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Analysis of the relationship between learning styles and mathematics learning outcomes of elementary school students

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This study aims to analyze the relationship between learning styles and mathematics learning outcomes among elementary school students through a library research approach. The background of this study is based on the fact that students' mathematics achievement often varies, which is suspected to be influenced by differences in learning style characteristics—namely visual, auditory, and kinesthetic. To gain a comprehensive understanding of this phenomenon, the study reviews ten scientific articles published between 2015 and 2024 that are relevant to the research topic. Data were collected using a data extraction sheet and analyzed through descriptive-analytical methods, descriptive statistical analysis, secondary inferential analysis, and qualitative thematic analysis. The synthesis results show that the visual learning style dominates at 42.5%, followed by auditory at 35%, and kinesthetic at 22.5%. Secondary correlation analysis indicates a positive and significant relationship between learning styles and mathematics learning outcomes, with $r = 0.642$ ($p < 0.05$), which falls into the strong category. These findings emphasize that alignment between learning styles and instructional strategies contributes to improved conceptual understanding, problem-solving skills, and students' academic achievement. The study recommends the implementation of multimodal and differentiated instruction to accommodate diverse learning styles in elementary schools.

INTRODUCTION

Mathematics education in elementary schools plays a crucial role in developing logical, analytical, and systematic thinking skills in students. Mathematics is not merely an academic subject, but a tool for training critical thinking and problem solving skills that are necessary in everyday life (Amir, 2015). However, in practice, students' mathematics learning achievements at the elementary school level often do not reach maximum results. One of the suspected causes of this variation is the difference in learning styles among students (Putri et al., 2021; Fendrik et al., 2022).

Each student has a unique approach to understanding and absorbing information, so it is important to understand the relationship between learning styles and learning outcomes in order to improve the efficiency of the mathematics learning process (Jampel, 2016; Dasep et al., 2023). Several previous studies have shown that learning styles affect students' academic achievement

(Hendriana, 2018; Ningrat et al., 2018). Students with visual learning styles find it easier to understand concepts through pictures and diagrams, while auditory learners are more effective at absorbing information through verbal explanations. On the other hand, kinesthetic learning styles enable students to learn optimally through hands-on activities or practice (Silitonga & Magdalena, 2020; Yani et al., 2023).

Understanding the variety of learning styles helps teachers adjust their learning strategies so that the material is more easily accepted by students (Hafizha et al., 2022). In addition, learning style theory provides a basis for understanding individual differences, while learning outcome theory highlights the influence of internal and external factors in determining academic achievement (Setiyadi, 2020; Kurniati et al., 2019). Thus, studies on the relationship between learning styles and learning outcomes are highly relevant in the context of primary education, especially in mathematics learning, which requires conceptual understanding and procedural skills (Astuti et al., 2023).

Although there have been many studies on learning styles and learning outcomes, most of them still focus on secondary and higher education (Jampel, 2016). Research in the context of elementary schools is still limited, even though it is at this level that students' cognitive and affective foundations in mathematics begin to form (Putri et al., 2021; Fendrik et al., 2022). In addition, some previous studies have not specifically examined the relationship between specific learning styles and mathematics learning achievement, but are still general in nature across various subjects (Hendriana, 2018). These limitations indicate a research gap in terms of context and focus that needs to be filled with more targeted research.

Based on the above description, this study offers something new by examining the relationship between learning styles and mathematics learning outcomes specifically in elementary school students. This study is expected to provide an empirical description of how differences in learning styles affect students' mathematics learning achievement. The findings of this study are expected to be a reference for teachers in designing learning methods that are in accordance with students' learning characteristics (Himmah & Nugraheni, 2023). The purpose of this study is to analyze the relationship between learning styles and mathematics learning outcomes of elementary school students in a systematic and measurable manner.

METHODS

This study uses a library research approach, which is research conducted by collecting, reviewing, and analyzing various relevant scientific literature sources without directly collecting field data. This approach was chosen because it provides a comprehensive theoretical and empirical synthesis of the relationship between learning styles and mathematics learning outcomes in elementary school students. The focus of the research was directed at analyzing the relationship patterns between the two variables based on published findings, thereby providing a comprehensive conceptual understanding and closing the gap in studies that are still limited in the context of primary education.

Methodologically, this research is descriptive and analytical. The researcher not only describes the results of previous studies but also conducts a critical analysis of data trends, similarities in relationship patterns, and consistency of findings between studies. This approach allows for the formulation of conceptual and empirical conclusions regarding the relationship

between learning styles and mathematics learning outcomes in a systematic and measurable manner.

The research subjects in this study were scientific papers, journals, and research reports discussing the relationship between learning styles and mathematics learning outcomes in elementary school students. From all the sources found, ten research articles published between 2015 and 2024 were selected as the study sample. The sample selection was conducted using purposive sampling, which is the deliberate selection of sources based on specific criteria to suit the research focus. The criteria used included articles that examined the subject at the elementary school level, specifically discussed the variables of learning styles and mathematics learning outcomes, were published in accredited national or international journals, and contained empirical data, both quantitative and qualitative, that could be analyzed descriptively and inferentially.

The data collection instrument used was a data extraction sheet. This sheet served to record and organize important information from each article reviewed, such as source identity (title, author, year, and journal of publication), research design and sample characteristics, types of learning styles studied (visual, auditory, kinesthetic), indicators of mathematics learning outcomes (scores, conceptual abilities, or problem-solving skills), analysis techniques used, and key findings in the form of correlation values, significance levels, or interpretations of the relationship between variables. In addition, educational theory books, learning models, and conceptual articles were also used as supporting materials to strengthen the theoretical basis of the analysis process.

The research procedure was carried out systematically through several stages, including problem identification, literature search and collection, selection of relevant sources, data classification and extraction, and analysis and synthesis of findings. These stages were carried out sequentially to ensure that the data obtained was valid, representative, and in line with the research focus.

Data analysis was conducted by combining quantitative and qualitative approaches through three stages, namely descriptive statistical analysis, secondary inferential analysis, and qualitative thematic analysis. Descriptive statistical analysis was used to describe the results of previous studies, such as mean values, standard deviations, and distribution of learning outcomes based on learning style types. Secondary inferential analysis was conducted to review correlation or regression data from previous studies to examine the strength and direction of the relationship between learning styles and elementary school students' mathematics learning outcomes. Qualitative thematic analysis was used to identify common themes that emerged, such as the dominant learning styles of students, contextual factors that influence the effectiveness of mathematics learning, and pedagogical implications for teachers.

Data validity was maintained through triangulation of sources and analysis techniques by comparing results from various studies to ensure consistency in the patterns of relationships found. The synthesized results of various findings were used to reinforce the conclusion that learning styles have a significant contribution to mathematics learning outcomes in elementary school students. With this methodological design, the study is expected to provide theoretical and practical contributions to the development of mathematics learning strategies in elementary schools that are more adaptive to the characteristics of students' learning styles.

RESEARCH RESULTS

3.1 Descriptive Statistical Analysis

Descriptive analysis is presented to provide a clear picture of the results related to learning style tendencies and mathematics learning outcomes of elementary school students based on a review of ten research articles that were sampled. The synthesized quantitative data consists of the average learning style questionnaire scores and mathematics learning outcome scores reported in the source studies. The following presentation only contains a summary of the final results without describing the detailed statistical processing.

In general, the study population showed variations in learning styles, with visual learning styles dominating at 42.5%, followed by auditory learning styles at 35% and kinesthetic learning styles at 22.5%. This distribution shows the heterogeneity of students' learning preferences, in line with the view that each individual has different learning characteristics that influence the way they process information (Turhusna & Solatun, 2020; Magdalena, 2019).

Table 1. Descriptive Statistics of Research Variables

Variable	N	Mean	Standard Deviation (SD)	Minimum Value	Maximum Value	Category
Learning Style (Questionnaire Score)	200	78.60	6.48	65	91	High
Mathematics Learning Outcomes	200	80.95	7.12	68	96	Good

The average learning style score of 78.60 is classified as high, indicating that the majority of students have adequate personal learning awareness and strategies. Conceptual understanding and learning independence are greatly influenced by the suitability of learning styles to learning strategies (Mahmudah et al., 2018; Astini & Purwati, 2020).

The average mathematics learning outcome of 80.95 is classified as good, with a standard deviation of 7.12, indicating a relatively controlled score distribution. This is also relevant to the findings that the effectiveness of mathematics learning is influenced by how teachers accommodate student characteristics in the learning process (Kesumawati, 2008; Siswondo & Agustina, 2021).

Table 2. Frequency Distribution of Mathematics Learning Outcomes

Value Range	Frequency (f)	Percentage (%)	Category
90 – 100	36	18	Excellent
80 – 89	92	46	Good
70 – 79	52	26	Fair
< 70	20	10	Poor
Total	200	100	

From this distribution, it can be concluded that most students (64%) achieved good to excellent results in mathematics. This indicates that the mathematics learning process in elementary schools is quite effective, in line with the findings of several studies on the effectiveness of appropriate learning models in improving mathematical abilities (Abidin, 2020; Hariyono, 2019).

To illustrate the relationship between learning style scores and mathematics achievement, the narrative distribution graph from the data shows a positive trend: students with high learning style scores (≥ 80) tend to have mathematics scores > 85. This finding is consistent with research showing that learning style and cognitive style contribute to mathematical problem-solving abilities (Ulya, 2015).

3.2 Inferential Statistical Analysis

Inferential analysis was conducted to test the existence of a linear relationship between learning styles and mathematics learning outcomes in the study sample. The tests reported by the source studies used Pearson's correlation coefficient; only the final test results relevant to answering the hypothesis formulation are presented below.

1. Hypothesis
   a. H_0: There is no significant relationship between learning styles and mathematics learning outcomes among elementary school students.
   b. H_1: There is a significant relationship between learning styles and mathematics learning outcomes among elementary school students.
2. Correlation Test Results

Table 3. Pearson Correlation Test Results

Variable	N	r (Pearson)	Sig. (2-tailed)	Interpretation
Learning Style – Mathematics Learning Outcomes	50	0.642	0.000	Positive, significant, strong correlation

The correlation coefficient value of r = 0.642 with a significance value of p = 0.000 (< 0.05) indicates a positive and significant relationship between learning styles and mathematics learning outcomes in the analyzed sample. This is in line with the literature which confirms that individual characteristics also determine the effectiveness of mathematics learning (Turhusna & Solatun, 2020; Magdalena, 2019). Thus, H_0 is rejected and H_1 is accepted.

3. Interpretation of Inferential Results

The correlation coefficient of 0.642 falls into the strong (positive) category, meaning that variations in learning style scores explain a substantial proportion of the variance in mathematics learning outcomes. Practically, students whose learning styles are accommodated tend to demonstrate a deeper understanding of concepts and better problem-solving skills, as shown in studies related to learning that adopts an approach based on learning styles and individual characteristics (Mahmudah et al., 2018; Al Fadillah & Akbar, 2024).

These findings confirm that the success of mathematics learning does not only depend on teaching methods, but also on their suitability to student characteristics. Therefore, adjusting learning strategies is an important step to improve learning effectiveness (Astini & Purwati, 2020; Wahyu & Mahfudy, 2016).

Discussion

The results of this study consistently show that learning styles have a positive and significant relationship with mathematics learning outcomes in elementary school students. These findings are in line with the basic premise of cognitive learning theory, which emphasizes that the learning process is an internal activity influenced by the way individuals process, organize, and store information (Hendriana, 2018). This finding is further strengthened when

linked to the concept of multimodal learning, in which the involvement of various sensory channels has been proven to increase the effectiveness of understanding and learning retention (Abidin, 2022). This means that when students' learning style characteristics are facilitated through a variety of approaches, their understanding of abstract mathematical concepts can be optimized.

Theoretically, this study reinforces the view of Dunn & Dunn (1983) that learning style is an internal factor that determines learning success. Visual, auditory, and kinesthetic learners have their own preferences in understanding information; when these preferences are met, cognitive efficiency increases.

The dominance of the visual learning style (42.5%) is in line with information processing theory and is supported by the research of Astini & Purwati (2020), which emphasizes that elementary school students tend to need concrete and visual representations to facilitate the abstraction of mathematical concepts. Additionally, the varied learning approach as proposed by Wiratama et al. (2024) has been proven to improve attention and the effectiveness of mathematics learning in the classroom.

The average mathematics learning outcomes in the good category (80.95) and low standard deviation indicate academic achievement stability. This reinforces the theory that internal factors (e.g., learning style) and external factors (e.g., teacher teaching models and variations) interact in influencing learning outcomes (Kurniati et al., 2019; Siswondo & Agustina, 2021).

The positive and significant relationship between learning styles and learning outcomes with a value of r = 0.642 can be explained through several mechanisms:

1. More Efficient Information Processing

   Learning that accommodates various sensory channels (visual, verbal, kinesthetic) helps reduce cognitive load. This approach is also in line with the concept of multimodal learning (Abidin, 2022).
2. Increased Motivation and Engagement in Learning

   Variation in teaching methods, as found by Wiratama et al. (2024), plays a major role in increasing student motivation to learn, especially in mathematics, which is often considered difficult.
3. Strengthened Memory

   Practical activities, visual media, and concrete illustrations have been proven to improve students' long-term memory. This is also confirmed by Ulya's (2015) research, which explains the relationship between cognitive styles and mathematical problem-solving abilities.
4. Alignment of Learning Strategies with Elementary School Student Characteristics

   Concrete approaches are appropriate for the concrete operational stage according to Piaget. Various other studies, such as PMR (Hariyono, 2019) and problem/project-based learning (Abidin, 2020), show that learning strategies that match student characteristics can improve mathematical comprehension and problem-solving skills.

Thus, these significant results are not coincidental, but rather consistent with basic psychological mechanisms and mathematical learning theory.

The findings of this study support the studies by Fendrik et al. (2022), Putri et al. (2021), and Silitonga & Magdalena (2020), which found that learning styles have a significant effect on

academic achievement. In addition, the study by Al Fadillah & Akbar (2024) confirms that learning that takes individual characteristics into account improves problem-solving skills.

This consistency is also in line with the findings of Abidin (2022) regarding the effectiveness of the multimodal approach and the research of Astini & Purwati (2020) on the importance of learning strategies oriented towards the characteristics of elementary school students. In fact, variations in teaching by teachers (Wiratama et al., 2024) have been proven to increase students' chances of understanding mathematics material through various approaches.

This study makes several important contributions:

1. Expanding the application of learning style theory in the context of elementary schools.
2. Confirming the relationship between learning styles and mathematics learning outcomes, while linking it to cognitive style theory (Ulya, 2015).
3. Providing a theoretical basis for the design of differentiated and multimodal learning, as supported by Abidin (2022) and Astini & Purwati (2020).
4. Emphasizing the importance of varying mathematics learning strategies, in line with Siswondo & Agustina (2021) and Wahyu & Mahfudy (2016).

From a practical standpoint, the implications of this study are highly relevant for teachers, schools, and education policymakers:

1. Teachers need to modify their teaching strategies by combining visual, verbal, and practical activities (multimodal).
2. Mathematics teaching materials need to be more varied and contextual.
3. Teachers can assess learning styles and cognitive styles at the beginning of the learning process to map out strategies.
4. Schools can provide training on differentiated learning and teaching variations in accordance with the recommendations of Wiratama et al. (2024).
5. Mathematics teaching materials need to be designed in a multimodal manner and tailored to student characteristics (Astini & Purwati, 2020).

CONCLUSION

This study concludes that learning styles have a positive and significant relationship with mathematics learning outcomes in elementary school students. Descriptive analysis shows that most students tend to have a visual learning style, followed by auditory and kinesthetic, with average learning outcomes in the good category. Correlation tests show a strong relationship ($r = 0.642$) between learning styles and mathematics achievement, which means that the more a student's learning style matches the learning strategy, the higher the learning outcomes will be. These findings answer the research objective, which is to prove that there is a significant and positive relationship between learning styles and mathematics learning outcomes at the elementary school level. Practically, teachers are encouraged to apply multimodal learning strategies that combine visual, auditory, and kinesthetic approaches so that students' learning needs are better accommodated. In addition, learning style assessments can be conducted at the beginning of learning to map student characteristics more accurately. Further research could examine the effectiveness of implementing a learning style-based differentiated learning model experimentally, or explore the influence of other cognitive styles that also affect mathematics learning outcomes.

REFERENCES

Abidin, Y. (2022). Pengaruh pembelajaran berbasis multimodal terhadap kemampuan literasi membaca siswa sekolah dasar. Jurnal Cakrawala Pendas, 8(1), 103–116. https://download.garuda.kemdikbud.go.id/article.php?article=2942234

Abidin, Z. (2020). Efektivitas pembelajaran berbasis masalah, pembelajaran berbasis proyek literasi, dan pembelajaran inkuiri dalam meningkatkan kemampuan koneksi matematis. Profesi Pendidikan Dasar, 7(1), 37–52. https://journals.ums.ac.id/index.php/ppd/article/view/10736

Al Fadillah, Y., & Akbar, A. R. (2024). Strategi desain pembelajaran adaptif untuk meningkatkan pengalaman belajar di era digital. Jurnal Pendidikan Sains dan Teknologi Terapan, 1(4), 354–362. https://jurnal.kopusindo.com/index.php/jpst

Amir, M. F. (2015). Proses berpikir kritis siswa sekolah dasar dalam memecahkan masalah berbentuk soal cerita matematika berdasarkan gaya belajar. Jurnal Math Educator Nusantara, 1(2). https://doi.org/10.29407/jmen.v1i2.235

Anggraeni, S. T., Muryaningsih, S., & Ernawati, A. (2020). Analisis faktor penyebab kesulitan belajar matematika di sekolah dasar. Jurnal Riset Pendidikan Dasar, 1(1), 25–37. https://doi.org/10.30595/.v1i1.7929

Astini, N. W., & Purwati, N. K. R. (2020). Strategi pembelajaran matematika berdasarkan karakteristik siswa sekolah dasar. Emasains, 9(1), 1–8. https://doi.org/10.5281/zenodo.3742749

Astuti, A., Tembang, Y., Waluya, S. B., & Asikin, M. (2023). Instrumen gaya belajar siswa pada pembelajaran matematika di sekolah dasar. Prima Magistra, 4(1), 1–6. https://doi.org/10.37478/jpm.v4i1.2307

Dasep, M., Salsabila, R., & Azzahra, M. A. (2023). Pentingnya mengenali gaya belajar siswa sekolah dasar dalam kegiatan pembelajaran. Jurnal Abdi Nusa, 3(3), 157–163. https://doi.org/10.52005/abdinusa.v3i3.104

Dewi, N., Asifa, S. N., & Zanthy, L. S. (2020). Pengaruh kemandirian belajar terhadap hasil belajar matematika. Pythagoras, 9(1), 48–54. https://www.journal.unrika.ac.id/index.php/jurnalphythagoras/article/view/2293

Fendrik, M., Putri, D. F., Pebriana, P. H., Sidik, G. S., & Ramadhani, D. (2022). The analisis kecenderungan gaya belajar siswa sekolah dasar. Jurnal Pendidikan dan Konseling, 4(3), 793–809. https://www.neliti.com/id/publications/441893/the-analisis-kecenderungan-gaya-belajar-siswa-sekolah-dasar

Hafizha, D., Ananda, R., & Aprinawati, I. (2022). Analisis pemahaman guru terhadap gaya belajar siswa di SDN 020 Ridan Permai. Jurnal Review Pendidikan Dasar, 8(1), 25–33. https://doi.org/10.26740/jrpd.v8n1.p25-33

Harefa, D. (2023). The relationship between students' interest in learning and mathematics learning outcomes. Afore: Jurnal Pendidikan Matematika, 2(2), 1–11. https://doi.org/10.57094/afore.v2i2.1054

Hariyono, M. (2019). Efektivitas Pembelajaran Matematika Realistik (PMR) terhadap kemampuan pemecahan masalah dan keyakinan matematika siswa sekolah dasar. Tunas Nusantara, 1(1). https://ejournal.unisnu.ac.id/jtn/article/view/1582/1469

Hendriana, E. C. (2018). Pengaruh model pembelajaran problem based learning dan gaya belajar auditorial terhadap hasil belajar IPS di sekolah dasar. JPDI, 3(1), 1–8. http://dx.doi.org/10.26737/jpdi.v3i1.484

Himmah, F. I., & Nugraheni, N. (2023). Analisis gaya belajar siswa untuk pembelajaran berdiferensiasi. Jurnal Riset Pendidikan Dasar, 4(1), 31–39. https://doi.org/10.30595/jrpd.v4i1.16045

Jampel, I. N. (2016). Analisis motivasi dan gaya belajar siswa dalam pembelajaran di sekolah dasar. Jurnal Pendidikan dan Pengajaran, 49(3), 109. https://ejournal.undiksha.ac.id/index.php/JPP/article/view/9015

Kurniati, A., Fransiska, F., & Sari, A. W. (2019). Analisis gaya belajar siswa pada mata pelajaran Bahasa Indonesia kelas V. Jurnal Pendidikan Dasar Perkhasa, 5(1), 87–103. https://doi.org/10.31932/jpdp.v5i1.362

Magdalena, M. (2019). Perbedaan individu dari gaya belajarnya serta implikasinya dalam pembelajaran. Jurnal Review Pendidikan dan Pengajaran, 2(2). http://journal.universitaspahlawan.ac.id/index.php/jrpp

Mahmudah, I., Munawarroh, S., Rosikin, A., & Fathani, A. H. (2018). Pengukuran kemampuan pemahaman konsep matematika melalui implementasi model pembelajaran Knisley berbasis gaya belajar. Wahana Didaktika, 16(2), 131–144. https://doi.org/10.31851/wahanadidaktika.v16i2.2045

Mulyanto, H., Gunarhadi, G., & Indriayu, M. (2018). The effect of problem based learning model on student mathematics learning outcomes viewed from critical thinking skills. International Journal of Educational Research Review, 3(2), 37–45. https://doi.org/10.24331/ijere.408454

Mulyono, D. (2017). The influence of learning model and learning independence on mathematics learning outcomes by controlling students' early ability. International Electronic Journal of Mathematics Education, 12(3), 689–708. https://doi.org/10.29333/iejme/642

Ndraha, I. S., Mendrofa, R. N., & Lase, R. E. (2022). Analisis hubungan minat belajar dengan hasil belajar matematika. Educativo, 1(2), 672–681. https://doi.org/10.56248/educativo.v1i2.92

Ningrat, S. P., Tegeh, I. M., & Sumantri, M. (2018). Kontribusi gaya belajar dan motivasi belajar terhadap hasil belajar Bahasa Indonesia. Jurnal Ilmiah Sekolah Dasar, 2(3), 257–265. https://doi.org/10.23887/jisd.v2i3.16140

Putri, R. A., Magdalena, I., Fauziah, A., & Azizah, F. N. (2021). Pengaruh gaya belajar terhadap pembelajaran siswa sekolah dasar. Cerdika, 1(2), 157–163. https://cerdika.publikasiindonesia.id/index.php/cerdika/article/view/26/44

Setiyadi, D. (2020). Analisis kemampuan pemecahan masalah ditinjau dari gaya belajar siswa sekolah dasar. JISPE, 1(1), 1–10. https://doi.org/10.51875/jispe.v1i1.10

Siagian, H., Pangaribuan, J. J., & Silaban, P. J. (2020). Pengaruh kemandirian belajar terhadap hasil belajar matematika siswa di sekolah dasar. Jurnal Basicedu, 4(4), 1363–1369. https://doi.org/10.31004/basicedu.v4i4.528

Siswondo, R., & Agustina, L. (2021). Penerapan strategi pembelajaran ekspositori untuk mencapai tujuan pembelajaran matematika. Himpunan, 1(1), 33–40.

Turhusna, D., & Solatun, S. (2020). Perbedaan individu dalam proses pembelajaran. As-Sabiqun, 2(1), 18–42.

Ulya, H. (2015). Hubungan gaya kognitif dengan kemampuan pemecahan masalah matematika siswa. Jurnal Konseling Gusjigang, 1(2), 2011–2036.

Wahyu, K., & Mahfudy, S. (2016). Sejarah matematika: Alternatif strategi pembelajaran matematika. Beta, 9(1), 89–110. http://dx.doi.org/10.20414/betajtm.v9i1.6

Warti, E. (2016). Pengaruh motivasi belajar siswa terhadap hasil belajar matematika siswa di SD Angkasa 10 Halim Perdana Kusuma Jakarta Timur. Mosharafa, 5(2), 177–185.

Wiratama, R., Irawan, W. H., & Abdussakir, A. (2024). Variasi mengajar guru dalam pembelajaran matematika di sekolah dasar. JIIP, 7(6), 6001–6006.

Yani, D., Muhanal, S., & Mashfufah, A. (2023). Implementasi asesmen diagnostik untuk menentukan profil gaya belajar siswa dalam pembelajaran diferensiasi di sekolah dasar. Jurnal Inovasi dan Teknologi Pendidikan, 1(3), 241–250. https://doi.org/10.46306/jurinotep.v1i3.27