**Ilmu Pendidikan: Jurnal Kajian Teori dan Praktik Kependidikan**, 7(2), 2022, 85–95
ISSN 2549-7774 (online) & 2548-6683 (print)
DOI: 10.17977/um027v7i22022p85-95

# Development of JARI BARU Multimedia Based on Van Hiele's Theory for Grade V of Elementary School

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**Abstract**

Students have trouble learning due to the limitations of mathematics learning media, particularly in the solid figure material. This study aims to create multimedia called *JARI BARU Belajar Interaktif Bangun Ruang* solid figure interactive learning based on van Hiele's theory, the material for a solid figure is valid according to experts, practical according to teachers, and interesting according to students. The subjects of this study were all students in class V Elementary School Rembang 2 Blitar City. This development research used the ADDIE research model. The results of the validity assessment by media, and material experts, and the results of practical responses by teachers show that this media is very valid and practical. While the results of the attractiveness response by students showed the value of product attractiveness is very high. The product developed received a very good response from students. Another significance of the use of this learning media is that it can provide an understanding of the solid figure as indicated by the value that students get when working on evaluation questions and get an average score that exceeds the minimum completeness criteria so that students can learn the material in well, fun, and optimal way.

**Keywords:** multimedia; Van Hiele's theory; solid figure

**How to cite**: Kirana, C. P., Yuniawatika, Y. & Sutansi, S. (2022). Development of JARI BARU Multimedia Based on Van Hiele's Theory for Grade V of Elementary School. *Ilmu Pendidikan: Jurnal Kajian Teori dan Praktik Kependidikan*, *7*(2). 85–95. doi: 10.17977/um027v7i22022p85-95

## 1. Introduction

Mathematics is a general knowledge that has an important role in improving the quality of human resources. In everyday life, humans cannot be separated from mathematics (Pathuddin & Raehana, 2019). This is also evidenced by the teaching of mathematics from basic education to the university level (Yuniawatika, 2018). Mathematics is taught from an early age because it has the purpose to improve the quality of human resources. According to Ibrahim & Suparni (2012), learning mathematics is needed by all students because it aims to provide students with logical, analytical, critical, and creative thinking skills, and able to work in groups, so that students have the skills to acquire, process, and able to take advantage of the information to adapt to the ever-changing circumstances of life and be able to face competition. Mathematics learning is abstract and the concepts are interrelated (Syahputra, 2019).

Geometry is a part of mathematics that is closely related to the daily life of students because almost every object is a geometric object. The purpose of studying geometry itself is so that students can understand the properties and relationships between geometric elements, and have good problem-solving skills (Safrina, Ikhsan, & Ahmad, 2014). At the elementary school level, geometry consists of two materials, flat figures and solid figures (Amsikan & Nahak, 2017).

Based on the level of difficulty, a solid figure is more difficult to understand because some more types and formulas must be understood and mastered by students (Hartati, 2015). This problem was also experienced by the fifth-grade students of State Elementary School of Rembang 2 Blitar City who had difficulty in solid figures because the learning media did not support mathematics learning. Meanwhile, according to Mashuri (2019), learning mathematics can take place properly and effectively and can stimulate the thoughts, thoughts, interests, and feelings of students when distributing messages or information through the use of learning media.

Based on interviews with fifth-grade teacher resource persons at one of the elementary schools in Blitar City and analysis of student needs, several problems were found in the learning process for mathematics content, the media used was very limited, only relying on media in the form of textbooks and videos from the internet. This is one of the factors causing the problems experienced by students, difficulty in understanding spatial learning. It was also found that the learning media used by teachers to teach building materials was only in the form of image media. Meanwhile, according to Sari (2012), a solid figure includes three-dimensional shapes, so it is not suitable if the delivery of spatial material uses image media that only has two dimensions. A similar problem also occurred at State Elementary school 1 Glatak Delanggu that the media used in learning was not able to support learning to solid figures so students had learning difficulties (Setyaningtyas, 2019). In a study conducted by Sintawati, Rudiyanta, & Nuryanto (2020) it was shown that the cause of the difficulty in understanding solid figure material was that the teacher did not prepare and provide learning media specifically for solid figure learning. Another factor that causes students' lack of understanding is that teachers are less creative in packaging learning media (Fitrianti, Handayani, & Suyitno, 2020). Meanwhile, fifth-grade students are still in the concrete operational stage, where students will have difficulty if there is no physical object in front of them (Ibda, 2015). One of the physical objects can be in the form of learning media. Without learning media, the level of learning effectiveness and good quality of education will be difficult to achieve, the same thing will happen if learning media are available, but teachers who have low media selection skills will also make learning not optimal (Zainiyati, 2017).

Selecting learning media that is synchronized with time, circumstances, costs, and the objectives to be achieved is taken into consideration for developing learning media (Falahudin, 2014). The needs of learning media, curriculum, and student characteristics are of particular concern in selecting appropriate media for learning. Based on interviews with teachers and questionnaires given to 14 students of State Elementary School of Rembang 2, it shows that the media needed are complete, practical, attract attention and interest in learning, increase understanding, and can be used in classical and independent learning.

Media development will be more effective if it is integrated with theories relevant to the subject that will be taught by the teacher. The theory related to solid figures is the theory formulated by van Hiele. Van Hiele makes stages that emphasize the way how a person thinks in understanding the Solid Figure. These stages consist of stages 0-4, the stages of visualization, analysis, informal deduction, deduction, and rigor. However, this study only uses the first three stages of van Hiele's theory. This was chosen by considering Kennedy's statement in Ahmad, Helsa, & Ariani (2020) which states that the first three levels of the van Hiele theory stage apply during elementary school. At the basic education level, the level of students' thinking is still limited to the ability to identify spatial shapes based on the complete form, describe the properties of the shapes, and make conclusions using implication statements (Razak & Sutrisno, 2017). In a study conducted by Siregar, Siahaan, & Hariyanti (2018), it was stated that the use

of media combined with van Hiele's theory of geometric thinking stages was proven to improve students' spatial abilities. The advantages of applying van Hiele's theory include (1) making students can understand mathematics better, (2) communication skills in mathematics content are increased, and (3) each stage of learning can adjust students' level of understanding and think (Ike, 2020).

From the results of the needs analysis questionnaire, it was also found that all students were already using mobile phones during learning. However, the use of mobile phones in learning is only limited to watching videos on the internet as a learning resource. To maximize its utilization, mobile phones can be used as learning media. Android cell phones were chosen because they are the type commonly used by students, besides that, learning media operated via cell phones will be more practical in their use. Media that utilizes technology makes students more interested and increases their enthusiasm for learning (Iskandar et al., 2020). Interactive multimedia can be used as a solution to develop android-based learning media. Interactive multimedia has been adapted to the characteristics and circumstances of students because it is practical and interesting (T. N. Akbar, 2016). This type of media is also able to foster student interest in learning during learning (Nuritno & Raharjo, 2017).

The use of interactive multimedia can make learning more innovative, able to combine various types of media in a product that supports each other to achieve the goals of learning, increase interest, motivation, and passion for student learning during learning activities, able to provide visuals on abstract material to be taught if only through descriptions from teachers or media that are commonly used, and can create an independent attitude in students in gaining knowledge (Munir, 2013). In the needs analysis activity, it was found that the teacher had difficulty developing media that was able to make students interested and interested in participating in learning. According to its function, according to Daryanto (2013), multimedia can increase the attractiveness and attention of students towards learning. Research conducted by Huda showed that the use of interactive multimedia makes material that can be represented more interesting and helps students understand, achieving learning objectives becomes easier, and boring classroom conditions become fun (Huda, 2018). Based on this description, development research was carried out to produce interactive multimedia based on van Hiele's geometric thinking level in grade 5 elementary school that was valid according to experts, practical according to teachers, and interesting according to students.

## 2. Method

This development research uses the ADDIE research model. The product developed is interactive multimedia based on van Hiele's theory in grade 5 SDN Rembang 2 Blitar City.

### 2.1. Research Subject

Two tests were carried out on research subjects, a small group test and a large group test. The subjects of the small group try-out were 4th graders at State Elementary School Tlumpu, Blitar City. Meanwhile, the large group try-out took place at State Elementary School Rembang 2 Blitar City with the subject of 14 students of class V. Sampling was done by cluster random sampling technique.

### 2.2. Research Design

This development research uses the ADDIE research model adapted from the Mulyatiningsih development model adapted from Dick and Carry, consisting of 5 steps. ADDIE

stands for Analysis, Design, Development, Implementation, and Evaluation stages as in Figure 1. Image caption 1: (1) analyze potential and problems; (2) product design, product manufacture, and preparation of validation instruments; (3) Develop learning media based on the media script and media validation by experts and teacher; (4) small group test and large group test; (5) the developed product is re-checked to correct errors and improve the product.

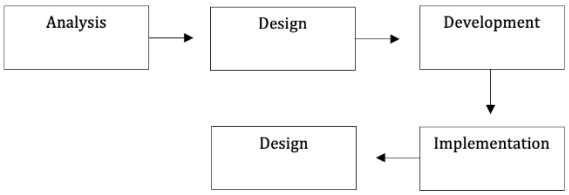


**Figure 1. Research and development steps according to Mulyatiningsih (Mulyatiningsih, 2016)**

## 2.3. Material/Instruments

Data collection techniques were carried out through non-test techniques (needs analysis questionnaires, interviews, expert validation, response questionnaires by teachers, and attractiveness response questionnaires by students).

## 2.4. Data Analysis

There are two types of data, qualitative data obtained from interviews with the homeroom teacher along with comments and suggestions from experts, and quantitative data. The results were obtained from the percentage results from needs analysis, expert validation results, practicality responses by teachers, and attractiveness responses by students. The instrument was analyzed using a Likert scale and a Guttman scale.

# 3. Results

## 3.1. Product Design

The results created from this development research are in the form of JARI BARU multimedia Based on Van Hiele's geometric thinking level, geometric material in grade V elementary school. This product is published in an application format that can be operated on Android phones. The product display is made practical, attractive, and full of colors and images equipped with animation and audio, as shown in Figure 2 below.


**Figure 2. Menu Display**

Learning activities begin with the visualization stage, then students continue the analysis stage with analyzing activities based on the results of the visualization stage, the last stage is informal deduction with student activities making connections between shapes. The

visualization, analysis, and informal deduction stages are presented as shown in Figure 3, Figure 4, and Figure 5 below.


**Figure 3. Visualization Stage Display**

At the visualization stage, students are directed to create a solid figure from a net that functions as an object to be observed by students.


**Figure 4. Analysis Stage Display**

At the analysis stage, the solid figures that students have created in the visualization stage are reused as a student tool to answer questions about the properties of the solid figures.


**Figure 5. Informal Deduction Stage Display**

In the informal deduction stage, students are directed to conclude the relationship between the types of solid figures. JARI BARU Multimedia based on van Hiele's theory is designed to be easy to use and practical. Because this media does not require internet access if the media application has been downloaded on the cellphone, the media can be used whenever and wherever the user is. In addition to the instruction menu on the media, this product is also equipped with a user manual to make it easier for users to operate multimedia as shown in Figure 6 below.


**Figure 6. Manual Book**

In this multimedia, there is a video that contains the properties of the solid figure. This video serves to reinforce students on the material being studied during independent study. The video display is presented in Figure 7 below.


**Figure 7. Video Display**

To measure students' learning ability and understanding, the JARI BARU based multimedia is accompanied by working instructions, and practice questions and students can see the score on the evaluation menu displayed as shown in Figure 8 and Figure 9 below.

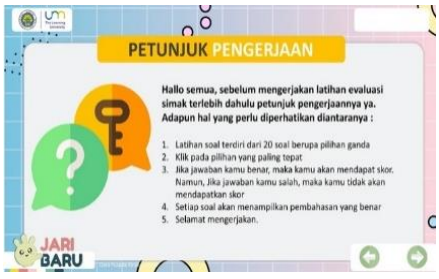


**Figure 8. Instructions Display**


**Figure 9. Practice Questions Display**

## 3.2. Product Validation

After the product has been made, the activities carried out are validation of material experts and media experts, as well as providing practical response questionnaires to teachers and attractiveness response questionnaires by students. The questionnaire grid was modified by Sriadhi (2019) regarding the feasibility of interactive multimedia. The material expert validation questionnaire grid includes an assessment of the aspects of material feasibility, evaluation, presentation of material, language, and implementation of van Hiele's theory. Based on the results of the validity of the material aspect of 97.6%. This percentage is included in the range of 85.01% - 100.00%, which is interpreted as included in the very valid category and can be used without any revision. The validation was also carried out by media experts. The grid on the validation questionnaire by media experts includes an assessment of the appropriateness of media guides and information, aesthetics, program performance, and navigation. Based on the calculation results, the validity value of media experts is 86%. This percentage includes the range of 85.01% - 100.00%, which is interpreted by entering the category as very valid and feasible to be applied to learning without any revision. The validation results are presented in Table 1 below.

**Table 1. Validation Results From Experts**

| No | Validator | Validation Value | Average Validation Value | Category | Description |
|---|---|---|---|---|---|
| 1. | Material expert | 97.6 | 91.8 | Very valid | Usable, without revision |
| 2. | Media expert | 86 | | | |

In addition to the validity assessment, the media was also assessed based on the practicality response by the teacher. The grid from the practical response questionnaire by the teacher is a combination of material and media aspects. Based on the results of the calculations carried out, the JARI BARU multimedia product based on van Hiele's theory obtained a validity value of 100%. This percentage is in the range of 85.01% - 100.00%, which is included in the very practical category and the media can be used in learning without any improvement, as presented in Table 2 below.

**Table 2. Practicality Response Results**

| No | Evaluator | Practical Value | Average Practicality Value | Category | Description |
|---|---|---|---|---|---|
| 1. | Teacher | 100 | 100 | Very practical | Usable, without revision |

## 3.3. Implementation

Then after validation activities to experts and practicality assessment were carried out, a tryout was carried out on class V students. The tryout was carried out in two stages, the first was a small group tryout, then continued in large groups. The results of the try-out assessment in a small group with a subject of 4 students got an attractiveness rate of 100%, meaning that if it is interpreted it falls into the range of 85.01%-100.00% and is included in the very interesting

category and can be used without revision. While the large group try out the subject of 14 students with the acquisition of 96.1% which means it is in the very interesting category and the media can be used without revision. The categorization used in the validation results, practicality response results and attractiveness is modified based on Akbar (2015) which is presented in Table 3 below.

**Table 3. Categorization of Validity, Practicality, and Attractiveness**

| Achievement Score (%) | Category | Description |
|---|---|---|
| 85.01 – 100.00 | Very Valid/Practical/Attractive | Can be used without any revision |
| 70.01 – 85.00 | Quite Valid/Practical/Attractive | Usable, with minor revisions |
| 50.01 – 70.00 | Less Valid/Practical/Attractive | Can be used with major revisions |
| 01.00 – 50.00 | Invalid/Practical/Attractive | Cannot be used |

In the pilot activity, overall it can be seen that the condition of the students in the try-out test was very enthusiastic and showed a positive response to the JARI BARU multimedia based on van Hiele's theory. In this test, students were also asked to do practice questions, the average student learning outcomes were 90 in the small group tryout, and an average score of 88.6 in the large group tryout. Based on the average score, it can be seen that students can achieve the minimum completeness criteria agreed upon by the school by 75.

Based on the results shown, it can be seen from the development of the JARI BARU multimedia based on van Hiele's theory that has values of validity, practicality, and attractiveness to be used and applied to learning mathematics in solid figure materials based on the results of assessments from material experts, media experts, teachers, and students. So it can be concluded that the JARI BARU product multimedia based on Van Hiele's geometric thinking level is suitable to be applied to teaching and learning activities of mathematics content in grade V elementary school.

## 4. Discussion

### 4.1. The Validity of JARI BARU Multimedia based on van Hiele's Theory

In developing the JARI BARU multimedia product based on van Hiele's theory, it went through several stages of assessment or validation by two experts. The first expert is an expert who assesses the material aspect and the second expert focuses on media aspect assessment, practicality assessment by the teacher, and product attractiveness assessment by carrying out tryouts on 4 students in the small group tryouts and 14 students in the large group tryouts. Based on the results of the validity of the material aspect of 97.6%. The comments from the material expert validators are in the form of suggestions for adding practice questions with the HOTS indicator. The addition of HOTS indicator questions is useful in helping students improve higher-order thinking skills (Fanani, 2018).

The results of the validation by media experts obtained a score of 86%. Comments and suggestions were also obtained in this media validation activity, including suggestions for adapting images found in nearby elementary schools. By doing learning using mobile phones will provide a new learning experience by utilizing technology in learning. Because in the current era of globalization, technology is considered absolute to be mastered by students,

especially in the field of education (Dewi, Sunarsi, & Akbar, 2020). In addition, according to Rahmat (2015), the use of interactive multimedia will make learning more student-centered.

This product was also assessed for its practicality by the fifth-grade teacher of State Elementary School of Rembang 2, Blitar City. The teacher assesses the multimedia product of JARI NEW based on van Hiele's theory from the material and media aspects. The results of filling out the practicality response questionnaire showed a score of 100%. So, the development of JARI BARU multimedia based on van Hiele's theory is practically used in learning mathematics.

### 4.2. The Effectiveness of JARI BARU Multimedia based on van Hiele's Theory

The implementation of van Hiele's theory on the JARI BARU multimedia product at the visualization stage is that students are directed to carry out activities to manipulate, fold, shape, create, cut, and construct geometric shapes, involve physical objects around them, and there are activities to choose various geometric shapes. At the analysis stage, van Hiele's theory is applied with students describing the properties of the shapes by answering questions and finding solutions to problems that lead students to find the properties of the shapes. At the last level, the informal deduction is implemented with activities in which students study the relationships that have been made in the analysis stage and make conclusions.

The product was tested on fifth-grade students to see how attractive the media product being developed was. Testing on students requires two stages, the first is a small group try out with 4 fifth grade students at State Elementary School Tlumpu Blitar City and the second is a large group try out with 14 students in class V State Elementary School of Rembang 2 Blitar City. The results of the first try out, get an attractiveness score of 100% so it is included in the very attractive category. When carrying out small group tryouts, there were few suggestions so that improvements were made. After the product is improved, the results can be used in the next tryout, namely in large groups. The results of the large group try-out got an attractiveness score of 96.1%, which means the product can be used without any improvement. In the large group try-out, multimedia products received a good response from all fifth-grade students at State Elementary School of Rembang 2, Blitar City. At the time of learning the students were very orderly and enthusiastic. They listen intently when given directions about using media. Students carry out activities according to the stages of van Hiele's theory in the media. Students also work on questions with discipline and full responsibility.

The tryout also aims to see an increase in student learning outcomes after directly using the product developed by working on questions consisting of 10 questions about cube and block material. After working on the practice questions, student learning outcomes showed an average score of 90 during small group tryouts, while the average score when conducting group tryouts was 88.6. With the acquisition of the average score, students have been able to exceed the minimum completeness criteria set by the school, which is 75. Thus, the data that has been obtained from filling out the comments and suggestions column on the attractiveness response questionnaire by students shows that the product developed is very good, interesting, easy to use, and fun.

## 5. Conclusion

Based on the results of the research on the development of the JJARI BARU multimedia (Belajar Interaktif Bangun Ruang/Interactive Learning to Solid Figure) based on van Hiele's geometric thinking level, the validity of material experts and media experts was obtained with

an average value of 91.6% with a very valid category. This media obtained a practical value from the teacher as a user of 100% with a very practical category. In addition, the JARI BARU multimedia based on van Hiele's theory obtained an average attractiveness score of 98.1% from students in the very attractive category. The application of the JARI BARU multimedia based on Van Hiele's geometric thinking level in teaching and learning activities can facilitate students to improve their understanding of the material in the fifth grade. The description is very in line with the expectations and needs at the analysis stage which states that solid figure learning in class V requires complete, practical media, attracts attention and interest in learning, increases understanding, and can be used in classical and independent learning. It will be more useful if the product being developed is evaluated for improvement and can be disseminated to users taking into account the needs, conditions of students, and the availability of supporting facilities.

## References

Ahmad, S., Helsa, Y., & Ariani, Y. (2020). Pendekatan Realistik dan Teori Van Hiele. Yogyakarta: Yogyakarta: Deepublish.

Akbar, S. (2015). Instrumen Perangkat Pembelajaran. Bandung: Bandung: Remaja Rosdakarya.

Akbar, T. N. (2016). Pengembangan multimedia interaktif IPA berorientasi guided inquiry pada materi sistem pernapasan manusia kelas V SDN Kebonsari 3 Malang. Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan, 1(6), 1120–1126.

Amsikan, S., & Nahak, S. (2017). Hubungan Konsep Ruang Ume Kbubu Desa Kaenbaun Kabupaten Timor Tengah Utara Dengan Konsep Geometri.

Daryanto. (2013). Media Pembelajaran (Peranannya sangat penting dalam mencapai tujuan pembelajaran). Yogyakarta: Yogyakarta: Gava Media.

Dewi, R. V. K., Sunarsi, D., & Akbar, I. R. (2020). Dampak Penggunaan Teknologi Informasi dan Komunikasi Terhadap Minat Belajar Siswa di SMK Ganesa Satria Depok. Jurnal Ilmiah Wahana Pendidikan, 6.

Falahudin, I. (2014). Pemanfaatan media dalam pembelajaran. Jurnal Lingkar Widyaiswara, 1(4), 104–117.

Fanani, M. Z. (2018). Strategi Pengembangan Soal HOTS pada Kurikulum 2013. Edudeena: Journal of Islamic Religious Education. https://doi.org/10.30762/ed.v2i1.582

Fitrianti, I., Handayani, D. E., & Suyitno, Y. (2020). Keefektifan Media Magic Box Terhadap Hasil Belajar Matematika Materi Jaring-Jaring Bangun Ruang Sederhana. MIMBAR PGSD Undiksha, 8(2), 323–329.

Hartati, P. (2015). Peningkatan Kemampuan Memecahkan Masalah Yang Berkaitan Dengan Bangun Ruang Sisi Lengkung Melalui Model Pembelajaran N. Didaktikum, 16(2).

Huda, A. (2018). Model Pembelajaran Desain Grafis. Padang: Padang: UNP Press.

Ibda, F. (2015). Perkembangan kognitif: teori jean piaget. Intelektualita, 3(1).

Ibrahim, S., & Suparni, M. P. (2012). Pembelajaran Matematika Teori dan Aplikasinya. Yogyakarta: Suka-Press UIN Sunan Kalijaga.

Ike, S. (2020). Analisis Proses Berpikir Siswa Berdasarkan Teori Van Hiele dalam Pemecahan Masalah Matematis Kelas VII SMP Gajah Mada Bandar Lampung. Lampung: UIN Raden Intan.

Iskandar, A., Sudirman, A., Safitri, M., Sulaiman, O. K., Ramadhani, R., Wahyuni, D., … Simamarta, J. (2020). Aplikasi Pembelajaran Berbasis TIK. Yayasan Kita Menulis.

Mashuri, S. (2019). Media Pembelajaran Matematika. Deepublish.

Mulyatiningsih, E. (2016). Pengembangan Model Pembelajaran. UNY.

Munir. (2013). Multimedia Konsep dan Aplikasi dalam Pendidikan. Bandung: Bandung: Alfabeta.

Nuritno, R., & Raharjo, H. (2017). Pengembangan Bahan Ajar Berbasis Multimedia Interaktif Dalam Meningkatkan Minat Belajar Matematika Siswa. ITEj (Information Technology Engineering Journals), 2(1), 1–10. https://doi.org/10.24235/itej.v2i1.11

Pathuddin, H., & Raehana, S. (2019). Etnomatematika: Makanan Tradisional Bugis Sebagai Sumber Belajar Matematika. MaPan: Jurnal Matematika dan Pembelajaran, 7(2), 307–327. https://doi.org/10.24252/mapan.2019v7n2a10

Rahmat, S. T. (2015). Pemanfaatan Multimedia Interaktif Berbasis Komputer dalam Pembelajaran. Jurnal Pendidikan dan Kebudayaan Missio, 7, 196–208.

Razak, F., & Sutrisno, A. B. (2017). Analisis tingkat berpikir siswa berdasarkan teori van Hiele pada materi dimensi tiga ditinjau dari gaya kognitif field dependent. Edumatica: Jurnal Pendidikan Matematika, 7(02), 22–29. https://doi.org/10.22437/edumatica.v7i02.4214

Safrina, K., Ikhsan, M., & Ahmad, A. (2014). Peningkatan kemampuan pemecahan masalah geometri melalui pembelajaran kooperatif berbasis teori van hiele. Jurnal Didaktik Matematika, 1(1).

Sari, N. L. I. (2012). Asyiknya Belajar Bangun Ruang dan Sisi Datar. Jakarta: PT Balai Pustaka.

Setyaningtyas, H. (2019). Analisis Kesulitan Belajar Siswa Kelas V Pada Materi Bangun Ruang dan Alternatif Pemecahannya Berdasarkan Teori Van Hiele di SD Negeri 1 Gatak Delanggu. Surakarta: Skripsi tidak diterbitkan. Surakarta: Universitas Muhammadiyah Surakarta.

Sintawati, M., Rudiyanta, M., & Nuryanto, M. (2020). Pengembangan Media Magic Geometry pada Materi Bangun Ruang Kelas IV Sekolah Dasar. Jurnal Tadris Matematika, 3(1), 77–88. https://doi.org/10.21274/jtm.2020.3.1.77-88

Siregar, B. H., Siahaan, C. Y., & Hariyanti, H. (2018). Peningkatan Kemampuan Spasial Melalui Penerapan Teori Van Hiele Terintegrasi Dengan Multimedia Dengan Mempertimbangkan Gaya Belajar Siswa. JURNAL HANDAYANI PGSD FIP UNIMED, 9(2), 62–71.

Sriadhi, S. (2019). Instrumen Penilaian Multimedia Pembelajaran. Medan: Universitas Negeri Medan.

Syahputra, M. Z. (2019). Kemampuan Siswa dalam Melakukan Koneksi Matematis.

Yuniawatika, Y. (2018). Pembelajaran Matematika di SD menggunakan Pendekatan Matematika Realistik Indonesia (PMRI). KARYA DOSEN Fakultas Ilmu Pendidikan UM. https://doi.org/10.31980/mosharafa.v5i3.279

Zainiyati, H. S. (2017). Pengembangan Media Pembelajaran Agama Islam Berbasis ICT. Kencana.