka.pdf
<1% - http://www.e-journal.stkipsiliwangi.ac.id/index.php/didaktik/article/view/113
<1% -
https://www.scribd.com/document/334704103/Prosiding-Semnas-STKIP-2014-pdf
<1% -
https://pt.scribd.com/doc/314060563/Pfis-Pengembangan-Lks-Fisika-Berbasis-Siklus-Belajar-Learning-Cycle-10841008-Irmarosaindriyani-Pascasarjana-uad-Ac-id
<1% -
http://journals-jd.upm.edu.my/Pertanika%20PAPERS/JSSH%20Vol.%2026%20(T)%20Aug.%202018%20(View%20Full%20Journal).pdf
<1% - http://sk.sagepub.com/reference/hdbk_curriculum
<1% -
http://www.tandfonline.com/doi/full/10.1080/00223891003670166?scroll=top&needAccess=true
1% - http://journal.ikipsiliwangi.ac.id/index.php/jiml/article/view/318
<1% - https://www.scribd.com/document/350139989/PROSIDING-SEMNAS-2016-pdf
<1% - http://iistejournalupdate.blogspot.com/
<1% -
https://dataportal.education.tamu.edu/Documents/OCYe5tK92NgZ5nvnTsNjwiOs.docx
<1% - http://www.phschool.com/cmp2/implementing/pdfs/bibliography.pdf

<1% -
https://mafiadoc.com/prosiding-seminar-nasional-pendidikan-matematika_59be4ddb1723dd46288dcaf6.html
<1% -
https://docplayer.info/68828351-Pengaruh-context-based-learning-cbl-terhadap-kemampuan-berpikir-reflektif-matematis-siswa.html
<1% -
https://ptun-jakarta.go.id/wp-content/uploads/file/putusan/Putusan%2062%20G%202015%20PTUN%20JKT.pdf
<1% - http://riset.unisma.ac.id/index.php/jpm/article/view/187
<1% - http://journal.ikipsiliwangi.ac.id/index.php/jiml/article/view/319
<1% - https://www.scribd.com/document/372038479/bab-1-2-3-intaaaaan
<1% - http://journal.stkipsingkawang.ac.id/index.php/JPMI/article/view/76
1% - https://journal.ikipsiliwangi.ac.id/index.php/jiml/article/view/319
1% - http://ejournal.sps.upi.edu/index.php/edusentris/article/view/208
<1% - https://bundaliainsidi.blogspot.com/2012/07/skripsi-pendidikan-matematika.html
<1% -
https://www.scribd.com/doc/311890614/Penerapan-Sistem-Pembelajaran-Reflektif-Dalam-Upaya-Peningkatan-Kemampuan-Berpikir-Kritis-Siswa-Pada-Pembelajaran-Matematika-Amin127
<1% -
https://www.scribd.com/document/334514998/Sistem-Pendidikan-Dasar-Menengah-di-16-N-pdf
1% - http://ejournal.sps.upi.edu/index.php/edusentris/article/view/239
<1% - http://journal.ikipsiliwangi.ac.id/index.php/jiml/article/view/317
<1% - http://msceis2018.upiconf.org/kfz/pages/abstracts1.php
<1% - http://e-journal.stkipsiliwangi.ac.id/index.php/didaktik/article/view/116
<1% - http://seminar.uny.ac.id/semnasmatematika/prosidingsemnasmat2015
<1% - http://carijudulindonesia.blogspot.com/2015/03/pendidikan-matematika-3.html
<1% - http://repository.upi.edu/7609/7/t_bing_1008839_bibiography.pdf