International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Development of Learning Devices with a Realistic Mathematics Education Approach in Class Geometry Material VIII SMP

Fabian Yoel Paisa[1], Philoteus E. A. Tuerah[2], Victor R. Sulangi[3]

[1, 2, 3]Master of Mathematics Education Study Program, Postgraduate Program, Manado State University
[1]*fabianpaisa12[at]gmail.com,*
[2]*philoteustuerah[at]unima.ac.id,*
[3]*victorsulangi[at]unima.ac.id*

Abstract: ***This study aims to produce learning tools in the form of Learning Implementation Plans (RPP) and Student Worksheets (LKPD) with a Realistic Mathematics Education approach in Geometry material for class VIII SMP that meet valid, practical, and effective criteria. This research is a development research that refers to the ADDIE development model, including Analysis, Design, Development, Implementation, and Evaluation. The subjects of this research trial were class VIII F students of SMP Negeri 1 Kawangkoan. The instruments used in this study included lesson plans validity assessment sheets, LKPD validity assessment sheets, student response questionnaires, teacher response questionnaires, observation sheets of learning implementation, and learning achievement tests. The products produced in this study are learning tools in the form of lesson plans and worksheets with a Realistic Mathematics Education approach on flat sided geometric material. The results showed that the learning device met the criteria (1) valid with an average score for lesson plans 4.56 and an average score for LKPD 4.45 out of a maximum score of 5, (2) practical with a student response questionnaire score of 4.41 and the teacher's response questionnaire score was 4.6 and the average learning implementation was 97.47%, (3) effective with a percentage of completeness of the learning outcomes test of 93.75%.***

Keywords: Learning Sets, Realistic Mathematics Education

1. Preliminary

Education is one of the most important things in a person's life. It is education that determines and guides one's future and the direction of one's life. Education is a way to develop human resources. Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential. The achievement of educational goals in each educational institution is largely determined by the processing of the learning process carried out by all parties. One party that plays an important role in learning activities and is seen as a very important center and is a keyword for students is the teacher or can be called a teacher. One of the lessons carried out by the teacher is to train and hone students' brains to think actively and critically, develop reasoning power, logical, systematic way of thinking, namely learning mathematics. Even and Ball stated"*Mathematics teachers are generally recognized to be key to students' opportunities to learn mathematics*" (Wu, Yao And Cai, 2020). Mathematics is a subject given at every level of education starting from elementary, junior high, high or vocational schools but also taught at the university level which is used as basic or general learning. Mathematics (Novitasari, 2016: 8) is a field of study taught in formal educational institutions which is one of the most important parts in efforts to improve the quality of education. Because mathematics is always taught at the educational level, students should be accustomed to and enjoy learning mathematics itself more. But in reality mathematics is considered a scary subject, boring and difficult to understand. This is because mathematics is an abstract concept that causes students to experience boredom or boredom in learning mathematical concepts so that new breakthroughs are needed to convey mathematical material.According to Siagian (2016: 63), learning mathematics is an effort made to make students want to learn or an activity to teach students about knowledge obtained through thinking activities. Students' attitudes towards mathematics will grow and develop if learning activities are carried out in a variety of ways and are faced with real life. In general, in learning mathematics, the concept of learning carried out by students is only limited to memorizing formulas to solve math problems or problems. One of the mathematical concepts taught in schools that is closely related to the real life of students is geometry. According to Muchlis "Geometry is defined as a branch of mathematics that studies points, lines, planes, and space objects and their properties" (Sari, 2015: 2). Geometry is very close to the lives of students because many applications are found in everyday life. Even though it is close to students, if the material taught uses inappropriate methods or models and learning is not carried out in a planned manner, it will be difficult for students to understand. Students' mastery of geometry will be higher if students are familiarized with geometric shapes related to the shapes of objects or buildings around the environment where they live.In the journal Realistic mathematics education approach on teaching geometry in primary schools: Collaborative action research states "The Realistic Mathematics Education (RME) approach results in students learning to gain knowledge directly through what they experience or do" (E J Mutaqin, 2020). Ariyanti stated that RME is a theory in mathematics education which is based on the idea that mathematics is a human activity and mathematics must be significantly connected with the context of students' daily lives as a source of development and as an application area through mathematical processes both horizontally and vertically (Ningsi, 2014). "With the

RME approach, students play an active role in constructing mathematical knowledge, namely by utilizing the reality and the environment they understand so that learning mathematics becomes more meaningful" (Cobb P, Zhao Q and Visnovska J, 2008). Realistic mathematics learning is basically the use of reality and the environment that students understand to facilitate the process of learning mathematics better than in the past. (Soedjadi, 2001). What is meant by reality is real or concrete things that can be observed or understood by students through imagining, while what is meant by the environment is the environment where students are located both in the school, family and community environment that students can understand. This environment is also called everyday life.

To be able to carry out PMR we must know the principles used by PMR. There are three PMR/RME principles, namely Guided Re-invention, Didactical Phenomenology and Self-delevated Models (Gravemeijer, 1993: 90). Guided Re-invention. Provide opportunities for students to do mathematics with realistic contextual problems for students with the help of the teacher. Learners are encouraged or challenged to actively work and are even expected to be able to construct or build their own knowledge to be acquired. Learning does not start with characteristics or definitions or theorems and is then followed by examples, but begins with contextual or real problems, which then through student activities it is hoped that the characteristics or definitions or theorems or rules can be found by the students themselves. Didactical Phenomenology (Didactic Phenomena). In this case, students are expected in solving problems to move towards mathematical thinking so that they will find or build their own properties or definitions or certain mathematical theorems (horizontal mathematization), then improve the mathematization aspect (vertical mathematization).Thus, students begin to get used to being free to think and dare to argue, because the methods used by students are different or even different from the teacher's thinking but the method is correct and the results are also correct. This is a didactic phenomenon. By paying attention to the didactic phenomena that exist in the classroom, a mathematical process will be formed that is no longer teacher-oriented, but is changed or switched to learning mathematics that is student-oriented or even problem-oriented. Self-delevoped Models (Model built by myself). When students work on contextual problems, students develop a model. This model is expected to be built by students themselves, both in the process of horizontal or vertical mathematization. Freedom given to students to solve problems independently or in groups. By itself it will allow the emergence of various models of problem solving made by students.In learning realistic mathematics, it is hoped that there will be a sequence of "real situation" → "model of that situation" → "model towards the formal" → "formal knowledge". According to him, this is what is called "bottom up" and is an RME principle called "Self-delevated Models". According to Izzati (2010) there are five characteristics of PMR, namely: (1). Using Context (the use of context): Contextual problems used by the teacher in learning will increase the participation of students in solving the problems given, so that students can contribute to learning. The context developed in PMR must be easily imagined, the situation is interesting, and related to the world of students. (2) Using the model (the use of models): The use of models provided by the teacher in learning aims to link non-formal mathematics and formal mathematics. Students use the mathematical model they already know, then develop it to solve contextual problems, so they find the model of in the informal form followed by the model for in the formal form.(3) Using the results of students' thinking (students contribution): Students design their own strategies for solving contextual questions, then these strategies are used as contributions to learning so that learning becomes constructive and productive. (4) Using interactive methods in learning mathematics (interactivity): Students learn to interact in the learning process by explaining, expressing ideas, and responding to the opinions of others. (5). Integrated with other topics / intertwining topics in mathematics (intertwining): Topics in learning mathematics are not taught separately, but mathematics must be seen as a unified whole. Students must be able to understand the interrelationships between concepts in order to make it easier for them to solve problems.

Mastery of the material is part of the learning objectives. One that results in whether or not learning objectives are achieved is learning planning. Martinis Yamin and Maisah stated that lesson planning is important in achieving learning success. If the learning plan is well prepared, the learning objectives can be achieved optimally. Weinstein and Meyer stated "Good teaching includes teaching students how to learn, how to remember, how to think and how to motivate themselves". (Arends, 1997: 243). Learning plans are prepared by the teacher in the form of learning tools (Martinis and Maisah, 2009). Learning tools are one or several preparations prepared by the teacher both individually and in groups so that the implementation and evaluation of learning can be carried out systematically and obtain the desired results (Nazarudin, 2007). Learning tools that are usually prepared by teachers are Learning Implementation Plans (RPP) and Student Worksheets (LKPD). The Learning Implementation Plan (RPP) is an elaboration of the syllabus to direct students' learning activities in an effort to achieve Basic Competence (Rusman, 2012). RPP is prepared by the teacher as a reference in carrying out learning activities.According to Permendiknas Number 41 of 2007 concerning Process Standards, each teacher is obliged to prepare a complete and systematic lesson plan so that learning takes place interactively, inspiring, fun, challenging, motivating students to participate actively, and providing sufficient space for initiative, creativity and independence. in accordance with the talents, interests, and physical and psychological development of students. Nitko & Brookhart (2007: 18) stated, "instruction is the process you use to provide students with the conditions that help them achieve the learning targets". Learning is a process used to direct students to conditions that help them achieve learning goals. Based on the results of observations and interviews with several teachers and students at SMP Negeri 1 Kawangkoan, especially in class VIII students they experienced a problem where they still did not understand the concept of geometry material, especially in the flat sided geometric section because they were only given material in a straight line. raw using printed books so that they are only fixated on memorizing formulas and the result is when they forget the formula they become confused to solve the given problem,

especially when faced with contextual problems. Also the teacher has prepared his own lesson plan which is used as a reference in carrying out learning activities. Based on observations of several lesson plans made by the teacher, it shows that lesson plans are arranged in a systematic and complete manner. RPP components have been arranged systematically and completely. The material listed in the RPP is quite complete.However, the RPP that is used is generally not only used on one material but on several materials with the same concept and structure without considering the RPP that is suitable for use in that material. That is, most of the learning activities listed in the RPP are teacher-centered, with the steps of the teacher explaining the learning material, then giving examples of questions, and finally giving practice questions. Students only receive knowledge and do not have the opportunity to discover their own knowledge. This can result in knowledge becoming less meaningful, because knowledge will be meaningful if students seek and find it themselves (Lahadisi, 2014). The same is true with RPP, LKPD or Student Worksheets which support the learning process to be more active. Student Worksheets (LKPD) are sheets that contain assignments that must be done by students. LKPD is one source of learning. The use of LKPD in learning can increase student activity, and can direct students to find knowledge through their own activities. Based on observations, schools do not use LKPD, most schools use printed books as a learning resource. The printed book mostly contains material, material supporting information, some instructions, sample questions, and practice questions, so it does not direct students to find their own knowledge. Students tend to memorize formulas and strategies in solving a problem but this is not effective because if students forget the formula then students become confused to solve a problem.

2. Research Procedure

This type of research is research development or Research and Development (R & D) ADDIE model, which consists of 5 stages, namely (1) Analysis consisting of Needs Analysis, Competency Analysis, Characteristics Analysis. (2) Design: The design stage is the stage of designing the product concept in detail. Activities at this stage include drafting RPP and LKPD with a Realistic Mathematics Education approach that refers to process standards and results at the analysis stage, (3) Development which consists of: Development of learning tools, Device Validation, Revision, (4). Implementation: The implementation phase is the stage of testing learning tools with a Realistic Mathematics Education approach that have been developed for students who are used as research subjects. The results at this stage will produce data that will be used to measure the effectiveness and practicality of the learning tools used, and (5) Evaluation: At this stage a measurement is made of the achievement of the learning tools. The data obtained at the implementation stage is processed to measure the validity, effectiveness and practicality of the learning tools that have been developed. In addition, at this stage revisions to stage 2 were carried out, namely revisions to learning tools that were adjusted to the suggestions of students and teachers.

3. Results and Discussion

The results obtained at the Analysis stage are teacher-centered learning activities. Students are less actively involved in learning. Students are enthusiastic about participating in learning, but the concentration of students is easily distracted. At the beginning of learning, students concentrate on learning and are easily conditioned. However, if students feel bored and bored, students become unfocused and difficult to condition. Teachers have difficulty teaching geometry material, especially on geometric material. This is due to the lack of visual aids owned by the school. The teacher has difficulty getting students to imagine geometric material. The teacher has developed a lesson plan, but the teaching materials used by the teacher are only based on the printed book provided by the school and follow the modules from the book without any development. The module only contains material summaries, sample questions and practice questions so that it does not facilitate students to find their own knowledge through activities. Based on these conditions, it is necessary to develop learning tools that can facilitate students to be able to explore and find their own knowledge, and that can help students imagine geometric material.Therefore, it is necessary to develop learning tools with a Realistic Mathematics Education approach. The results obtained at the Design stage were (1) Design of RPP with a Realistic Mathematics Education Approach for 7 learning meetings, (2) Design of LKPD with a Realistic Mathematics Education Approach for 7 learning meetings, (3) Design of Teacher Guide LKPD and (4) Collection of References . The results obtained at the Development stage are valid RPP and LKPD and Research Instruments. The results obtained at the Implementation stage were Learning Device Trials in Schools, Completion of Learning Implementation Observation Sheets, Implementation of Learning Outcomes Tests, Completion of Student and Teacher Response Questionnaires. The results obtained at the Evaluation stage were (1) Practicality Analysis: The practicality of learning devices was measured based on the results of student response questionnaires and teacher response questionnaires. The results of the student response questionnaire analysis showed that the average score obtained was 4.41 out of a maximum score of 5 with a good classification. The results of the teacher's response questionnaire analysis showed that the average score obtained was 4.6 out of a maximum score of 5 with a very good classification. The results of filling in the observation sheet of the implementation of learning are presented with the results shown in Table 3.1.

Table 3.1: Results of Analysis of Learning Implementation

The Meeting	Percentage	Qualification
1	100%	Very good
2	88.23%	Good
3	94.11%	Very good
4	100%	Very good
5	100%	Very good
6	100%	Very good
7	100%	Very good
Overall Average	97.47%	Very good

Based on the results of the analysis of student response questionnaires, teacher response questionnaires, and the

results of the analysis of the implementation of learning, it can be concluded that the learning tools with the Realistic Mathematics Education approach are arranged practically. (2) Effectiveness Analysis: The results of the effectiveness of learning devices are measured using learning achievement tests. Analysis of learning outcomes tests listed in table 3.2.The percentage of complete learning outcomes obtained 93.75% meets the very good classification. Based on the percentage of mastery of learning outcomes, it can be concluded that the learning tools with the Realistic Mathematics Education approach that were developed were effective. Based on the description of the research results above, the research product is obtained in the form of a learning device with a Realistic Mathematics Education approach on the material of Flat Sided Spaces. The learning tools developed in this study are lesson plans and worksheets.

Table 3.2: Completeness of Student Learning Outcomes

The highest score	96
Lowest Value	62
Many Students Complete	30 Students
Many Students Are Not Complete	2 Students
Percentage of Mastery Learning Outcomes	93.75 %

This learning tool was developed based on the ADDIE development model, which includes analysis, design, development, implementation, and evaluation. After going through the five stages, a learning device with a Realistic Mathematics Education approach is produced. The learning tools, in the form of lesson plans and worksheets, with the Realistic Mathematics Education approach were validated by two expert lecturers in mathematics from Manado State University and one senior teacher in mathematics from SMP Negeri 1 Kawangkoan to determine feasibility before being tried out. The results of the RPP assessment are in the form of a statement from the validator that the RPP is feasible to be tested with revisions. In addition, there are quantitative results, namely the average score obtained is 4.56 out of a maximum score of 5 with a very good classification. The results of this assessment are inseparable from the preparation process which takes into account the criteria for a good lesson plan according to the attachment to the Minister of National Education Regulation No. 41 of 2007. Meanwhile, the results of the LKPD assessment are in the form of a statement from the validator that LKPD deserves to be tested with revisions with quantitative assessment results, namely the average score obtained is 4.45 from the score a maximum of 5 with very good qualifications. this shows that the developed LKPD is in accordance with the good LKPD classification according to Darmodjo & Kaligis (1992), namely meeting the didactic, construction, and technical requirements. In addition, LKPD also meets good LKPD qualifications according to Endang Widjajanti (2010), which fulfills the requirements for material quality and the Realistic Mathematics Education approach. After the validation was completed, the learning tools were revised according to the expert lecturer's suggestions. Then learning devices are implemented in schools. In this study, implementation activities were carried out at SMP Negeri 1 Kawangkoan. RPP is used as a reference in learning activities. while LKPD is used as a learning resource by students and teachers.

Learning activities that use learning tools with a Realistic Mathematics Education approach begin with context. Students are given a context related to the material to be studied. The use of context at the beginning of learning can increase students' motivation and interest in learning the material (Ariyadi Wijaya, 2012). Then students discuss in their respective groups to complete the activities in the LKPD which contain mathematization. This discussion activity led to interaction between students. Interaction in learning is useful in developing students' cognitive and affective abilities (Ariyadi Wijaya, 2012). In addition to causing interaction between students, the use of context can make students more active in learning and can find their own mathematical concepts. After the discussion activity, students present the results of their discussion in front of the class. Students who do not convey the results of their discussions provide responses or add answers that are lacking. This activity is an interactive activity, because there is interaction between students. Before the end of the lesson, the teacher and students confirm the correct answer. After that, students reflect on learning which is followed by carrying out learning assessments, namely by doing homework.

When the learning takes place, the observer observes the course of learning and fills in the observation sheet of the implementation of learning. At the first meeting, the implementation of learning reached 100%, the second meeting reached 88.23%, the third meeting reached 94.11%, the fourth meeting until the seventh meeting reached 100%. So that the average implementation of the overall learning is 97.47%. This shows that the suitability between the learning during the trial and the lesson plan contained in the RPP with the Realistic Mathematics Education approach is included in the very good category.

After the learning device implementation activities, an evaluation is carried out in the form of an assessment of learning outcomes. The assessment of learning outcomes was attended by 32 class VIII F students of SMP Negeri 1 Kawangkoan with the activity of working on a learning achievement test which was arranged based on achievement indicators. The result of this assessment is that the percentage of completeness of student learning outcomes reaches 93.75% with very good criteria. This shows that students give a good appreciation of learning using learning tools with a Realistic Mathematics Education approach, so that students get good grades and many students complete. Based on the completeness of the learning outcomes of these students, it can be concluded that learning tools with a Realistic Mathematics Education approach are effectively used in learning. This is in line with the results of research conducted by Ilma Triwindari (2014) which produced lesson plans and worksheets with an effective Realistic Mathematics Education approach. After the learning outcomes assessment activity, the activity of distributing student response questionnaires and teacher response questionnaires was carried out. The student response questionnaire was filled out by 32 students. The result of the student response questionnaire analysis is that the average score obtained is 4.41 out of a maximum score of 5 with a very good classification. The result of the teacher's response

questionnaire analysis is that the average score obtained is 4.6 out of a maximum score of 5 with a very good classification. The results of the analysis of student and teacher response questionnaires show that learning tools with a Realistic Mathematics Education approach make it easy and useful for teachers and students in the learning process. It can be concluded that learning tools meet practical qualifications.

Berdasarkan uraian di atas, dapat disimpulkan bahwa perangkat pembelajaran dengan pendekatan Pendidikan Matematika Realistik pada materi Bangun Ruang Sisi Datar yang telah dikembangkan memenuhi kuasifikasi valid, praktis, dan efektif.

4. Conclusions and Suggestions

Based on the results and discussion of the research that has been described, it can be concluded several things as follows: (1) Learning tools in the form of lesson plans and worksheets with a realistic mathematics education approach on the material Flat Sided Spaces meet the valid criteria with an average score for lesson plans, namely 4.56 of the score a maximum of 5 with very good qualifications. While the average score for LKPD is 4.45 out of a maximum score of 5 with very good qualifications. The assessment of this learning device is based on the validity aspect carried out by two expert lecturers in mathematics from Manado State University and one senior teacher in mathematics from Kawangkoan 1 Public Middle School, (2) Learning devices in the form of lesson plans and LKPD with a Realistic Mathematics Education approach on Construct material The Flat Side Room fulfills the practicality criteria so that a practical learning device is obtained. This is indicated by an overall average of 4.41 out of a maximum score of 5 with good qualifications, and an overall average of 4.6 out of a maximum score of 5 with very good qualifications. In addition, practicality is also shown by the overall average of 97.47% implementation of learning with very good qualifications, (3) The effectiveness of teaching materials is determined based on the results of the learning outcomes test. The percentage of completeness obtained is 93.75% with very good qualifications. This shows that the learning device with the Realistic Mathematics Education approach meets the criteria of being effective.Suggestions that can be given based on the research that has been done are as follows. (1) The learning tools with the Realistic Mathematics Education approach that have been developed are expected to be used as learning resources by students and teachers in learning flat sided geometric material in other schools where implementation is taking place. (2) The development of learning tools with other approaches and materials can be carried out with the same procedure as used in this study. (3) The researcher realizes that there are still many shortcomings in this research, for this reason it is hoped that further researchers can develop this research better again so that the results will be obtained more optimally.

Acknowledgement
The author as a student at the Masters Program in Mathematics Education PPs State University of Manado expresses his highest gratitude to the Manado State University in this case the Postgraduate Program which has provided the opportunity for researchers to study as well as explore the theory and practice of developing mathematics learning tools so that the authors gain the ability more that supports the author's task as a Mathematics teacher.

References

[1] Abdur Rahman As'ari, Mohammad Tohir, Erik Valentino, Zainul Imron, Ibnu Taufiq. 2017. Matematika SMP/MTs Kelas VIII Semester 2. Jakarta : Pusat Kurikulum dan Perbukuan, Balitbang, Kemendikbud.
[2] Ainin, M. 2013. Penelitian Pengembangan dalam Pembelajaran Bahasa Arab. Okara. 2(8). Hlm. 97.
[3] Arends, R 1997. Classroom Instruktional Management. NewYork: The McGrawHill Company.
[4] Ariyadi Wijaya. (2012). Pendedekan Matemateka Realestek, Suatu Alternatef Pendekatan Pembelajaran Matemateka . Yogyakarta: Graha Ilmu.
[5] Arikunto, Suharsimi. 2010. Dasar-dasar Evaluasi Pendidikan. Jakarta: Bumi Aksara.
[6] Asep Jihad & Abdul Haris. (2008). Evaluasi Pembelajaran. Yogyakarta: Multi Pressido.
[7] Cobb P, Zhao Q and Visnovska J 2008 Learning from and Adapting the Theory of Realistic Mathematics education Éducation Didact 2 105–24
[8] Das Salirawati. (2004). Penyusunan dan Kegunaan LKS dalam Proses Pembelajaran. Diakses dari http://staff.uny.ac.id/sites/default/files/pengabdian/das-salirawati-msidr/19penyusunnan-dan-kegunaan-lks.pdf pada tanggal 18 Februari 2023, Pukul 15.42 WITA.
[9] E J Mutaqin. "Realistic mathematics education approach on teaching geometry in primary schools: Collaborative action research". Journal of Physics: Conference Series 1987. No.1 (2020): 2
[10] E. Mulyasa. (2013). Implementasi KTSP Kemandirian Guru dan Kepala Sekolah. Jakarta: PT Bumi Aksara.
[11] Endang Mulyatiningsih. (2012). Riset Terapan: Bidang Pendidikan dan Teknik. Yogyakarta: UNY Press.
[12] Erman Suherman, dkk. (2001) . Strategi Pembelajaran Matematika Kontemporer. Bandung: JICA.
[13] Eveline Siregar & Hartini Nara. (2014). Teori Belajar dan Pembelajaran. Bogor: Penerbit Ghalia Indonesia
[14] Gravemeijer, Koeno. (1993). Developing Realistic Mathematics Educations. Universiteit Utrecht.
[15] Hadi, sutarto. 2005. Pendidikan Matematika Realistik dan implementasinya. Banjarmasin: Tulip
[16] Hendro Darmodjo & Jenny R.E. Kaligis. (1992). Pendidikan IPA 2. Jakarta: Depdikbud.
[17] Ilma Triwindari. (2014). Pengembangan RPP dan LKS Materi Lingkaran dengan Pendekatan Matematika Realistik untuk Siswa SMP Kelas VIII. Skripsi. UNY.
[18] Izzati, Nur Didi Suryadi. 2010. Komunikasi matematik dan pendidikan matematika realistik. Yogyakarta.
[19] Kemendikbud. 2013. Permendikbud No. 65 Tahun 2013 Tentang Standar Proses Pendidikan Dasar dan Menengah. Jakarta: Kemendikbud.
[20] Kyriacou, C. (2009). Effective teaching in schools: Teory and practice (third edition). London: Nelson Thornes Ltd

[21] Lahadisi. (2014). Inkuiri: Sebuah Strategi Menuju Pembelajaran Bermakna. Jurnal Al-Ta'dib (Volume 7). Hlm. 85-98.
[22] Marsigit, dkk. (2015). Filsafat Matematika dan Praksis Pendidikan Matematika. Yogyakarta: UNY Press.
[23] Martinis Yamin & Maisah. (2009). Manajemen Pembelajaran Kelas; Strategi Meningkatkan Mutu Pembelajaran. Jakarta: Gaung Persada.
[24] Muchlis. 2008. Bahan Ajar Geometri. FKIP Univ. PGRI Palembang: Tidak diterbitkan
[25] Nazarudin. (2007). Manajemen Pembelajaran Implementasi Konsep, Karakteristik dan Metodologi Pendidikan Agama Islam di Sekolah Umum. Yogyakarta: Teras.
[26] Nieven, Ninke. et al. (1999). Design Approaches and Tools in Education and Training. Dordrecht: Kluwer Academic Publishers.
[27] Ningsih S 2014 Realistic Mathematics Education: Model Alternatif Pembelajaran Matematika Sekolah JPM IAIN Antasari 1 73–94
[28] Nitko, A.J., & Brookhart, S.M. (2007). Educational assessment of students. Columbus, OH: Merill.
[29] Novitasari, D. 2016. Pengaruh Penggunaan Multimedia Interaktif terhadap Kemampuan Pemahaman Konsep Matematis Peserta didik. Jurnal Pendidikan Matematika. 2(2). Hlm. 8.
[30] Peraturan Menteri Pendidikan Nasional Nomor 41 Tahun 2007 Mengenai Standar Proses.
[31] Posamantier, A. S., Jaye, D. and Krulik, S. (2007). Exemplary practices for secondary math teacher. Association for supervision and curriculum development. Alexandria, Virginia: Association for Supervision and Curriculum Development.
[32] Rahmah, Nur. "Hakikat Pendidikan Matematika". Al-khwarizmi jurnal pendidikan matematika dan ilmu pengetahuan alam. Vol.1. No.2 (2013). Hal.3
[33] Rusman. (2012). Model-Model Pembelajaran Mengembangkan Profesinalisme Guru. Depok: PT Raja Grafindo Persada.
[34] S. Eko Putro Widyoko. (2009). Evaluasi Program Pembelajaran: Panduan Praktis bagi Guru dan Calon Pendidik. Yogyakarta: Pustaka Belajar.
[35] Sari, Devita. 2015. Pengembangan bahan ajar bangun ruang sisi datar melalui pendekatan pendidikan matematika realistik. Jakarta: Program Pascasarjana Universitas Terbuka.
[36] Siagian, M.D. 2016. Kemampuan Koneksi Matematik dalam Pembelajaran Matematika. MES (Journal of Mathematics Education and Science). 2(1). Hlm. 63.
[37] Sugihartono, dkk. (2012) . Psikologi Pendidikan . Yogyakarta: UNY Press.
[38] Suyono & Hariyanto. (2015). Implementasi Belajar dan Pembelajaran. Bandung: PT Remaja Rosdakarya.
[39] Trianto, (2015). Model pembelajaran terpadu: konsep, strategi dan implementasinya dalam kurikulum tingkat satuan pendidikan (KTSP). Jakarta: Bumi Aksara.
[40] Undang-Undang Nomor 20 Tahun 2003 Mengenai Sistem Pendidikan Nasional.
[41] Wu,Yingkang, Yao, Yiling and Cai,Jinfa. Learning to be mathematics teacher educators. International Handbook of Mathematics Teacher Education Vol 4. No.1 (2020) : 231
[42] Yousaf, Ashfeen & Khan, Tenzilla. (2014). Recognition of Cognitive Development Stages in Students with Reference to Pagetian Cognitive Stages. Internateonal Journal of English and Educateon E Volume 3). Halaman 410-422.