



Does Educational Background Affect Understanding of Science Concepts? Case Study of Prospective Elementary School Teachers

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Received: April 5, 2023

Revised: July 25, 2023

Accepted: August 25, 2023

Published: August 31, 2023

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DOI: [10.29303/jppipa.v9i8.3584](https://doi.org/10.29303/jppipa.v9i8.3584)

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Abstract: This research is a quantitative study to determine the effect of educational background on the understanding of the science concept of UPY PGSD students. This research is based on the low understanding of the science concept as evidenced by the percentage of science learning test results, namely 67.6% of the total number of semester 2 PGSD UPY students scored below 80. The method used in this research is ex post facto quantitative which is used to determine the cause of the low understanding of students' science concepts in terms of their educational background. The data collection used an educational background questionnaire and a science concept understanding test that had been tested for validity and reliability. The research shows the results of the t-test namely $t_{count} < t_{table}$ ($0.095 < 0.931$), then H_0 is accepted and H_a is rejected, which means that there is no significant influence between students' educational background on the understanding of science concepts. However, there is a unidirectional relationship between the two with the result of a positive correlation test (r) of 0.055 and contributing an influence of 0.3% from the educational background on understanding the science concept of PGSD UPY students.

Keywords: Educational Background; Understanding; The Science Concept

Introduction

Educational background is one of the benchmarks for an individual to be said to be capable or not, the higher a person's educational background, the higher the ability level is expected to be because the educational background will determine the individual's personality, mindset and insight. Human resources who have a certain educational background will usually be seen in their ability to process learning that has been mastered in previous education. The urgency of education as a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, as well as skills needed by himself and

society (UU No. 20 tahun 2003). Differences in the characteristics of each individual related to student educational background are one of the problems that are often encountered in learning (Setiyawan, 2018). A supportive educational background will expedite the next learning process (Purnamasari et al., 2022). The more identical elements of a subject, the easier it will be for someone to learn other subjects (Shubchan, 2021).

According to the National Education System Law no. 20 of 2003, the level of education is the stage of education that is determined based on the level of development of students, the goals to be achieved and the abilities developed. The level of formal education consists of: (a) basic education; (b) secondary education; and (c) higher education. The secondary education level is a continuation of basic education which consists of

How to Cite:

Umardianti, U., Supartinah, S., & Kurniawati, W. (2023). Does Educational Background Affect Understanding of Science Concepts? Case Study of Prospective Elementary School Teachers. *Jurnal Penelitian Pendidikan IPA*, 9(8), 5798–5805. <https://doi.org/10.29303/jppipa.v9i8.3584>

general secondary education and vocational secondary education. Forms of educational units at the secondary education level include high schools (SMA), Madrasah Aliyah (MA), Vocational High Schools (SMK), and Vocational Madrasah Aliyah (MAK), or other equivalent forms. Education Units at the Higher Education level are educational units that carry out education after secondary education which includes diploma, bachelor, master, specialist, and doctoral education programs organized by universities. Higher education can take the form of academies, polytechnics, high schools, institutes, or universities. The importance of educational background as a stepping stone to continue to the next higher level of education.

Education as an effort that plays a large role in improving the quality of human resources. Through education, certain personal individuals are motivated to develop attitudes, knowledge and skills to be better and more advanced than before. Attainment of the best aspects of attitude, knowledge and skills is carried out through a process at the educational level, starting from basic education, secondary education to higher education. Progress at each level of education is the capital for continuing to the next higher education. All efforts and efforts are made by educators to prepare students to become graduates with quality and integrity. Certain programs are also implemented at the upper secondary education level in order to prepare graduates for the higher education level,

Higher education which occupies the top level in the educational pyramid consists of diploma, bachelor, master, specialist and doctoral levels which are held by certain tertiary institutions, both private and public. Higher education belongs to several fields in order to produce quality human resources in various aspects of life. The educational aspect is a favorite major for prospective students, this was found from the results of the Higher Education Database (PDDikti) data, in October 2022, namely 21.5% of students in Indonesia were students studying education. One of the many study programs in the education faculty is elementary school teacher education (PGSD).

The PGSD study program is a department for teaching, educating and improving students' skills to become prospective elementary school teachers. Graduated elementary school teachers are now called classroom teachers who are mandated to teach all subjects except religion and sports. A distinctive characteristic of the PGSD major is that students must master all the concepts of subject matter in order to become professional elementary school teachers in all respects, including science, social studies, Indonesian language, mathematics, civics and arts and culture. The urgency of understanding concepts is a factor that causes errors in drawing conclusions in solving problems (Zebua, 2020) and low student learning

outcomes (Marbun & Marbun, 2021; Putra & Hefni, 2022). Zalukhu et al. (2023), shows the urgency of understanding concepts in overcoming difficulties experienced by students in solving problems in learning real analysis: (1) difficulties in procedural understanding; (2) difficulties in logical reasoning; (3) difficulty in abstraction; (4) the difficulty of formal proof to solve real problems.

The concept according to Rosser (2001), is an abstraction that represents a class of objects, events, activities, or relationships that have the same attributes. Concept understanding is a level of ability that expects individuals to be able to understand concepts, situations and known facts, and be able to explain in their own words according to their knowledge, without changing the meaning (Purwanto, 2009). Kilpatrick et al. (2001), suggested indicators of understanding concepts, namely: a) the ability to restate the concepts that have been learned; b) the ability to give examples of the concepts that have been studied; and c) the ability to relate various concepts that have been learned. According to van Breukelen et al., (2017) states that science and technology play an important role in improving an increasingly modern world. The progress of this world certainly requires human resources who are skilled in understanding scientific concepts. So it can be explained that understanding the concept of natural science is an individual's effort to understand an abstraction of objects, events, activities, facts and relationships between elements in his mind and later can be implemented in everyday life.

The problem of understanding the concept has been examined by researchers. According to Devy et al. (2022) who stated that the level of understanding of the science concept of the research sample was still relatively low, which was marked by repetition of complete answers, irrelevant and unclear answers. The results of subsequent studies showed that the level of understanding of science concepts by elementary school teachers was still below 50%, especially in the material of the sun, temperature and heat, electricity, magnetic fields, and the solar system (Hasnawati et al., 2022). Other studies have found that the level of students' conceptual understanding of lithospheric material is low, with an average of still below 50% of the 6 questions given (Laelandi et al., 2022).

In order to equip students with good mastery of science material concepts, the PGSD study program, especially at the PGRI Yogyakarta University (UPY), designed a science course for 2nd semester PGSD students by discussing the concept of living things and their environment and human organ systems assuming that all students should master the concepts science concepts that have been studied at the previous level. The educational background of UPY PGSD second semester students also varies, ranging from general high

schools, vocational high schools, madrasah aliyah and other secondary education programs.

Preliminary studies that have been conducted with lecturers supporting science courses show that the understanding of science concepts for second semester PGSD UPY students varies and most (more than half) fall into the low category as evidenced by the percentage of science learning test results, namely 67.6% of the entire number of UPY PGSD 2 semester students scored below 80. Variations in student educational backgrounds with various curricula and various vocational subjects in each secondary education unit have an impact on the level of understanding of the science concept. This is also in line with the results of Setiyawan's research (2018) which states that there are seven learning problems caused by differences in educational background, namely 1) there is a gap in learning, 2) ability adjustment, 3) slowing of learning, 4) diversion and unification of learning focus, 5) feelings of anxiety, inadequacy and fear in learning, 6) lack of self-confidence, and 7) laziness in learning. In terms of the impact of diverse student educational backgrounds provides a gap to influence the understanding of science concepts (Rahayu, 2019), therefore a-research is needed on the influence of educational background on the understanding of science concepts in PGSD UPY students.

Method

This research is a type of ex post facto quantitative research that is used to find out the causes of the behavior or status of groups of individuals. This research was conducted to determine the effect of educational background on the understanding of the science concept in the second semester of PGSD UPY students and how much influence the educational background had on the understanding of the science concept in the second semester of PGSD UPY students. The research was conducted in room 309, unit II campus of PGRI Yogyakarta University, Jl. PGRI II No. 232, Sonosewu, Ngestiharjo, Kec. Kasihan, Bantul Regency, Special Region of Yogyakarta which will be held in March 2023.

The population of this study were all UPY PGSD undergraduate students. The sample of this research was the 2nd semester PGSD UPY students in 4 classes, namely class A4-22, A5-22, A6-22 and A7-22 totaling 147 samples. The research variables used in this study are the independent variable (free) and the dependent variable (tied). The independent (free) variable is the

student's educational background, the educational background referred to in this study is the formal educational background such as SMA/SMK/MA and the dependent variable (tied) is the understanding of the science concept.

Data collection techniques used questionnaires and document studies by empowering instruments in the form of questionnaires and tests of understanding the concept of science. The questionnaire given to 147 samples was used to identify and collect the background and vocational skills of students in their previous education. The science concept understanding test contains 35 questions about living things and their environment and human organ systems. Study of documents from the results of the Science concept understanding test to obtain research data related to the value of understanding the Science concept for second semester PGSD UPY students.

The validity of the instrument used in this research is content validity. Content validity is done by comparing the contents of the instrument with the subject matter being taught. Content validity is carried out by considering the opinion of experts (expert judgment). The assessment carried out by expert judgment lies in the feasibility of the instrument regarding understanding the concept. After the questions are declared valid, the questions can be used as a measuring tool in this study related to the understanding of the concept of science in semester 2 PGSD UPY students.

The data analysis technique used in this study is descriptive statistical analysis and inferential statistical analysis. This descriptive statistical data analysis was used for the results of the educational background questionnaire and the level of understanding of the science concept in the second semester of PGSD UPY students. And inferential statistical analysis was used to calculate the influence of educational background on the understanding of the science concept in semester 2 of PGSD UPY.

Result and Discussion

Descriptive statistical data analysis was used to analyze the results of a questionnaire on educational background and the level of understanding of the science concept. Analysis of descriptive statistical data for the results of the student educational background questionnaire is contained in Table 1.

Table 1. Educational Background Questionnaire Results and Science Concept Understanding Test Scores for UPY PGSD Students

LB	F	P	Σ	\bar{x}	f	p	Σ	\bar{x}
MA (SCIENCE)	14	10%	934.29	66.74	6	4%	408.57	68.10
MA (NON-SCIENCE)					8	5%	525.72	65.72
SMA (SCIENCE)	98	67%	6600	67.35	45	31%	3157.2	70.16
SMA (NON-SCIENCE)					53	36%	3442.85	64.96
SMK	35	24%	2388.6	68.25	35	24%	2388.6	68.25
AMOUNT	147	100%	9922.92	202.33	147	100%	9922.92	337.17

Notes:

- LB : Backgroundbackground of student education
- F : total frequency
- P : Total percentage
- Σ : Number of science concept understanding test scores
- \bar{x} : The average value of the science concept understanding test
- f : Frequency per major
- p : Percentage of each major

Analysis of descriptive statistical data for the level of understanding of students' science concepts can be seen in Table 2.

Table 2. Results of Science Concept Understanding Test for Semester 2 PGSD UPY Students

No	Number	F	P	No	Number	F	P
1	31	1	1%	12	63	11	7%
2	34	2	1%	13	66	11	7%
3	37	5	3%	14	69	8	5%
4	40	1	1%	15	71	14	10%
5	43	1	1%	16	74	18	12%
6	46	4	3%	17	77	12	8%
7	49	2	1%	18	80	9	6%
8	51	6	4%	19	83	11	7%
9	54	9	6%	20	86	3	2%
10	57	8	5%	21	89	2	1%
11	60	3	2%	22	91	6	4%

N = 147

Inferential Statistical Data Analysis
Validity Test and Reliability Test

This validity test was conducted to find out whether the questions contained in the test sheet used as a research instrument were valid. The reliability test was

carried out to find out whether the research instrument was reliable to be used as a data collection tool or not. The results of the validity test and reliability test using SPSS are as follows.

Table 3. Test Instrument Validity Test Results

Validity test					
Number	r count	Information	Number	r count	Information
r count 1	0.273	VALID	r count 19	0.366	VALID
r count 2	0.207	VALID	r count 20	0.202	VALID
r count 3	0.358	VALID	r count 21	0.235	VALID
r count 4	0.374	VALID	r count 22	0.431	VALID
r count 5	0.33	VALID	r count 23	0.36	VALID
r count 6	0.194	VALID	r count 24	0.26	VALID
r count 7	0.358	VALID	r count 25	0.425	VALID
r count 8	0.207	VALID	r count 26	0.424	VALID
r count 9	0.374	VALID	r count 27	0.294	VALID
r count 10	0.416	VALID	r count 28	0.41	VALID
r count 11	0.388	VALID	r count 29	0.488	VALID
r count 12	0.492	VALID	r count 30	0.494	VALID
r count 13	0.388	VALID	r count 31	0.394	VALID
r count 14	0.492	VALID	r count 32	0.38	VALID
r count 15	0.318	VALID	r count 33	0.492	VALID
r count 16	0.501	VALID	r count 34	0.226	VALID
r count 17	0.354	VALID	r count 35	0.388	VALID
r count 18	0.522	VALID			

r tabel (N=73, $\alpha=0.05$) = 0.1914

Table 4. Test Instrument Reliability Test Results

Reliability Statistics			
		Cronbach's Alpha	
		Based on	
Cronbach's Alpha	Standardized Items	N of Items	
0.833	0.829	35	

Simple linear regression test

Before conducting the t-test, you must first look for the regression equation and the contribution contributed by variable X to variable Y with the simple linear regression Formula 1:

$$Y = a + bX = 67.281 + 0.005X \tag{1}$$

Constants a and b are found from simple linear regression calculations using SPSS with the results in Table 5.

Table 5. Simple Linear Regression Calculation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	67.281	1.980		33.976	0.000
	Educational background	0.005	0.056	0.055	0.095	0.931

Correlation coefficient test (r)

The relationship between educational background and understanding of the science concept in semester 2 PGSD UPY students can be determined by testing the correlation coefficient (r) using SPSS, the results of which are shown in Table 6.

Table 6. Calculation of the correlation coefficient test (r)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.055 ^a	.003	-.329	2,41844

After getting the correlation value, the next thing to do is to find out how much the contribution given by the student's educational background is towards understanding the concept of science. The calculation uses the Formula 2 of the determinant coefficient as follows:

$$KP = (r^2) \times 100\% = (0.055)^2 \times 100\% = 0.3\% \tag{2}$$

The t-test for the Hypothesis

H0 : Nothere is a real (significant) influence between educational background on the

understanding of the science concept of UPY PGSD students ($t_{count} < t_{table}$)

Ha : There is a significant (significant) influence between educational background on the understanding of the science concept of UPY PGSD students ($t_{count} > t_{table}$)

The t-test was conducted to test the hypothesis, whether Ha is accepted and Ho is rejected or Ho is accepted and Ha is rejected. The results of the t-test can be seen in Figure 2 so that it is found that the t_{count} is 0.095 and the t_{table} is 0.931. The t-test results yield $t_{table} = 0.931$ and $t_{count} = 0.095$ which means $t_{count} < t_{table}$ ($0.095 < 0.931$), then Ho is accepted and Ha is rejected, which means that there is no real (significant) effect between educational background on understanding the science concept of PGSD UPY students.

In this sub-chapter, the researcher will discuss the process, results and analysis of research data that has been obtained with predetermined hypotheses. This research was started by conducting interviews and observing the supporting documents of the interview results. Based on the interview process conducted with lecturers supporting the Science course, it was found that UPY PGSD students came from different educational backgrounds and majors and their understanding of the concept of science varied. This is supported by data from the previous year's UPY PGSD student test results, namely 67.6% of the total number of UPY PGSD 2 semester students scored below 80. This means that most students do not understand the science concept in detail and detail. According to Nugroho & Pramukantoro (2014) students who come from high school backgrounds are theoretically more prepared to accept learning materials in college because the curriculum in high school is designed to prepare students to be ready to continue their education to college. Based on research by Ponirin (2019) which states that there are differences in test results between students with religious and general education backgrounds. Students with a religious education background have a higher level of understanding of PAI than students with a general education background. It was concluded that there was an influence between the educational background of students and the level of understanding of certain concepts.

Starting from the results of the interviews, document observation and analysis of the relevant research, the researchers created a questionnaire to collect educational background data and tests to measure understanding of the science concept of PGSD UPY students. So that the results of the assessment can be trusted, validity and reliability tests were carried out on the science concept understanding test which found that the test totaled 35 questions consisting of living things and their environment as well as human organ

Research conducted by Lu'luilmaknun et al. (2022), revealed that students' understanding of concepts is partially influenced by learning motivation, learning independence, and self-confidence. In order to improve understanding of concepts, improvements are needed in learning tools that have been researched by researchers as a form of program to develop the quality of learning. Several studies state that in order to improve the understanding of science concepts, students can use interactive learning media (Wahyuni et al., 2023), CTL-based digital comic media (Rahayu et al., 2023), problem-based learning model innovations (Sari, 2023) and other learning innovations.

Based on these relevant studies, it can be explained that other factors that influence conceptual understanding include internal factors, namely motivation, interest in learning, talent, readiness, learning methods, and cognitive abilities as well as external factors, namely the role of educators, facilities, and the environment family.

Conclusion

The order of educational background of UPY PGSD students mostly starts from SMA (67%), SMK (24%) and MA (9%). The order of the highest average scores of UPY PGSD students starts from SMK (68.25), SMA (67.35), and MA (66.74). In the educational background of SMA and MA, the value of understanding the concept of science in science majors is higher than in non-science majors. Educational background does not significantly influence students' understanding of science concepts. This can be seen in the results of the t-test namely $t_{\text{count}} < t_{\text{table}}$ ($0.095 < 0.931$), then H_0 is accepted and H_a is rejected, which means that there is no significant influence between students' educational background on the understanding of science concepts. However, there is a unidirectional relationship between the two with the result of a positive correlation test (r) of 0.055 and contributing an influence of 0.3% from the educational background on understanding the science concept of PGSD UPY students. As for suggestions that can be recommended from the results of this study, namely conducting other studies to analyze the factors that influence students' understanding of science concepts.

Acknowledgments

My gratitude goes to the presence of Allah SWT, thanks to the staff of PGRI Yogyakarta University and the science lecturer who have given me the opportunity and accepted me to do this research, my parents who have always supported me, and my friends who have always encouraged me.

Author Contributions

Urmila Umardianti: Conceptualization, methodology, writing—original draft preparation, formal analysis, investigation, and visualization. Supartinah and Wahyu

Kurniawati: writing—review and editing, validation, supervision, and resources.

Funding

This research received no external funding.

Conflicts of Interest

The authors declare no conflict of interest.

References

- Devy, N. K., Halim, A., Syukri, M., Yusrizal, Y., Nur, S., Khaldun, I., & Saminan, S. (2022). Analysis of Understanding Physics Concepts in terms of Students' Learning Styles and Thinking Styles. *Jurnal Penelitian Pendidikan IPA*, 8(4), 2231–2237. <https://doi.org/10.29303/jppipa.v8i4.1926>
- Hasnawati, H., Syazali, M., & Widodo, A. (2022). Analysis of Understanding Science Concepts for Prospective Elementary School Teacher Candidates. *Jurnal Penelitian Pendidikan IPA*, 8(6), 2954–2960. <https://doi.org/10.29303/jppipa.v8i6.2438>
- Kilpatrick J., Swafford, J. dan Findell, B. (2001). *Adding It Up: Helping Children Learn Mathematics*. National Academy Press.
- Laelandi, R., Widodo, A., & Sriyati, S. (2022). Depth of Science Learning Materials in Schools and Student Concept Mastery. *Jurnal Penelitian Pendidikan IPA*, 8(3), 1470–1478. <https://doi.org/10.29303/jppipa.v8i3.1706>
- Lu'luilmaknun, U., Salsabila, N. H., & Tyaningsih, R. Y. (2022). Faktor-Faktor Afektif Yang Mempengaruhi Pemahaman Konsep Matematika Siswa Sekolah Menengah. *Mathematic Education And Application Journal (META)*, 3(2), 17–24. <https://doi.org/10.35334/meta.v3i2.2398>
- Manurung, M. (2017). *Analisis Faktor yang Mempengaruhi Pemahaman Konsep Matematika pada Siswa SMA Al-Hidayah Medan TP 2016/2017*. Doctoral dissertation, UMSU. Retrieved from <http://repository.umsu.ac.id/handle/123456789/12743>
- Marbun, S. R., & Marbun, S. K. (2021). pengaruh pemahaman konsep dan penalaran terhadap hasil belajar matematika siswa SMP. *EKSAKTA : Jurnal Penelitian Dan Pembelajaran MIPA*, 6(1), 287–294. Retrieved from <http://jurnal.um-tapsel.ac.id/index.php/eksakta/article/view/8792>
- Nugroho, C., & Pramukantoro, J. . (2014). Pengaruh Motivasi Belajar Mahasiswa Berdasarkan Latar Belakang Sekolah pada Mata Kuliah Praktik Dasar Listrik dan Matematika Teknik 1 Terhadap Prestasi Belajar Mahasiswa S1 PTE UNESA Tahun Angkatan 2012. *Jurnal Pendidikan Teknik Elektro*, 3(1), 97–104.

- <https://doi.org/10.26740/jpte.v3n1.p%25p>
- Ponirin., D. K. (2019). *Pengaruh Latar Belakang Pendidikan Mahasiswa Terhadap Tingkat Pemahaman Pembelajaran Pendidikan Agama Islam di Iain Palopo*. Doctoral dissertation, Institut Agama Islam Negeri Palopo.
- Purnamasari, N., Mulyadi, & Rohiq, M. (2022). Pengaruh Latar Belakang Pendidikan dan Minat Belajar Siswa Terhadap Hasil Belajar Bahasa Arab di Madrasah Aliyah Laboratorium Jambi. *Jurnal Pendidikan Dan Konseling*, 4(4), 4530–4534. Retrieved from <https://journal.universitaspahlawan.ac.id/index.php/jpdk/article/view/6186>
- Purwanto, N. (2009). *Prinsip-Prinsip dan Teknik Evaluasi Pengajaran*. Remaja Rosdakarya.
- Puspa, S. D., Riyono, J., & Puspitasari, F. (2021). Analisis Faktor-Faktor yang Mempengaruhi Pemahaman Konsep Matematis Mahasiswa dalam Pembelajaran Jarak Jauh Pada Masa Pandemi Covid-19. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 5(1), 302–320. <https://doi.org/10.31004/cendekia.v5i1.533>
- Putra, D. E., & Hefni, E. (2022). Faktor Penyebab Rendahnya Hasil Belajar Siswa dan Strategi Guru Meningkatkan Pemahaman Konsep Siswa. *Jurnal Pendidikan Tembusai*, 6(2), 14942–14958. <https://doi.org/10.31004/jptam.v6i2.4776>
- Rahayu, A., Prasetyo, A. T., & Utomo, C. B. (2023). Pengembangan Komik Digital Berbasis CTL Untuk Pemahaman Konsep IPA dan Motivasi Belajar Siswa Sekolah Dasar. *Jurnal Inovasi Pendidikan Dan Pembelajaran Sekolah Dasar*, 7(1), 89. <https://doi.org/10.24036/jippsd.v7i1.122234>
- Rahayu, S. I. (2019). Analisis Faktor-Faktor Yang Mempengaruhi Pemahaman Konsep Dasar Akuntansi. *Jurnal Pajak, Akuntansi, Sistem Informasi, Dan Auditing (PAKSI)*, 1(1), 40–57. <https://doi.org/10.33476/jpaksi.v1i1.966>
- Rosser, N. A. (2001). *The Concept and Principle Received the Studying Experience*. Jossey-Bass Publishers.
- Safitri, S., Muharrami, L. K., Hadi, W. P., & Wulandari, A. Y. R. (2021). Faktor Penting Dalam Pemahaman Konsep Siswa Smp: Two-Tier Test Analysis. *Natural Science Education Research*, 4(1), 45–55. <https://doi.org/10.21107/nser.v4i1.8150>
- Sari, N. P. A. H. (2023). Implementasi Model Pembelajaran Problem Based Learning Berbasis Kontekstual Untuk Meningkatkan Pemahaman Konsep IPA Siswa Sekolah Dasar. *Jurnal Dedikasi Pendidikan*, 7(1), 223–229. <https://doi.org/10.30601/dedikasi.v7i1.3524>
- Setiyawan, A. (2018). Problematika Keragaman Latar Belakang Pendidikan Mahasiswa dan Kebijakan Program Pembelajaran Bahasa Arab. *Arabiyat: Jurnal Pendidikan Bahasa Arab Dan Kebahasaaraban*, 5(2), 195–213. <http://dx.doi.org/10.15408/a.v5i2.6803>
- Shubchan, M. A. (2021). Memahami Latar Belakang Pendidikan Peserta Didik. *Perspektif*, 1(2), 167–171. <https://doi.org/10.53947/perspekt.v1i2.60>
- van Breukelen, D. H. J., de Vries, M. J., & Schure, F. A. (2017). Concept learning by direct current design challenges in secondary education. *International Journal of Technology and Design Education*, 27(3), 407–430. <https://doi.org/10.1007/s10798-016-9357-0>
- Wahyuni, S., Hariandi, A., & Alirmansyah, A. (2023). Upaya Meningkatkan Pemahaman Konsep Peserta Didik pada Muatan IPA Ekosistem Kelas V Sekolah Dasar Menggunakan Video Interaktif. *Journal on Education*, 5(2), 5152–5172. <https://doi.org/10.31004/joe.v5i2.1254>
- Zalukhu, A., Herman, H., Hulu, D. B. T., Zebua, N. S. A., Telaumbanua, T. I., Telaumbanua, M. S., Panggabean, E. M., & Sihombing, D. I. (2023). Urgensi Pemahaman Konsep Mahasiswa dalam Pemecahan Masalah ada Pembelajaran Analisis Real Program Studi Pendidikan Matematika. *Journal on Education*, 5(2), 4519–4529. <https://doi.org/10.31004/joe.v5i2.1177>
- Zebua, V. (2020). Analisis Kesalahan Siswa Dalam Menyelesaikan Soal Barisan Dan Deret Ditinjau Dari Kemampuan Pemahaman Konsep Matematis. *Jurnal LEMMA*, 6(2), 122–133. <https://doi.org/10.22202/jl.2020.v6i2.4088>