

The Impact of *DELIKAN* Learning towards Mathematics Achievement in Terms of Students Motivation: An Experiment at the State Elementary Schools of Banyumas, Central Java, Indonesia

Sony Irianto & Karma Iswasta Eka

ABSTRACT: *This research is aimed at finding out the difference between the Mathematics achievement of the students taught using DELIKAN (Dengar, Lihat, Kerjakan or Listening, Looking, Doing) learning and those taught using Conventional one; the difference in Mathematics due to the difference in the level of motivation; and the interrelationship of Mathematics achievement as caused by DELIKAN learning, conventional learning, and motivation. This research was carried out in State Elementary School of Pasir Wetan and State Elementary School 2 of Kecila in the even semester of the academic year of 2009/2010. The method used was experiment with factorial design of 2 x 2. The population was the fourth year students of both Elementary Schools. Data was collected through multiple choice objective test and questionnaire to measure motivation. The result of the analysis showed that there was a significant difference in the mathematics achievement of students taught using DELIKAN and those taught with conventional learning; there was not significant difference in mathematics achievement as a result of difference in motivation; and there was not significant interrelationship in mathematics achievement as caused by DELIKAN, conventional learning, and motivation.*

KEY WORDS: *DELIKAN learning, conventional, motivation, Elementary Schools, and Mathematics achievement.*

Introduction

The development of education in Elementary School is very crucial stage because the formation of learning habit takes place at this phase. If there is something wrong in this stage in the form of either incorrect method or concept, the wrong perception with is carried by the learners to next level of education. In other words, teaching and learning in Elementary School should be correct in line with Pedagogical and Psychological aspects in children development (Suherman, 1993; Djaali, 1999; Darhim, 2001; and Muhsetyo, 2005).

Sony Irianto and Karma Iswasta Eka are the Lecturers at the Faculty of Education and Teacher Training UMP (Muhammadiyah University of Purwokerto), Jalan Raya Dukuhwaluh PO Box 202, Purwokerto 53182, Central Java, Indonesia. They can be reached at: tukiranump@yahoo.com

Mathematics as a Hard Subject in Indonesia

Mathematics is a subject which gets most attention from teachers, parents, and students themselves. But in reality, many students do not fully understand Mathematics concept. The result is that many students get low achievement and become demotivated in learning Mathematics.

This low achievement is also because students find it difficult to understand Mathematics. This is because Mathematics is composed of many abstract concepts and expressed in logical reasoning.

This low achievement also happens in SD (*Sekolah Dasar* or Elementary School) Pasir Wetan, Banyumas, Central Java, Indonesia. This can be seen from the score of Mathematics National Exam from the academic year of 1999/2000 to 2004/2005 as shown in table 1.

Table 1

Scores of Mathematics National Exam of SD Negeri Pasir Wetan from the Academic Year of 1999/2010 to 2004/2005

N	Academic Year	Average Scores
1	1999/2000	6.64
2	2000/2001	5.75
3	2001/2002	5.59
4	2002/2003	5.87
5	2003/2004	6.57
6	2004/2005	6.96

Source: *Document of SD Negeri Pasir Wetan, Banyumas (2005)*.

Tabel 2

The Recapitulation of the Final-School Exam Score of Mathematics the Academic Year of 2005/2006 to 2006/2007

Score	2005/2006	2006/2007
Highest	10	9.04
Lowest	4.79	4.90
Mean	7.56	7.02
Deviation Standard	1.40	0.95

Source: *Document of SD Negeri Pasir Wetan, Banyumas (2007)*.

Besides, the average review scores of mathematics of the second semester of the fourth grade of the academic year 2005/2006 is 6.5. While the students' absorption level on the subject of mathematics of the grade IV A and grade IV B can be seen from the following table.

Table 3

The Students' Absorption Level on the Subject of Mathematics of the Grade IV A and Grade IV B of SD Negeri Pasir Wetan of the Academic Year of 2006/2007

Skill	Absorption Level (%)	
	Grade IV A	Grade IV B
Arithmetic	67	66
Geometry/Measuring	65	63

Source: Document of SD Negeri Pasir Wetan, Banyumas (2007).

From the above data, it can be seen that student's achievement and absorption level is relative low. Based on the observation and interview with the headmaster as well as the teacher of grade IV, it can be concluded that it is the teacher-centeredness of learning mode, causing he students to be passive, which has made the achievement and observation level low

It was then known that media was not involved in the learning of prime number, making it difficult for students to understand the concept. Erman Suherman (1993:272) says that learning aid can make the lesson interesting so that it can encourage to learn more. Besides that with learning aid students' attention can be more focused. The role that learning aid play is to lay the basic ideas which underlie a certain concept.

According to Nana Sudjana (1991:58), *DELIKAN* (*Dengar, Lihat, Kerjakan* or Listening, Looking, Doing) learning is appropriate for teaching subject which is both factual and conceptual. In this type of learning, students will memorize, know, explain, differentiate, conclude, and apply. This learning will focus on motivation information by listening, looking, and doing. "Listening" means paying attention to and understanding explanation given by the teacher. "Looking" is watching teacher's showing things, how a concept works, example of how a problem is solved, and reading books. This is the continuation of the listening stage for better understanding of the topic being explained. While "doing" is the students' activities in doing the assignments the teacher gives.

The use of numbered-line rod is an example of an effort in making students understand better about the concept of integer. Basically, there is not any negative measurement, but in Mathematics there is the concept of negative integer which is still difficult for students to understand. Gatot Muhsetyo (2005) says that numbered-line rod can help students understand this Mathematical concept better. Therefore the use of this learning aid in *DELIKAN* learning is expected to improve students understanding about the concept of arithmetic, and integer, so that their motivation and achievement can increase.

This research will try to find out the impact of *DELIKAN* learning using the numbered-line rod towards the students Mathematics achievement, particularly on the conceptual understanding, and also analyze its impact on their motivation. The result of this research is expected to be of use for the Ministry of Education in improving the quality of mathematics learning.

Therefore the problem of the research can be formulated as follows: (1) Is there any impact of *DELIKAN* learning using numbered-line rod towards students' Mathematical achievement?; (2) Is there any impact of motivation towards students' Mathematical achievement?; and (3) Is there any interaction between the impact of *DELIKAN* learning and motivation towards students' mathematics achievement?

The Essence of Mathematics Learning in Elementary School

Mathematics is often viewed as a subject with strict ordering, which means that one concept should be totally understood before understanding a new concept. Ausabel, in Suryadi (1997), says that unless the prerequisite is well understood, students will not be able to understand the next concept.

The average age of elementary school students is seven to eleven years old, at which their mental development is in the stage of concrete operational. At this stage, a child has the ability to make logical thinking with the use of concrete things. This is in line with what Djaali (1999) says that the learning of Mathematics concept in elementary schools should be aided with concrete objects. Otherwise, Mathematics concept, which is abstract in nature, will mean nothing for students, and students will find it difficult to understand the next topic.

To help solve this problem, teacher should find the most effective way of presenting the material with the help of learning aid so that student will easily understand it.

First, Mathematics Learning Aids. Mathematics learning media is defined as a learning aid which is in its use integrated with the objective and content as stated in the GBPP (*Garis-garis Besar Program Pengajaran* or the General Guideline of the Learning Program) of Mathematics to improve the quality of learning.

According to Johnson and Raising, in Darhim (2001:6), says that learners can remember a fifth of what they have heard, a half of what they have seen, and three quarter of what they have done. This means that if the media is in the form of audio visual aids and can be manipulated, learning aid can help improve the achievement of a learning process.

Second, Numbered-Line Rod. Number is an abstract Mathematical concept. Therefore, its operation will be difficult to understand if its basic is not mastered. Integer is one of the concept of number which can be expressed as $\{\dots, -2, -1, 0, 1, 2, \dots\}$ which include negative integers and prime numbers.

Many problems arise when a teacher presents the addition and subtraction of integers to the fourth years students of elementary schools. Darhim (2001) says that all the basic forms of calculation in the integer system can be visualized concretely using numbered-line rod which is a modification of number line ladder or ribbon.

Third, DELIKAN Learning. *DELIKAN* (*Dengar, Lihat, Kerjakan* or Listening, Looking, Doing) learning, according to Nana Sudjana (1991:58), is one form of CBSA (*Cara Belajar Siswa Aktif* or Student-Centered Learning) in its simplest

form. What is meant by simple is that it is easy to apply. This type of learning is appropriate for learning process which involves facts and concepts. This type of learning involves students' mental activities such as recalling, knowing, explaining, differentiating, concluding, and applying. This model emphasized information of motivation.

As the name suggests, students do three activities, namely listening, looking, and doing. "Listening" means not only paying attention and understanding teacher's explanation but also other instructional media such as recorded material, discussion, role play, and so on. "Looking" includes observing teacher's demonstrating, how something works, how a problem is solved, and reading books. This activity is the continuation or complement of listening activity, which is meant to improve students' retention. The "doing" is in the form of completing assignments given by the teacher which is meant for the students to apply and use the concept learned, for example doing exercises, discussing a solution of problems, doing assignments of a workbook, or making writing task.

Fourth, Learning Motivation. M.D. Merrill and C.M. Reigeluth (2000:341) define motivation as a recurring dilemma for beginning and teachers alike. Keller, in R.M. Gagne (1989:320), says that motivating begins with the analysis of the learners, setting the goal of motivating, deciding the method of motivating and making necessary revision.

According to A.M. Sardiman (2001:24), several indicators of a highly motivated learner, among others, is having an interest in the teacher in that he or she likes and is not indifferent towards him/her, being enthusiastic to the subject being learned, wanting his/her being known and recognized, always trying to recall what he/she has learned and relearn it, and having control over his/her morality. The learner also has high persevere in carrying assignments out and can work for a relatively long time, being tough in overcoming difficulties, and not easily satisfied with what he/she has achieved.

Fifth, Mathematics Learning Achievement. Learning achievement is the maximum result someone has obtained after a learning effort. W.S. Winkel (1996:226) says that learning achievement is a proof of someone's success. Therefore, learning achievement is the result of a measurement of someone's learning effort which expressed in the form of symbol, letter, or sentence showing what someone has obtained.

Mathematics learning achievement is an indicator on the level of mastery in mathematics in the form of score after attending mathematics course.

Research Design

This research was carried out at Grade IV of SDN (*Sekolah Dasar Negeri* or State Elementary School) of Pasir Wetan and SDN (*Sekolah Dasar Negeri* or State Elementary School) 2 Kecila of the Banyumas Regency, in Central Java, Indonesia. Sample was taken using cluster random sampling technique, in which sample was taken randomly on the basis of group or class. In this research Grade IV of

SDN Pasir Wetan was chosen as the experiment class which given treatment with *DELIKAN* type of learning and Grade IV of SDN 2 Kecila as the control class which was taught using conventional method. This research was an experimental one, because the result would confirm the causal relationship among the variables being studied.

The purpose of this research was to find the impact of *DELIKAN* and conventional method of learning towards the students' Mathematics achievements viewed from their motivation which classified into two categories, low and high motivation. To identify the variable, 2 x 2 factorial design was used. This research used two main instrument, namely test and motivation questionnaire which was given when the students were being taught with *DELIKAN* and conventional method. The analysis was done in two stages, the first to test the analysis requirement; and to test the hypothesis.

Result of the Research

Anova test of the two-factor interactions was used to test the hypothesis of this research, the result is as follows:

Tabel 4

Post Test Score of DELIKAN and Conventional Learning and Motivation Between-Subject Factors

		Value Label	N
Method	1	<i>DELIKAN</i>	48
	2	Conventional	35
Motivation Level	1	Low	41
	2	High	42

Tabel 5

Result of the Measurement Two-Factor Interaction
 Test of Between-Subjects Effects

Dependent Variable: Postest

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	6458.851a	3	2152.950	7.711	.000
Intercept	220044.620	1	220044.620	788.125	.000
Method	6321.879	1	6321.879	22.643	.000
Grade	97.597	1	97.597	.350	.000
Method * Grade	54.310	1	54.310	.195	.000
Error	22056.812	79	279.200	--	--
Total	267100.000	83	--	--	--
Corrected Total	28515.663	82	--	--	--

a.R Squares = .227 (Adjusted R Squared = .197)

From table 5 above, it can be concluded that the result of each hypothesis test of this research is as follows:

First, the result of hypothesis-test I shows that there is a difference between Mathematics learning achievement of students taught with *DELIKAN* method and those with conventional method or in other words there is an impact of *DELIKAN* method towards Mathematics learning achievement which higher than that of conventional method.

Second, the result of hypothesis test II shows that there is no difference in Mathematics achievement as a result students' motivation. Based on the data, there are students with high motivation in learning Mathematics who get low achievement and there are also student with low motivation who get high achievement. This means that there is not any impact of motivation on the students' Mathematics achievement.

Third, the result of hypothesis test III shows that there is no significant interaction about Mathematics learning achievement which is caused by *DELIKAN* and conventional learning, and students motivation. There are students with high motivation who got higher scores than those with low motivation. Students in experiment class with *DELIKAN* learning perform better those in control class which was taught with conventional method.

Concl usion and Suggestion

Based on the result of the research, it can be concluded that: (1) There is an impact of *DELIKAN* learning on the students' Mathematics achievement which is higher than that of conventional one; (2) Motivation, either high or low, does not give impact towards students' Mathematics achievement; and (3) There is not any significant interaction about the students' Mathematics learning achievement caused by *DELIKAN*, conventional learning, and level of motivation.

Students with high motivation tend to perform better in Mathematics that those with low motivation, and experiment class taught with *DELIKAN* learning achieve better score than those taught with conventional learning.

Based on the above conclusion it is suggested that: (1) In order to apply *DELIKAN* learning method a teacher should make good preparation such as preparing learning aid, media and so on; and (2) Teachers are expected to use active, creative, effective and enjoyable learning model which suits class condition through experiment research and classroom action research.

References

- Budiyono. (2004). *Statistika Penelitian*. Surakarta, Indonesia: Sebelas Maret University Press.
- Darhim. (2001). *Materi PokokWork Shop Matematika*. Jakarta: Universitas Terbuka.
- Depdiknas [Departemen Pendidikan dan Kebudayaan]. (2007). *Dokumen Nilai SD Negeri Pasir Wetan Banyumas*. Purwokerto, Indonesia: SDN Pasir Wetan.
- Depdiknas [Departemen Pendidikan dan Kebudayaan]. (2007). *Dokumen Struktur Kurikulum SD Negeri Pasir Wetan Banyumas*. Purwokerto, Indonesia: SDN Pasir Wetan.
- Djaali. (1999). "Materi Pelajaran Matematika di SD Terlalu Abstrak dan Rumit" in daily newspaper of *Kompas*. Jakarta: 6 May.
- Gagne, R.M. (1989). *Principle of Instructional Design*. New York: Hall Rinehart and Winston
- Merril, M.D. & C.M. Reigeluth. (2000). *Education Psychology*. New Jersey: Education Technology Publications.
- Muhsetyo, Gatot. (2005). *Pembelajaran Matematika SD*. Jakarta: Penerbit UT [Universitas Terbuka].
- Pandoyo. (1992). "Konsep-konsep Essensial Pengajaran Matematika". *Makalah Seminar Pendidikan Matematika*.
- Santoso, Singgih. (2003). *Mengatasi Berbagai Masalah Statistik dengan SPSS Versi 11.5*. Jakarta: PT Elex Media Komputindo.
- Sardiman, A.M. (2001). *Interaksi dan Motivasi Pembelajaran*. Jakarta: PT Raja Grafindo Persada.
- Sudjana, Nana. (1991). *Model-model Mengajar CBSA (Cara Belajar Siswa Aktif)*. Bandung: Penerbit Sinar Baru.
- Suherman, Erman. (1993). *Materi Pokok Strategi Pembelajaran Matematika*. Jakarta: Penerbit UT [Universitas Terbuka].
- Sukarman, H. (2003). *Dasar-dasar Didaktik dan Penerapannya dalam Pembelajaran*. Jakarta: Penerbit Depdiknas RI.
- Suryadi. (1997). *Alat Peraga dan Media Pengajaran Matematika*. Jakarta: Ditjen Dikdasmen Depdikbud RI.
- Winkel, W.S. (1996). *Psikologi Pengajaran*. Jakarta: Gramedia Widiasarana Indonesia.
- Winkel, W.S. (2004). *Psikologi Pengajaran*. Yogyakarta: Media Abadi.