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DEVELOPMENT OF CONTEXTUAL TEACHING MATERIALS USING A SPORTS CONTEXT IN STATISTICS FOR SPORTS-TALENTED SCHOOLS NUSA TENGGARA TIMUR PROVINCE

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ABSTRACT

At Nusa Tenggara Timur Provincial Sports Gifted High School in Kupang show that there are still many students who are not enthusiastic about learning mathematics in class. On every occasion, learning mathematics should start with the identification of problems that are appropriate to the situation (contextual problems). With the application of contextual problems, using real examples related to everyday life will bring students to conditions that can make students actively involved in learning. This research aims to produce contextual teaching materials on statistics material with a sports context for students at Sports Gifted Schools, as well as describe the impact on student learning outcomes from the results of developing these teaching materials. The development model that will be used to develop learning tools in this research is the ADDIE model. Data collection uses validation sheets, student response questionnaires to teaching materials, and student learning outcomes tests. Based on the results of the research, teaching materials in the form of statistical material modules measuring data concentration using the context of middle-distance running sports were declared valid and suitable for use, with the assessment results from material expert validators being 76% valid and the assessment results from media expert validators being 88% very valid. The teaching materials also received a good response from students, with the results of the student questionnaire responding to the teaching materials at the small group trial stage getting a percentage of 91% and at the large group trial stage getting a percentage of 95%. The teaching materials developed also have a positive impact on student learning outcomes. This can be seen from the results of students' learning tests after using these teaching materials, where the overall average score of students is 78.1, and the percentage of completeness obtained is 70%. Apart from that, it can also be seen that in the learning process, the students are actively discussing.

Keywords: Contextual Teaching Materials, Sports Context Statistics, Learning Mathematics

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PRELIMINARY

Mathematics has an essential role in everyday life and is used worldwide as an important medium in various other sciences. Mathematics is indispensable in human life, and almost all aspects of life require mathematics and its applications. Mathematics is taught to humans so that they can use it and think mathematically in everyday life. Field sports are

daily activities that contain many mathematical elements, such as field shapes, field lines, and tracks, which are building blocks in mathematics. Many movements of sports athletes use mathematical functions (Akbar, 2021).

Statistics is one of the subjects in high school mathematics. Statistics is essential for solving math problems at School. According to the Ministry of National Education (Maftuh, 2018), the purpose of learning statistics is so that students have confidence in their mathematical abilities, become good problem solvers, and can communicate and reason effectively. In sports data, accurate statistics about athletes can be used to determine athlete improvement. We can also measure the opponent's performance using past data. Conversely, opponents can also measure our performance through statistics (Dewayani, 2013).

Nusa Tenggara Timur Province Sports Blessings State High School is located in the city of Kupang and is one of the educational units with a high school level in the city of Kupang. This School aims to be able to accommodate various student interests who want to channel their talents and interests in the field of sports so they can excel in every regional, national, and international sporting event and continue at higher levels of education, as well as for students who will enter the world work. Based on the results of interviews conducted by researchers with subject teachers mathematics at Nusa Tenggara Timur Provincial Sports Gifted High School in Kupang show that there are still many students who are not enthusiastic about learning mathematics in class. Mathematics learning at this school used a curriculum in 2013. Learning is carried out using the lecture method, namely, the teacher explains the material from the textbook, then provides example questions and asks questions and answers. However, in mathematics learning, students appear to be less active, and some students have difficulty understanding the material. This issue arises from multiple factors, such as the limited variety of teaching methods employed by educators during the learning process and the reliance on packaged textbooks as the sole learning resource.

Learning media should be considered in the learning process at School and outside of School to achieve optimal learning outcomes. The use of media is very important and influential in achieving learning objectives. Teachers as educators must know the media that are suitable for the material so that lessons can be carried out efficiently (Hilda et al., 2023), (Saputri & Wahyuni, 2024). Teaching materials have a very close relationship with learning media and complement each other. Modules are one form of teaching materials and print media. The use of modules in learning can have a positive impact on students, including students becoming more independent in learning (Diana et al., 2023), (Minadja et al., 2024).

Therefore, it is necessary to develop modules using the right strategy so that the modules developed can be valid and effective.

On every occasion, learning mathematics should start with the identification of problems that are appropriate to the situation (contextual problems). By submitting contextual problems, students are gradually guided to master the concept of mathematics. With the application of contextual problems, using real examples related to everyday life will bring students to conditions that can make students actively involved in learning (Mustofa. A. & Taram. A., 2015), (Faisyal et al., 2023), (Nurhikmayati & Sunendar, 2020). Sports are activities related to mathematics that can be used in the classroom because they are usually done by students. After all, sports are a subject taught in schools (Mutia et al., 2020).

The results of research conducted by Ndruru, Y (2022) show that module statistics with a developed contextual approach can improve students' understanding of concepts. Apart from that, the results of research conducted by Fitra et al. (2018) show that some students were able to solve the questions with Good and had communication, reasoning, and argumentation, formulating skills and strategies to solve problems, and performing good operations.

This research aims to produce contextual teaching materials on statistics material with sports context for Sports Gifted School students, as well as describing the impact on student learning outcomes from the results of the development of these teaching materials. Novelty from this research, when compared with previous research, is as follows: In Ndruru, Y's (2022) research, a statistics module was developed for students in Class XII high school uses contextual problems in general, while this research uses problems in the context of sports for school students' Class XII Sports Talent. In research conducted by Fitra et al. (2018), Pisa questions were developed using the context of running sports for students 15 years old, while researchers conducted this research by developing teaching materials in the form of modules.

At the Olympics, the public is usually only interested in the scores of athletes who placed first, second, and third place in each event. However, scientists who. However, scientists who study athletic performance want to know the relative value of scores for athletes who do not place in the top three, find trends in the data over the years, and compare modern performance with ancient performance. These scientists need to know the mean (average), median (typical score), and mode (most common score) for all athletes across all

events. Mean, median, and mode in statistics are known as measures of central tendency (Vincent, William J & Weir, 2020).

A measure of data centring is a location or point that provides an overview or information on where the data centres or is collected (Widodo & Andawaningtyas, 2017). Data centring can also be said to be a measure that can determine how data is collected and find a value that can represent a series of data (Yulianto, 2016). The size of data concentration is a point in the form of a value that can represent and provide an overview or information where the data is collected or is centred.

According to Mulyasa (2013), Tamami et al., (2021), Arifin et al., (2020), Prahmana & D'Ambrosio, (2020), Contextual Teaching and Learning is a learning concept that emphasizes the connection between learning materials and the real world of students' lives so that students can connect and apply learning outcomes competencies in their daily lives. Meanwhile, Suprijono (2009) (in Putrianasari & Wasitohadi, 2015) said that Contextual Teaching and Learning (CTL) is an approach that enables educators to link the content they teach with real-life situations, helping students relate their knowledge to practical applications in their roles as family or community members. In essence, CTL focuses on integrating learning materials with the real-world experiences of students. This approach supports teachers in fostering connections between academic content and everyday life while encouraging students to apply their understanding in meaningful, real-world contexts as active members of their families and society.

METHODS

This type of research is Research and Development (R&D). The process of researching, designing, producing, and testing for validity to develop a new product or improve an existing one can be accounted for. The development model that will be used for creating learning tools in this research is the ADDIE model. The ADDIE development model involves stages of development with five steps/development phases, including analysis, design, development or production, implementation or delivery, and evaluations (Sohilait, 2020).

This research was conducted at the Nusa Tenggara Timur Province Sports Talent School, Jalan W. J. Lalamentik Oepoi Kupang City. The research subjects were students in class XII Nusa Tenggara Timur Province Sports Talent School, Kupang City. So that the module can be installed, used, and tested appropriately; then, after designing and compiling teaching materials, researchers carry out validation first. Validation is carried out by material

expert validators and expert media validators. Scale of scoring criteria on the validation sheet questionnaire using a 1-4 Likert scale (Sugiyono, 2019) according to the following table:

Table 1. Score criteria

Score	Information
1	Very less
2	Not enough
3	Good
4	Very good

The validation sheet that has been filled in by the validator can then be determined as validation percentage using the following formula:

$$V = \frac{\sum score\ given\ by\ the\ validator}{highest\ score\ \times\ number\ of\ statements} \times 100\%$$

To interpret the validity value, classification is used validity as in the following table:

Table 2. Validity Value Classification

Interval	Eligibility Criteria	Information
81%-100%	Very Valid	No Revision
61%-80%	Valid	No Revision
41%-60%	Quite Valid	Partial Revision
21%-40%	Less Valid	Revision and review of Material
0%-20%	Invalid	Total Revision

Following the validation process, where the teaching materials were tested and deemed valid, the researchers proceeded with a trial. This trial aimed to assess students' responses to the contextual modules incorporating sports themes, which were developed by the researchers and utilized during learning activities. To gather feedback, the researchers collected students' opinions regarding the teaching materials. The percentage of each statement item in the student response questionnaire is obtained from:

$$\frac{\sum \mathrm{T} \times \mathrm{P_n}}{\text{Ideal Score}} \times 100\%$$

Where T is the total number of respondents who voted, Pn is the preferred number of likert scores and the ideal score is the highest score obtained from "highest score of likers × number respondents".

After participating in learning activities using teaching materials developed, students also carry out learning outcomes tests. This learning outcomes test is carried out to obtain information about students' mathematics learning outcomes in statistics material after taking part in learning activities using teaching materials in the form of modules contextual to the sports context. To analyze the learning results, test steps- The step taken is to tabulate test data on student learning outcomes and calculate the percentage of completeness of student

learning outcomes tests. Presentation of complete test results Student learning can be calculated using the formula:

$$P = \frac{m}{n} \; x \; 100\%$$

Where m is the number of students who have completed, and n is the number of students.

RESULT AND DISCUSSION

In the first stage, namely the analysis stage, the researcher conducted interviews with subject teachers to collect information and analyze needs related to the product being developed. Based on the results of curriculum interviews used in schools is the 2013 curriculum. This is so that researchers know the curriculum in force at School. In this context, the School has implemented the 2013 curriculum in learning. Therefore, researchers want to ensure that developing materials are under the competencies in the 2013 curriculum. This is important so that the teaching materials developed can support the learning process and fulfil students' needs under the applicable curriculum.

Apart from the applicable curriculum, researchers also find out about books and what sources and learning methods are applied. By knowing the sourcebook used, researchers can see the main references that serve as a guide for teachers in compiling learning materials. Based on the results of interviews with subject teachers, the sourcebook used is a book from the Ministry of Education and Culture. Books used in this are under the applicable curriculum and the desired competencies achieved in the curriculum, but from the interview results, it is also known that students have difficulty understanding the material in this book, so students become less interested in learning to use the sourcebook. Neither is the sourcebook used using problems related to the context of students' interests, namely sports.

After knowing the sourcebook used, the researcher also wanted to know the learning methods used in class. By knowing the learning methods used, researchers can assess the effectiveness and approach applied in activating students. From the results of the interview, it is known that the learning method method used is the lecture method. This makes students tend to only listen to the teacher's explanation and are less actively involved in learning.

Based on the problem analysis obtained from interviews, researchers found that one of the challenges in learning mathematics in the classroom is the lack of student interest and active involvement. To overcome this problem, researchers are interested in developing contextual teaching materials using a sports context. Through the development of contextual

teaching materials using a sports context, the researcher hopes that students will be more involved and motivated in learning mathematics. They can see the relevance of mathematics in their daily lives. The section presents research results related to the objectives. The research results can be equipped with tables, graphs (images), and/or charts.

In the second stage, namely the design process, the researcher designs or plans the teaching materials that will be developed based on the results of the problem analysis. Teaching materials will be developed using contextual learning models and middle distance running sports in the cases or problems that will be discussed. Design pages in the module using the Canva application, and each page is provided with images related to the context used to make it more interesting. Then, the researcher compiled a module framework. The module consists of a cover, introduction, table of contents, learning activities, answer key, and bibliography.

Figure 1. Appearance of Teaching Material Cover Design

In the third stage, namely the development stage, researchers carry out validation tests to find out how appropriate the teaching materials are in the form of modules that have been created. Modules that have been created will be validated by material expert validators and media expert validators. The following are validation results from material experts:

Table 3. Results of Material Expert Validation

Rated aspect	Average (%)	Criteria
Content Eligibility	81%	Very Valid
Presentation Eligibility	73%	Valid
Language Eligibility	92%	Very Valid
Contextual Assessment	58%	Quite Valid
Average Total	76%	Valid

From the table, it can be seen that the validation results from material experts on the size of teaching materials clustered data, centered on the context of middle-distance running

sports, which got a total average of 76%. This shows that the overall material The teaching developed meets valid criteria. Conclusions given by Material expert validator is a module that can be used with revisions.

Table 4. Media Expert Validation Results

Rated aspect	Average (%)	Criteria
Graphic Eligibility	81%	Very Valid

Overall, from the aspect of graphic feasibility, it gets a total score of 95 out of 108, which means getting a percentage of 88%. This shows that the teaching materials developed meet very valid criteria from the aspect of graphic feasibility. The conclusion given by the media expert validator is that the module can be used without revision.

Overall, the assessment results from each validator are as follows:

Table 5. Results of Material Expert Validation

Validators	Average	Category
Subject Matter Expert	76%	Valid
Media Expert	88%	Very Valid
Average	92%	Very Valid

Based on the data above, it can be seen that the average validation assessment is 82%, which is in the very valid category. From the validation results, it can be concluded that the teaching materials are in the form of statistical modules on concentration measures grouped data with contextual problems using the context of running sports medium distance, which is declared valid and suitable for use as teaching material for class XII.

After validating, the author revised the teaching materials under assessments, comments, and suggestions provided by experts. The author made revisions to teaching materials, especially the contextual assessment aspects assessed by material experts. Some teaching materials still need to be revised.

Figure 2. Parts of Constructivism Before Revision

In that section the material expert validator commented "In the constructivism section, explain the reasons why calculating the mean can analyze changes in athletes and make predictions or decision making. In the inquiry section, a discussion arises to answer the question of what data we use mean, median or mode, and explain the reasons", so based on these comments the author changed it to the following image:

Figure 3. Part of Constructivism After Revision

Figure 4. Explanation Section at the Inquiry Stage Before Revision

In this section, the material expert validator commented "In the completion section before calculating the mean of the known data, explain why and what the purpose of the data needs to be presented in the frequency distribution table. At the stage of determining the range to create a frequency distribution table, it is necessary to build a reason why it is necessary to find the range of data", so on the basis of these comments the author changed it to be as shown below:

Figure 5. Explanation Section at the Inquiry Stage After Revision

In the fourth stage, namely implementation, researchers conducted trials on teaching materials that had been previously validated and developed. This teaching material was tested in Small groups first with a total of 6 students selected randomly at the Nusa Tenggara Timur Province Sports Talent School. During small group trials, Students look active in discussions and solving problems related to middle-distance running context. After completing the learning series, students fill out the questionnaire. The questionnaire is to determine students' responses to teaching materials that have been developed and used in trials. From the results of the student response questionnaire regarding teaching materials, the teaching materials got a percentage of 91% overall. This shows that the students' response to the teaching materials was very good. Based on the results of the student response questionnaire, the teaching materials used in the trial were determined to be valid. This small group was declared valid and can be used for large-group trials.

After conducting small-group trials, big-group trials are carried out. Large group trials were carried out with 20 students in class XII Natural Sciences Major 1. This large group trial was carried out in four meetings, namely three times learning meetings and one meeting to carry out learning results tests and fill out the questionnaire. At the first meeting, learning activities were carried out with the material group mean data, then the second meeting carried out learning activities with group median data material, and at the third meeting activities were carried out with group data mode material. Every meeting begins with recognizing the benefits of using data centralization measures taught at the meeting The teacher then directs and guides the students in completing problems according to the stages in the teaching materials, and ends with reflection and authentic assessment. Reflection is carried out to see what they can understand at these meetings, while authentic assessment

can be carried out as practice questions, assignments, or tests to see learning results at each meeting.

During learning, students discuss the questions given with friends in a group. While the students are having a discussion, the teacher also does it Go around and monitor student discussion activities. The teacher also helps guide and direct groups who ask questions and experience difficulties when working on questions. Then, after finishing the discussion in groups, students were asked to present the results of the group discussion. During learning, the students actively discuss. The results of this research are the same as the results of research conducted by Mahmudi et al. (2022) in their research which shows that, in general, students are involved actively in learning and students work together to solve problems given on contextual-based teaching materials.

The final stage is the evaluation carried out at the last meeting. At the meeting, tests on student learning outcomes were carried out, and student response questionnaires were filled out regarding teaching materials. From the results of the student response questionnaire to teaching materials, it can be seen that overall, the teaching materials received a percentage of 93%. This shows that the students' response to the teaching materials was very good, and their response increased when compared with the percentage of small group trials.

The students also felt that the questions used were related to their daily lives and made them interested in completing them. This can be seen from the percentage of student responses that got a percentage of 93% with the statement, "The questions given are very attached to everyday life and make me interested in getting it done." Apart from that, learning from this teaching material also makes students more active. This can be seen from the percentage of student responses, which got a percentage of 96% with the statement, "The teaching materials used can help raise my level of activity." Students also feel happy using teaching materials developed during learning activities. This can be seen from the percentage of student responses that got a percentage of 89% with the statement, "I like using this teaching material in learning." The results of this study are the same as the opinion of Magdalena (2021), who said that using teaching materials The right one can overcome students' passive attitudes and make students more enthusiastic about studying. (Kusuma et al., 2023) also say that teaching materials make Students happy, interested, and enthusiastic during the learning process and have a positive impact on learning outcomes.

Apart from filling out the questionnaire, students also take a learning outcomes test. Based on the test results, the student learning that was carried out shows that the average value of the students as a whole is 78.1, with the lowest score being 60 and the highest score

being 90. The percentage of completeness obtained was 70%, with the number of students who completed it being 14 people and the number of students who did not complete it being six people. This shows that the teaching materials developed have a positive impact on student learning outcomes. From this percentage of completion, The effectiveness of teaching materials can also be seen. From the results of the percentage of completeness obtained, it can be concluded that the teaching materials are effective. The results of this study are the same as the results of research conducted by Rahmadani et al. (2021), which shows that the product being developed is effective if it can obtain a percentage of completeness >60%. Apart from that, it is also said in the research that learning tools are said to be effective if they can influence students' learning completion according to expectations or more than the same as KKM.

Although the product developed has a good impact on student learning outcomes, there are still students who have not been able to achieve the KKM score on the test results. This matters because several errors were found in the students' work. The error is like the mistake when determining the top edge, which was that he made a mistake in adding up the decimal numbers, so the length of the class and the final answer result are wrong. It's the same with the results of research conducted by Fitra et al. (2018), where their research showed that some students still made decimal addition errors and errors in converting time units.

In the previous statistical module development research conducted using contextual questions in general (Ndruru, 2022), while in this study using questions in the context of sports. In the research on the development of pisa questions using the context of sports, previously conducted question development (Fitra et al., 2018), while researchers conducted this research by developing teaching materials in the form of modules.

With the research and development of this module, it can provide facilities for students in statistical material and motivate students to learn mathematics with something that students are interested in in their daily lives. Besides that, it can make students understand and enjoy the learning presented through the teaching materials developed. If there is interest in learning, namely the existence of a sense of like / pleasure, a statement of preference, and the existence of interest, there is an awareness to learn without being told, as well as participate in learning activities, and give their attention to learning (Ndraha & Harefa, 2023). This module can also be an example for other research in the future.

CONCLUSION

Based on the results and discussion presented, the author draws the following conclusions from the research on the Development of Contextual Teaching Materials Using Sports Contexts for Statistical Materials at Nusa Tenggara Timur Province's Sports Talent School:

1. The teaching materials developed, in the form of statistical modules focusing on data concentration and utilizing the sports context of middle-distance running, were found to be valid and feasible. The validation results showed a 76% validity score from material expert evaluations and an 88% "very valid" rating from media expert evaluations. Additionally, the teaching materials received positive responses from students during the trial implementation. In the small group trial, student response questionnaires indicated a 91% satisfaction rate, while in the large group trial, the percentage increased to 95%.
2. Teaching materials in the form of statistical material modules measuring data concentration Using the context of middle-distance running sports has a positive impact on student learning outcomes. This can be seen from the results of student learning tests after using these teaching materials, where the average score of the students as a whole is 78.1, with the lowest score being 60 and the highest score being 90. Completion percentage The result obtained was 70%, with the number of students who completed it being 14 people and the number of students who did not complete it was six people. Apart from that, it can also be seen In the learning process, the students were seen actively discussing and were also seen from the percentage of student responses that get a percentage of 96% with the statement "The teaching materials used can help raise the level of my activity". Students also feel happy using the teaching materials developed during learning activities. This can be seen from the percentage of student responses who got a percentage of 89% with the statement "I enjoy using this teaching material in learning".

REFERENCES

Akbar, N. M. (2021). *Peran Matematika Dalam Bidang Olahraga di Kehidupan*. Kompas. https://www.kompasiana.com/namay131/5ff184628ede481a700e1dea/peran-matematika-dalam-bidang-olahraga-di-kehidupan

Arifin, A. M., Pujiastuti, H., & Sudiana, R. (2020). Pengembangan media pembelajaran STEM dengan augmented reality untuk meningkatkan kemampuan spasial matematis siswa. *Jurnal Riset Pendidikan Matematika*, *7*(1), 59–73. https://doi.org/10.21831/jrpm.v7i1.32135

Dewayani, M. (2013). *Statistik Itu Penting dalam Olahraga*. Kompas. https://www.kompasiana.com/keiramaunakea/552e17416ea834a3378b45a4/statistik-itu-penting-dalam-olahraga

Diana, N., Suhendra, Termudi, & Juandi, D. (2023). *Mengembangkan Media Pembelajaran Matematika Dengan Pendekatan STEM* (S. Wulandari (ed.); Pertama). Syiah Kuala University Press.

Faisyal, I. D. S., Supriadi, N., & Pratiwi, D. D. (2023). Ethnomathematics In E-Modules Using A Scientific Learning Approach For JHS Students. *Mathline : Jurnal Matematika Dan Pendidikan Matematika*, *8*(1), 1–16. https://doi.org/10.31943/mathline.v8i1.212

Fitra, D., Putri, R. I. I., & Susanti, E. (2018). Soal Serupa Pisa Menggunakan Konteks Cabang Olahraga Lari. *Jurnal Inovasi Edukasi*, *1*(1), 8–22. https://doi.org/10.35141/jie.v1i1.28

Hilda, Sismulyasih, N., Wati, T., & Afifah, T. (2023). *Media Pembelajaran SD* (B. Wijayama (ed.); Pertama). Cahya Ghani Recovery.

Kusuma, J., Supardi, Akbar, M. R., Hamidah, Ratnah, Fitrah, M., & Sepriano. (2023). *Dimensi Media Pembelajaran* (Efitra (ed.); Pertama). Sonpedia Publishing Indonesia.

Magdalena, I. (2021). *Tulisan Bersama Tentang Media Pembelajaran SD* (R. Awahita (ed.); Pertama). Jejak Publisher.

Mahmudi, A., Sugiman, S., Hernawati, K., & Lestari, H. P. (2022). Pengembangan Bahan Ajar Matematika Berbasis Kontekstual. *PYTHAGORAS Jurnal Pendidikan Matematika*, *17*(2), 368–376. https://doi.org/10.21831/pythagoras.v17i2.26986

Minadja, A. W. S., Sutiarso, S., & Firdaus, R. (2024). The Effectiveness of Using Electronic Student Worksheet With A Contextual Approach On Student Adversity Quotient. *Mathline : Jurnal Matematika Dan Pendidikan Matematika*, *9*(3), 691–704. https://doi.org/10.31943/mathline.v9i3.655

Ndruru, Y. (2022). Pengembangan Modul Materi Statistika Melalui Pendekatan Kontekstual Untuk Meningkatkan Pemahaman Konsep Siswa Kelas XII SMA. *FAGURU: Jurnal Ilmiah Mahasiswa Keguruan*, *1*, 180–192.

Nurhikmayati, I., & Sunendar, A. (2020). Jurnal Pendidikan Matematika Pengembangan Project Based Learning Berbasis Kearifan Lokal Berorientasi pada Kemampuan Berpikir Kreatif dan Kemandirian Belajar. *Mosharofa: Jurnal Pendidikan Matematika*, *9*(1), 1–12. http://journal.institutpendidikan.ac.id/index.php/mosharafa

Prahmana, R. C. I., & D'Ambrosio, U. (2020). Learning Geometry and Values from Patterns: Ethnomathematics on the Batik Patterns of Yogyakarta, Indonesia. *Journal on Mathematics Education*, *11*(3), 439–456. https://doi.org/10.22342/jme.11.3.12949. 439-456

Putrianasari, D., & Wasitohadi. (2015). Pengaruh Penerapan Pendekatan Contextual Teaching and Learning (CTL) Terhadap Hasil Belajar Matematika Ditinjau Dari Motivasi Belajar Siswa Kelas 5 SD Negeri Cukil 01 Kecamatan Tengaran - Kabupaten Semarang.

Rahmadani, N., Hartatiana, H., & Nizar, H. (2021). Pengembangan Lembar Kerja Siswa Berbasis Problem Based Learning. *Jurnal Pendidikan Matematika*, *12*(2), 231–238. http://ojs.uho.ac.id/index.php/jpm

Saputri, W. A., & Wahyuni, S. (2024). Development Study: Ethnomathematics-Based Digital Worksheets With A Realistic Approach. *Mathline : Jurnal Matematika Dan Pendidikan Matematika*, *9*(2), 381–402. https://doi.org/10.31943/mathline.v9i2.612

Sohilait, E. (2020). *Metodologi Penelitian Pendidikan Matematika* (Edisi 1 Ce). Cakra.

Sugiyono. (2019). *Metode Penelitian Kuantitatif, Kualitatif, Dan R&D* (Sutopo (ed.); Edisi Kedu). ALFABETA.

Tamami, M., Maya, V., Tian, S., Aziz, A., Santi, V. M., Pengembangan, A. T. A., Ajar, B., & Aziz, T. A. (2021). Pengembangan Buku Ajar Matematika dengan Pendekatan Contextual Teaching And Learning (CTL) pada Materi Statistika untuk Siswa Kelas XI SMK Bisnis dan Manajemen Pengembangan Buku Ajar Matematika dengan Pendekatan Contextual Teaching And Learning (CTL). International Journal of Progressive Mathematics Education. 8435. https://doi.org/https://doi.org/10.22236/ijopme.v1i3.7620©2021

Vincent, William J & Weir, J. P. (2020). Statistics in Kinesiology. Human Kinetics.

Widodo, A., & Andawaningtyas, K. (2017). Pengantar Statistika (Pertama). UB Press.

Yulianto, H. (2016). Statistik 1 (M. B. Lathif (ed.); Pertama). Lembaga Ladang Kata.