

# IMPROVEMENT OF ABILITY OF MATHEMATICAL PROBLEM STUDY USING PROBING PROMPTING TECHNIQUE ASSISTED BLENDED LEARNING IN UNIVERSITY PGRI PALEMBANG

Rahmawati, Jayanti  
DTY Universitas PGRI Palembang  
rahmawatisuandi@yahoo.co.id

## Abstract

This study aims to examine the improvement of Mathematical Problem Solving (KPM) of students through Probing Prompting learning technique. Probing Prompting technique is learning by way of presenting a series of questions that are guided and explored so that there is a process of thinking that links the previous knowledge and experience with new knowledge to be learned. Questions raised on the students encourage students to think more rationally about the knowledge gained previously. In the face-to-face study dikuliah Differential Equation, assisted blended learning is by using the internet online. This study used quasi-experimental method with the control group design of pretest and non-equivalent postes. The subject of this research is a mathematics student at PGRI University of Palembang, namely experimental class that get learning Probing prompting assisted blended learning (PPPBB) and control class that get conventional learning (PK). Based on the result of the test analysis, the difference of the average increase of KPM of the students who get the learning PPPBB and the students who get conventional learning, get the value of the table of the increase of KPM students who get learning Prompting blended learning promotion (PPPBB) better than students who get conventional learning.

**Keywords:** Enhancement, Problem solving, Probing Prompting and Blended Learning.

## INTRODUCTION

Mathematics is one of the subjects that are required in every level of school from elementary to high school because mathematics is very important in daily life in improving the human mind power. According to Abdurrahman (2003) "Mathematics is a symbolic language whose practical function is to express quantitative and spatial relationships while its function is to facilitate thinking". In education, students' ability to be sharpened through problems, so that students are able to improve their various competencies. This is in accordance with Dahar (2011: 121) which states that the ability to solve problems is basically the main goal of the educational process. Mathematics itself many diverse knowledge both abstractly and complexity, especially if taking a mathematics majors for teacher education students such subjects Differential equations that have mandatory requirements that must be owned by previous students for example basic knowledge before the course of PD.

Accordingly, according to Oktavia (2016), there are still many universities that emphasize the transformation of knowledge as much as possible to the students rather

than transform the skills needed by students in learning, so there are still many students having difficulties in learning differential equations. Ability to solve the problem is an application in understanding the concept, the reality in the field of mathematical problem solving ability is still less satisfactory. This can be seen from some research results that have been done by Kadir (2010), Ibrahim (2011) and Hutagaol (2012) at elementary and secondary schools. Mathematics learning so far has only been developed with theoretical model of learning, giving examples of problems and exercises, students are instructed to record the concepts of the material delivered without understanding what they are notes, even the students are less able to understand the concepts that exist on the note when given a sample example.

This fact is not an encouraging thing because problem-solving abilities are not only the goal of mathematics learning, but also the main tool for training individuals to solve problems of everyday life. Wahyudin (2003) in Purwanto (2013) explains that problem solving is also a skill that will be carried on the student's daily problems or decision-making situations, so the problem-solving ability helps a person well in his life. Similar statements related to problem solving are expressed by Halmos (NCTM, 2003: 34) in Rahmawati and Jayanti (2017) that problem solving is at the heart of mathematics.

In order to solve student problems can be improved, a proper learning approach is needed. Sagala (2011) that teachers should have methods in learning as a strategy that can facilitate learners to master the science provided. In addition, teachers must know the difficulties experienced by students in learning mathematics so that can be given the right solution for the purpose of learning can be achieved. It is designed so that students can understand the mathematical concepts they are learning. One way that can be used is through the application of learning techniques with probing prompting.

Several studies have reported the advantages of probing prompting techniques than conventional learning can develop representational skills of high school mathematics learning outcomes, mathematical understanding of junior high school students (Rosnawati, 2008), students' junior secondary reasoning skills (Sudarti, 2008), mathematical communication skills of junior high school students (Yuriska, 2014) and the ability of mathematical connections of junior high school students (Danaryanti, 2016) as well as our own research on the influence of probing, and Ambarwati (2015) Rahmawati and Jayanti (2017) concluded that there is a significant influence between Blended Learning Model using probing prompting Against Student Learning Outcomes In Differential Equations Courses. Dwi santoso (2014) learning model probing prompting can improve student achievement in mathematics subject

Based on empirical data above, and theoretically that students can learn actively using learning with probing prompting technique, in which students can mengkontruksi knowledge with the freedom to propose ideas from the questions made by the teacher so that students can improve the ability of mathematical pemahaman and problem solving college student. Based on the description above, the authors are interested to conduct research with the title "Learning Model Using Probing Prompting Techniques assisted Edmodo Blended Learning to Increase the Ability of Mathematical Understanding and Problem Solving Students Semester 4 FKIP Mathematics University of Palembang PGRI".

Based on the background of the above problem, then the formulation of the problem in this research in general is: "Is learning by using blended learning probing prompting techniques can improve students' mathematical problem solving skills?"

As described above, students' mathematical problem solving skills are very important in mathematics learning, the results of this study can provide the following benefits:

1. For teachers, learning by using blended learning probing prompting technique provides an alternative that can be applied in learning mathematics to improve students' mathematical problem solving skills.
2. For students, give a new impression in the learning of mathematics and facilitate students to understand the concept of mathematics so that there is improvement of students' mathematical problem solving abilities.
3. For researchers, provide valuable experience to build innovation in education through effective learning in improving students' mathematical problem solving abilities.
4. For the world of education, can contribute thoughts on learning that can improve the quality of education

#### Mathematical Problem Solving Abilities

According Sumarmo (2000) problem solving is a process to overcome the difficulties encountered to achieve a desired goal. Branca (in Sumarmo, 1994) says that problem solving can be interpreted by using general interpretations, ie problem-solving as objectives, problem-solving as a process, and problem-solving as basic skills. Bell (1978: 119) suggests According to Robert L. Solso (Ratnasari, 2014), problem solving is a direct-directed thinking to find solutions or solutions to a specific problem. While Siwono (2008) argues that problem solving is a process or individual effort to respond or overcome obstacles or constraints when an answer or answer method has not been apparent. Thus problem solving is the process of individual thinking in a direction to determine what should be done in overcoming a problem.

Kesumawati (Chotimah, 2014) states that the ability to solve mathematical problems is the ability to identify the elements that are known, asked, and the adequacy of the necessary elements, able to create or construct mathematical models, to select and develop solving strategies, to explain and verify the answers obtained . Dahar (2011) argues that problem solving is a human activity that combines the concepts and rules that have been obtained before, and not as a generic skill. According to Arthur (2008: 1) problem solving is part of thinking. As part of thinking, problem-solving exercises can improve thinking skills as high-level cognitive processes that require more modulation and control than routine or basic skills. Stacey (2005) in Kurniawan (2012) suggests that the ability of understanding is one of the factors that contribute and contribute to determine the success of students in solving problems.

The above opinion suggests that in solving problems, one requires not only routine or basic skills, but also various other skills to manage all the thinking processes in order to solve the problems at hand. The ability to solve mathematical problems is the ability that becomes the target of mathematics and measurable learning. According to (Pustaka Yustisia Team, 2007: 389), problem solving is a strategic competency that students demonstrate in understanding, choosing approaches and problem-solving strategies, and solving models for solving problems. Indicators showing problem solving, (1) indicating problem understanding, (2) organizing data and selecting relevant information in problem solving, (3) presenting problems mathematically in various forms,

(4) choosing appropriate approaches and problem solving methods , (5) developing problem solving strategies, (6) creating and interpreting mathematical models of problems, and (7) solving non-routine problems.

### Learning Probing Prompting

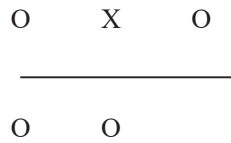
The term probing in terms of language means investigating. Marmo and Idris (2008) argue that the probing question is a digging question for obtaining further answers from existing answers aimed at improving the quality of the first answer so as to obtain a clearer, more accurate and reasonable answer. In the event that students can not answer or misrepresent, the teacher asks follow-up questions that will guide the thinking process of the student, so that the student ends the question. This probing technique can be used as a technique to improve the quality and quantity of student answers. Probing can be a digging question, and asks continuous questions that encourage students to explore answers to previous questions. In this lesson, teachers guide students to increase curiosity, foster self-esteem and train students in communicating their ideas, this technique is closely related to the question.

The probing question is "a digging question to get further answers from students who intend to develop a quality answer, so that the next answer is clearer, accurate and more grounded" while the prompting question, this question intends to "guide the student so he can find the answers more true ". This questioning technique is digging up student answers to obtain further answers from the students. With the technique of probing-prompting question, the teacher gives more opportunity to the students to better dig their answer and further improve or improve the student's answer to the previous question.

Implementation of probing-prompting technique can be seen in the following scenario: a) Teachers provide questions relating to material that has been previously designed in accordance with what learning objectives will be achieved. b) The teacher gives the time to think about the answer of the question approximately 1-15 seconds so that students can formulate what it captures from the question. c) After that randomly assigned, the teacher chooses a student to answer the question, so that all students have the same chance to choose. d) If that answer is given the right students, then the same question is also asked to the other students to ensure that all students are actively involved in the learning process but, if the answer given is wrong, then asked a follow-up question that requires students to think towards the original question so that students can answer the question was right. This question usually requires students to think higher, digging and guiding students so that all the information available to students will help them answer the initial question. e) Ask other students to provide samples or other answers that support the previous answer so that the answer to the question becomes complex. f) Teacher gives reinforcement or additional answers to assure to students that the expected competencies of the learning have been achieved and know the level of student understanding in the learning.

## METHOD

The research used is quasi experiment. The design of the study used a non-equivalent control group design. (Creswell, 2012). In summary, the design of the experiment can be described as follows.



information:

O: Pretes / postes on troubleshooting

X: Treatment in the form of learning Probing Prompting aided blended learning

## Results And Discussion

### 1) Testing Ability Troubleshooting Mathematical Problem (KPMM).

The problem for the KPMM test consists of 4 questions consisting of 10 indicators analyzed. To obtain a picture of the quality of KPMM of students, the data were analyzed descriptively to know the mean and standard deviation of pretest, postes and n-gain score of KPMM students based on learning, KAM, and overall. Descriptive statistics of complete student KPMM data are presented in Table 5.4 Improvement of student KPMM based on learning (PPPBBL and PK), KAM (high, medium, low), and overall more clearly can be seen in the bar chart in Figure 5.4 below: Before conducting the test first tested pre-paid analysis, and homogeneity test of variance. The summary of the normality test results is presented in Table 5.2 and the homogeneity test in Table 5.3.

Tabel 5.2 Data Normality Test Improved Mathematical Problem Solving Ability Based on Learning and KAM

KAM Groups	Pembelajaran	N	K-S	Sig	Ho
All item	PTPPL	36	1.269	0.080	accepted
	PK	34	0.727	0.666	accepted
High	PTPPL	8	1.104	0.175	accepted
	PK	4	0.534	0.938	accepted
medium	PTPPL	24	1.183	0.122	accepted
	PK	21	0.631	0.820	accepted

Low	PTPPL	4	0.802	0.541	accepted
	PK	9	0.411	0.996	accepted

Ho: Data on increasing KPMM based on normal distributed learning

Tabel 5.3 Homogeneity Test of Population Variance Increasing KPMM Based on KAM Lessons

KAM groups	Statistik Levene (F)	Sig.	Ho
All item	0.001	0.982	Accepted
high	2.032	0.184	Accepted
medium	0.162	0.689	Accepted
low	4.843	0.052	Accepted

Ho: The inter-group variance increases the homogeneous KPMM data

Seen in the table above, namely Table 5.2 and Table 5.3 is seen that the data increase in the group KPPM PPPBL and PK normal distribution and variance homogeneous. Therefore, to find out whether there is a difference between the apperment of KPMM between the two learning groups (PPPBL and PK) can be done using the t-test. The summary of t test results can be seen in the following table:

Table 5.4 Test of Mean Data Differences of KPMM Improvement Based on Learning and KAM

KAM groups	To learning	Rerata	T	Sig.	Ho
All item	PPPBL	0.4711	-6.888	0.000	rejected
	PK	0.3219			
high	PPPBL	0.5411	-2.754	0.020	rejected
	PK	0.3771			
medium	PPPBL	0.4533	-4.404	0.000	rejected
	PK	0.3377			
low	PPPBL	0.4377	-5.784	0.000	rejected
	PK	0.2607			

To find out whether there are differences in the increase of KPMM students who get learning probing prompting and students who get conventional learning, both reviewed overall and based on learning and KAM proposed hypothesis and the conclusions obtained as follows:

For Hypothesis 1:

Students who received bled learning probing prompting learning received improved mathematical problem solving skills better than those who received conventional learning in the overall review.

Hence Conclusion 1:

Based on the result of test analysis difference of mean improvement and mean of improvement of KPMM student who get learning of probing prompting with blended learning aid and student who get conventional learning, it can be concluded that overall improvement of KPMM student who get learning by using probing prompting technique better than student who got Conventional learning.

For Hypothesis 2:

Students who received learning by using blended learning probing prompting techniques obtained improved mathematical problem solving skills better than those who received conventional learning in high KAM.

Hence Conclusion 2:

Taking into account the average value of KPMM improvement and test result of statistic test of difference in both groups of data improvement of KPMM of students based on high KAM can be concluded that the improvement of KPMM of students who received learning probing prompting blended learning better than the students who received conventional learning ditinjau from high KAM.

For Hypothesis 3:

Students who received learning probing prompting with blended learning improved mathematical problem solving ability better than those who got conventional learning viewed from KAM being.

Hence Conclusion 3:

Taking into account the average value of KPMM improvement and statistical test results of differences in the two groups of data improvement KPMM students based on KAM is able to conclude that the increase of KPMM students who received learning probing prompting better than students who received conventional learning viewed from KAM is.

For Hypothesis 4:

Students who received blended learning probing prompting learning obtained improved mathematical problem solving skills better than those who received conventional learning under low KAM.

Hence Conclusion 4:

Taking into account the average value of KPMM improvement and statistical test result of difference test in the second group of data improvement of KPMM of students based on KAM low it can be concluded that the improvement of KPMM of students who got learning probing prompting with blended learning better than the students who received conventional learning from low KAM. Seen in Table 5.4 it can be seen that overall the students who get blended learning probing prompting learning showed a higher KPMM improvement than the students who get conventional learning. The results are supported also by the posttest average. In the table It appears that students who get



learning probing prompting as a whole show a higher postes average than the students who get a learning probing of 23.44 while students who get conventional learning for 19.20 Based on Figure 5.4 it appears that overall improvement of KPMM of students who get learning probing prompting greater than students who get conventional learning. Increased KPMM students who get learning probing prompting and who get conventional learning in terms of overall students in the category of moderation / enough.

## REFERENCES

- [1] Abdurrahman, Mulyono. Pendidikan Bagi Anak Berkesulitan Belajar. Jakarta : PT Rineka Cipta, 2003.
- [2] Ambarwati. Penerapan Pembelajaran Matematika Teknik Probing Prompting Untuk Meningkatkan Kemampuan Komunikasi Matematika Siswa Smp Negeri 4 Tuban,. surabaya : skripsi universitas islam negeri sunan ampel, 2015.
- [3] Auliya, R.N. Pengaruh Model Pembelajaran Kooperatif Tipe CRH (Course, Review, Huray) Terhadap Kemampuan Pemahaman Matematis dan Kecemasan Matematika Siswa SMP. Tesis PPs UPI. . Bandung : s.n., Pengaruh Model Pembelajaran Kooperatif Tipe CRH (Course, Review, Huray) Terhadap Kemampuan Pemahaman Matematis dan Kecemasan Matematika Siswa SMP. Tesis PPs UPI. .
- [4] Arthur, L. B. Problem Solving. U.S.: Wikimedia Foundation, Inc. U.S : s.n., 2008.
- [5] Arumsari, D . Pengaruh pendekatan open ended terhadap kemampuan pemahaman matematis siswa sekolah menengah pertama Skripsi pada Jurusan Matematika FKIP UNSWAGATI. . 2010.
- [6] Conceptualization of The PISA Mathematical Literacy Proficiency Scale: A Validation of Its Cognitive Components. Cheung, K. C. East China Normal Uni : : A Validation of Its Cognitive Components. Disajikan pada The East Asia Forum on Mathematics Competence and Their Assessment, 10-11 Mei 2012,, 2012.
- [7] Chotimah, N.H. Pengaruh Model Pembelajaran Generatif (MPG) Terhadap Kemampuan Pemecahan Masalah dan Disposisi Matematis Siswa di Kelas X pada SMA Negeri 8 Palembang. Palembang : Universitas PGRI Palembang, 2014.
- [8] Creswell. Research Design Pendekatan Kualitatif, Kuantitatif, dan Mixed Edisi Ketiga. Yogyakarta : Pustaka Pelajar, 2009.
- [9] Dahar, R., W. 2011. Jakarta: : Erlangga, Teori-teori Belajar dan Pembelajaran. .
- [10] Penerapan model probing prompting learning Untuk meningkatkan kemampuan koneksi matematis siswa smp, EDU-MAT Jurnal Pendidikan Matematika Universitas Lambung Mangkurat, . Danaryanti. Lampung: EDU-MAT Jurnal Pendidikan Matematika Universitas Lambung Mangkurat, , 2016, Vol. Volume 4, Nomor 1, April 2016, hlm 8 - 14.



- [11] BNSP, Depdiknas. Peraturan Menteri Pendidikan Nasional No.22 Tahun 2007 Tentang Standar Isi. Jakarta : s.n., 2007.
- [12] Meningkatkan kemampuan pemahaman matematis siswa Melalui problem posing. Ferdianto, F dan Ghanny. Cirebon : Jurnal Euclid, pp. 1-59 ©Prodi Pendidikan Matematika Unswagati , 2014, Vol. ISSN 2355-17101, vol.1, No.1.
- [13] Garrison, D. R., & Vaughan, N. D., . . Blended Learning in Higher Education : Framework, principles and guidelines. . San Fransisco: : Josey-Bass, 2008.
- [14] Hutagaol, Kartini. . Strategi Multi Representasi dalam Kelompok Kecil untuk Meningkatkan Kemampuan Pemecahan masalah dan Kemampuan Komunikasi Matematis Siswa SMP. Bandung : Disertasi Pendidikan Matematika SPS UPI, 2012.
- [15] Ibrahim. penerapan Pembelajaran Kontekstual Berbasis Potensi Pesisir sebagai Upaya Peningkatan Kemampuan Pemecahan Masalah Matematik, Komunikasi Matematika, dan Keterampilan Sosial Siswa SMP. . Bandung : Disertasi Pendidikan Matematika SPS UPI, 2011.
- [16] Indah Cahyani, Nur. Keefektifan penerapan teknik probing prompting dalam pemahaman siswa pada materi pelajaran al-Islam di SMP Muhammadiyah 2 Taman Sepanjang. . Surabaya : : UINSA., 2010.
- [17] Jayanti. Pengembangan Soal-Soal Model TIMSS Untuk mengukur kemampuan Aplikasi matematis Siswa di SMP. Palembang : Tesis Pendidikan Matematika UNSRI, 2012.
- [18] Kadir. Analisis Implementasi Strategi Perkuliahan Kolaboratif Berbasis Masalah dalam Mengembangkan Kemampuan Pemecahan Masalah , Kemampuan Komunikasi Matematis, dan Keyakinan terhadap Pembelajaran Matematika. Bandung : Disertasi Pendidikan Matematika SPS UPI, 2010.
- [19] Marno Idris. Strategi dan Metode Pengajaran. Yogyakarta : Arus Media, 2008.
- [20] Penerapan teknik probing-prompting dalam Pembelajaran matematika siswa kelas viii Mtsn Lubuk Buaya Padang . Yuriska, Mayasari dkk. Padang : Jurnal Pendidikan Matematika FMIPA UNP, 2014, Vol. Vol. 3 No. 1 (2014) : Part 2 Hal 56-61.
- [21] Analisis kesulitan mahasiswa dalam menyelesaikan Persamaan differensial tingkat satu. Oktavia, Ayu. Semarang : Jurnal : epints.ums.c.id, 2016.
- [22] Pengaruh Model Pembelajaran Blended Learning menggunakan probing prompting Terhadap Hasil Belajar Mahasiswa Pada Mata Kuliah Persamaan Diferensial. Jayanti., Rahmawati dan. Palembang : Jurnal Nabla Dewantara : Jurnal Pendidikan Matematika (SSN 2528-3901), 2017.
- [23] Rosmawati, H. Penggunaan Teknik Probing Untuk Meningkatkan Pemahaman Konsep Matematika Siswa. Bandung : Skripsi: UPI, 2008.

[24] Ruseffendi. Dasar-dasar Penelitian Pendidikan dan Bidang Non-eksakta Lainnya. Bandung : Tarsito, 2005.

[25] Pengaruh Model Blended Learning terhadap Motivasi dan Prestasi Belajar Siswa SMK. . yarif, I. s.l. : Jurnal Pendidikan Vokasi,, 2012, Vol. 2(2), 234-249.

[26] Berfikir dan Disposisi Matematik: Apa, Mengapa dan bagaimana Dikembangkan pada peseta didik.. Sumarmo, U. Bandung : Jurnal FMIPA UPI Bandung, 2010.

[27] Susanti, Esa. Penerapan Model Probing-Prompting Pada Pembelajaran Matematika Siswa Kelas Viii Smp Negeri 1 Muara Kelingi Tahun Pelajaran 2016/2017. Palembang : STKIP-PGRI Lubuklinggau, 2016.

[28] Thorne, K. Blended Learning : How to integrate online and traditional learning. London: : Kogan Page, 2003.