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Problem Solving Model with Integration Pattern: Student's Problem Solving Capability

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***Abstract*—This study aims to create a new model of learning model that is integrated into the value of Islam and science, especially in the subjects of mathematics. The results of research conducted by researchers at MINU Pucang Sidoarjo obtained data that 1) learning math materials taught only based on transfer knowledge without the integration of Islamic values and science. A lot of content can be included in the material such as integrating the sum of numbers with the meaning and time of prayer, 2) Problem solving ability in MINU Pucang Sidoarjo still low due to the absence of habituation of teachers for students to think logically so that learners tend to memorize without knowing the stages of Scientific thinking that must be understood by learners.**

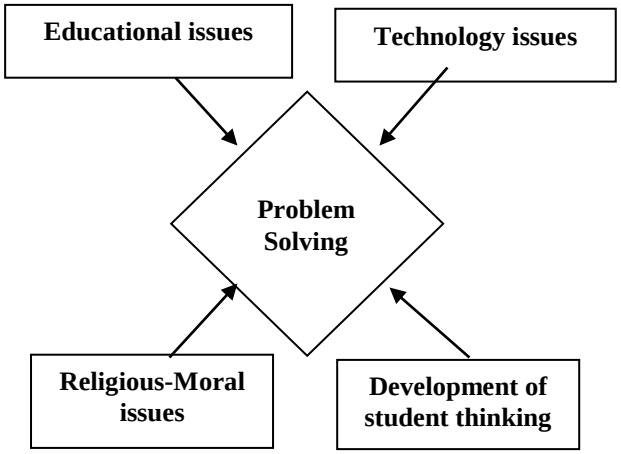
Keywords— problem-solving, integration pattern

I. INTRODUCTION

Education is part of social engineering. Through community, education can be formed and directed to a particular goal (Duschl: 2008). It is explicitly clear that human excellence can be indicated through the national education system. One of indication factor of the education system is seen as good if learners have the ability in problem-solving. Problem-solving ability is a self-skill learner to be able to use activities in solving problems of everyday life (Soedjadi, 1994: 36).

The ability to solve problems is very important in mathematics, not only for those who will later learn or study mathematics but also for those who will integrate into other fields of science and in the values of everyday life (Russefffendi, 2006: 341). Ability Problem solving is very valuable in our education. Many educational experts have placed a heavy emphasis on the ability to solve this problem, especially in mathematics and science (Dewey, 1916) is a continuous movement as "invention learning" (Bruner, 1961)

The reality of primary and secondary education is currently lack of educated manner that is able to produce graduates who can solve problems (Zsóka et. al.: 2013). Not only graduates are able to solve problems but education also has full responsibility in harmonizing the science and moral values of the Indonesian citizens. It is realized that teachers in Indonesia especially in *madrasah ibtidaiyah* need to strengthen their ability in facilitating and harmonizing learners to be trained to think logically, systematically, scientifically, to find solutions and apply their knowledge according to Islamic values in the problems they face. See the chart below:



When they are well managed, they will directly result on students' academic performance. They can answer all the challenges that will be faced today, and the future. The novelty of the research tries to make the learning model integrated by the value of Islam and science, where this model is expected to be a pilot project for the integration of science and Islamic values so that there is no scientific dichotomy in the learning process. The scientific contribution of researchers as an educational technology expert is very important to design a ten- or twenty-year learning model that can help the development of our education. It is also expected for learners to discover new concepts of what they learn so as to be meaningful and meaningful to the future life (Novak: 1984).

II. METHOD

This study used a development research. The development research model based on Borg and Gall (2003: 570) consists of nine stages in this research they are 1) research and information collecting, (2) planning, (3) developing preliminary form of product, (4) preliminary field testing, (5) main product revising, (6) main field testing, (7) operational product revising, (8) operational field testing, and (9) final revising product. The subjects of this study are learners of MINU Pucang Sidoarjo.

III. Result And Discussion

Problem-based learning (PBL) has been known since the era of John Dewey. It is now beginning to be raised because the general review of problem-based learning consists of presenting learners to an authentic and meaningful problem situation that can make it easier for learners to conduct investigations and inquiry (Trianto, 2007).

Problem-Based Learning is an educational strategy encompassing several related teaching methods and is based on research into how adults learn effectively. (W. Benbow; 2014)

Barrow (1980) and Barret, (2005) stated that "The learning results from the process of working towards the understanding of a resolution of a problem. The problem is encountered first in the learning process."

Cunningham et.al. (2000), Chasman et.al., (2003) stated "…Problem-based learning (PBL) has been defined as a teaching strategy that "simultaneously develops problem-solving strategies, disciplinary knowledge, and skills by placing students in the active role as problem-solvers confronted with a structured issue.

Problem-based learning that has the right steps for problem-solving is expected PBM that can provide enhanced problem-solving skills because in PBM there are supporting elements as in the following figure:

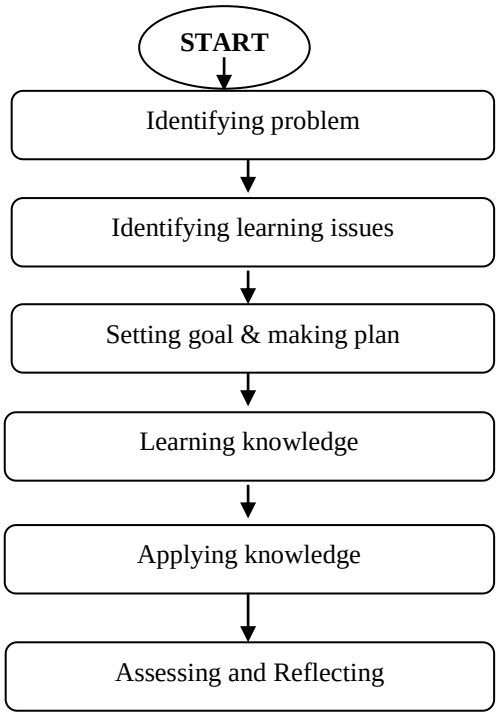


Figure 2.1 Steps PBL: Miao et.al. (2000) and Barret (2005)

Very rapid technological and scientific advances are seen as common knowledge and products that do not carry the "Islamic" label. As Imam Suprayogo (2006: 142) points out, it would be more useful to find a new format for the integration of both types of knowledge (divine knowledge) and science (scientific knowledge) in which one truth is absolute, because it is sourced from the Known Supreme, while others, science is a scientific discovery of relative truth, because it is the result of human findings from research activities and the power of reason that can be re-verified at any time.

Abdulloh (2013: 768) states that integration is both connecting and uniting between two or more things (matter, though, or approach). While Kun-towijoyo (2004: 69) explains that the integration of Islam-Science as "we do not drink a glass of H20, but a glass of water"

The result of this research is done per step, that are:

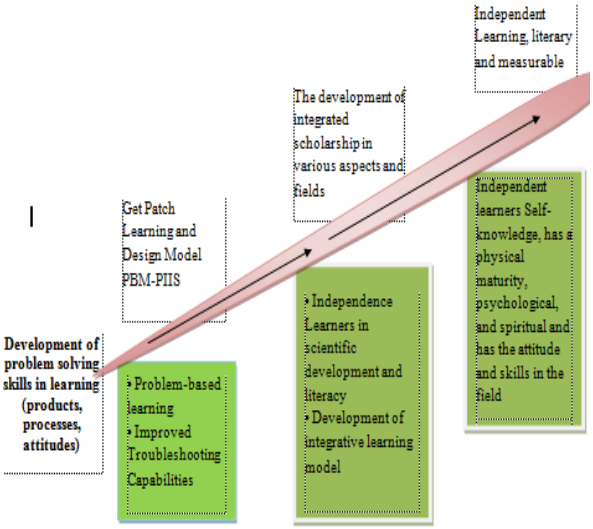


Figure 2.2 Roadmap PBL-PIIS

Table Syntax PBL-PIIS

Fase	Activity	Model Development of PBL-PIIS to be tested
1	• Connecting learning objectives with Islamic values • Submission the phenomena or demonstrations must be based on Islamic values	• Experience-based issues that are integrated with Islamic values. • Identify problems that have been integrated with Islamic values.
2	• Associating learning problems with the foundations that conform to scientific values in Islam	• Identifying Learning Issues: Determining what needs to be done to solve problems that have been integrated with Islamic values.
3	• connecting learning objectives with Islamic value-based information • connecting the implementation of experiments with Islamic values	• Making Plan: Conducting individual literacy studies independently related to issues that are integrated with Islamic values
4	• Planning of works and reports tailored to Islamic values and integration of facts that match the theme of the assignment.	• Learning Knowledge: Sharing the information that has been obtained. • Applying Knowledge: Work together in solving and finding solutions to the problem of sharing information that has been integrated with Islamic values.
5	• Reflections delivered by teachers based on	• Assessing and Reflecting: Conduct a thorough analysis and

Fase	Activity	Model Development of PBL-PIIS to be tested
	scientific facts and integrated Islamic studies.	evaluation of teacher-assisted learning activities.

The syntax above explains clearly the steps taken from the stage of orientation, organizing, guiding in finding experience, developing and presenting results and analyzing and evaluating the process with the pattern of integrating Islamic values and science in mathematics subjects.

The result of the limited test of PBL_PIIS model of this study shows:

No	Name	*Pre-test*	*Post-test*
1.	FF	94,6	100
2.	IP	69	75
3.	JA	79,3	90
4.	JG	83	90
5.	LU	89,3	95
6.	NA	86,6	100
7.	MB	87,3	95
8.	ME	89,3	95
9.	MU	80,3	85
10.	NH	92	90
11.	SW	85	100
12.	FD	89,3	95
13.	RC	88	100
14.	RA	93	95
Total		1206	1305

From the analysis of t-test data above, it can be seen that the count is 7.85. Then t is compared with t table with degrees of freedom (DK) = n1 + n2 - 2 = (14 + 14 - 2 = 26) with alpha 0.05 for two tail test. Based on deck 26 and alpha 0.05, it turns t table value for two-sided test = 2.056.

Because the arithmetic t is greater than t table (7.85> 2.056) then Ha is accepted and Ho is rejected. This shows that the PBL-PIIS model is significant in improving the problem solving of mathematics in MINU Pucang Sidoarjo especially in fifth grade students.

The feasibility test model has been validated by the model expert, as follows: At this stage, the researcher proposes the development of PBL-PIIS model to 3 experts in the learning model that is the professor and lecturer at the Muhammadiyah University of Sidoarjo. The assessment found that the PBL-PIIS model product was revised 4 times, among others, syntax improvements, Islamic value integration model, and Science, the addition of up-date reference and model improvement. After that, the validator stated that it was in line with the learning model development criteria.

The test phase is expanded; this large group test involves students of fifth grader and methematics at MINU Pucang Sidoarjo with to 30 students.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pretest	67,3333	30	9,44433	1,72429
	Posttest	91,0000	30	10,61879	1,93872

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Pretest & Posttest	30	,268	,152

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pretest - Posttest	-23,66667	12,17214	2,22232	-28,21182	-19,12152	-10,650	29	,000

Based on the mean or average score in the table above, it can be seen the difference between the pretest and posttest results, i.e. the pretest result shows 67.33 and the posttest result shows the average value of 91.

The result of t-test analysis using SPSS 15 with a significance level of 0.05 indicates that the value of p-value statistic test t is 0.00 which means (<0.55) means there is a significant influence on the average of pre-test and post-test. This shows that the development of PBL-PIIS Model Mathematics subjects developed can be used in Mathematics learning.

IV. CONCLUSION

Based on the results, it can be concluded that the Development of Problem Based Learning Model with Islamic value Integration Pattern at MINU Pucang Sidoarjo improve Problem Solving Ability, especially on mathematic subjects.

The PBL-PIIS model that focuses on the integration of Islamic and Science values is feasible to be used in mathematics learning for basic education of both public and private schools.

REFERENCES

[1] Barret, Terry. (2005). Understanding Problem-Based Learning. New York: Merill.

[2] Borg, Walter dan Meridith D. Gall. (1983) . Educational Research an Introduction (Fourth Edition). New York: Longman.

[3] Bruner J. (1961) . The act of discovery. Harvard Educational Review, 31.

[4] Dewey, John. (1981). . A method of Science Teaching, Boston: Heath.

[5] Kuntowijoyo, 2004.Epistemology dan paradigma Ilmu-ilmu Humaniora dalam Perspektif Pemikiran Islam. Yogyakar-ta: Suka Press.

[6] Soedjadi, R. (1994). Memantapkan Matematika Sekolah se-bagai Wahana Pendidikan dan Pembudayaan Penalaran. Surabaya: Media Pendidikan Matematika Nasional.

[7] Trianto. (2007) .Model-Model Pembelajaran Inovatif Berorien-tasi Konstruktivistik. Jakarta: Prestasi Pustaka.

[8] Duschl, R. (2008). Science education in three-part harmony: Balancing conceptual, epistemic, and social learning goals. *Review of research in education*, *32*(1), 268-291.

[9] Zsóka, Á., Szerényi, Z. M., Széchy, A., & Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *Journal of Cleaner Production*, *48*, 126-138.

[10] Novak, J. D., & Gowin, D. B. (1984). *Learning how to learn*. Cambridge University Press.

[11] Abdullah, M. Amin, et. al. (2003). Menyatukan Kembali Ilmu-Ilmu Agama dan Umum: Upaya Mempertemukan Epistemologi Islam dan Umum. Yogyakarta: IAIN Sunan Kalijaga Press.

[12] Barrows,H.S. & Tambblyn, R.N. (1980). Problem-Based Learning : An Approach to Medical Education. New York. Springer.

[13] Cunningham F.G., Leveno, K.J., Bloom, S.L.; Hauth, J.C. Williams obstetrics. 22nd ed. McGraw Hill: 587–606.

[14] Imam Suprayogo, Tobroni. 2001. Metode Penelitian Sosial Agama cet. 1, Bandung: Remaja Rosdakarya.

[15] Ruseffendi. (2006). Pengantar Kepada Membantu Guru Mengembangkan Kompetensinya dalam Pengajaran Matematika. Bandung: Tarsito