PRIMARY: JURNAL PENDIDIKAN GURU SEKOLAH DASAR
VOLUME 12 NOMOR 4 AGUSTUS 2023
ISSN : 2303-1514 | E-ISSN : 2598-5949
DOI : http://dx.doi.org/10.33578/jpfkip.v12i4.9991
https://primary.ejournal.unri.ac.id/index.php/JPFKIP

INFOGRAPHIC IN DISCOVERY LEARNING: CAN IT IMPROVE THE LEARNING PROCESS AND NUMERICAL LITERACY FOR STUDENTS?

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INFOGRAFIS DALAM PEMBELAJARAN PENEMUAN: MAMPUKAH MENINGKATKAN PROSES BELAJAR DAN LITERASI NUMERASI SISWA?

ARTICLE HISTORY

Submitted:
04 Juni 2023
04th June 2023

Accepted:
19 Juli 2023
19th July 2023

Published:
25 Agustus 2023
25th August 2023

ABSTRACT

Abstract: *This article reviews a classroom action in the form of the application of the discovery learning model assisted by infographic teaching materials to improve the learning processes and numeracy literacy skills of fourth-grade students at SD Negeri 6 Benteng Sidrap Regency of South Sulawesi in Indonesia. The approach is qualitative with the type of classroom action research (CAR). The research was conducted in two cycles on two-dimensional geometric shapes material. Each cycle was conducted in two learning meetings. The research results indicate that after implementing the action, the learning process reveals various changes, such as the focus, activity and involvement, and learning interactions. This change led to the improvement of students' numeracy literacy skills. The action in cycle I indicate that out of 20 students, five students (25%) were in the high-ability category and seven students (35%) were in the medium-ability category. Eight students (40%) were still in the low-ability category. In terms of the action in cycle II, there were 14 students (70%) who were in the high ability category, three students (15%) were in the medium ability category, and three students (15%) were still in the low ability category. The conclusion is that applying the Discovery Learning model supported by infographic teaching materials can improve fourth-grade students' learning process and numeracy literacy skills at SD Negeri 6 Benteng of Sidrap Regency in South Sulawesi.*

Keywords: discovery learning, infographics, literacy, numeracy

Abstrak: Artikel ini mengkaji tindakan kelas berupa penerapan model pembelajaran penemuan dengan dukungan bahan ajar infografis untuk meningkatkan proses pembelajaran, keterampilan literasi dan numerasi siswa kelas 4 SD Negeri 6 Benteng Kabupaten Sidrap, Sulawesi Selatan, Indonesia. Pendekatan yang digunakan adalah kualitatif dengan jenis penelitian tindakan kelas (PTK). Penelitian dilakukan dalam dua siklus pada materi bentuk bangun datar. Setiap siklus diselesaikan dalam dua kali pertemuan pembelajaran. Hasil penelitian menunjukkan bahwa setelah dilakukan tindakan, proses pembelajaran menunjukkan berbagai perubahan, seperti fokus, aktivitas & keterlibatan, dan interaksi pembelajaran. Perubahan proses pembelajaran ini mendorong pada peningkatan kemampuan literasi berhitung siswa. Tindakan siklus I menunjukkan bahwa dari 20 siswa, lima siswa (25%) berada pada kategori kemampuan tinggi dan tujuh siswa (35%) berada pada kategori kemampuan sedang. Delapan siswa (40%) masih dalam kategori kemampuan rendah. Pada tindakan siklus II terdapat 14 siswa (70%) yang berada pada kategori kemampuan tinggi, tiga siswa (15%) berada pada kategori kemampuan sedang, dan tiga siswa (15%) yang masih berada pada kategori kemampuan rendah. Kesimpulannya adalah penerapan model pembelajaran pembelajaran penemuan berbantuan bahan ajar infografis dapat meningkatkan proses belajar dan keterampilan literasi numerasi siswa kelas 4 di SD Negeri 6 Benteng Sidrap Sulawesi Selatan.

Kata Kunci: pembelajaran penemuan, infografis, literasi, numerasi

CITATION

Wilda, W., Krismanto, W., & Israwaty, I. (2023). Infographic In Discovery Learning: Can It Improve The Learning Process And Numerical Literacy For Students?. *Primary: Jurnal Pendidikan Guru Sekolah Dasar, 12* (4), 1010-1021. DOI: http://dx.doi.org/10.33578/jpfkip.v12i4.9991.

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INTRODUCTION

Numerical literacy is defined as students' ability to describe information related to numbers or mathematics and then formulate a problem, analyze the problem, and find a solution to the problem (Maulidina, Ana Puspita dan Hartatik, 2019). Numerical literacy is also defined as the ability to understand and apply basic knowledge of mathematics in everyday life, which means it requires understanding and incorporating core mathematical concepts, terminology, facts, and skills in response to the needs of external situations from the real world (D. Layug et al., 2021). Numerical literacy is about using mathematics to make sense of the world and applying mathematics in contexts for social purposes. For most young people and adults, numeracy literacy focuses on giving mathematics meaning. Mathematical knowledge and skills contribute to efficient and critical computation, so students need various mathematical knowledge, skills, understanding, and dispositions to solve problems in real contexts in personal, further learning, work, and community environments (Tout et al., 2021). For this reason, numeracy literacy skills are very much needed in mathematics because mathematics is not only always related to formulas but also requires students' reasoning or critical thinking patterns in answering every problem presented and its application in their daily lives.

Based on the OECD's Program for International Student Assessment 2018 results, the average 15-year-old in Indonesia scores 379 points in mathematics, compared to an average of 489 points among OECD countries (OECD, 2019). This shows that the numeracy literacy skills of students in Indonesia still need to improve. In addition, the cause of the low numeracy ability of Indonesian students can be influenced by several different factors. The facts are that only a tiny portion utilizes numeracy literacy skills in everyday life. Students may have mastered the ability to count as a basic mathematical concept. However, students' skills in using these concepts in actual conditions or solving unstructured problems should be addressed (Salvia et al., 2022).

The low ability of numeracy literacy in elementary school level children is a problem that must be corrected immediately in the learning process. Because the acquisition of children's early academic competence through the process of learning mathematics is essential in the long-term development of academic success and even their future careers (Purpura & Lonigan, 2015; Purpura & Napoli, 2015) , therefore, it is necessary to review the learning model that has been used by teachers so far in mathematics learning classes. The teacher must select innovative and exciting models in learning activities so that students are enthusiastic and active and ultimately improve student learning outcomes. In learning mathematics, high-quality pedagogy is associated with gains in student learning outcomes (Cohrssen & Niklas, 2019). The discovery learning model is one learning model that supports mathematical numeracy literacy skills in the learning process (Kusumadewi et al., 2019).

Numerical literacy and discovery learning are interrelated, and numeracy literacy can solve problems in everyday life. At the same time, the discovery learning model is one in which students search for information independently, then find information and process data independently so students remember. Numerical literacy can be developed while reading and studying teaching materials, working on practice questions, and the examples of questions presented. Efforts to develop numeracy literacy can be facilitated through discovery learning steps. The steps of discovery learning are stimulation, problem identification, data collection, data processing, verification, and conclusions (Apriliani, 2022).

Appropriate teaching materials must also be combined with the model to support operating the learning model. Teaching material itself is something that teachers or

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students use to facilitate the learning process. The form can be reading books, workbooks, or videos(Kosasih, 2021). One alternative teaching material is infographics. Infographic teaching materials are equipped with pictures or graphics and essential information. This makes learning activities more exciting and easy to understand because the delivery of information is made more concise and clear (Haryanti & Saputro, 2016). Rapid advancements and technological innovations bring new opportunities for use in education, and infographics are one of these opportunities as they include data visualization, which is beneficial in enhancing individual learning (Baglama et al., 2020). So that in various literature, infographics are recommended as a medium to improve the performance and results of learning mathematics (Baglama et al., 2020; Ozdamli & Ozdal, 2018; Singh & Jain, 2017).

Based on the results of researcher observation and interviews with some teachers in mid-March 2023 showed that the mathematical numeracy literacy skills of SD Negeri 6 Benteng Sidrap students were still relatively low. In the learning process, they still use teaching materials that rely on textbooks; the teacher only presents the material by writing, drawing on the blackboard, and then explaining the information from the picture. This causes a lack of student engagment in the learning process, so the teacher must change or try the teaching model during this lesson. One alternative that is suitable for improving the learning process in Mathematics content and has the potential to have an impact on increasing students' numeracy literacy skills, namely the discovery learning model with infographics. Researchers believe it is essential and urgent to conduct classroom action research at SDN 6 Benteng Sidrap to improve students' numeracy literacy skills by applying the Discovery Learning learning model with Infographic Teaching Materials in Mathematics learning content. This research aims to answer two research questions: 1) How is the implementation of the discovery learning model based on infographics in improving the learning process of flat shape material for fourth-grade students at SDN 6 Benteng Sidrap? 2) Can implementation the discovery learning model using infographics improve students' numeracy literacy abilities in flat shape material for fourth-grade students at SDN 6 Benteng Sidrap? This research aims to improve the processes and abilities of students' numeracy literacy. For teachers and schools, this research can be a reference or material for sorting out the appropriate models to use to improve students' numeracy literacy skills. Of course, the results of this research will further complement the specific body of knowledge on strategies to improve students' numeracy literacy skills at the elementary school level.

METHOD

The research was conducted in 4th grade at SDN 6 Benteng Sidrap, South Sulawesi. The research subjects were 20 students. This research was conducted in May 2023. The research design used in this study is the Classroom Action Research model developed by Elliot (Elliott, 2001). Learning improvement is designed through several stages or procedure, namely: 1) planning; 2) implementation; 3) action observation; and 4) reflection. The implementation of the action refers to the six steps of the discovery learning model, namely; 1) Stimulation, 2) Problem statements, 3) Data collecting, 4) Data processing, 5) Verification, and 6) Generalization.

The research data collected with two instrumen: 1) instrumen for observation of students' learning and teachers' activity. This data is to determine the learning process and the implementation of discovery learning using infographics; 2) instrumen for measure of students' numeracy literacy. This instrument is in the form of a students' numeracy literacy tests. Each student's answer is not only corrected for right or wrong and then given a

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score, but continued with the analysis in the form of the level of numeracy ability based on predetermined indicators of numerical literacy ability. Giving action is stopped if 76% of all students in the research class reach medium and high levels according to the numeracy literacy ability indicators, as shown in Table 1.

RESULTS AND DISCUSSION

Implementation of Cycle I Actions

In the core activities, the teacher applies discovery learning steps, namely:

1) Providing stimulation. Namely, the teacher divides students into four groups consisting of 4-5 people in each group. Then the teacher distributes infographic teaching materials to students in each group. Students read material on infographic teaching materials, and the teacher conducts questions and answers to students about the material that has been read. An example of an infographic used in learning cycle I can be seen in Figure 1.

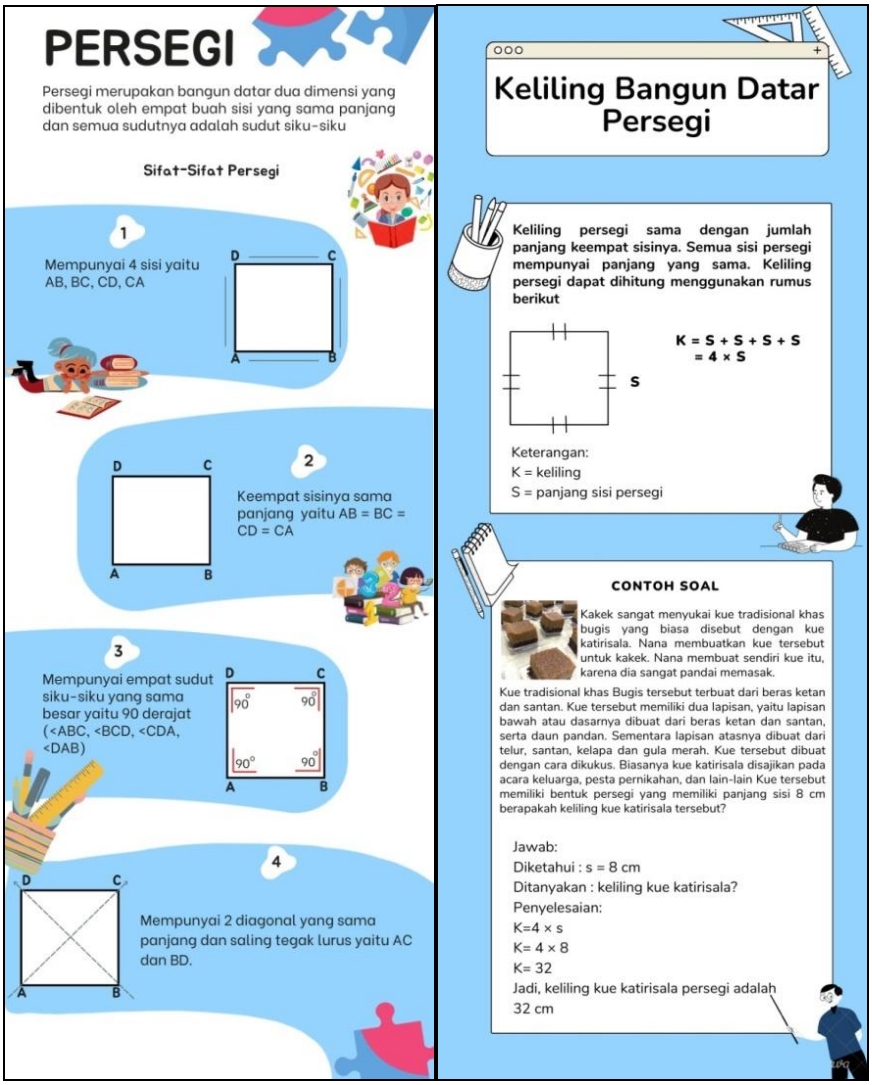

Figure 1. Example of an infographic for learning in cycle I

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2) Identify problems; students are given problems through student worksheets. The teacher explains the steps for working on student worksheets and guides students to analyze the problems that exist in student worksheets.
3) Data collection: Students can collect information on flat shape material from infographic teaching materials.
4) Data processing: Students discussed solving problems on student worksheets in their groups.
5) Verification, namely, after students answer the student worksheets given, the teacher invites group representatives to present the results of their group work, and other groups are allowed to respond to the results of their friends' discussions. The teacher explains the correct answer.
6) Conclude, namely, the teacher checks the activity of students in each group and guides students to conclude the discussions that have been carried out.

Table 1. Indicators of Students' Numerical Literacy Ability

Ability Level	Indicators
High	Able to show five indicators, namely: 1) Be able to use various kinds of numbers and symbols related to mathematics to solve problems in various contexts of everyday life 2) Able to write down precisely what is known and asked from the problem 3) Be able to design steps to solve the problem 4) Able to solve questions correctly 5) Able to write the conclusion of the problem
Medium	Able to show three indicators, namely: 1) Be able to use various kinds of numbers and symbols related to mathematics to solve problems in various contexts of everyday life 2) Able to write down what is known and asked from the problem 3) Able to solve problems
Low	Able to show two indicators, namely: 1) Be able to use various kinds of numbers and symbols related to mathematics to solve problems in various contexts of everyday life 2) Able to write down what is known and asked from the problem

Source: Adaptation from (Baharuddin et al., 2021)

At the end of the second cycle I learning meetings, they were given six evaluation questions in the form of story questions that had to be completed individually. The results of their work are then analyzed and used in determining the categories of their numeracy literacy abilities. The following is an example of questions in cycle I.

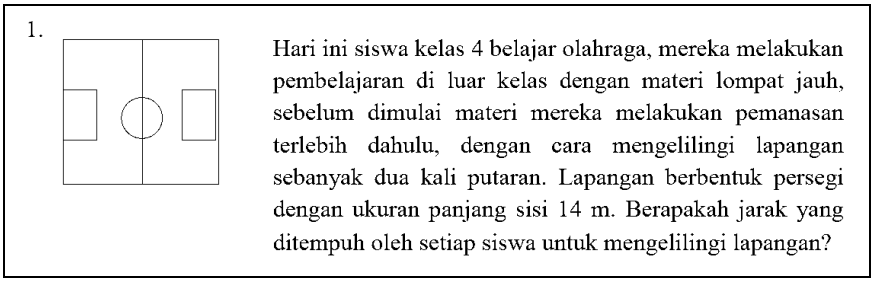

Figure 2. Example of an evaluation question in cycle I

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Learning Improvement Results After Cycle I Actions

After applying the discovery learning model based on infographics in cycle I (through two meetings), there have been various changes in the learning process. First, there is a change in student learning activities and engagment. When the teacher distributes infographic teaching materials around flat shapes in the first step of discovery learning, students focus on paying attention and examining the infographics to get information from the teaching materials. Likewise, at the time of data collection and verification. They intensely use infographic teaching materials to get information as data for solving problems they must solve. Changes that occur next are in learning interactions seen in working in groups when working on student worksheets. Even though in cycle I, only a few students dared to convey the results of their discussions. It also apprehends asked questions related to teaching materials. It is still limited to several students being able to answer these questions and must be guided first by the teacher. The following change is that the condition or atmosphere of learning in the classroom is quite conducive, this condition can be seen by students focusing on paying attention to the infographics given since the beginning of learning, paying attention to explanations about the circumference of flat shapes, and students are pretty calm in doing group assignments. Through student worksheets that have been adapted to the steps of discovery learning, it encourages students to be able to follow the learning steps comfortably. They are quite capable of following the steps demonstrated by the teacher in solving problems; besides that, students have also begun to pay attention to other groups in presenting the results of their discussions. Based on the results of observations of the learning process from the aspects of the teacher and students conducted by observers, it can be stated that the learning process from the point of view of the implementation of learning by the teacher has reached the Good category with a percentage of 79.16% of the learning indicators that have been carried out. As for the results of observing the learning process from the point of view of students reaching the good category with a percentage of 70.62%, the learning indicators have been carried out.

Some of the shortcomings as a result of reflection during the implementation of the action in the first and second meeting cycles are: 1) there are still some students who have not been able to read information through infographic teaching materials around flat shapes, 2) only a few students dare to answer the teacher's questions based on the information available on infographics, 3) not all students dare to respond to the findings of groups presenting based on data on infographics. For this reason, several improvements need to be made so that these deficiencies do not occur again in cycle II, namely: 1) the teacher needs to guide intensively some students who still have difficulty finding information through infographics, 2) The teacher is more active in guiding students to be brave enough to answer questions and dare to present or respond based on information obtained from infographics.

After applying discovery learning using infographics, there has been an increase in students' numeracy literacy skills which can be seen in the analysis of student evaluation test results. Before the teacher applied the discovery learning model based on infographics, students' numeracy literacy skills were still in the low category. After applying the discovery learning model using infographics in the first cycle of the first meeting and the second meeting, it can be seen that of the 20 students; there were five students (25%) who were included in the high ability category, seven students (35%) were in the medium category. There are still eight students (40%) in the low-ability category. Thus, only 60% of students in the high and medium literacy category were achieved. Based on the results of observations, the results of

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reflection, and the results of achieving students' numeracy literacy abilities, the research needs to be continued to cycle II. The following is an example of the results of student work along with the scoring and analysis of their numeracy literacy abilities in the first learning cycle.

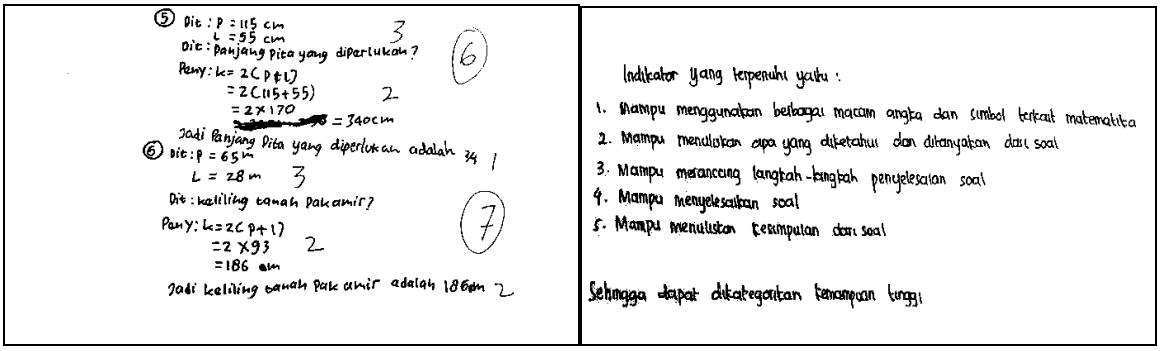

Figure 3. Examples of student completion results, scoring and analysis of students' numeracy literacy abilities

Implementation of Cycle II Actions

The steps for implementing cycle II actions are still the same as those for cycle I, namely applying the six steps or discovery learning syntax. The difference is the topic of the material being studied, infographics given to students, and various efforts to improve the learning process as a follow-up to the reflection results in cycle I. An example of an infographic used in learning cycle II can be seen in Figure 4.

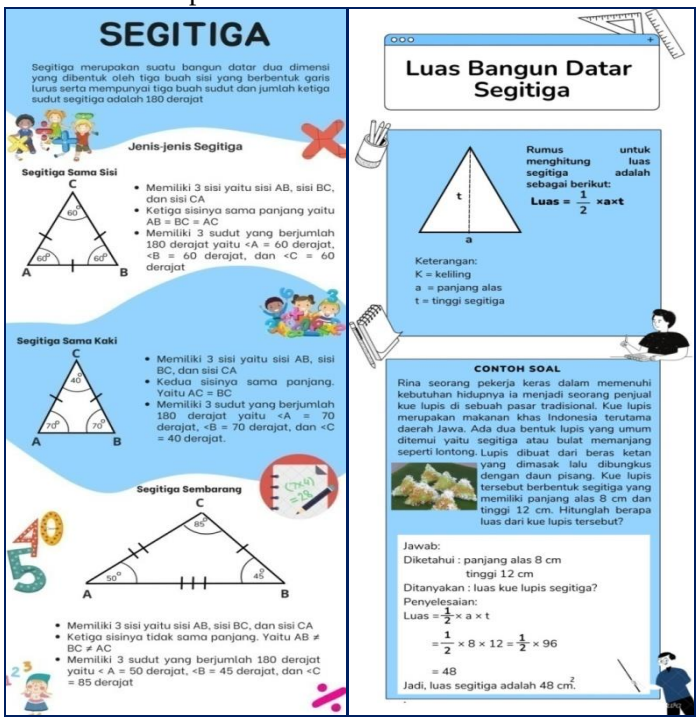

Figure 4. Example of an infographic for learning in cycle II

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At the second meeting of cycle II, the students were given six evaluation questions in the form of story questions that had to be completed individually. The results of their work are then analyzed and used in determining the categories of their numeracy literacy abilities. The following is an example of questions in cycle II.

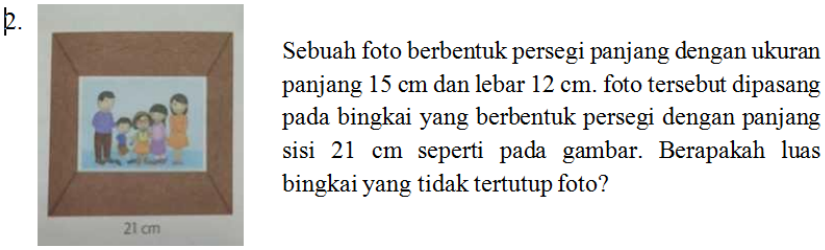

Figure 4. Example of an evaluation questionin cycle II

Learning Improvement Results After Action Cycle II

After implmentation the discovery learning model based on infographics in cycle II (through two meetings), the changes in the learning process became increasingly significant, especially in the activeness and engagment of students in learning. Students are more focused and intense in reading and learning the information in infographics, both at the stage of providing stimulation, data collection, and verification. Using this infographic is very helpful for students, especially in guiding them to solve problems in the given story problems. Step-by-step can guide students to solve these problems, especially in group work sessions. Interaction between students in groups becomes more intense when they discuss solving problems given through student worksheets and are guided by the steps for solving them through infographics given to them. Based on the results of observations of the learning process from the teacher and student aspects carried out by observers in cycle II, it can be stated that the learning process in terms of the implementation of learning by the teacher has reached the good category with a percentage of 91.66% of the learning indicators that have been carried out. As for the results of observing the learning process from the point of view of students reaching the good category with a percentage of 91.25%, the learning indicators have been carried out.

In cycle II, the results of the analysis of students' numeracy literacy skills showed that out of 20 students, there were 14 students (70%) who were in the high ability category, three students (15%) were in the medium ability category, and three students (15%) were still in the low ability category. Based on these data, 85% of students are in the high and medium category of numeracy literacy skills. Thus the action in this study was stopped in the second cycle.

DISCUSSION

The application of the discovery learning model using infographics for learning in this study can be seen in several learning components, namely in teaching materials where the teacher provides contextual teaching materials; for example, the teaching materials contain explanations, formulas, and examples of flat shapes, besides that they appear in discovery student worksheets, for example, the student worksheet is equipped with discovery learning steps, and there is a problem that must be solved by students so that students can easily understand the problem by following these steps. Then students are given evaluation questions related to numeracy literacy skills. Finally, the teacher explains material about plane shapes by giving examples and everyday

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problems so students can apply them. This aligns with Camille Catlett's opinion that integrating math content into routines allows children to see mathematics in context, provides situationally relevant learning opportunities, and supports the everyday use of mathematics (Catlett, 2020).

Various changes have occurred in learning flat shapes in 4th grade SDN 6 Benteng Sidrap. For example, changes that occur in changes in student learning activities. This increase can be seen when the teacher distributes flat-shape infographic teaching materials, and students can find information from the teaching materials themselves. With students getting their information through infographic teaching materials, their interest in reading in the learning process becomes active. A study shows that learning mathematics using well-designed teaching materials will work effectively because the objectives of learning mathematics are well conveyed and can make students more familiar with the material being taught (Guntur et al., 2017). In addition, teaching materials can foster students' interest in reading teaching materials so that during the learning process, students become active. Furthermore, other studies also suggest that discovery learning is a model for developing active ways of learning by finding yourself and investigating yourself, then, the results obtained will last a long time in memory, and students will not easily forget (Basri et al., 2018).

Subsequent changes in learning interactions can be seen in the activity of finding information through teaching materials; students can answer questions from the teacher and explain orally the material and formulas of the perimeter and area of flat shapes obtained in these teaching materials; other activities can also be seen when students read out the results of their group discussions in front of his friends and other students responded. Thus students dare to appear in front of the class. A study suggests that the discovery learning model engages students in group discussions (Lestari & Petrossky, 2018). Students enthusiastically respond to teacher questions and can answer them well. Students are also more active in expressing opinions or writing answers to questions in front of the class without being appointed by the teacher.

Furthermore, other studies suggest that the discovery learning model generates student enthusiasm in participating in learning activities; students scramble to present the results of their group work and respond to the results of other groups Students are increasingly active in working in groups to participate in solving problems given by the teacher to find concepts about the material through observation activities. Students are also increasingly interested and motivated to ask and answer questions because the teacher does not convey the material in its entirety, making students curious and interested in asking questions so that it trains students to be more confident and have courage.

Various changes in the learning process, as described above, then lead to an increase in students' mathematical numeracy literacy skills. This can be seen in the percentage of cycle I: the percentage of high ability is 25%, the percentage of moderate ability is 35%, and the percentage of low ability is 40%. Then it rises in cycle II. Namely, the percentage of high ability is 70%, the percentage of medium ability is 15%, and the percentage of low ability is 15%. Regarding the percentage of high ability, as much as 25% of students in cycle I rose to 70% in cycle II. In cycle II, the students can answer numeracy literacy questions.

Thus, if appropriately used, applying the discovery learning model based on infographics can improve the process and mathematical numeracy literacy skills of fourth-grade students at SDN 6 Benteng Sidrap. This is in line with research (Jamila., 2018) whose research results show that the discovery learning model with infographic media has an effect because students are more active in learning; students can also discover

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concepts and principles through observing, explaining, and analyzing so it is not easy to forget. The results of other studies also show that infographics in discovery learning can help increase student achievement and be used as teaching materials in learning (Medrano & Pacis, 2022). Likewise, the research conducted by Salsabilla, et al., whose research results show that infographics media can increase student learning interest as evidenced by the significant difference between students who take lessons using infographic media and students who study conventionally/without media (Salsabilla et al., 2021). Specifically, it is also in line with recommendations from various literature that infographics are a medium that has the potential to improve performance and learning outcomes in mathematics (Baglama et al., 2020; Francis, 2022; Ozdamli & Ozdal, 2018; Singh & Jain, 2017).

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of learning improvement, it was concluded that applying the discovery learning model based on infographics could improve the learning process in 4th grade SDN 6 Benteng Sidrap, South Sulawesi. This can be seen in changes and improvements during the learning process, such as in student learning activities and engagement and learning interactions. Applying the discovery learning model using infographics can also improve numeracy literacy skills in flat shape material for fourth-grade students at SDN 6 Benteng Sidrap, South Sulawesi. This is evident in the increase in the percentage of students in the high and medium categories in their numeracy literacy skills in cycle I and II.

Based on the experience of implementing improved learning using the infographic-based discovery learning model to improve the numeracy literacy skills of elementary school students, there are several recommendations: 1) teachers are advised to apply the infographic-based discovery learning model in the learning process in elementary schools as an alternative to improve students' numeracy literacy processes and abilities. Using teaching materials in infographics is also suggested as an alternative to various student learning resources to make learning more enjoyable. This is also in line with the recommendation of one study that learning will be better and improve when assisted by the use of infographics as a strategy for individual students, especially for those with learning difficulties in mathematics, so that the use of these infographics improves their learning processes and outcomes(Baglama et al., 2020). Future researchers can continue specific research on discovery learning, for example, by integrating a variety of learning resources other than infographics. This is also consistent with the explanation that there are various learning resources that teachers or parents can provide for children to promote their literacy development (for example, story books, letter flashcards, literacy workbooks, board games, card games, and computer games) and numeracy development (e.g., number charts, counting picture books, number workbooks, and games) (Cheung et al., 2021) or integrating them with math games (Cohrssen & Niklas, 2019).

REFERENCES

Baglama, B., Yucesoy, Y., Uzunboylu, H., & Özcan, D. (2020). Can Infographics Facilitate The Learning of Individuals With Mathematical Learning Difficulties? *International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE)*, *5*(2), 119–128. https://doi.org/10.5937/IJCRSEE1702119B

Baharuddin, M. R., Sukmawati, & Christy. (2021). Deskripsi Kemampuan Numerasi Siswa Dalam Menyelesaikan Operasi Pecahan. *Pedagogy*, *6*(2), 10–103.

ISSN : 2303-1514 | E-ISSN : 2598-5949
DOI : http://dx.doi.org/10.33578/jpfkip.v12i4.9991
https://primary.ejournal.unri.ac.id/index.php/JPFKIP

Basri, A. M., Rohana, R., & Pagarra, H. (2018). Penerapan Model Pembelajaran Discovery Learning Untuk Meningkatkan Hasil Belajar IPA. *Jurnal Publikasi Pendidikan*, *8*(3), 160–173.

Catlett, C. (2020). From Article to Action: Promoting Numeracy Development. *Young Exceptional Children*, *23*(2), 112–113. https://doi.org/10.1177/1096250620909988

Cheung, S. K., Dulay, K. M., Yang, X., Mohseni, F., & McBride, C. (2021). Home Literacy and Numeracy Environments in Asia. *Frontiers in Psychology*, *12*, 578764. https://doi.org/10.3389/fpsyg.2021.578764

Cohrssen, C., & Niklas, F. (2019). Using mathematics games in preschool settings to support the development of children's numeracy skills. *International Journal of Early Years Education*, *27*(3), 322–339. https://doi.org/10.1080/09669760.2019.1629882

D. Layug, G., Velario, J. P. V., & Capones, J. G. (2021). Teachers' Interventions in Improving Numeracy Skills of Grade 7 Students in Baguio City National High School. *Proceedings of The 4th International Conference on Advanced Research in Teaching and Education*, *1*, 14–22. https://doi.org/10.33422/4th.icate.2021.08.74

Elliott, J. (2001). *Action Research for Educational Change*. Open University Press.

Francis, A. (2022). *Understanding Visual Literacy, Mathematical Literacy and The Teaching Potential of Infographics with Mathematical Representation: A Review of Literature*. Ontario Tech University.

Guntur, M., Muchyidin, A., & Winarso, W. (2017). Pengaruh Penggunaan Bahan Ajar Matematika Bersuplemen Komik Terhadap Kemandirian Belajar Siswa. *Eduma : Mathematics Education Learning and Teaching*, *6*(1), 43. https://doi.org/10.24235/eduma.v6i1.1667

Haryanti, F., & Saputro, B. A. (2016). Pengembangan Modul Matematika Berbasis Discovery Learning Berbantuan Flipbook Maker Untuk Meningkatkan Kemampuan Pemahaman Konsep Siswa Pada Materi Segitiga. *Jurnal Pendidikan Matematika*, *1*(2), 147–161. https://doi.org/10.22236/kalamatika.vol1no2.2016pp147-161

Jamila. (2018). Pengaruh Model Pembelajaran Discovery Learning dengan Media Infografis Terhadap Pemahaman Konsep Fisika Kelas X Materi Besaran Pengukuran dan Vektor. *Skripsi*.

Kosasih. (2021). *Pengembangan Bahan Ajar*. Bumi Aksara.

Kusumadewi, R. Fironika., Ulia, Nuhyal., & Ristanti, Nesti. (2019). Efektivitas Model Pembelajaran Discovery Learning Terhadap Kemampuan Literasi Matematika di Sekolah Dasar. *Sekolah Dasar: Kajian Teori Dan Praktik Pendidikan*, *28*(1), 11–16. https://doi.org/10.17977/um009v28i12019p011

Lestari, W., & Petrossky, R. (2018). Aplikasi Model Pembelajaran Discovery Learning Untuk Meningkatkan Hasil Belajar Siswa Materi Administrasi Umum Kelas X AKL 1 SMK Muhammadiyah 2 Palembang. *Administrasi Manajemen Pendidikan*, *1*(2), 59–64.

Maulidina, Ana Puspita dan Hartatik, S. (2019). Profil Kemampuan Numerasi Siswa Sekolah Dasar Berkemampuan Tinggi Dalam Memecahkan Masalah Matematika. *Jurnal Bidang*

ISSN : 2303-1514 | E-ISSN : 2598-5949
DOI : http://dx.doi.org/10.33578/jpfkip.v12i4.9991
https://primary.ejournal.unri.ac.id/index.php/JPFKIP

Pendidikan Dasar, *3*(2), 1–6. https://doi.org/10.21067/jbpd.v3i2.3408

Medrano, E. L., & Pacis, C. Y. (2022). Infographics in Guided Discovery Lessons for Grade 6 Science. *American Journal of Multidisciplinary Research and Innovation*, *1*(3), 120–131. https://doi.org/10.54536/ajmri.v1i3.490

OECD. (2019). *PISA 2018 Assessment and Analytical Framework*. OECD. https://doi.org/10.1787/b25efab8-en

Ozdamli, F., & Ozdal, H. (2018). Developing an Instructional Design for the Design of Infographics and the Evaluation of Infographic Usage in Teaching Based on Teacher and Student Opinions. *EURASIA Journal of Mathematics, Science and Technology Education*, *14*(4). https://doi.org/10.29333/ejmste/81868

Purpura, D. J., & Lonigan, C. J. (2015). Early Numeracy Assessment: The Development of the Preschool Early Numeracy Scales. *Early Education and Development*, *26*(2), 286–313. https://doi.org/10.1080/10409289.2015.991084

Purpura, D. J., & Napoli, A. R. (2015). Early Numeracy and Literacy: Untangling the Relation Between Specific Components. *Mathematical Thinking and Learning*, *17*(2–3), 197–218. https://doi.org/10.1080/10986065.2015.1016817

Salsabilla, T. Dinda., Yuliati, Yuyu., & Cahyaningsih, Ujiati. (2021). Studi Literatur: Penggunaan Media Visual Infografis Meningkatkan Minat Belajar IPS Siswa. *Seminar Nasional Pendidikan*, 276–282.

Salvia, N. Z., Sabrina, F. P., & Maula, I. (2022). Analisis Kemampuan Literasi Numerasi Peserta Didik Ditinjau Dari Kecemasan Matematika. *Jurnal Nasional Matematika*, *3*(1), 352–360.

Singh, N., & Jain, N. (2017). Effects of infographic designing on image processing ability and achievement motivation of dyscalculic students. *In Proceedings of the International Conference for Young Researchers in Informatics, Mathematics and Engineering.*, *1852*, 45–53.

Tout, D., Sakurai, J., & Sawatzki, C. (2021, September 13). *Supporting critical numeracy and maths skills in teaching and learning*. Teacher Magazine. https://www.teachermagazine.com/au_en/articles/supporting-critical-numeracy-and-maths-skills-in-teaching-and-learning.