# Efforts to Increasing Numeracy Literacy of Elementary School Students Through Quiziz Learning Media

*S. Saefurohman [1], Rina Maryanti [2*], Nissa Nur Azizah [3], Dwi Fitria Al Husaeni [3], Verra Wulandary [4],*

*Asep Rudi Irawan [5]*

[1] Departemen Pendidikan Ekonomi, Universitas Pendidikan Indonesia, Indonesia
[2] Departemen Pendidikan Khusus, Universitas Pendidikan Indonesia, Indonesia
[3] Departemen Pendidikan Ilmu Komputer, Universitas Pendidikan Indonesia, Indonesia
[4] Graduate school of International Development and Cooperation, Hiroshima University, Japan
[5] School of Human Sciences, University of Tsukuba, Japan
Correspondence: E-mail: rina.maryanti@upi.edu

## A B S T R A C T S

A Study conducted by PISA in 2018 showed that Indonesian students' mathematical abilities were at a low level of performance. It means that numeracy literacy of Indonesian students is very low. The purpose of this study was to predict how the effect of learning using the Quiziz application on students' numeracy literacy in elementary schools. The method was used the single subject method by doing pretes and post-test. The results of study show that average post-test score of students is greater than the average pretest score. This is because the Quiziz application which is used as a learning medium can be made attractively using the various features provided so that students are more interested in learning. The study conclude that the Quiziz application can improve students' numeracy literacy skills in elementary schools. The increase in literacy has an impact on the mindset of children in solving problems in every day life.

## A R T I C L E   I N F O

## 1. INTRODUCTION

According to the Ministry of Education and Culture, there are at least six basic literacys that must be achieved by Indonesian children, namely reading literacy, numeracy literacy, scientific literacy, digital literacy, cultural literacy and citizenship, and financial literacy. One of the literacy can be applied in basic education is numeracy literacy. This literacy includes the skill of applying mathematical concepts and rules in everyday life (Ekowati *et al.*, 2019). Students who have numeracy literacy skills wiil have an impact on good thinking habits so that they are easy to solve problems (Räsänen *et al.*, 2009; Gan *et al.*, 2015; Anders *et al.*, 2013). Facts on the ground show that Indonesian students' mathematical abilities are in the low performance category. This is evidence by the results of the 2018 PISA study which places Indonesia in 73rd rank out of 79 countries. So in the case, efforts are needed to improve numeracy literacy through interesting learning using game-based digital media such as Quiziz.

Many research studies discuss the use of digital media such as Quiziz in the learning process. The results of the research show that the use Quiziz media in elementeray school student learning can improve students'cognitive and concentration in answering questions (Wibawa *et al,* 2019). Another study conducted on third grade in elementary school students showed effectiviness of using Quiziz on students cognitive development, the result was that 56% of the experimental class were in the fairly effective category (Hidayati and Aslam, 2021). Another study conducted at an elementary school in Telukagung using Quiziz as a medium in online learning, the results showed that learning was effective and running smoothly (Nasution and Nandiyanto, 2021). The same thing was done in the Quiziz learning media can produce creative, innovative and fun learning media so it needs to be used as a learning medium (Aini, 2019). In line with previous research but using another games-based digital, namely Kahoot, it turns out that it can improve results, enthusiasm for learning and the effectivenesss of students in learning mathematics (Putra and Afrilia, 2020). Based on previous studies, there are not too many studies that discuss the use of Quiziz for improving students' numeracy literacy.

Based on this background, we conducted research with the aim of knowing an increase in students' numeracy literacy skills using Quiziz learning media. The study used a quantitative approach using an experimental method with a single-subject pretest-posttest design. The research results were analyzed using descriptive statistics by comparing the mean values in the pre-test with the post-test. The results showed an increase in the average score after using the Quiziz learning media.

## 2. THEORITICAL FRAMEWORK
### 2.1 Definition of Numeracy Literacy

Numerical literacy is the knowledge and skill to use a variety of numbers and symbols related to basic mathematics to solve practical problems in various contexts of everyday life and analyze information presented in various forms (graphs, tables, charts, etc.) then use the interpretation of the results of the analysis to predict and make decisions (Räsänen *et al,* 2009) The scope of numeracy literacy which consists of number concepts and arithmetic operation skills in everyday life including in economic life, geometry and measurement, as well as data processing in the form of tables, diagrams, and charts including taking information from data.

**2.1 Edgar Dale's Learning Media Theory**

Edgar Dale's learning media theory describes the level of student understanding in a cone of experience (Sari, 2019). In the cone of experience from Edgar Dale, the more the media can accommodate direct involvement in learning, the better student understanding will be better (Levefre *et al.,* 2010).

**Figure 1** describes the learning experience of Edgar Dale. This theory asserts that students will feel a more meaningful learning experience if the teacher presents a learning atmosphere that can be felt by students using all their five senses. In other words, the more senses students use when learning, the more easily the learning process will be absorbed by students. Based on this theory, the Quiziz application is a learning media that is included in the *simulate, model, or experience lesson* category.

## 3. METHODS
### 3.1. Research subject

This study used a single subject design by conducting a pretest-posttest. The population in this study was from 5th grade students at the Elementary School and then the sample was taken randomly. The study involved 10 students from grade 5 in elementary school. The students who were sampled had different characteristics, namely 4 male students and 6 female students.

### 3.2. Materials and method

This research is an experimental learning media to see the effect on numeracy literacy. The tools used in this experiment are Quiziz, Google Meet, and Google Forms. The use of google meet to integrate Quiziz so that it can be displayed on the video conference screen and while the google form is used to assist surveys and distribute pretest-posttest questions.

The pretest and posttest questions refer to numeracy literacy skills in the form of applying mathematics in everyday economic life. It is calculating discounts, comparing between two or more discounted items, calculating presentations in diagrams, calculating simple profits, and comparing two or more business profits in simple terms.

**Figure 2** shows the stages in conducting this experiment. The research procedure consists of 6 stages, namely, 1) preparation by conducting a survey of learning media needs to be carried out, 2) designing and making Quiziz learning media containing numeracy literacy material in everyday economic life, 3) making pretest questions using google form and distributing to the class Whatsapp group, 4) delivering numeracy material to students with Quiziz media which is integrated with google meet, 5) giving posttest questions to students to find out changes in students' numeracy literacy abilities, 6) pretest and posttest result data collected and then processed and analyzed with the help of descriptive statistics.

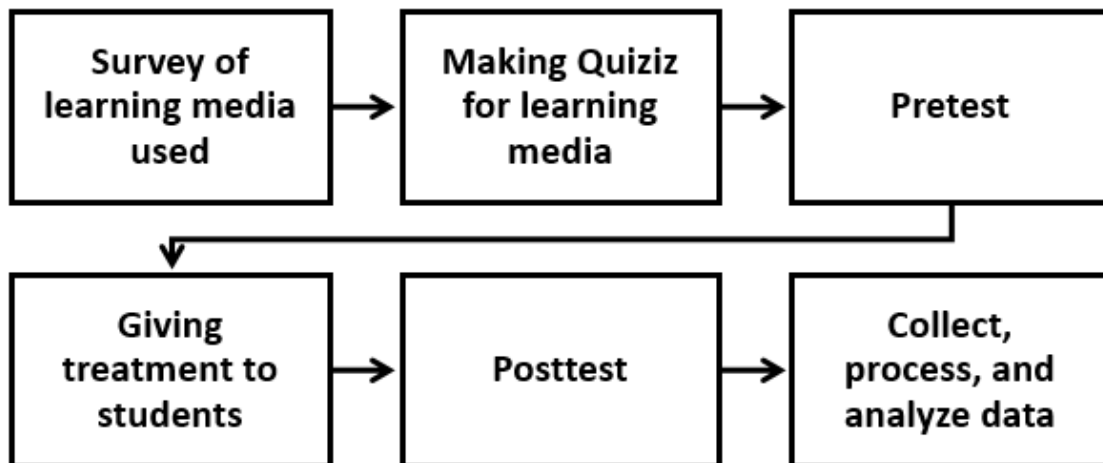**Figure 1.** Edgar dale's cone of experience, adopted from Sari (2019).



**Figure 2.** Experimental research flow scheme.

## 4. RESULTS AND DISCUSSION
### 4.1. Student Demography

This research was conducted in elementary schools. The number of students involved in this study were 10 students with details of male as many as 40% (4 students) and female as many as 60% (6 students). In addition, we conducted a survey on students' interest in the types of learning media. **Figure 3** shows the results of a survey regarding interest in the learning media that will be used. Based on these results, 20% (2 students) are interested in using visual-based media such as power point, 50% (5 students) are interested in using game-based learning media such as Quiziz, and 30% (3 students) are interested in video-based learning media such as YouTube.

### 4.2. Pre-test and post-test results

This study uses the Quiziz application to create learning media. The material presented in the media is about numeracy literacy in everyday economic life such as calculating discounts and business profits in a simple way. The delivery of the material was done online through google meet, before giving the research material, we gave 10 pretest questions related to numeracy literacy, then gave treatment with Quiziz which was displayed on the google meet screen, and then gave 10 posttest questions.

**Table 1** explains the pretest and posttest scores of students who are differentiated by gender, this is done to find out the difference in the numeracy literacy abilities of male students and female students. Data analysis used descriptive statistics in the form of calculating the average pretest-posttest score for female students and male students, as well as calculating the average pretest-posttest score for all students.

Based on **Table 1**, in the case of male students the posttest mean score (82.5) is higher than the pretest average (67.5), the increase in the score is 22.2%. These results indicate that there is an increase in the numeracy literacy ability of male students after being given the Quiziz learning media. The same case occurred in female students, the posttest average score (78.3) was higher than the pretest average score (65.0), an increase of 20.5%. These results also indicate that there is an increase in the literacy ability of female students after being given the Quiziz learning media. An interesting finding in this study is that the increase in grades for male students (22.2%) is greater than the increase in grades for female students (20.5%). This can happen considering that Quiziz media is a game-based learning media which may be an interesting thing for male students so that it can increase their focus and thinking power during learning and in the end will make it easier for them to calculate on the pretest-posttest questions (Aders *et al.*, 2012).
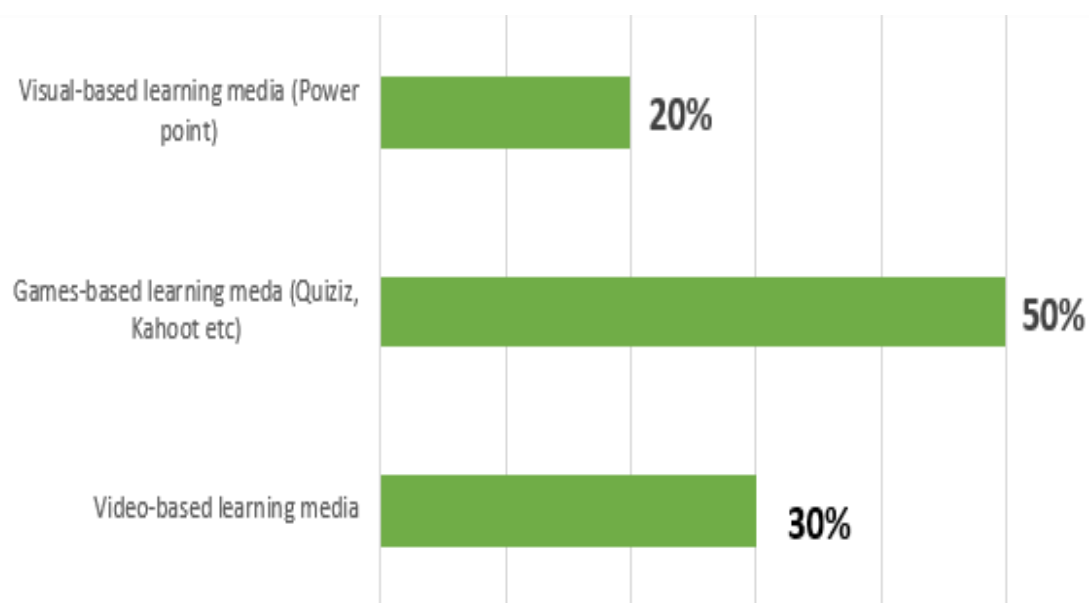


**Figure 3.** Survey of types of student learning media.

**Table 1**. Pretest and posttest results by gender.

| Gender | Students Name (Intial) | Score | |
|--------|------------------------|---------|---------|
| | | **Pretest** | **Postest** |
| Male | FH | 60 | 70 |
| Male | HDA | 80 | 90 |
| Male | APE | 60 | 80 |
| Male | FAJ | 70 | 90 |
| | *Mean* | 67.5 | 82.5 |
| Female | NDKS | 60 | 50 |
| Female | MDA | 50 | 70 |
| Female | MS | 60 | 90 |
| Female | HR | 70 | 80 |
| Female | RZK | 70 | 80 |
| Female | FRH | 80 | 100 |
| | *Mean* | 65.0 | 78.3 |

These results indicate that the Quiziz media can improve students' numeracy literacy skills, both female students and male students. This is because the Quiziz media which was previously studied has effectiveness in learning and can even improve focus, cognitive development, and creative thinking (Hidayati and Aslam, 2021; Aini, 2019). The existence of these results can be used as a means for teachers to create learning media that can increase literacy, one of which is Quiziz .

## 5. CONCLUSION

The conclusion of this study is that the Quiziz learning media can improve numeracy literacy. Based on the results of the research, it was found that the posttest score for female students (78.5) was greater than the pretest score (65.0). The same case occurred in male students, the posttest average value was greater (82.5) than the pretest average score (67.5). Increasing students' numeracy literacy can help their mindset in solving problems. This result is expected that Quiziz can be used as a medium of learning in elementary schools.

## 6. ACKNOWLEDGMENTS

## 7. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

## 8. REFERENCES

Aini, Y. I. (2019). Pemanfaatan media pembelajaran quizizz untuk pembelajaran jenjang pendidikan dasar dan menengah di bengkulu. *Kependidikan, 2*(25), 65-82.

Anders, Y., Grosse, C., Rossbach, H. G., Ebert, S., and Weinert, S. (2013). Preschool and primary school influences on the development of children's early numeracy skills between the ages of 3 and 7 years in Germany. *School Effectiveness and School Improvement Journal*, 24(2), 195-211.

Anders, Y., Rossbach, H. G., Weinert, S., Ebert, S., Kuger, S., Lehrl, S., and Von Maurice, J. (2012). Home and preschool learning environments and their relations to the development of early numeracy skills. *Early Childhood Research Quarterly*, 27(*2*), 231-244.

Dantes, N., and Handayani, N. N. L. (2021). Peningkatan literasi sekolah dan literasi numerasi melalui model blanded learning pada siswa kelas v sd kota singaraja. *Widyawala: Jurnal Ilmu Pendidikan, 1*(3)*, 269-283.*

Ekowati, D. W., Astuti, Y. P., Utami, I. W. P., Mukhlishina, I., and Suwandayani, B. I. (2019). Literasi numerasi di sd muhammadiyah. *Jurnal Pendidikan dan Pembelajaran Sekolah Dasar, 3*(1), 93-103.

Gan, B., Menkhoff, T., and Smith, R. (2015). Enhancing students' learning process through interactive digital media: new opportunities for collaborative learning. *Computers in Human Behavior*, *51*(2) 652-663.

Hidayati, I. D., and Aslam, A. (2021). Efektivitas media pembelajaran aplikasi quizizz secara daring terhadap perkembangan kognitif siswa. *Jurnal Pedagogi dan Pembelajaran*, *4*(2). 38 – 45.

Lefevre, J. A., Polyzoi, E., Skwarchuk, S. L., Fast, L., and Sowinski, C. (2010). Do home numeracy and literacy practices of Greek and Canadian parents predict the numeracy skills of kindergarten children. *International Journal of Early Years Education*, 18(*1*), 55-70.

Nasurllah, M., Adib, H., and Syafrawi, M. S. (2021). Dale's theory dan bruner's theory (analisis media pembelajaran). *Al-Ulum Jurnal Pemikiran dan Penelitian ke Islaman, 8*(2), 225-238*.*

Nasution, A. R., and Nandiyanto, A. B. D. (2021). Utilization of the google meet and quiziz applications in the assistance and strengthening process of online learning during the covid-19 pandemic. *Indonesian Journal of Educational Research and Technology*, *1*(1)*, 31-34.

Putra, A., and Afrilia, K. (2020). Systematic literature review: penggunaan kahoot pada pembelajaran matematika. *Jurnal Ilmiah Pendidikan Matematika Al Qalasadi, 4*(2), 110-122.

Räsänen, P., Salminen, J., Wilson, A. J., Aunio, P., and Dehaene, S. (2009). Computer-assisted intervention for children with low numeracy skills. *Cognitive development Journal*, *24*(4), 450-472.

Sari, P. (2019). Analisis terhadap kerucut pengalaman edgar dale dan keragaman gaya belajar untuk memilih media yang tepat dalam pembelajaran. *Mudir: Jurnal Manajemen Pendidikan, 1*(1), 58-78.

Wibawa, R. P., Astuti, R. I., and Pangestu, B. A. (2019). Smartphone-based application "quizizz" as a learning media. *Dinamika Pendidikan, 14*(2), 244-253.