



The Relationship Between Learning Styles and Cognitive Competencies in Biology Learning

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ABSTRAK

Masalah yang sering dihadapi dalam proses pembelajaran adalah rendahnya hasil belajar yang diperoleh siswa. Salah satu faktor yang mempengaruhi hasil belajar siswa adalah gaya belajar. Hasil observasi menunjukkan bahwa guru masih jarang menggunakan metode, model dan media pembelajaran yang bervariasi. Pada saat pembelajaran, setiap siswa tidak memahami gaya belajarnya (modalitas). Hal ini dapat menyebabkan ketidakseimbangan antara gaya belajar siswa dengan model, metode atau media pembelajaran yang digunakan oleh guru sehingga menyebabkan rendahnya kompetensi kognitif siswa. Penelitian ini bertujuan untuk menganalisis hubungan antara gaya belajar dengan kompetensi kognitif siswa. Penelitian ini merupakan penelitian deskriptif. Jumlah sampel sebanyak 121 siswa. Teknik pengumpulan data menggunakan tes hasil belajar, angket, dan dokumentasi. Analisis data dalam penelitian ini menggunakan rumus korelasi Pearson Product Moment. Pengujian korelasi dilakukan dengan menggunakan rumus t untuk mengetahui apakah koefisien korelasi tersebut signifikan atau tidak. Analisis persentase kontribusi pengaruh gaya belajar siswa terhadap kompetensi kognitif siswa dianalisis dengan menggunakan koefisien determinan. Berdasarkan penelitian yang telah dilakukan, ditemukan bahwa tidak terdapat hubungan yang signifikan antara gaya belajar dengan kompetensi kognitif siswa. Gaya belajar yang dominan adalah gaya belajar visual, kemudian gaya belajar kinestetik dan yang paling sedikit adalah gaya belajar auditori. Kesimpulan dari penelitian ini adalah tidak terdapat hubungan yang signifikan antara gaya belajar dengan kompetensi kognitif siswa.

ABSTRACT

The problem often faced in the learning process is the low learning outcomes obtained by students. One of the factors that influence student learning outcomes is learning style. The observations show that teachers rarely use varied learning methods, models, and media. At the time of learning, each student did not understand their learning style (modality). It can cause an imbalance between students' learning styles and the models, methods, or learning media used by the teacher, causing low cognitive competence in students. This study analyzes the relationship between students' learning styles and cognitive competence. This research is a descriptive study. The total sample is 121 students—data collection techniques using learning outcomes tests, questionnaires, and documentation. Data analysis in this study used the Pearson Product Moment correlation formula. Correlation testing is done by using the t formula to determine whether the correlation coefficient is significant or not. The percentage contribution of students' learning styles on students' cognitive competence was analyzed using determinant coefficients. Based on the research that has been done, it is found that there is no significant correlation between learning styles and students' cognitive competencies. The dominant learning style is the visual learning style, then the kinesthetic learning style, and the least is the auditory learning style. This study concludes that there is no significant relationship between learning styles and students' cognitive competencies.

1. INTRODUCTION

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential. Education aims to develop the potential of students to have religious, spiritual strength, self-control, personality, intelligence, noble character, and skills

(Fadhilaturrehmi et al., 2021; Zikri, 2020). Education is never separated from learning activities, and the learning process strongly influences the success of education. The learning process is the development of talents, interests, and abilities and the needs and characteristics of students' learning styles (Handini et al., 2016; Putri et al., 2019). Such a learning process aims to achieve learning objectives following the 2013 curriculum criteria (Kurniawan & Noviana, 2017; Susanti et al., 2015). The achievement of learning objectives can be seen from the achievements of students in cognitive, psychomotor, and affective aspects. The success of the learning process will certainly be influenced by various factors, both from the school environment and family or the students themselves. Each student has different abilities in absorbing, processing, and conveying information.

However, based on observations from interviews with biology teachers who teach at SMAN 1 Junjung Sirih, namely Mrs. Haspi Warni, S.Si on November 23, 2020, it was revealed that learning at school is still not effective and the score of the Odd Semester Mid-Semester Examinations for the 2020/2021 Academic Year is revealed. In each class has not reached the set. Many students are less focused and less active in the learning process, and some students only record what is conveyed but do not understand what the teacher is saying. Factors that influence students in the learning process are students' learning styles. Materials or materials for biology lessons (IPA) are basically in the form of facts, concepts, principles, and theories. The subject matter must be designed attractively, easily understood by students, and communicated. Students' understanding of concepts will help students in the process of remembering, providing information, and improving students memory.

Learning style is an approach process in explaining and accepting how each individual learns and how each individual learns to concentrate on the process of mastering certain information (Fadhilaturrehmi et al., 2021; Hendriana, 2018; Permana, 2016). Students generally have different learning styles, such as visual, auditory, and kinesthetic learning styles (Hendriana, 2018; Maulah et al., 2020). Visual learning style is a learning style through the sense of sight. Students can understand when the teacher can show concrete evidence, such as describing information in the form of maps, diagrams, graphs, flow charts, and visual symbols to present things that can be conveyed in words (Permana, 2016; Sanjaya, 2021). The auditory learning style relies on the sense of hearing, meaning that students can understand learning after listening to information explanations first. Kinesthetic learning requires students to touch something that can provide certain information to remember. The learning process will be carried out effectively if the teacher applies learning strategies and learning styles that follow the needs of students to improve the results of learning competencies (Hapsari & Zulherman, 2021; Hendriana, 2018). This study analyses the relationship between learning styles and students' cognitive competence.

2. METHOD

This research is descriptive. Descriptive research describes a symptom, fact, event, or event that is currently or has occurred that aims to reveal the relationship between two variables, namely the independent variable in the form of learning styles and the dependent variable in the form of students' cognitive competence. The instrument for collecting data from the students' learning styles in this study used a questionnaire that used as many as 34 questions to determine students' learning styles. The questionnaire uses a Likert scale with four alternative answers to the statements: always, often, rarely, and never. Each alternative answer to this question has a score of 4, 3, 2, and 1. The instrument design was validated by two Biology lecturers, FMIPA, UNP. The results of the validation of the questionnaire were conducted by conducting a questionnaire trial which was carried out on eleventh-grade science students at SMAN 1 KT Singkarak to determine its reliability. If the instrument is valid and reliable, it is tested in eleventh grade IPA 1 to IPA 4 at SMAN 1 Junjung Sirih as the object of this research. The data that has been collected is then analyzed using correlational analysis using the Pearson Product Moment correlation formula. The correlation coefficient hypothesis is tested using the t formula to find out whether the correlation coefficient is significant or not. The calculated results' correlation can be significant if the score of $t_{count} > t_{table}$. The coefficient of determination (Basic Competence) is used to see the percentage of the influence of the independent variable X on the dependent variable Y.

3. RESULT AND DISCUSSION

Result

Based on the research done at SMAN 1 Junjung Sirih, primary data is obtained in the form of learning styles and secondary data in the form of cognitive competence of the eleventh-grade science students of SMAN 1 Junjung Sirih. Learning style data was obtained through a questionnaire consisting of

34 questions, and cognitive competency data was obtained from the mid-semester test scores of students for the 2020/2021 school year. The average score of 121 students can be seen in Table 1 and Table 2.

Table 1. The Average Score of Students' Learning Styles in Class XI IPA SMAN 1 Junjung Sirih

No	Class	Average (score)	Description
1	XI IPA 1	85,77	Good
2	XI IPA 2	86,00	Good
3	XI IPA 3	85,66	Good
4	XI IPA 4	84,56	Good
Average		85,49	Good

Table 2. Average scores of the second semester Middle Examination Students of Class XI IPA SMAN 1 Junjung Sirih

No	Class	Average (score)	Description
1	XI IPA 1	73,67	Enough
2	XI IPA 2	70,33	Enough
3	XI IPA 3	69,06	Enough
4	XI IPA 4	71,06	Enough
Average		71,03	Cukup

The normality test was carried out to determine whether the data were normally distributed, so the correlation analysis formula could be used to determine the relationship between each research variable. The normality test in this study used the Liliefors test, which was applied to each group of data obtained at a significant level of $\alpha = 0.05$. Based on the normality test that has been carried out for the score $<$, it means that the data is normally distributed. The recapitulation of the results of the normality test of learning style data can be seen in Table 3.

Table 3. Recapitulation of Normality Test Results of Learners' Learning Style Data

No	Class	L count	L table	Description
1	XI IPA 1	0,09	0,16	Normal
2	XI IPA 2	0,10	0,16	
3	XI IPA 3	0,08	0,16	
4	XI IPA 4	0,02	0,16	
Average		0,0725	0,16	

Data processing for the Normality Test of learning style data can be seen in Appendix 10. Data for the mid-semester test scores of students for the 2020/2021 Academic Year are normally distributed because $<$. The results of the normality test of students' Middle Semester Examination scores can be seen in Table 4.

Table 4. Recapitulation of the Results of the Normality Test of Cognitive Competency Score Data for Second-Semester Students of the 2020/2021 Academic Year

No	Class	L count	L table	Description
1	XI IPA 1	0,16	0,16	Normal
2	XI IPA 2	-0,03	0,16	
3	XI IPA 3	-0,01	0,16	
4	XI IPA 4	-0,03	0,16	
Average		0,03	0,16	

The normality test data processing for the Cognitive Competency scores of Students for the Academic Year 2020/2021 can be seen in Appendix 10. Based on the normality test results, it is known that the learning style and mid-semester exam scores are normally distributed. So for correlation analysis, the Pearson Product Moment formula will be used. For each learning style, a correlation analysis was carried out with the score of the Mid-Semester Examination for the 2020/2021 Academic Year. The three learning styles in the IPA 1 to IPA 4 classes have no significant relationship between the variables. Still, they have a correlation score with the correlation coefficient criteria from very low to low. The visual learning style in

class XI IPA 1 has a correlation coefficient criterion of 0.01, which is very low, with a contribution or determinant coefficient of 0.01%. Class XI IPA 2 has a correlation coefficient criterion of 0.04 with a very low correlation, namely with a contribution or determinant coefficient of 0.16%. Class XI IPA 3 has a correlation coefficient criterion of 0.24, namely with a low correlation with a determinant coefficient of 5.76%, and class XI IPA 4 has a correlation coefficient criterion of 0.17, namely with a very low correlation with a contribution of 2.89%.

The auditory learning style in class XI IPA 1 has a correlation coefficient criterion of 0.01, with a very low correlation with a contribution or determinant coefficient of 0.01%. Class XI IPA 2 has a correlation coefficient of 0.22, namely with a low correlation with a contribution of 4.84%, class XI IPA 3 has a correlation coefficient of 0.37 with a low correlation with a contribution of 13.69%, and class XI IPA 4 has a correlation coefficient of 0.39 with a low correlation with a contribution of 15.21%. Furthermore, the kinesthetic learning style in class XI IPA 1 has a correlation coefficient criterion of 0.01, which is very low, with a contribution or determinant coefficient of 0.01%. Class XI IPA 2 has a correlation coefficient criterion of 0.22, namely with a low correlation with a contribution of 4.84%, in class XI IPA 3 has a correlation coefficient criterion of 0.17, with a very low correlation with a contribution of 2.89%, and class XI IPA 4 has a correlation coefficient criterion of 0.04 with a very low correlation with a contribution 0.16.

Discussion

The findings show no significant relationship between the variables but have a correlation score with the correlation coefficient criteria from very low to low. Students' activeness can determine their success in absorbing information and knowledge during the learning process (Ardianto & Rubini, 2016; Lubis et al., 2019). Based on data analysis, visual learning styles in class XI IPA 1 and IPA 2 have very low criteria. Factors that influence student learning outcomes include students' intellectual abilities, students' learning styles, and students' learning motivation (Lee & Osman, 2012; Soltani & Askarizadeh, 2021; Umrana et al., 2019). The results of the research as a whole show that there is no positive and significant relationship between learning styles in learning and students' cognitive competencies. It is because students are not fully aware of their learning styles, so they have not been able to optimize them. Students have varied learning styles, so in the learning process, the teacher should be able to prepare various teaching media, including the use of illustrated multimedia for students with visual learning styles, audio multimedia for students with auditory learning styles, and multimedia that involves movement or direct experiments for students with kinesthetic learning styles so that the teacher can optimize the three learning styles during the learning process.

Learning styles are key to developing performance at work, school, and in interpersonal situations (Ilhami & Ristiono, 2021). A person's learning style is a combination of how he absorbs, organizes, and processes information. There are three kinds of learning styles, auditory learning style is learning through what is heard, visual learning style is learning through what is seen, and kinesthetic learning style is learning by moving, working, and touching (Gunawan et al., 2016; Handini et al., 2016; Ilhami & Ristiono, 2021). Every child has more than one learning style to achieve their learning goals. Hereditary factors or heredity and environmental factors are factors that influence individual differences.

Previous findings stated that learning styles affect the development and growth of students (Ilhami & Ristiono, 2021; Zikri, 2020). If a teacher can identify trends in student learning styles, this will be very useful in improving cognitive competence (Wahyudi et al., 2021). This research implies that high cognitive competence is expected to be a hope for all parties. The high Cognitive Competence achieved by students in the school will cheer up the educators because it is an indicator of the effectiveness and productivity of the teaching and learning process in the classroom, as well as raising the school's image. The high learning achievement of children for parents is a matter of pride and a sense of worth in guiding and directing their children in learning activities.

4. CONCLUSION

There is no relationship between learning styles and students' cognitive competencies because many factors can affect students' scores. Science subject teachers optimize students' learning styles so that students' cognitive competencies increase by carrying out varied learning processes. For further research, it is recommended to be able to examine how the relationship between learning styles and cognitive competence is not only in one material.

5. REFERENCES

Ardianto, D., & Rubini, Bi. (2016). Literasi Sains Dan Aktivitas Siswa Pada Pembelajaran Ipa Terpadu Tipe

- Shared. *USEJ - Unnes Science Education Journal*, 5(1), 1167-1174. <https://doi.org/10.15294/usej.v5i1.9650>.
- Fadhilaturrahmi, F., Ananda, R., & Yolanda, S. (2021). Persepsi Guru Sekolah Dasar terhadap Pembelajaran Jarak Jauh di Masa Pandemi Covid 19. *Jurnal Basicedu*, 5(3), 1683-1688. <https://doi.org/10.31004/basicedu.v5i3.1187>.
- Gunawan, G., Harjono, A., & Imran, I. (2016). Pengaruh Multimedia Interaktif Dan Gaya Belajar Terhadap Penguasaan Konsep Kalor Siswa. *Jurnal Pendidikan Fisika Indonesia*, 12(2), 118-125. <https://doi.org/10.15294/jpfi.v12i2.5018>.
- Handini, D., Gusrayani, D., & Panjaitan, R. L. (2016). Penerapan Model Contextual Teaching And Learning Meningkatkan Hasil Belajar Siswa Kelas IV pada Materi Gaya. *Jurnal Pena Ilmiah*, 1(1), 451-460. <https://doi.org/10.23819/pi.v1i1.2974>.
- Hapsari, G. P. P., & Zulherman, Z. (2021). Pengembangan Media Video Animasi Berbasis Aplikasi Canva untuk Meningkatkan Motivasi dan Prestasi Belajar Siswa. *Jurnal Basicedu*, 5(4), 2384-2394. <https://doi.org/10.31004/basicedu.v5i4.1237>.
- Hendriana, E. C. (2018). Pengaruh Model Pembelajaran Problem Based Learning Dan Gaya Belajar Auditorial Terhadap Hasil Belajar Ips Di Sekolah Dasar. *Jurnal Pendiidikan Dasar Indonesia*, 3(1), 1 - 8. <https://doi.org/10.26737/jpdi.v3i1.484>.
- Ilhami, T., & Ristono, R. (2021). Hubungan Gaya Belajar dan Kompetensi Kognitif Peserta Didik dalam Pembelajaran Biologi. *Journal for Lesson and Learning Studies*, 4(3), 315-322. <https://doi.org/10.23887/jlls.v4i3.37325>.
- Kurniaman, O., & Noviana, E. (2017). Penerapan Kurikulum 2013 Dalam Meningkatkan Keterampilan, Sikap, Dan Pengetahuan. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, 6(2), 389. <https://doi.org/10.33578/jpkip.v6i2.4520>.
- Lee, T. T., & Osman, K. (2012). Interactive Multimedia Module in the Learning of Electrochemistry: Effects on Students' Understanding and Motivation. *Procedia - Social and Behavioral Sciences*, 46, 1323-1327. <https://doi.org/10.1016/j.sbspro.2012.05.295>.
- Lubis, A. B., Miaz, Y., Taufina, & Desyandri. (2019). Pengaruh Model Everyone Is A Teacher Here Terhadap Aktivitas Dan Hasil Belajar IPS Siswa SD. *Jurnal Basicedu*, 3(2), 725 - 735. <https://doi.org/10.31004/basicedu.v3i2.61>.
- Maulah, S., A, F. N., & Ummah, N. R. (2020). Persepsi Mahasiswa Biologi terhadap Perkuliahan Daring sebagai Sarana Pembelajaran Selama Pandemi Covid-19. *ALVEOLI : Jurnal Pendidikan Biologi*, 1(2), 49-61. <https://doi.org/10.35719/alveoli.v1i2.6>.
- Permana, A. (2016). Pengaruh Gaya Belajar dan Motivasi Belajar Mahasiswa Terhadap Kemampuan Belajar Ilmu Alamiah Dasar. *Formatif: Jurnal Ilmiah Pendidikan MIPA*. <https://doi.org/10.30998/formatif.v6i3.999>.
- Putri, F. E., Amelia, F., & Gusmania, Y. (2019). Hubungan Antara Gaya Belajar dan Keaktifan Belajar Matematika Terhadap Hasil Belajar Siswa. *Edumatika: Jurnal Riset Pendidikan Matematika*, 2(2), 83-88. <https://doi.org/10.32939/ejrpm.v2i2.406>.
- Sanjaya, B. P. (2021). Kemandirian Belajar Siswa Sekolah Dasar Selama Pembelajaran Daring. *Jurnal Inovasi Pendidikan Dasar*, 5(2), 71-78. <https://doi.org/10.36928/jipd.v5i2.733>.
- Soltani, A., & Askarizadeh, G. (2021). How students' conceptions of learning science are related to their motivational beliefs and self-regulation. *Learning and Motivation*, 73, 101707. <https://doi.org/10.1016/j.lmot.2021.101707>.
- Susanti, N. Y., Trapsilasiwi, D., & Kurniati, D. (2015). Analisis Tingkat Kognitif Uji Kompetensi pada Buku Sekolah Elektronik (BSE) Matematika SMP/MTs Kelas VII Kurikulum 2013 Berdasarkan Taksonomi Bloom. *Kreano Jurnal Matematika Kreatif-Inovatif*, 6(1). <http://dx.doi.org/10.15294/kreano.v6i1.4509>.
- Umrana, Cahyono, E., & Sudia, M. (2019). Analisis Kemampuan Pemecahan Masalah Matematis Ditinjau Dari Gaya Belajar Siswa. *Jurnal Pembelajaran Berpikir Matematika*, 4(1), 67-76. <https://doi.org/10.22202/horizon.v1i3.5257>.
- Wahyudi, M., Agung, I. G., & Wulandari, A. (2021). Kontribusi Gaya Kognitif dan Sikap Ilmiah Terhadap Kompetensi Pengetahuan IPA. *Jurnal Penelitian Dan Pengembangan Pendidikan*, 5(1), 17-25.
- Zikri. (2020). Hubungan Gaya Belajar Dan Konsep Diri Terhadap Hasil Belajar Siswa Smk Negeri 3 Solok Selatan. *Jurnal Pendidikan Teknologi Dan Kejuruan*, 17(2), 135-144. <https://doi.org/10.23887/jptk-undiksha.v17i2.24209>.