Analysis of Student Learning Styles and Implementation of Relevant Learning Methods to Optimize the Teaching and Learning Process

Annisa' Fitriyah Anwari	**Bahar Agus Setiawan**
Universitas Islam Negeri Kiai Haji Achmad Siddiq Jember, Indonesia	Universitas Muhammadiyah Jember, Indonesia
ORCID: 0009-0004-9101-7795	ORCID: 0000-0001-6796-5104

Article history	*Corresponding author*
Received 20 December 2024 - Accepted 24 March 2025	baharsetiawan@unmuhjember.ac.id DOI: 10.35316/jpii.v9i2.673

Abstract: The purpose of this research was to map the learning styles of students so that they can be found in 1 class what learning styles were owned by students and what learning methods were suitable for their learning styles. The method used was a mixed method by combining the quantitative method of distributing questionnaires to identify students' learning styles and qualitative methods to describe learning methods suitable for each existing learning style. The results of this study show that there were 4 learning styles, namely visual, auditory, kinesthetic and mixed (auditory-visual and visual-kinesthetic). Learning methods that can be used for visual learning styles are: Learning videos, concept maps (Mind Mapping) and Visual presentations. For auditory learning style methods, namely: Class discussions and debates, podcasts and audio recordings and interactive lectures. For kinesthetic learning style methods, namely: Project-Based Learning, simulation, role-playing and field practice. And for mixed learning styles, namely: 1) visual auditory learning styles using multimedia presentation methods and interactive webinars. 2) the kinesthetic visual learning style uses 3D model and simulation methods and practical demonstrations.

Keywords: *learning styles, learning method*

Introduction

Understanding students' learning styles is key to improving learning effectiveness. Each student has a unique way of absorbing information influenced by their background, one of which is their respective learning styles. Understanding learning styles is essential because it contributes to learning success. The right learning style allows information to be conveyed effectively and understood clearly (Halim et al., 2022; Nguyen, et.al., 2022) . Understanding learning styles is also very important because it influences the selection of learning tools, increases engagement, and increases knowledge retention for better learning outcomes in subjects such as science, where concepts can be abstract and challenging (Subagja & Rubini, 2023;

Balakrishnan & Gan, 2016). In addition, it is also to align teaching methods with their characteristics and improve the quality of learning and self-motivation (Dewi et al., 2023; Marković & Jovanović, 2012) (Thu Ha, 2021). Therefore, learning style analysis is the first step in designing an effective learning process.

Learning styles are generally divided into three categories: visual, auditory and kinesthetic. Each category has different characteristics and preferences in the way they learn. A study identified three categories of learning styles: visual (learning through sight), auditory (learning through hearing), and kinesthetic (learning through movement and touch). This style describes how students absorb, organize, and process information during the learning process (Pashler et al., 2008; Auliyah et al., 2023; Spurlock, 2023). Meanwhile, the learning style categories based on the VARK model are Visual (V), Aural (A), Read or Write (R), and Kinesthetic (K). In addition, learners can be classified as uni-capital, bimodal, trimodal, or quad-modal based on their preferences (Rajapaksha & Karunathilaka, 2019). Another study explained that the categories of learning styles include VAK (Visual, Auditory, Kinesthetic), Fundamental Dimensions (holistic-analytics, verbaliser-imager), and Curry's Onion model (instrumental preferences, social interaction, information processing). This categorization reflects a diverse approach to understanding how learners perceive and interact with their environment (Li et al., 2016). Understanding these differences allows educators to choose a method that is more suitable for each student. Thus, an introduction to learning style categories can help in designing more effective learning strategies.

Learning method has a direct impact on student motivation and engagement. Appropriate methods can increase students' understanding and interest in lecture materials. For example, multimedia for visual style or group discussion for auditory style can make learning more engaging. The selection of learning methods based on learning styles significantly improves student performance by personalizing content delivery. Adapting educational approaches to individual preferences encourages engagement and improves understanding, leading to more effective learning experiences in the education system (Dorça et al., 2016; Emma, 2024). Identifying students' learning styles through observation or surveys is essential to adjust teaching strategies (Azzahrah, et al., 2021). In addition, learning styles and teaching methods significantly affect learning outcomes such as the Think Pair Share method resulting in higher learning outcomes compared to Problem-Based Learning for visual and auditory learners (Utami, 2016). Learning that utilizes technology-based media by students' learning styles can also facilitate the achievement of learning objectives (Rahmi & Samsudi, 2020; Emma, 2024) . This shows that choosing the right learning method according to the student's learning style can create a more conducive learning environment.

Based on observations, it was found that if educators use conventional learning methods, students tend to be bored and less interested in the courses being taught. A lack of interest in students will also have an impact on learning outcomes, namely during discussions in the classroom or when educators provide opportunities for students to ask questions, students tend to be silent and less active in discussions or during question and answer sessions. Therefore, the diversity of learning methods used by educators during learning is highly expected for smooth learning for students.

Therefore, here the researcher aims to map the learning styles of students so that it

can be found in 1 class what learning styles are owned by students and what learning methods are suitable for their learning styles. With this research, it is also hoped that students can be helped and educators can adjust more relevant learning methods so that the creation of conducive classes and the achievement of learning goals can be achieved.

Research Method

In this study, a mixed method was used, which was to combine a quantitative method with a type of survey with a descriptive qualitative method in the 3rd-semester students of the Islamic Studies program at the University of Muhammadiyah Jember. The respondents amounted to 22 students.

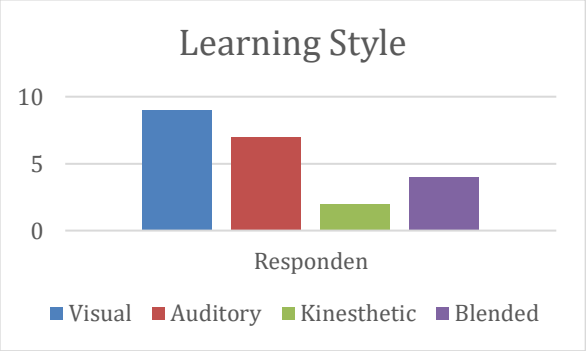
The data collection technique uses a questionnaire, which the questionnaire is distributed by the researcher to the 3rd-semester students of the Islamic Religion study program at the University of Muhammadiyah Jember using a Google form so that they can freely fill out the questionnaire anywhere and with a more flexible time. After the questionnaire is filled out by the students, an analysis of the results of the questionnaire is carried out to find out the final result of the learning style they have, then with the existing learning style, what learning methods are identified that are suitable for each existing learning style.

Findings and Discussion

Student Learning Style

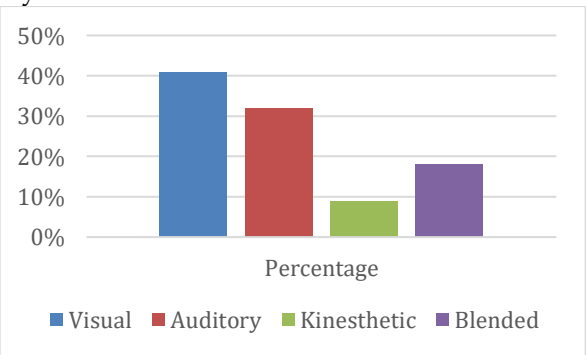
From the results of the questionnaire that has been distributed to 3rd-semester students, the results of the 3rd-semester students' learning styles are found as follows:

Figure 1. Student learning style diagram



From the picture above, it was found that there were 4 types of learning styles for 3rd-semester students, namely visual, auditory and kinesthetic learning styles. Visual learning style occupies the first learning style and is also dominant in 3rd-semester students as many as 7 students while the second is the auditory learning style as many as 7 students and continued with a mixed learning style with as many as 4 students and the last is the kinesthetic learning style where there are only 2 students who have this learning style with the percentages drawn below:

Figure 2. Percentage of student learning styles



From figure 2, it can be seen that the percentage obtained from the number of students is 22 students with results for visual learning style with a percentage of 41%, auditory learning style with a percentage of 32%, kinesthetic learning style with a percentage of 9% and finally mixed learning style with a percentage of 18%.

Learning Methods

Visual Learning Style

Visual learning style is a learning process that relies on vision as a recipient of information and knowledge. A person who has a visual learning style will easily accept ideas, concepts, data and information packaged in the form of images. Visual learning styles are characterized by a preference for learning through visual aids such as images, graphs, and demonstrations (Arifah et al., 2023; Alabi, 2020). In other research, it was also revealed that the visual learning style refers to students who process information through visual means, such as graphs and diagrams (I. D. Utami & Masduki, 2023). The visual learning style emphasizes learning through sight, utilizing visual materials such as images and diagrams, which aids in understanding and retaining information effectively (Norhidayah, 2023).

In the learning style analysis data, it was found that visual learning style was the most dominant learning style in 3rd-semester students, it was seen that from 22 people who filled out the questionnaire, 9 children had visual learning styles. Some methods that can be used for students who have a visual learning style are: First: Learning videos. Use videos that can explain the concept or lecture material. Videos can include animations, demonstrations, or recorded lectures, learning videos can provide students with an engaging learning experience with visual learning styles and facilitate the understanding of complex concepts through visualization. Second: Concept map (Mind Mapping). Students create or are given visual diagrams that explain the relationships between concepts or materials. This concept pet (mind mapping) technique helps to understand and remember information better through graphical representation. Third: Visual Presentation. Lecturers can use slides with graphs, diagrams, drawings, or animated videos to explain the material. Students can understand the material more easily through attractive visual elements.

Auditory Teaching Style

Auditory Learning Style is a learning process that relies on hearing as a recipient of information and knowledge. A person with this type of learning is more focused on listening to the lecturer's speech well and clearly without the need for a visual display when studying. Auditory learning (AL) involves engaging with educational content through listening, such as podcasts. In Jafarian research, it was proven that auditory learning increases reading motivation and engagement, leading to improved academic achievement, especially benefiting students with a wide range of nerves, including those with ADHD (Jafarian & Kramer, 2024). A person who has an auditory learning style also understands information through listening, debating, and speaking at a moderate pace and also someone with good reminders and responds better when listening than reading (Harahap et al., 2021). The auditory learning style involves learning best through spoken language formats, such as lectures and discussions. A person with an auditory learning style also understands information through speed, emphasis, and tone, and they benefit from interaction, listening, and speaking to improve their memory and comprehension (Masela & Subekti, 2021).

In the learning style analysis data, it was found that auditory learning style was the number 2 learning style after visual learning style in 3rd-semester students, it was seen that from 22 people who filled out the questionnaire, 7 children had auditory

learning styles. Some methods that can be used for students who have an auditory learning style are: First: Class discussions and debates. During learning, they can hold group discussions or debates about topics according to the material being taught. Students can share opinions and listen to other people's perspectives, with this method can improve understanding through verbal interaction and listening, as well as hone public speaking skills. Second: Podcasts and audio recordings. By using podcasts or audio recordings as learning resources, students can listen to lecture materials or interviews with experts in their fields, which can allow students to learn while doing other activities, such as while travelling, and strengthen understanding through hearing. Third: Interactive lectures. This method uses material delivered orally by lecturers but is interspersed with questions and answers or moments of reflection so that students are more engaged and focused on listening.

Kinesthetic Learning Style

Kinesthetic Learning Style is a learning process that relies on touch or taste to receive information and knowledge. A person who has a kinesthetic learning style tends to like to do, touch, feel, move and experience directly. Kinesthetic learning styles have a significant impact on the ability to solve problems in math subjects (Firdaus & Herwandi, 2023). A person with a kinesthetic learning style in medical education uses clay modeling, drawing, sketching, and crocheting to create three-dimensional mental models and gain a broader visuospatial understanding of anatomy (Hernandez et al., 2020).

In the learning style analysis data, it was found that kinesthetic learning style was the least learning style among other learning styles in 3rd-semester students, it was seen that from 22 people who filled out the questionnaire, there were only 2 children who had kinesthetic learning styles. Some of the methods that can be used for students who have a kinesthetic learning style are: First: Project-Based Learning. In this method, students are involved in practical projects that require physical involvement, such as laboratory experiments or art projects. This method also encourages learning through hands-on experience and the application of theory in practice. Second: Simulation and role-playing. In the role-playing method, students use simulations or role-playing games to describe real situations in the field of study. Students can take part in relevant scenarios where they can improve practical skills and understanding of the context through hands-on experience. Alert: Field Practice. This method involves students in real activities outside the classroom, such as observation or conducting experiments to understand the application of concepts directly.

Blended Learning Style

A blended learning style is a learning style in which a person absorbs information well in more than one way. In this study, the researcher found that there are 2 mixed learning styles in students, namely visual auditory and visual kinesthetic learning styles. In the learning style analysis data, it was found that mixed learning styles became the 3rd most popular learning style after the dominant visual learning style and audiophile learning style in 3rd-semester students, it was seen that 22 people who filled out the questionnaire, 4 students had mixed learning styles, including 1 student with visual auditory learning style and 3 students with kinesthetic visual learning style. Some methods that can be used for

students who have a blended learning style are:

Visual auditory learning style with the first learning method: Multimedia Presentation. This method uses presentations that combine visual elements (images, graphics) and audio (narrative, music) to convey information which facilitates better understanding by combining two channels of information, making it more interesting and memorable. Second: Interactive webinars. By hosting webinars that combine visual presentations with live Q&A sessions, students can view the material and interact in real time, which can increase engagement and allow students to get immediate feedback.

Furthermore, the visual kinesthetic learning style with learning methods is: First: 3D models and simulations. Using a physical model or 3D simulation to explain a concept. Students can see and interact with the object being studied. This method facilitates better understanding through a combination of visual and physical experiences. Second: Demonstration of practice. Involve students in observation and direct participation in specific practices, for example, breathing techniques in Sufism or movements for spiritual relaxation.

Conclusion

From the data obtained, there are 4 learning styles, namely visual, auditory, kinesthetic, and mixed (auditory, visual, visual and visual kinesthetic). Visual learning style occupies the first and also dominant learning style in semester 3 students as many as 7 students with a percentage of 41% while the second is the auditory learning style as many as 7 students with a percentage of 32% followed by a mixed learning style with as many as 4 students with a percentage of 18% and the last is the kinesthetic learning style where there are only 2 students with a percentage of 9%. Learning methods that can be used for visual learning styles are: Learning videos, concept maps (Mind Mapping) and Visual presentations. For auditory learning style methods, namely: Class discussions and debates, podcasts and audio recordings and interactive lectures. For kinesthetic learning style methods, namely: Project-Based Learning, simulation, role-playing and field practice. And for mixed learning styles, namely: 1) visual auditory learning styles using multimedia presentation methods and interactive webinars. 2) the kinesthetic visual learning style uses 3D model and simulation methods and practical demonstrations.

References

Alabi, M. (2020). Visual or Auditory: The Effective Learning Modality in Multimodal Learners. *International Journal of Physiology*. https://doi.org/10.37506/ijop.v8i2.1269

Auliyah, N., Listyarini, I., & Prayito, M. (2023). Analisis gaya belajar peserta didik kelas vi a sd negeri sarirejo. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *9*(2), 3946–3953. https://doi.org/10.36989/didaktik.v9i2.1237

Azzahrah Putri, R., Magdalena, I., Fauziah, A., & Nur Azizah, F. (2021). Pengaruh Gaya Belajar terhadap Pembelajaran Siswa Sekolah Dasar. *Cerdika: Jurnal Ilmiah Indonesia*, *1*(2), 157–163. https://doi.org/10.36418/cerdika.v1i2.26

Balakrishnan, V., & Gan, C. L. (2016). Students' learning styles and their effects on the use of social media technology for learning. *Telematics and Informatics*, *33*(3). https://doi.org/10.1016/j.tele.2015.12.004

Dewi, K., Sulianto, J., & Reffiane, F. (2023). Analisis Gaya Belajar Peserta Didik

Pada Pembelajaran Ipas Kelas Iv Di Sd Negeri Gajahmungkur 04 Semarang. *Didaktik : Jurnal Ilmiah PGSD STKIP Subang*, *9*(2), 3637–3646. https://doi.org/10.36989/didaktik.v9i2.1216

Dini Putri Arifah, N., Osman, A.-N., & Putri, L. A. (2023). The Visual Learning Style In the Thematic Learning Process at grade V SDN 12 Kampung Durian, Padang Timur District, Padang. *TOFEDU: The Future of Education Journal*, *2*(3), 530–539. https://doi.org/10.61445/tofedu.v2i3.78

Dorça, F. A., Araújo, R. D., de Carvalho, V. C., Resende, D. T., & Cattelan, R. G. (2016). An automatic and dynamic approach for personalized recommendation of learning objects considering students learning styles: An experimental analysis. *Informatics in Education*, *15*(3), 45–62. https://doi.org/10.15388/infedu.2016.03

Emma, L. (2024). *The Role of Learning Styles in Effective Teaching and Learning*. *October*.

Firdaus, A. M., & Herwandi, H. (2023). Students' Mathematics Problem-Solving Ability With Kinesthetic Learning Style At Vocational School. *Lentera Pendidikan : Jurnal Ilmu Tarbiyah Dan Keguruan*, *26*(1), 153–170. https://doi.org/10.24252/lp.2023v26n1i11

Halim, A., Wirda, A., & Yusrizal, Y. (2022). Analysis of learning styles in terms of knowledge, skills and attitudes. *Momentum: Physics Education Journal*, *6*(2), 162–170. https://doi.org/10.21067/mpej.v6i2.6581

Harahap, Z. H., . S., & . S. (2021). The Effects of Visual and Auditory Learning Styles on Students' Learning Outcomes in Historical Social Studies. *International Journal of Research and Review*, *8*(1), 72–76. https://doi.org/10.52403/ijrr.20210109

Hernandez, J. E., Vasan, N., Huff, S., & Melovitz-Vasan, C. (2020). Learning Styles/Preferences Among Medical Students: Kinesthetic Learner's Multimodal Approach to Learning Anatomy. *Medical Science Educator*, *30*(4), 1633–1638. https://doi.org/10.1007/s40670-020-01049-1

Jafarian, N. R., & Kramer, A.-W. (2024). AI-assisted audio-learning improves academic achievement through motivation and reading engagement. In *Computers and Education: Artificial Intelligence* (pp. 1–20). https://doi.org/10.31234/osf.io/ac2zq

Li, Y., Medwell, J., Wray, D., Wang, L., & Xiaojing, L. (2016). Learning Styles: A Review of Validity and Usefulness. *Journal of Education and Training Studies*, *4*(10), 90–94. https://doi.org/10.11114/jets.v4i10.1680

Marković, S., & Jovanović, N. (2012). Learning style as a factor which affects the quality of e-learning. *Artificial Intelligence Review*, *38*(4). https://doi.org/10.1007/s10462-011-9253-7

Masela, M., & Subekti, A. S. (2021). Auditory and kinaesthetic learning styles and L2 achievement: A correlational study. *Englisia: Journal of Language, Education, and Humanities*, *8*(2), 41. https://doi.org/10.22373/ej.v8i2.7529

Nguyen, H-H., Nguyen, T-L., & Vu, C.-T. (2022). European Journal of Educational Research. *European Journal of Educational Research*, *11*(2), 859–872.

Norhidayah, N. (2023). The Effect of Visual Learning Style on Learning Outcomes in Arabic Subjects. *Al-Muyassar: Journal of Arabic Education*, *2*(1), 33. https://doi.org/10.31000/al-muyassar.v2i1.6581

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles

concepts and evidence. *Psychological Science in the Public Interest, Supplement*, *9*(3). https://doi.org/10.1111/j.1539-6053.2009.01038.x

Rahmi, M. N., & Samsudi, M. A. (2020). Pemanfaatan Media Pembelajaran Berbasis Teknologi sesuai dengan karakteristik Gaya Belajar. *Edumaspul: Jurnal Pendidikan*, *4*(2), 355–363. https://doi.org/10.33487/edumaspul.v4i2.439

Rajapaksha, G. R. S., & Karunathilaka, M. (2019). Learning style preferences of students 2017-2019 batch of diploma in pharmacy of National Institute of Health Sciences (NIHS)–Sri Lanka. *International Journal of Advance Research, Ideas and Innovations in Technology*, *5*(1), 766–771.

Spurlock, K. R. (2023). Review of Learning styles, classroom instruction, and student achievement. *Education Review*, *30*. https://doi.org/10.14507/er.v30.3713

Subagja, S., & Rubini, B. (2023). Analysis of Student Learning Styles Using Fleming's VARK Model in Science Subject. *JURNAL PEMBELAJARAN DAN BIOLOGI NUKLEUS*, *9*(1), 31–39. https://doi.org/10.36987/jpbn.v9i1.3752

Thu Ha, N. T. (2021). Effects of Learning Style on Students Achievement: Experimental Research. *Linguistics and Culture Review*, *5*(3).

Utami, I. D., & Masduki, M. (2023). Student's Visual Reasoning In Solving Linear Equations In Terms Of Learning Style. *Prima: Jurnal Pendidikan Matematika*, *7*(1), 26. https://doi.org/10.31000/prima.v7i1.7171

Utami, P. S. (2016). Pengaruh Gaya Belajar Dan Metode Pembelajaran Terhadap Hasil Belajar Ips Siswa SMP. *Jurnal Dimensi Pendidikan Dan Pembelajaran*.