

The Effectiveness of Euclid's Algorithm Method in Solving Problems about FPB

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Abstract

Many students are constrained in determining the FPB value of two numbers. The use of factor theorem methods has not been effective in helping students solve problems about FPB. Euclid's algorithm comes as a solution to make it easier for students to solve problems about FPB. This study aimed to test the effectiveness of Euclid's algorithm theorem in solving problems about FPB. This type of research is quasi-experimental and involves two classes: the experimental class (the application of Euclid's algorithm theorem) and the control class (using the factor tree method). The sample involved in the study was course V-A and V-B SDN 19 student Nan Sabaris. The instruments used in the study are questionnaires, observation sheets, and essay tests. Data collected in research activities is analyzed with an independent test of t-test samples. Before the data is analyzed, both data groups must first be normally distributed and homogeneous. The results of data analysis both in the form of questionnaire analysis, observation sheet, and analysis of test results showed a significant difference between the solution of FPB problems between experimental classes using Euclid theorems and control classes that use factor tree methods. Euclid's algorithm is a practical, easy-to-understand method, and the user does not take a long time in the process of the problem. The thing to note in applying Euclid's algorithm theorem is the understanding of the principle of division by students. Teachers need to pay attention to the extent of students' knowledge of the division material because this understanding affects students' performance in using Euclid's algorithm theorem to solve problems about FPB.

Keywords: Euclid's Algorithm, Greatest Common Factor, FPB, Mathematical Learning, Factor Theorem

Abstrak

Banyak siswa terkendala dalam menentukan nilai FPB dari dua buah bilangan. Penggunaan metode pohon faktor belum efektif dalam membantu siswa menyelesaikan soal tentang FPB. Algoritma euclid hadir sebagai solusi untuk mempermudah siswa dalam menyelesaikan soal tentang FPB. Tujuan penelitian ini adalah untuk menguji keefektifan penggunaan teorema Algoritma Euclid dalam menyelesaikan soal tentang FPB. Jenis penelitian ini adalah kuasi eksperimen dan melibatkan dua kelas yaitu kelas eksperimen (penerapan teorema algoritma euclid) dan kelas kontrol (menggunakan metode pohon faktor). Sampel yang terlibat dalam penelitian adalah siswa kelas V-A dan V-B SDN 19 Nan Sabaris. Instrumen yang digunakan dalam penelitian adalah angket, lembar observasi dan tes essay. Data yang dikumpulkan dalam kegiatan penelitian dianalisis dengan uji independen sample t-test. Sebelum data dianalisis, kedua kelompok data harus terlebih dahulu terdistribusi normal dan homogen. Hasil analisis data baik berupa dari analisis angket, lembar observasi dan analisis hasil tes menunjukkan bahwa terdapat perbedaan yang signifikan antara penyelesaian soal FPB antara kelas eksperimen yang menggunakan teorema euclid dengan kelas kontrol yang menggunakan metode pohon faktor. Algoritma euclid merupakan metode yang praktis, mudah dipahami dan penggunaan metode ini tidak membutuhkan waktu yang lama dalam pengerjaan soal. Hal yang perlu diperhatikan dalam penerapan teorema algoritma euclid ini adalah pemahaman prinsip pembagian oleh siswa. Guru perlu memperhatikan sejauh mana pemahaman siswa terhadap materi pembagian, karena pemahaman ini mempengaruhi performa siswa dalam menggunakan teorema algoritma euclid untuk menyelesaikan soal tentang FPB.

Kata kunci: Algoritma Euclid, Faktor Persekutuan Terbesar, FPB, Pembelajaran Matematika, Pohon Faktor

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INTRODUCTION

Education is an effort to change the mindset and increase students' knowledge to prepare themselves to have qualified skills in the future. The education process that students take can determine

how the student builds his future. Education and learning is a unity that aims to teach students to have new knowledge (Kesuma et al., 2022). Learning is related to how teachers can transfer knowledge to be absorbed properly by students (Nurohim, 2021). The learning process allows students to have new knowledge both provided by the teacher directly and from the experiences that have been possessed by the students themselves (Marzuki, 2018). Students can actively build their knowledge through guidance and direction from teachers (Sapartien, 2017).

Education in Indonesia is grouped into several levels, including Early childhood education / Kindergarten (ages 4-6 years), Elementary School (age 6-12 years), Junior High School (age 12-15 years), High School (age 15-18 years) and college (Ulhusna et al., 2020). Each country has a distinctive curriculum that is applied at every school level, including in Indonesia. In Indonesia, primary school is the second level of education children take after kindergarten. At the elementary school level, students are taught basic knowledge such as reading, knowing religion, behaving/ behaving, understanding of nature, and numeracy (Yuliana Sari` & Esti Windari, 2019). Without realizing the science and basic knowledge studied at the elementary school level is continuous and continues to be studied in depth at the level of education at the next level (Sari et al., 2019). Lessons in junior high, high school, and college deepen elementary-level material (Sardin & Rajab, 2017). For example, in the study of mathematics, starting from elementary school, students have been invited to master the science of counting (Salbiah et al., 2021). Of course, this calculation will continue to be used as a long life skill, not only for the condition of pursuing education at the next level (Savriliana et al., 2020). Furthermore, numeracy skills and all the skills students obtain while studying mathematics studies will continue to be used in everyday life (Miranda & Ahmad, 2020). Therefore studying mathematics becomes a compulsory subject that needs to be mastered and understood by students (Afriatama & Ardita, 2022).

Mathematics is identical to counting activities (Indiyah, 2019). Almost all content in math learning requires students to do numeracy activities (Wibowo et al., 2021). One example is determining the Greatest Common Factor (FPB). FPB is defined as the federal factor of the two numbers whose value is greatest (Oktaviarini, 2016). Material about FPB has begun to be studied by students at the elementary school level. FPB can be applied in simplifying fractions, simplifying divisions that contain several variables, and understanding Euler functions. The importance of FPB material requires students to fully understand the concept and be able to apply it to various problem applications (Suryani, 2018).

Many methods can be used in solving problems regarding FPB. The results of previous studies show various methods that can be used including Drill and question and answer methods can also be used to solve FPB problems so that student learning outcomes on FPB material become better (Utami, 2012). Then the scaffolding method, in which students are given the opportunity to examine and reconstruct concepts independently and in groups, then reviewed with the teacher (Hadi, 2016). In addition, the PEBI method can also be used as an alternative to solving FPB problems, namely in the form of fractions, using the Euclides algorithm, concepts basic (prime) numbers, and the concept of slices in set theory (Yuniati, 2012). Further research shows that the method of using teaching aids in

the form of the KPK and FPB boxes is also a fun method to help students solve FPB questions (Yensy, 2020).

One of them is using a factor tree. The method of determining the value of FPB with the factor tree method can be started by dividing the number by the smallest number (starting from number 2 and so on). This method is practical, but there are exceptions to quite large numbers. Work on the problem of FPB sought using the tree factor technique will take a long time if the numbers that become problems in the form of number hundreds or even thousands. This method is concluded effectively for numbers with nominal units up to ten.

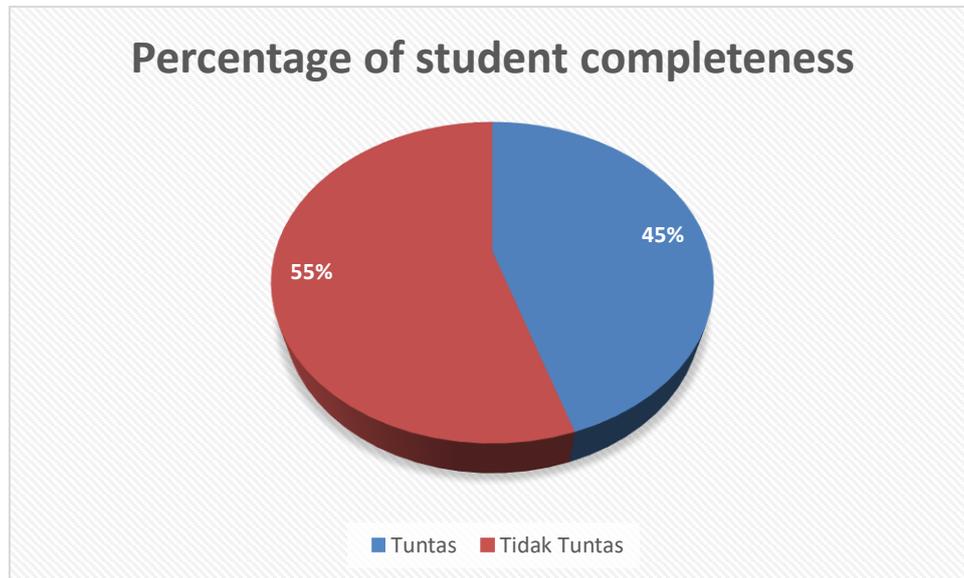


Figure 1. Percentage of Completion of Student Learning Outcomes on Materials about FPB

Based on the results of observations made in class V SDN 19 Nan Sabaris District Nan Sabaris Padang Pariaman Regency of West Sumatra Province, the settlement of the problem about FPB was done with the factor tree technique. Factor trees are the basic techniques used to determine FPB values. Solving the problem using the factor tree technique is to divide the number to be determined by the FPB value by the prime number starting from the number 2 and so on. The use of factor tree techniques will be considered completed in work on the question of FPB if the divisor number is the number itself (Latifah, 2020). Applying tree factor techniques in its implementation takes a considerable amount of time. In addition, the use of factor tree methods requires more accuracy from students because if one of the dividers is mistaken, then it can be ascertained that the results obtained are not appropriate.

Factor tree techniques are considered not yet effective and efficient in learning (Sabri, 2020). Many students experience obstacles in using factor tree methods. The main requirement in understanding FPB material is cunning in mastering the concept of multiplication and division and the thoroughness of students. Most students have difficulty because using a factor tree takes a long time. This technique is inefficient, so if it is used in practice, it will certainly reduce the effective learning time. The available allocation is felt less if this method is still used in determining the value of FPB.

The initial analysis results in the student's perspective on the factor tree method showed the following results.

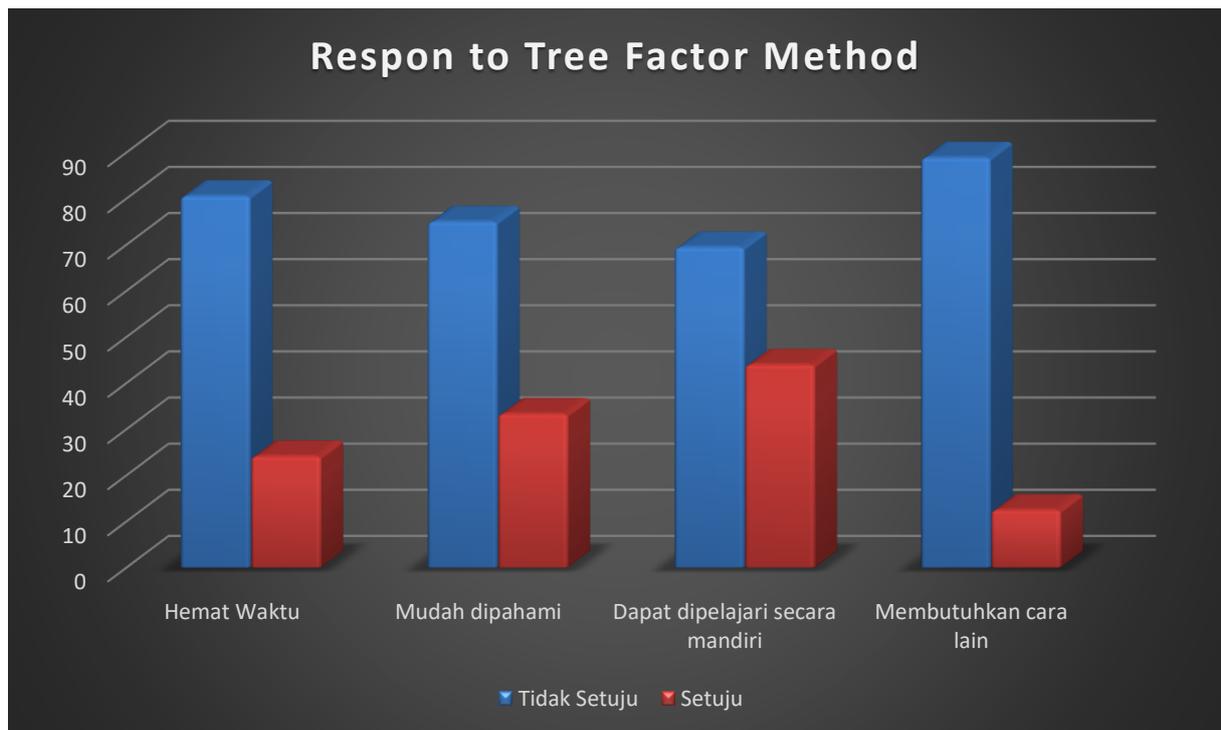


Figure 2. Results of Analysis of The Use of Factor Tree Techniques

Factor trees are a basic way that students can use to solve problems about FPB. The use of factor trees reveals several findings, including its use takes a long time, is not easy to understand by students, and has not been possible to be studied independently. The factor tree method has not been optimally used in determining the FPB value of some numbers. To streamline the work of the problem, a new approach is needed in solving the problem of FPB. One of them is using Euclid's algorithm.

Euclid's algorithm is one of the methods used to utilize the remnants of division. Euclid first discovered this theorem by applying the principle of division with the smallest number after the number 1. The division will continue to repeat until it reaches the last value of zero. The FPB value is taken from the iteration before the final result that forms the zero. Previous research conducted by Yunita (2012) combined Euclid's algorithm with other methods such as the method of calculating the form of fractions, the concept of base (prime) and the concept of intersection of set theory or this combination is known as the PEBI method (Yuniati, 2012). Euclid's algorithm is the most efficient way, can save time, and is easily understood by students. However, research to specifically test the use of Euclid's algorithm has not been done much. On this basis, Euclid's algorithm needs to be tested for its effectiveness in helping students solve problems about FPB. This study aims to look at the efficacy of Euclid's algorithm theorem in assisting students in solving problems related to FPB.

METHODS

The purpose of this study was to look at the effectiveness of Euclid's algorithm theorem in helping students solve problems related to FPB in mathematics learning in elementary school. This type of research is a quasi-experiment involving two classes, namely experimental and control classes. An experimental class is a class that, in its learning activities, uses Euclid's algorithm theorem, while a control class is a class that, in learning, uses a factor tree. The instruments used in this study are questionnaires, observation sheets, and tests in the form of essays. Respondents in this study involved 36 SDN 19 Nan Sabaris Padang Pariaman Regency students. The data in the study was analyzed with an independent sample t-test with the data group already distributed normally and homogeneously.

RESULTS AND DISCUSSIONS

Euclid's algorithm is one of the new methods used to determine the value of FPB. Euclid's algorithmic technique utilizes the rest of the division as the absolute limit for determining the value of the FPB. Division can be done by using the numbers that become pairs in assessing the value of FPB. For example, we will evaluate the FPB value of 12 and 18. The finishing steps use Euclid's algorithmic techniques as follows:

1. Choose a larger number and make smaller numbers a factor for division. Here the larger number is 18, so the divider is the number 12. The solution is:
$$18 = 1 \times 12 + 6$$
2. Selection of number one so that multiplication does not exceed the larger value, a number that may start from 1, 2, 3 and so on.
3. If the result is not yet zero, then repeat way 1, we make the number 12 as the largest number and 6 as a divider. The next process as follows:
$$12 = 2 \times 6 + 0$$
4. The number 12 allows it to be multiplied by two by 6, so that the sum on the final variable becomes 0. When it becomes zero, then the value of FPB can be determined, which is 6.

The following presented the results of student work using Euclid's algorithm technique in determining the FPB value of 2 numbers.

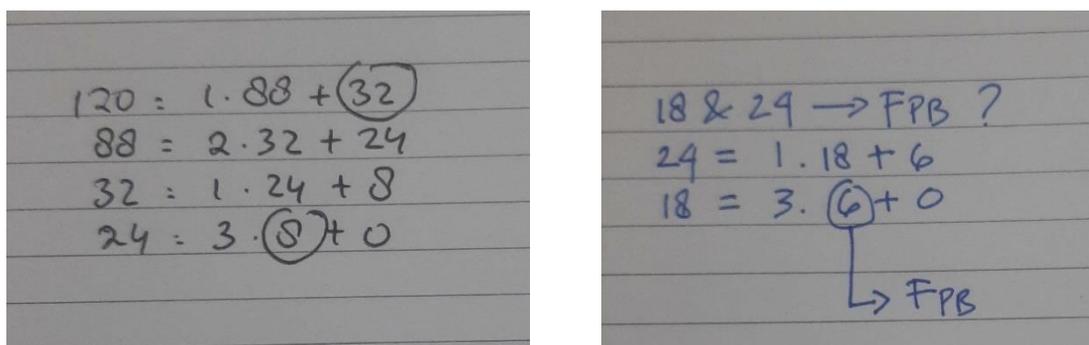


Figure 3. Student's Work in Determining FPB Using Euclid's Algorithm

Compared to the work on the problem of FPB between two techniques that use Euclid's algorithm and factor trees, it can be concluded that students who use Euclid's algorithmic methods are faster to solve problems about FPB. Of all the students in the experimental class who solved their FPB problems using Euclid's algorithmic technique, the average class showed students took about 6.05 minutes to work on two issues. When compared to control classes, students were given the same problem as the experimental class, taking an average of 10.75 minutes of work. This time difference is quite significant and makes it evident that using Euclid's algorithmic techniques in creating problems about FPB is quite effective compared to the use of factor tree techniques. An average comparison of the two classes is presented in the following image.

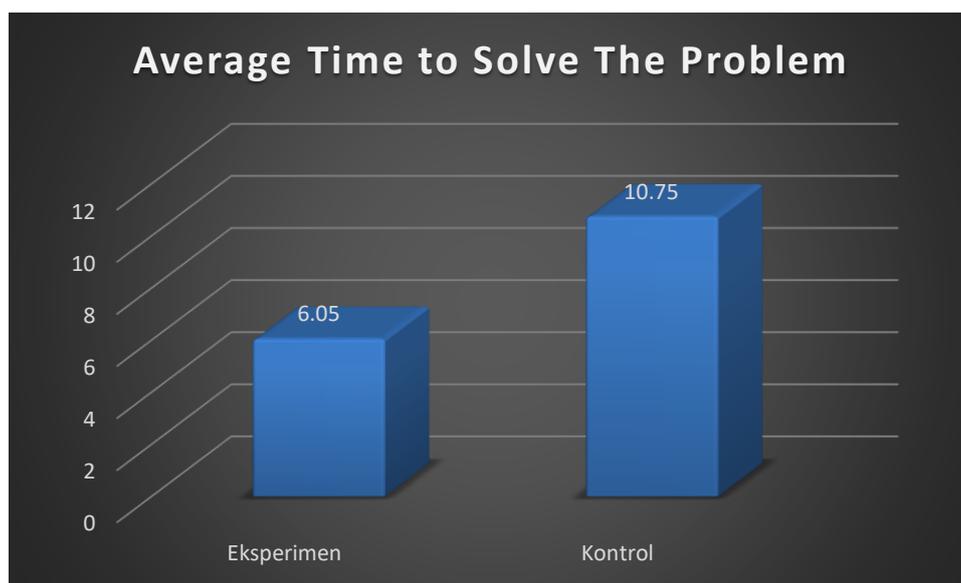


Figure 4. Average Workmanship results in Experimental and Control Classes

It is undeniable that Euclid's algorithm requires thoroughness and good sharing skills. Students who still do not understand the concept of division well enough have difficulty working on Euclid's algorithm. The basic division and multiplication skills are also unity in determining the successful use of Euclid's algorithmic techniques. Suppose students have fulfilled well the concept of multiplication and number sharing. In that case, certainly, students will easily and quickly be able to solve the problem of working on FPB problems (Desriyati et al., 2015) using Euclid's algorithm technique. Factor tree techniques are considered less efficient in terms of time because the division of numbers is done one by one. Division begins by dividing the main number by prime number, starting from the numbers 2, 3, 5, etc. This method is quite time-consuming and, in the process, is less effective.

Students' level of understanding regarding the concept of FPB in experimental and control classes shows results in the form of a significant difference in average test results. The average class obtained by the students who use Euclid's algorithmic technique is 83.5, with a very good grade point moderate category. Students in the control class group learning using factor tree techniques get a grade point average of 71.25 with a good type. If you look at the difference in the average grades of both class groups, it shows a fairly far difference in average points. This can be seen in the graph below.

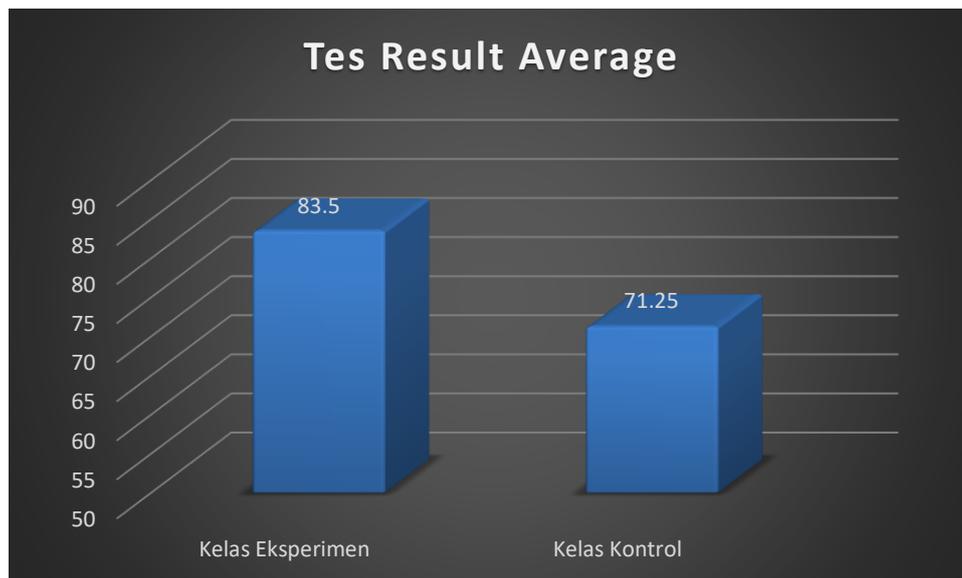


Figure 5. Comparison of Average Test Results of Experimental and Control Classes

The practicality of Euclid's algorithmic techniques becomes a factor that influences a student's level of understanding. Practical ways offered in learning activities help students easily remember and apply it to the work of problems. Innovations made in solving issues about FPB provide evidence that the development of theory in the field of mathematics makes it easier for students to solve problems. Engineering innovations and methods in math problems will make it easier for students to understand the material and reduce the perspective of students who find mathematics difficult.

An average difference test is needed to reinforce the conclusion that Euclid's algorithmic technique in the work of the FPB problem does provide evidence of significant differences. This test can be done using a test-t by first performing a prerequisite test, i.e., a test of normality and homogeneity. The following presented the results of the normality test analysis of both data groups used in research activities (practical classes and control classes).

Table 1. Summary of Experimental Class Normality Test Results and Control Classes

No	Variable	Value	
		Experiment	Control
1	N	20	16
2	Mean	83.5	71.25
3	Standard Deviation	16.31	8.062
4	Kolmogorov Smirnov	1.315	0.944
5	Sig-2 Tailed	0.063	0.334
	Conclusion	Test Distribution is Normal	

A comparison was made between sig-2 tailed value and the alpha value (0.05) to see the normality of data from a group. The data group will be distributed normally if the Sig-2 Tailed value is obtained after data analysis using SPSS > 0.05. Based on the results in table 1, it can be concluded that both data groups have been normally distributed, and testing can be continued on homogeneity tests. Here are presented the results of the data homogeneity test using the Levene test.

Table 2. Results of Control Class and Experimental Data Homogeneity Tests

No	Variable	Value
1	Levene Stat	22.308
2	df1	1
3	df2	34
4	Sig 2 Tailed	0.000

The data group will be homogeneous if the sig 2 tailed value $>$ the alpha value (0.05). Based on the results of the data analysis obtained in table 2, it can be concluded that both data groups have homogeneous variance. Both prerequisite tests have been met, and testing can be continued on an independent sample t-test.

To see the difference in the results of student understanding using Euclid's algorithmic techniques and factor trees, an independent sample t-test can be used. Summary of the independent test analysis results of independent sample t-test assisted spss application as follows.

Table 3. Summary of Test Results of Both Class Groups Using Independent Sample t-test Technique

	Group	N	Mean	Std. Deviation	Std. Error Mean
Value	Experiment	20	83.50	16.311	3.647
	Control	16	71.25	8.062	2.016
Sig 2 tailed = 0.000					

Based on the results of the data analysis, it is seen that the value of sig 2. Tailed by 0,000. The difference between the two class groups will be significant if the value is sig 2. Tailed $>$ 0.05. The conclusion that can be drawn based on the results of this test is that there is a significant difference in results between students using Euclid's algorithmic techniques and factor trees. Significant differences based on findings during research activities are influenced by the practicality of the techniques offered, time efficiency, ease of understanding of students, and the achievement of learning outcomes by minimum completion criteria.

Euclid's algorithm technique is said to be effective in helping students solve problems about FPB. Euclid's algorithm offers ease of working on problems supported by practicality in problem-solving steps. Various student responses found during research activities, such as Euclid's algorithmic technique, are very helpful for students in solving problems about FPB. Different student responses to Euclid's algorithmic techniques are analyzed based on the instrument questionnaires that have been deployed as follows.

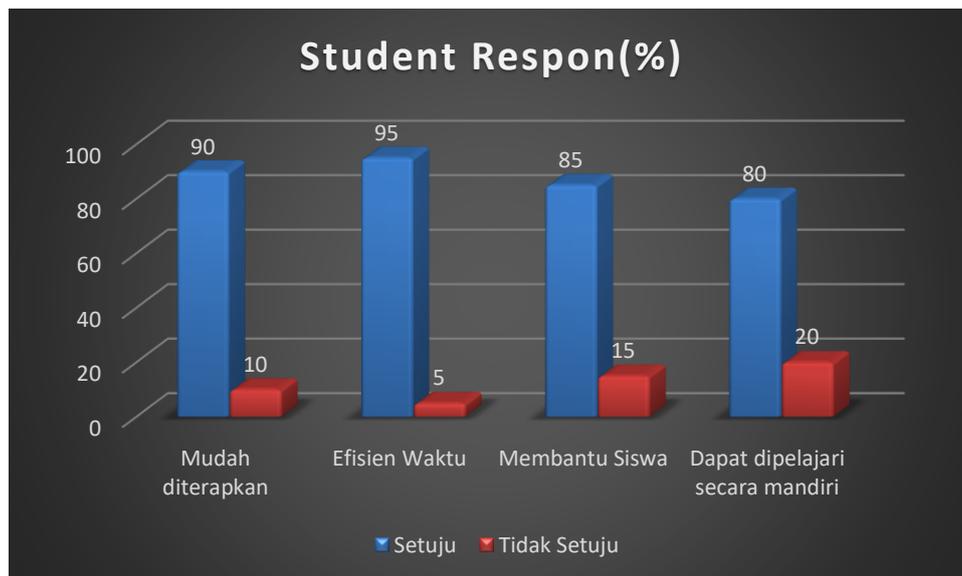


Figure 6. Results of Analysis of Student Response to the Effectiveness of Euclid's Algorithm

Based on the student's response, it can be concluded that using Euclid's algorithmic techniques makes it easier for students to work on problems. Easy-to-understand work steps can shorten students' time working on problems about FPB. Students will be helped well in working on problems because in solving FPB problems, pair students do not need to work on number factors one by one. In addition, Euclid's algorithmic techniques can be relearned easily and allow students to learn these techniques independently.

Euclid's algorithm comes as one of the alternative techniques that can be used to solve problems about FPB. Teachers in schools still using factor tree techniques can vary the method of working on FPB problems, with one of them using Euclid's algorithm. Euclid's algorithm in the work of problems about FPB proved effective in helping to improve the efficiency of work time, understanding and therefore highly recommended as one of the alternative solutions in the work of problems about FPB. In the future, it is expected that more innovations will appear that can make it easier for students to work on math problems so that slowly students' perception of mathematics will be less and less.

CONCLUSION

Euclid's algorithm is one of the theoretical innovations developed to make it easier for students to work on problems about FPB. Euclid's use of algorithmic techniques showed significant differences in results compared to factor tree techniques. Various factors that make Euclid's algorithmic method better include the ease of solution steps offered, time efficiency, practicality, and allowing students to learn this technique independently.

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REFERENCES

- Afriatama, R., & Ardita, Y. (2022). *Upaya Meningkatkan Proses dan Hasil Pembelajaran Matematika pada Materi KPK dan FPB dengan Pendekatan RME Menggunakan Media Bahan Pokok Efforts to improve the Process and Results of Mathematics Learning on KPK and FPB Materials with the RME Approach Using*. 2(1), 406–413.
- Desriyati, W., Gemawati, S., & Kunci, K. (2015). Cara Lain Menentukan FPB dan KPK. *Jurnal Sains Matematika Dan Statistika*, 1(1), 52–55.
- Hadi, S. (2016). Scaffolding Dalam Menyelesaikan Permasalahan KPK dan FPB. *Ibriez : Jurnal Kependidikan Dasar Berbasis Sains*, 1(1), 141-148
- Indiyah, I. (2019). Peningkatan Hasil Belajar Matematika Materi KPK Dan FPB Melalui Penerapan Problem Solving Approach Pada Siswa Kelas VI SDN 03 Manisrejo Kota Madiun. *Jurnal Ilmiah Pengembangan Pendidikan (JIPP)*, 6(1), 18–24. <https://ejurnalkotamadiun.org/index.php/JIPP/article/view/258>
- Kesuma, D. S., Berli, A. U., Meilisa, M., & Rahayu, C. (2022). *EDUKATIF : JURNAL ILMU PENDIDIKAN Fun Science Methods to Improve Student s ' Activeness in Science Learning*. 4(1), 530–538.
- Latifah, U. ;dkk. (2020). Miskonsepsi Penyelesaian Soal Cerita Matematika Materi FPB dan KPK Sekolah Dasar. *Jurnal Riset Pendidikan Dasar*, 03(2), 181–195.
- Marzuki. (2018). Peningkatan Prestasi Belajar Kpk Dan Fpb Dengan Menggunakan Media Dakon Pada Siswa Kelas Iv. *Penelitian*, 5(1), 21–25.
- Miranda, G. Y., & Ahmad, S. (2020). Peningkatan Hasil Belajar Siswa pada Materi FBB dan KPK Menggunakan Model Problem Based Learning di Kelas IV SDN 13 Gadut Agam. *Jurnal Pendidikan Tambusai*, 4(3), 2811–2818.
- Nurohim, N. (2021). Guided Discovery Learning Menggunakan Tabel Andromatika untuk Meningkatkan Motivasi dan Hasil Belajar Matematika. *Jurnal Didaktika Pendidikan Dasar*, 4(1), 227–254. <https://doi.org/10.26811/didaktika.v4i1.157>
- Oktaviarini, N. (2016). Penerapan Model Teams Games-Tournament (TGT) Untuk Meningkatkan Hasil Belajar Kelipatan Persekutuan Terkecil (KPK) dan Faktor Persekutuan Terbesar (FPB) pada Siswa Kelas IV SDN Serut 01 Tulungagung. *PENA SD (Jurnal Pendidikan Dan Pembelajaran Anak Sekolah Dasar)*, 2(1), 68–80.
- Sabri, S. (2020). Peningkatan hasil belajar KPK dan FPB dengan pendekatan konstruktivisme. *JPGI (Jurnal Penelitian Guru Indonesia)*, 5(2), 79. <https://doi.org/10.29210/02628jpgi0005>
- Salbiah, A. O., Masruroh, A. A., & Chotimah, S. (2021). *Pembelajaran Fpb Dan Kpk Dengan*. 4(5), 1327–1336. <https://doi.org/10.22460/jpmi.v4i5.1327-1336>

- Sapartien, R. (2017). Peningkatan Hasil Belajar Matematika Melalui Media Tabel Dengan Power Point Pada Siswa Sekolah Dasar. *Refleksi Edukatika : Jurnal Ilmiah Kependidikan*, 7(1), 26–30. <https://doi.org/10.24176/re.v7i1.1808>
- Sardin, S., & Rajab, R. (2017). Meningkatkan hasil belajar matematika melalui pendekatan pemecahan masalah pada siswa kelas V SD Negeri 2 Bone-Bone Kota Baubau pada pokok bahasan FPB dan KPK. *Jp3M (Jurnal Penelitian Pendidikan Dan Pengajaran Matematika)*, 3(1), 51–62.
- Sari, C. K., Muslihatun, A., Cahyaningtyas, L., Khaimudin, R. N. L. H., Fijatullah, R. N., & Nisa', E. U. (2019). Pemanfaatan permainan tradisional untuk media pembelajaran: Congklak bilangan sebagai inovasi pembelajaran matematika sekolah dasar. *Transformasi: Jurnal Pengabdian Masyarakat*, 15(1), 14–22. <https://doi.org/10.20414/transformasi.v15i1.915>
- Savriliana, V., Sundari, K., & Budianti, Y. (2020). Media Dakota (Dakon Matematika) Sebagai Solusi untuk Meningkatkan Hasil Belajar Matematika Siswa Sekolah Dasar. *Jurnal Basicedu*, 4(4), 1160–1166. <https://doi.org/10.31004/basicedu.v4i4.517>
- Suryani, A. (2018). Peningkatan Hasil Belajar Siswa Pada Materi FPB Dan KPK Dengan Metode Sisir. *Ibtida'i : Jurnal Kependidikan Dasar*, 5(02), 203. <https://doi.org/10.32678/ibtidai.v5i02.1231>
- Ulhusna, M., Putri, S. D., & Zakirman, Z. (2020). Permainan Ludo untuk Meningkatkan Keterampilan Kolaborasi Siswa dalam Pembelajaran Matematika. *International Journal of Elementary Education*, 4(2), 130. <https://doi.org/10.23887/ijee.v4i2.23050>
- Utami, D. (2012). Penggunaan Metode Drill dan Tanya Jawab Untuk Meningkatkan Hasil Belajar Matematika KPK dan FPB. *Dinamika*, 3(2), 149-153
- Wibowo, D. C., Handayani, A. F., Setiawan, B., Dores, J., Persada, S., & Sintang, K. (2021). *Peningkatan Hasil Belajar Siswa Menggunakan Media Dakon Matematika (DAKOTA) materi dengan model pembelajaran langsung , guru menjelaskan materi hanya pembelajaran sedangkan siswa bersifat pasif dan hanya menerima informasi yang Selain berdasarkan nilai . 2*, 176–185.
- Yuliana Sari`, E., & Esti Windari, G. (2019). Analisis Upaya Guru Dalam Mengatasi Kesulitan Belajar Siswa Pada Pelajaran Matematika Kelas Iv Di Sdn II Geger Kecamatan Sendang Kabupaten Tulungagung Tahun Pelajaran 2017/2018. *Pendas : Jurnal Ilmiah Pendidikan Dasar*, IV, 111–124. <https://doi.org/10.23969/jp.v4i1.1022>
- Yunita, S. (2012). Menentukan Kelipatan Persekutuan Terkecil (KPK) dan Faktor Persekutuan Terbesar (FPB) dengan Menggunakan Metode PEBI. *Beta*, 5(2), 149-165
- Yensy, N. A. (2020). Metode Alternatif Menentukan KPK dan FPB Suatu Bilangan Bulat Dengan Menggunakan Alat Peraga. *Pendipa : Jurnal of Science Education*, 4(2), 107-114.