GeoEnzo utilization as mathematics learning media with contextual approach to increase geometry understanding

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Abstract. This research is motivated by the low level of students' understanding of the concept of geometry, the low level of active participation of students during learning, and the lack of socialization about the use of media in learning mathematics. Geometry is an important field of mathematics, but students have many difficulties in understanding the concept of geometry delivered by the teacher. One of them is the material line and angle. The use of technology-based media and information can be utilized in the learning of mathematics to improve geometry understanding of students in the form of program package (software application) GeoEnzo. The purpose of this research is to see whether the increasing geometry understanding of students who get contextual learning by using GeoEnzo media is better than conventional learning. The research method used is quasi experiment with non-equivalent control group design. The research instrument used is the geometry understanding test. The population of this research is First State Junior High School 1 Cadasari, with the research sample is student of class VII as much as two classes. The data analysis used is t-test where previously performed the prerequisite test of normality and homogeneity. Based on data analysis of research results, it can be concluded that the increasing of students' geometry understanding who get contextual learning by using GeoEnzo media is better than conventional learning.

1. Introduction
Geometry is very important in people's lives since 2000 BC and has maintained its importance to this day. [1] reinforces the importance of geometry in the Revised Principles and Standards for School Mathematics [2] and states that "Geometry offers the means to describe, analyze, and understand the world and see beauty within the structure". This is in line with [3] where geometry is a means for studying mathematical structures.

Geometry also occupies a special position in the curriculum in Indonesia because there are many concepts contained therein. From a psychological point of view, geometry is the presentation of visual and spatial abstractions such as fields, patterns, measurements and mappings. On the other hand, from the point of mathematics, geometry provides approaches to problem solving, such as drawings, diagrams, coordinate systems, vectors and transformations. The purpose of geometry learning is that students gain confidence in their mathematical abilities, become good problem solvers, can communicate mathematically, and can reason mathematically [4].

Geometry is not only important for understanding the geometric world or our universe, as well as basic skills in mathematics. Sherrard [5] states that geometry is important for every student. This is an important aid for communication because geometric terms are used in speaking, it is encountered in real life, it helps develop spatial perceptions, geometry learning prepares students for school and higher science and for a variety of jobs requiring math skills, General thinking skills and problem-solving abilities are facilitated by geometry, and geometry learning can develop cultural and aesthetic value.
In fact, many previous studies have suggested that children find it difficult to understand the material of geometry. As stated [5] where the achievement of student geometry is lower than the other 4 mathematics fields that is measurement, data representation, algebra, analysis and probability. In addition, according to [6], geometry becomes a frightening subject consequently many students are losing interest in geometry.

[7] study revealed that there are still many masteries of geometry of elementary/ junior high school students because of the difficulties of students in understanding the concept/ principle of geometry and understanding the concept that still contains misconception.

Today, the role of media and technology is needed in the process of learning in the classroom. The importance of using technology has been advocated by NCTM for many years. [1, 2] states that "Technology is very important in teaching and learning mathematics. This affects the mathematics that are taught and improves students' learning". GeoEnzo is one of the computer software that can be used as a media in learning mathematics in the classroom. Besides contextual learning is a learning approach that can be used in conjunction with technology because the introduction of contextual geometry materials will further enhance students' understanding of the concept of geometry and computer technology can increase students' interest in learning geometry.

Because of the importance of geometry understanding and the low level of geometry understanding in schools, this study was conducted to see the enhancement of geometry understanding through the use of GeoEnzo with a contextual approach.

2. Theoretical Study
Understanding is divided into three parts, namely: (a) Understanding of translations (translations) is used to convey information with other languages and forms and concerning the giving of meaning from a variety of information; (b) Understanding of interpretation (explanation) is used to interpret the intent of reading, not only with words and phrases, but also includes understanding an information from an idea; (c) Extrapolation (expansion); including estimations and predictions based on a thought, an overview of an information, also includes making conclusions with consequences appropriate to the third level of cognitive information that is the application of using or applying a material that has been studied into new situations, that is ideas, theories or technical instructions [8]. Basically the concept of geometry is abstract, but the concepts of geometry can be realized by semi-concrete or concrete. Images and models of geometry can be observed directly by the students while learning takes place, making learning activities challenging and fun. Learning activities that attract students' attention will have an impact on increasing students' understanding of the concepts they are learning [9].

Geometry understanding is referred to in this study is an understanding of the concept of one of the geometry topic of the line and angle. The indicators of students' understanding of the mathematical concepts used by [1] can be seen from the students' ability in: (1) Defining the concept verbally and in writing; (2) Identify, create examples and not examples; (3) Using models, diagrams, and symbols to present a concept; (4) Converting a form of presentation into another form; (5) Know the various meanings and interpretations of concepts; (6) Identify the properties of a concept and recognize the conditions that define a concept; (7) Compare and differentiate concepts.

Schramm [10] stating that instructional media is a messenger technology (information) that can be utilized for learning purposes. On the other hand, Gerlach & Ely [10] stated that the learning media has a very wide scope, which includes human, material or study that builds a condition that enables learners to acquire knowledge, skills or attitudes.

At this time it cannot be denied that computers and the internet is one technology that is widely used in learning. Rapid development in technology makes the use of application software becomes an option for teachers in delivering material on the learning process in the classroom. With the development of technology, the choice of Application Software (so-called Program Packages) that can be used as a media in learning also more from free start to pay all depends on the needs and objectives
of teachers in conveying learning. Of the various Packages Programs that exist on the internet, it turns
out for the learning process cannot be directly used for granted but need development and design to fit
with the purpose of use. So the selection of the program package depends on the user in this case the
teacher whose purpose is none other to help the learning process so that students can more easily
understand the concept of the material submitted by the teacher.

GeoEnzo is one of the application software that can be downloaded for free and can be used as a
media of learning mathematics. Because with GeoEnzo as a digital whiteboard, the teacher can display
various images that exist in everyday life, draw a straight line, introduce a degree arc, a run, types of
ruler, calculator and so on which are the tools commonly used in the classroom in learning
mathematics. The presence of GeoEnzo as a media in learning is expected to present real-world
experiences into the context and concepts of student mathematics. According to [11] the contextual
approach is a holistic educational process and aims to motivate students to understand the meaning
of learning materials by connecting the material to the context of their daily life (personal, social, cultural
context). So the contextual approach, where context is presented in the learning of geometry can be
combined by utilizing GeoEnzo learning media. This is expected to affect the student' understanding
of the concept of geometry.

3. Methodology
The research method used is quasi experiment with non-equivalent pretest posttest control group
design. The population of this research is First State Junior High School 1 Cadasari, with the research
sample is student of class VII as much as two classes. Taken a class VII A as many as 30 students as a
class of experiments and class VIIIC as many as 32 students as a control class. Technique of collecting
data using test with instrument description. Problem description consists of seven items which is the
development of seven indicators of understanding mathematical concepts according to NCTM. The
data is processed and analyzed based on the total score and the item that indicates the level of
understanding and ability of the students on each indicator understanding the concept of geometry.

4. Result and Discussion
The data obtained in this study is the test results of students’ geometry understanding. To reveal the
initial ability of students' geometry understanding, the researcher performs pretest before the learning
takes place both in experimental class (contextual learning with GeoEnzo learning media) and control
class (conventional learning) After the learning took place both classes were given posttest to see the
final ability of students' geometry understanding. To know the increasing of geometry understanding
of experimental class and control class, then analyzed to result of pretest and posttest. The analysis
was performed using average normalized gain. The results are as follows:

| Table 1. Descriptive Statistics result of the students 'geometry understanding. |
|----------------------|------------------|------------------|
| class                | mean             |
| Pretest              |                 |
| the experimental     | 26.50            |
| control              | 26.88            |
| Posttest             |                 |
| the experimental     | 69.33            |
| control              | 54.84            |
| nGain                |                 |
| the experimental     | 0.589            |
| control              | 0.387            |
Based on table 1 above, the mean of pretest experimental class is 26.50, the mean of Pretest control class is 26.88. So that descriptive initial understanding of the geometry of students between the experimental class and control class is almost the same. The mean of posttest the experimental class is 69.33, the mean of Posttest control class is 54.84. The mean of normalized Gain the experimental class is 0.589, the mean of normalized Gain control class is 0.387.

To determine whether the improved geometry understanding of the experimental class students better than the control class is used normalized Gain data. The data tested the normality and homogeneity of the variance. The results are obtained as follows:

Table 2. Normality Test Result of the students 'geometry understanding.

| class      | Shapiro-Wilk Statistic | df  | Sig. |
|------------|------------------------|-----|------|
| Pretest    |                         |     |      |
| the experimental | 0.939                 | 30  | 0.085|
| control    | 0.942                  | 32  | 0.085|
| Posttest   |                         |     |      |
| the experimental | 0.939                 | 30  | 0.088|
| control    | 0.937                  | 32  | 0.062|
| nGains     |                         |     |      |
| the experimental | 0.977                 | 30  | 0.730|
| control    | 0.984                  | 32  | 0.913|

From Table 2 above, the sig value for the experimental class is 0.73 and the control class is 0.913, both of which are greater than 0.05, so the data from the two classes is normally distributed.

Table 3. Homogeneous Test Results of the students 'geometry understanding.

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 1.754            | 1   | 60  | 0.190|

From Table 3 above we get the sig value of 0.190 > 0.05 so that the two classes have the same variance in terms of the understanding of geometry.

After the prerequisite test the data are met that is normality and homogeneity, followed by independent t-test to see if there is any difference in the increase geometry understanding between the experimental class and the control class. The following results are obtained:

Table 4. Independent t-test result of the students 'geometry understanding.

| T   | df  | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
|-----|-----|-----------------|-----------------|-----------------------|
| 9.147| 60  | 0.000           | 0.20219         | 0.02211               |

From Table 4 above, the sig (2-tailed) value is 0.000 < 0.05, meaning there is not enough evidence to receive H0. So that alternative Hypothesis accepted. Judging from table 1, the average of normalized gains of experimental class is higher than the control class.
5. Conclusion

Based on data analysis of research results, it can be concluded that the increasing of students' geometry understanding who gets contextual learning by utilizing the media GeoEnzo is better than conventional learning. In other words, the use of GeoEnzo media with a contextual approach can significantly improve students' geometry understanding of line and angle material.

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