

## THE EFFECTIVENESS OF EZZLEMATH FOR IMPROVING THE READING COMPREHENSION OF MATHEMATICS PROBLEMS AT GRADE FIVE OF ICP ELEMENTARY SCHOOL

Ima Kulama Gutami<sup>1)</sup>, Adelia Nathasyach<sup>2)</sup>, Oktavia Dwi Widianti<sup>3)</sup>, Chyntia Heru Woro Prastiwi<sup>4)</sup>

<sup>1,2,3,4</sup>Fakultas Pendidikan Bahasa dan Seni, IKIP PGRI Bojonegoro

Email<sup>1</sup>: imakulamagutami@gmail.com

Email<sup>2</sup>: nathasyachadel<sup>2</sup>@gmail.com,

Email<sup>2</sup>: oktaviadwiwidianti16<sup>3</sup>@gmail.com

Email<sup>4</sup>: chyntia\_heru<sup>4</sup>@ikipgribojonegoro.ac.id

**Abstract:** *Mathematic problems often become obstacles to the students of ICP (International Class Program) schools in Indonesia, including the elementary school level. They cannot understand sentences presented in mathematic problems because they have constraints in the mathematical vocabulary. To overcome this problem, this research under the experimental design conducted experiments on using Ezzlemath (English Puzzle for Mathematics) for assisting the students' reading comprehension upon mathematic problems. By having fun in doing a puzzle and repeated words filled in the puzzle, the students of elementary school level of ICP design can have more exposure to mathematical vocabulary. The researchers involved 12 students of grade 5A as the experimental group and 17 students of grade 5B as the control group. The research results demonstrated that Ezzlemath gave significant effects to the students' reading comprehension of mathematic problems.*

**Keywords:** *Ezzlemath, mathematic problem, elementary school, ICP*

**Abstrak:** *Soal cerita Matematika sering menjadi kendala bagi siswa-siswi di sekolah-sekolah berdesign ICP (Internasional Class Program atau Program Kelas Internasional), termasuk pada level Sekolah Dasar (SD). Siswa-siswi tidak bisa memahami soal cerita Matematika karena mereka memiliki keterbatasan kosakata istilah-istilah Matematika dalam Bahasa Inggris. Untuk mengatasi masalah ini, penelitian eksperimental ini menerapkan Ezzlemath (English Puzzle for mathematics atau Puzzle Matematika Berbahasa Inggris) untuk mempermudah pemahaman bacaan terhadap soal cerita Matematika. Dengan mengerjakan puzzle teka teki silang secara menyenangkan dan mengulang kata-kata dalam puzzle, maka siswa-siswi SD sekolah berdesign ICP dapat mengalami banyak exposure terhadap istilah Matematika berbahasa Inggris. Para peneliti melibatkan 12 murid kelas 5A sebagai kelas eksperimental dan 17 murid kelas 5B sebagai kelas kontrol. Hasil penelitian mengindikasikan bahwa Ezzlemath mampu memberikan efek signifikan terhadap kemampuan pemahaman bacaan siswa terhadap soal cerita Matematika berbahasa Inggris.*

**Kata Kunci:** *Ezzlemath, soal cerita Matematika, Sekolah Dasar, ICP*

## INTRODUCTION

Mathematics is generally defined as a field of science that studies patterns of structure, change, and space. Then, informally it can be also known as the science of numbers. In the formalist view, mathematics is the study of axiomatically defining abstract structures using symbolic logic and notation. As for another view, mathematics is the basic science that underlies other sciences (Hariwijaya, 2009). Therefore, mathematics is taught at all basic school levels beginning from elementary school until senior high school.

In Indonesia, mathematics at the elementary school level can be delivered in two languages i.e., Indonesian and English. Specific to English Mathematics, this lesson is mostly applied at international schools with ICP (International Class Program) curriculum. International school is a school that adopts international education to give an international educational environment for students. Most International Schools in Indonesia are applying the Cambridge International Curriculum (CIC), an adapted curriculum from the University of Cambridge. Cambridge International Curriculum is an education program that is known for its best in preparing students for life, helping them develop the skills students need to achieve at school and work (UCLES, 2018). According to Keumala (2013), Cambridge International Curriculum helps students to be creative and independent. CIC also helped students to have a sensitivity to humanity's sense, environmental awareness, and skills. Elizabeth (2014) emphasizes that the implementation of CIC affects students' learning and achievement.

SD Muhammadiyah 3 ICP Sumberrejo Bojonegoro is one of the

schools that implements the Cambridge curriculum in mathematics learning. The students are expected to master the vocabulary in English Mathematics as well as to solve Mathematics problems. This school has a regular plus class by implementing National Curriculum from the Education Agency together with the Cambridge curriculum. During the teaching and learning process of English Mathematics, teachers and students must communicate in English well. Both curricula aim at preparing students to be able to communicate and compete with other people in the world as Indonesia has entered ASEAN Economic Community (AEC) which will be widened to Asia until the world. Consequently, the skill, knowledge, and habit to communicate in English must be implanted at early ages.

According to Siregar (2017), the students' perceptions of mathematics are different, 45% of students consider mathematics difficult, 80% of students consider mathematics as an important subject and 85% of students state that learning mathematics through games becomes fun. Another problem is that students have negative perceptions of arithmetic subjects and low learning interest (Nurfazar, 2016). Intisari (2017) states that students have a negative perception of mathematics and consider mathematics as a subject that is difficult, frightening, and makes them stressful. The various research results above indicate that in learning mathematics, each student has a different perception.

In addition to negative perception, another factor hindering the students from good achievement in English Mathematics is language. Mastering and memorizing Mathematics vocabulary in English is not

an easy task for students at ICP schools. In fact, the learning activity must involve the materials of both Mathematics and English simultaneously within a correct and fun.

For this reason, to improve the learning outcomes of fifth-grade students of SD Muhammadiyah 3 ICP Sumberrejo Bojonegoro in English Mathematics, the researchers tried to apply a learning medium namely Ezzlemath (English Puzzle for Mathematics). It is a bilingual (English-Indonesian) puzzle for memorizing vocabulary about Mathematics. Ezzlemath is expected to be able to improve student learning outcomes, especially in completing Mathematics Problems. Puzzle is a game to unite fragments of pieces to form a predetermined image or writing (Indriana, 2011).

## METHODOLOGY

This Quasi-experimental research employed treatments at SD Muhammadiyah 3 ICP Sumberrejo Bojonegoro which is located at PUK Komplek Masjid Sumberrejo Road, Sumberrejo District, Bojonegoro Regency, East Java Province for 4 months. The research subjects involved the fifth graders in the academic year of 2021-2022. There were two variables becoming the focus of research, namely the independent variable and the dependent variable. The dependent variable in this study was the reading comprehension of Mathematics problems, whereas the independent variables were Ezzlemath and Expository methods. The researchers employed Pre-Test and Post-Test control group designs for obtaining differences in students' reading comprehension upon the mathematics problems. By the end, the researchers gained the effects of both learning methods. Schematically, the design of this study is depicted in Table 1:

**Table 1.** Research Design of Pretest-Posttest Control Group Design

Group	Pre-Test	Treatment (X)	Post-Test
Experimental	O1	Ezzlemath	O2
Control	O1	Expository	O2

(Adapted from: Sugiyono,2014)

Description:

O1 = Giving Pre-Test to the Experimental and Control groups

O2 = Giving Post-Test to the Experimental and Control groups

X = Different treatments i.e., Ezzlemath and Expository

The sampling technique used is cluster random sampling. Through cluster random sampling, two classes were randomly selected. Then, the two classes are randomized again to choose the experimental class and the control class. The samples comprised class 5A with 12 students as the experimental group, while

5B with 17 students served as the control group. The procedure for this research activity is carried out in three stages, namely:

### Preparation phase

In the preparation stage, the researcher prepared everything needed during the research, including: (1) Conducting observations at school related to teaching and learning activities at SD Muhammadiyah 3 ICP Sumberrejo Bojonegoro; (2) Determining research sample; (3) Determining the teaching material; (4) Making research instruments, in the form of test questions and puzzles; (5) Analyzing the results of the instrument trials.

### Implementation phase

At the research implementation stage, the researcher applied the learning method in the classroom to collect the data. The steps consisted of: (1) Giving Pre-Test to both group samples; (2) Giving treatment to both classes; (3) Giving Post-Test to both group samples.

### Final Phase

At this final stage, the researchers carried out data analysis, research report, and conclusion drawing. The data collection technique was carried out by

giving tests (pre-test and post-test) about the mathematics materials. Then the test results were analyzed by the test validity, reliability, level of difficulty, and discriminating power of questions. Analysis of the validity of the questions used the product-moment formula, whereas the reliability test of the questions applied the Spearman-Brown formula, the difficulty index was for measuring the difficulty level of the questions and the discrimination index was for the differentiating power of the questions. Data analysis using parametric statistic t-test polled 9 variances with two-party test criteria, which have previously been tested for data normality using the Chi-Square test and the homogeneity of the data using the F test. Meanwhile, to find out the improvement of students' skills in Mathematics, normalized gain test (g) is used.

Figures 1 and 2 below the examples of Ezzlemaths for the mathematics material about Properties of 2D and 3D Shapes.

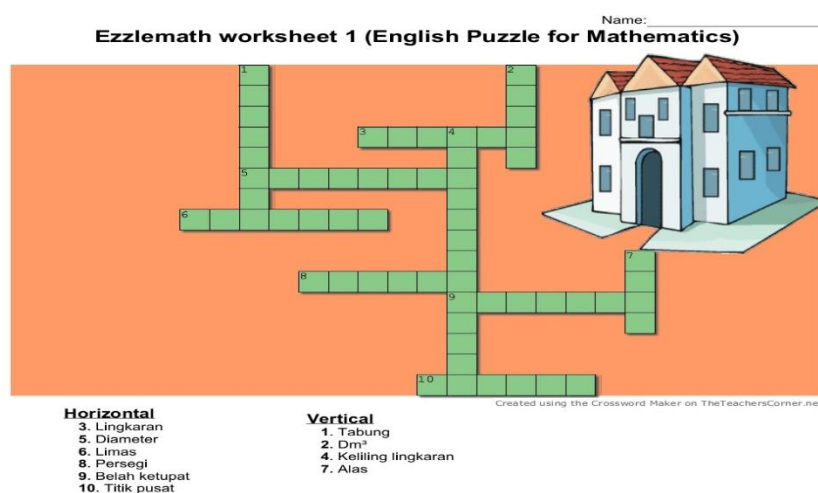
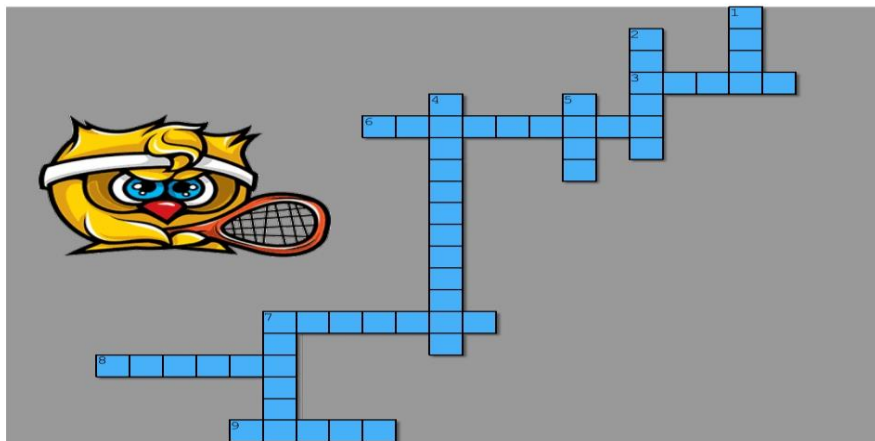


Figure 1 Ezzlemath in Indonesian-English

Name: \_\_\_\_\_

**Ezzlemath worksheet 2 (English Puzzle for Mathematics)**



- Horizontal**
- 3. Width
  - 6. Trapezoid
  - 7. Length
  - 8. Height
  - 9. Cuboid

- Vertical**
- 1. Sphere
  - 2. Volume
  - 4. Parallelogram
  - 5. Side
  - 7. Prism

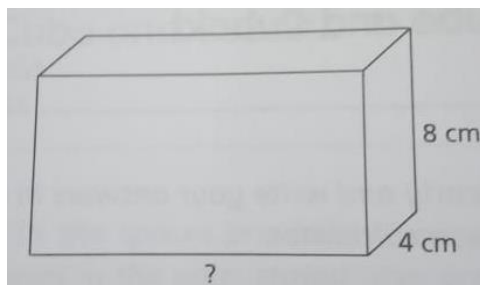
Created using the Crossword Maker on TheTeachersCorner.net

Figure 2 Ezzlemath in English-Indonesian

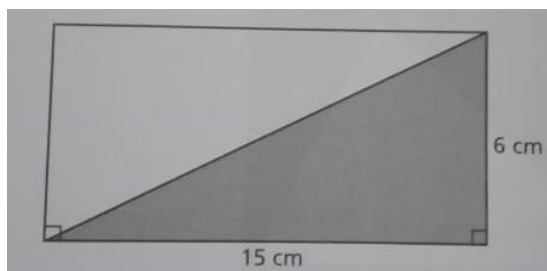
Table 2 Mathematics Problems on Properties of 2D and 3D Shapes

**MATHEMATICS PROBLEMS**

1. The perimeter of the triangle is 60 m. The height is 15 cm and the base is 20 cm. Find the other side!
2. The height of a triangle is 8 cm and its base is 7 cm. What is the area?
3. Find the volume of a cube with sides 4 cm.
4. The volume of a cuboid is  $384 \text{ cm}^3$ . If its height is 8 cm and its breadth is 4 cm, find the length of the cuboid.



5. Find the area of the shaded part.



## FINDINGS & DISCUSSION

In the early conditions, the learning outcomes, students' interest, and motivation for Mathematics were still low. They did not dare to apply questions, were difficult to practice questions, to express opinions, and lack of activeness. These conditions became the benchmark to increase interest and motivation students so that better learning processes and outcomes could be obtained, especially Mathematics problems.

The results of the study were presented in the form of data descriptions of students' skills regarding the mathematics material of Pre-Test and Post-Test using homogeneity test, normality test, and hypothesis testing (t-test polled variance with two-party test criteria). The teaching and learning materials for pre-test and post-test of experimental and control class comprised perimeter, volume, angles, and triangles. The results can be seen in Tables 3 and 4.

**Table 3.** Pre-test Data Recapitulation in Both Sample Classes

Component	Student Learning Outcomes Data	
	Experiment Class	Control Class
The number of students	12	17
Highest Score	100	100
Lowest Score	20	20
Average	54,16	56,4
Standard of Deviation (SD)		
Homogeneity Test	Homogenous	

**Table 4.** Post-test Data Recapitulation in Both Sample Classes

Component	Student Learning Outcomes Data	
	Experiment Class	Control Class
The numbers of student	12	17
Highest Score	100	100
Lowest Score	20	20
Average	45.6	47.6
Standard of Deviation (SD)		
Normality Test	Normal	Normal
Homogeneity Test	Homogenous	
Hypothesis Test	- t table < t calculation > + t table, H0 rejected and Ha accepted	

Before doing mathematics problems, the students must have much reading exposure about English vocabulary on Mathematics through Ezzlemath. In this

context, reading Ezzlemath becomes the first and vital skill as it is the foundation for all academic learning in which the students can get the information that can

be applied in the next steps of the learning process (Febrianti, Ermawati, & Rozaq, 2021). Ezzlemath can be the source not only for a reading activity, but also for motivation because the words asked in the Ezzlemath would then come up and be applied in the Mathematics problems. Keller (2009) defines four aspects indicating student's motivation: 1) attention means that the student's attention can be managed and directed to stimulate the motivation for learning, 2) relevance means that the objective, reason, and experience of learning are connected to the learning goals, materials, and examples, 3) confidence means that the students will feel confident and sure for their success as they can manage their own success, 4) satisfaction means that they have reinforcement from the learning materials. Ezzlemath managed and directed the students' attention to certain words that would be employed in the mathematics problems because the words inside were relevant. Ezzlemath developed the students' confidence and reinforcement to solve Mathematics problems.

## CONCLUSION AND SUGGESTION

Based on the results of research and discussion, it can be concluded that the implementation of Ezzlemaths as the learning media could improve student learning outcomes at class V SD Muhammadiyah 3 ICP Sumberjo Bojonegoro in 2020-2021 in solving Mathematics problems. Ezzlemaths served as the sources of learning which could motivate the students to read and memorize certain English words of Mathematics and apply them for solving Mathematics problems.

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