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# The Implementation Numeration Learning Using Covid-19 Context Assisted E-Learning Primary School Teacher

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**Abstract.** Mathematics learning that needs to be taught of primary school teachers consists of selected math parts to develop abilities and shape the child's personality and is guided by the development of science and technology, wherein Numeration learning in the form of PISA type questions using the application of learning PMRI using Covid-19 context. The learning media that will be developed in this study will be assisted by the Universitas PGRI Palembang e-learning system named SISFO. By utilizing E-Learning, one of them is online learning during the Covid-19 pandemic. Data collection uses descriptive qualitative and continuous quantitative where the data is also described theoretically and also uses the calculation of results in numeracy learning which is applied to the mathematics learning development course of primary school teachers at Universitas PGRI Palembang. The purpose of this research is to produce an application of numeracy learning based on the characteristics and principles of PMRI. The data submission analysis technique is in the form of observation sheets and student learning outcomes tests in the form of documentation. The results of the study were in the form of observation scores from PMRI activities in numeracy learning and also in the form of student learning outcomes that were documented as a whole which had a positive impact on working on 10 questions of reasoning ability tests on numeration that had been tested for validity and reliability in learning to work on statistical content questions.

## INTRODUCTION

Mathematics learning is a subject for the development of a student's thinking ability from elementary to secondary to tertiary levels to equip students to improve their logical, critical, and creative thinking skills in the school environment and the community. One of the abilities that the government is now publishing is literacy and numeracy skills. Numerical ability is an ability that must be acquired by students such as giving reasons and conveying ideas effectively, formulating, solving, and interpreting mathematical problems in various forms and situations. Program for International Student Assessment (PISA) [1]. Numeration is the ability/expertise in numbers to solve everyday problems [2]. Knowledge and skills [3] are used in numbers and symbols to solve problems of everyday life, where analyzing is appropriate this needs. The results of a survey conducted by the Program for International Student

Assessment (PISA) 2018 assessing global education problems, including regarding education in Indonesia, in the category of reading, science, and math skills, Indonesia's score is low because it is ranked 74th out of 79 countries. Based on the results of the OECD (Organization for Economic Co-operation and Development) survey [4] for the 2009-2018 survey period, Indonesia has always been in the bottom 10, out of three categories, namely reading, science, and mathematics. Indonesia's score is always below the average, this is a serious problem that must be faced by education in Indonesia, please note that PISA is one of the three-year programs initiated by the OECD (Organization for Economic Co-operation and Development) to measure learning competencies, global learners. [5]

One approach that is by the characteristics of elementary mathematics learning is the Realistic Mathematics Education (PMRI) approach assisted by E-learning [6] Because this approach is very suitable to be applied to mathematics lessons where the PMRI approach is centered on students who can form their knowledge through their activities in the classroom. The PMRI approach is a learning approach that is more concerned with student activities in the learning process in the classroom so that students can build their knowledge of the problems that exist in mathematics [7]. PMRI is a learning approach that is oriented to the real world, connecting learning to everyday life that can be imagined by students, in PMRI it is easy to remember mathematical concepts and ideas that originate from the real world [8]. This numeracy learning will use e-learning assistance, according to [9] online e-learning learning that can be accessed by children wherever they are. [10] added that through e-learning, learning materials can be accessed anytime and anywhere. [11] Electronic Learning or in short E-Learning is a learning concept by utilizing electronic media as an instrument in its learning media. In today's era, technological advances require us to be able to find information by the times. Through learning in elementary school one means to find out information. Where the development of science and technology increasingly encourages reform efforts in the use of technological results in the learning process. Learning media is also very important to use for students [12], making it easier for teachers in the learning process. One of them is by using the SISFO E-learning media where lecturers rarely use it, especially because of the Covid-19 so that primary school teachers usually study offline to go online. Where the Lecture must be able to use the media must be by learning. So that the learning process is not easy to feel bored especially in learning mathematics.

## RESEARCH METHOD

Research methods in general are scientific methods or steps to obtain data with certain goals and uses [12]. The method used in this study is a qualitative descriptive method. Qualitative descriptive research is research that is used to describe a situation scientifically [13] This research also mixes and matches quantitative descriptive because the data is also assessed with numeric symbols. This study will focus on finding out how the application of PISA and PMRI numeration in eLearning-assisted mathematics learning for students in solving problems in elementary mathematics deepening courses. To measure the extent of numeracy learning for students and learning outcomes of mathematics learning in elementary mathematics learning development courses using numeration assisted by e-learning where students will be given tests that are done by students. From the test results, it will be analyzed the level of learning outcomes for elementary mathematics learning development courses assisted by SISFO e-learning then will be categorized into good, sufficient, poor, and failed. This research was conducted in the Elementary Mathematics Learning Development Course for 6th-semester PGSD students. The data analysis was by observation of numeracy learning by the characteristics and principles of PMRI in elementary mathematics learning, statistical data content with the context of Covid-19, and then given a test question in the form of 10 reasoning test questions. to test the numeracy skills of students' reasoning in the test. Then the final results of student learning are categorized based on existing criteria.

## RESULTS AND DISCUSSION

The PMRI approach is a learning approach that is more concerned with student activities in the learning process in a student-oriented classroom, that mathematics is a human activity and mathematics must be connected in a real way to the context of students' daily lives to a learning experience that is oriented towards real things. (real), according to [14]. According to [15] there are three main principles in PMRI, namely guided reinvention and progressive mathematization; didactic phenomenology (didactical phenomenology), as well as developing their models (self-developed models). Research that focuses on students and teachers who can solve the problem [16] On the use of

environmental realities to achieve mathematical goals in [17]. Meanwhile, another study focused on the difficulty level of children's knowledge [18][19] while another study discussed how to explore potential effects on students' mathematical literacy, such as reasoning and argumentation [20].

In this numeracy learning assisted SISFO e-learning, where the collection of assignments is done online where the lecturer can see the time of collection of assignments, making students have to compete with other students. This can indirectly increase students' motivation and independence in learning. With increasing learning independence, student learning outcomes can also increase, as stated by [21], namely that the implementation of e-learning assisted learning can improve students' mathematical reasoning abilities and independent learning.



FIGURE 1. Home of Sisfo e-Learning Universitas PGRI Palembang

Figure 1 The numeracy learning used in the lesson introduces the modified numeracy that is studied by primary school teacher students at Universitas PGRI Palembang, while learning is assisted by e-learning SISFO Universitas PGRI Palembang. The front page of this research uses the SISFO application from the Universitas PGRI Palembang which is carried out in the Elementary Mathematics development course.

Problem 1: data collection of corona patients according to age group

Age Group	Number of Cases
0-4 TH	58
5-9 TH	71
10-14 TH	80
15-19 TH	118
20-44 TH	1307
45-54 TH	289
55-59 TH	120
60-69 TH	158
>70 TH	32

The Covid-19 virus has spread to the city of Palembang. According to the distribution of asymptomatic confirmed cases in the city of Palembang by age group in the period 1 February 2020 to 26 April 2021, the data obtained areas above. Asymptomatic confirmed cases are confirmed cases of COVID-19 without symptoms. People who are exposed to the virus do not feel any symptoms.

- From the data above, try to understand and sort in what age groups are the most to the least?

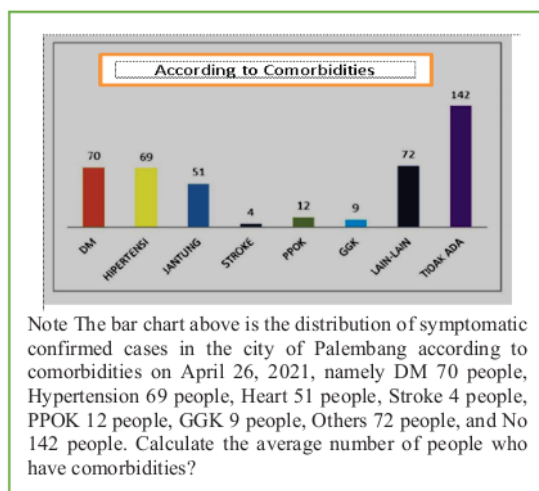
Answer:

- age 20-44 years that is 1307 people
- 45-54 years old, which is 289 people
- Ages 60-69 years are 158 people
- age 55-59 years, namely 120 people
- ages 15-19 years are 118 people
- 0-14 years old, 80 people
- ages 5-9 years i.e. 71 people

FIGURE 2. About the covid 19 context statistics data question for residents of Palembang, South Sumatra, and their primary school teacher answers

Figure 2. In this study, the questions in numeracy learning in the elementary mathematics learning development course were in statistics, where the context used was statistical data on Covid 19 in South Sumatra. Where children

are asked to reason from questions using bar charts, so they can determine the answers to questions where to reason from the largest to the smallest order of the answers to questions.



Answer:

There are 7 who have comorbidities, namely DM, Hypertension, Heart, Stroke, PPOK, GGK, and others, all of which turn into heart disease so:

$$\frac{70 + 69 + 51 + 4 + 12 + 9 + 72}{7}$$

$$= \frac{283}{7} = 40,43 \text{ people}$$

So close to 41 people affected by comorbidities

FIGURE 3. Statistical data on people affected by co-morbidities in the context of covid 19 and their answers

Figure 3. From the bar chart image of health outcomes on the 26th, the statistical victim data in Palembang, which asks students to reason about the meaning of the question, which is reading and reasoning to find the average of the existing comorbidities. In line with [22][23], students' ability to complete uncertainty and data content has diversity in each answer where they develop abilities in their field of knowledge.

### Data Analisis Technique

According to [24] observation is making observations directly to the object of research to see closely the activities carried out.

TABLE 1. Observation guidelines

PMRI Characteristics	Indicator	Result (%)
Using Context	1. Lecturers ask students to find and work on problems using surrounding objects that are related to the context of covid 19	90 %
	2. The lecturer asks students to name objects related to textbooks in e-learning that they have found around them	
Using Model	Lecturers provide opportunities for a primary school teacher to build their mathematical models, students themselves who complete them by being given e-learning books	82.5%
Student Contribution	Lecturers provide opportunities for students to contribute to solving problems in learning related to statistical material	87.5%
Interactivity	1. Lecturers provide opportunities for students to discuss in solving problems about statistics	82.5%
	2. Lecturers provide opportunities for students to ask questions about statistical material that they do not understand	
Integrated With Other Learning Topics	Lecturers relate problems in everyday life with the statistical material being studied	75 %
Range		83.6 % (Good)

In line with [25]-[27] Research demands the ability to do or get an activity from students by utilizing the surrounding context. The instrument used in this study was a test to find out how the application of numeracy learning assisted by e-learning SISFO to the learning outcomes of primary school teachers.

According to [28] Validity is showing the extent to which a measuring instrument can measure what it wants to measure. According to [29]. The formula that can be used to test construct validity with the product-moment correlation technique is:

$$r_{xy} = \frac{N(\sum XY) - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

The criteria for testing the validity of the instrument  $r_{xy} \leq r_{tabel}$ , then the instrument is declared valid.

Table 2 shows it can be seen that from the six questions tested, the results turned out to be questions numbered 1, 2, up to 10 valid and at a significant level of 5% so that it was concluded that question numbers 1, 2, up to 10 were feasible to use. Alignment of mathematics.

According to [30] the calculation phase of the reliability test using the formula Small displayed equations: Some

examples Alpha:  $r_{11} = \left(\frac{n}{n-1}\right) \left(1 - \frac{\sum \sigma_i^2}{a_t^2}\right)$  Dengan:  $\sigma^2 = \frac{\sum x^2 - \frac{(\sum x)^2}{N}}{N}$ ;  $r_{11} > r_{tabel}$

The results are in accordance with table 2.

The level of difficulty of a question is a measurement of how big the degree of difficulty of a question is according to [30] The formula used is:  $P = \frac{B}{JS}$ . The results are in accordance with table 2.

The calculation of discriminatory power is a measurement of the extent to which an item can distinguish students who have mastered competence from students who have not mastered competence based on certain criteria The results are in accordance with table 2. According to [30] calculate the distinguishing power of each item can be used with the

formula:  $D = \frac{B_A - B_B}{J_A - J_B}$

The results of the analysis in all of the tables above show that the numeracy questions have met adequate characteristics to be used in research.

**TABLE 2.** The result validity, reliable, difficulty and distinguishing power

No	1	2	3	4	5	6	7	8	9	10	$r_{table}$
<b>Question</b>											
$r_{count}$	0.454	0.472	0.576	0.489	0.470	0.713	0.683	0.600	0.555	0.600	0.329
Validity						Validity					
Item	0.472	0.552	0.944	0.645	0.638	1.021	0.749	1.472	0.842	1.021	$r_{11}$
Varians											
Score											
R criteria						Reliabel					0.76
Sum						26.471					
Variants											
TK	0.278	0.648	0.556	0.574	0.657	0.639	0.657	0.611	0.620	0.583	
Criteria	Diffic					Medium					
ult											
Coefficient	0.241	0.204	0.278	0.296	0.222	0.389	0.389	0.574	0.315	0.481	
DP											
Criteria				Enough				Good	Enough	Good	

### Data Analysis Techniques and Learning Outcomes of Primary School Teachers

The data taken from this study is a test given to students. From the students' answers, the learning outcomes of mathematics learning using PISA numeration questions and PMRI learning assisted by e-learning were analyzed forprospective elementary school teachers. According to [31]. The scoring formula is as follows:  $NP = \frac{R}{SM} \times 100$

**TABLE 3.** Student Learning Outcome Test Scoring Guidelines

Mastery Level	Letter Value	Weight	Predicate	Student Learning Outcomes
86 – 100%	A	4	Very Good	4
76 – 85%	B	3	Good	28
60 – 70%	C	2	Enough	8
55 – 59%	D	1	Not Enough	0
<54%	TL	0	Not Much	0
		Amount		40
		Average		81

Based on table 3, it is known that the average learning outcomes of students who take e-learning-assisted numeracy learning in the mathematics learning development course are 81 in the good category. So overall it can be concluded that the implementation of e-learning-assisted numeracy learning is effective for use in learning mathematics courses at PGSD because it can improve reasoning abilities and can improve student learning outcomes for elementary school teacher candidates.

### CONCLUSION

In this study, it can be concluded that e-learning-assisted numeracy learning leads to students' reasoning abilities for their activities which use the context of covid 19 in statistical material. The test data for the test have been tested for validity on 10 questions made with the results that all of them are valid and reliable, the difficulty level is getting 1 question that is difficult and the other is moderate, while 2 questions that have good distinguishing power and 8 other questions are sufficient. For the learning outcomes obtained with an average value of 81, it can be concluded that e-learning-assisted numeracy learning is effective to be applied in elementary mathematics learning. This research is part of development research that will be carried out by researchers as part of a student's dissertation. This study only takes data about questions in recognizing numeration of data content with statistics from the Covid-19 context. 10 questions are valid and reliable. While in learning, the researcher got good learning outcomes by using student activity sheets on reasoning abilities (C3) where students were seen to be active in working on sharing and jumping tasks from activity sheets seen from SISFO E-Learning.

In the future, researchers will develop various content in numeration by utilizing the assistance of the E-Learning section of learning so that student activities have applications in other learning fields.

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