
The Influence of Student Learning Styles on Student Achievement and Intelligence

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Abstract: *This study aims to determine the influence of learning styles on student achievement. This study used a quantitative approach. This type of research is field research. The population in this study was all grade VIII students of SMP Muhammadiyah 6. The data collection method uses a Likert scale model questionnaire to determine the type of student learning style, while the Akidah Akhlak learning achievement variable uses school documentation in the form of report card scores. The data analysis method used to test the hypothesis is multiple linear regression analysis. The results showed that: (1) There is a significant influence between Visual Learning Style on Akidah Akhlak Learning Achievement, which means that the better the Visual, the Learning Achievement will increase. (2) There is a significant influence between Auditory Learning Style and Learning Achievement, which means that the better the Auditory, the Learning Achievement will increase. (3) There is a significant influence between Kinesthetic Learning Style and Learning Achievement, which means that the better Kinesthetic Learning Achievement will increase. (4) The test results of multiple linear regression analysis obtained a calculated F value of 7.235 with a significance value of 0.000 ($0.000 < 0.05$), meaning that H_a is accepted and H_0 is rejected. This means that the hypothesis that states "Visual, Auditory and Kinesthetic together have a positive and significant effect on Learning Achievement" is accepted. Based on multiple linear regression analysis, it shows the magnitude of the coefficient of determination (r^2 square) = 0.191, meaning that the independent variables together affect the non-free variable by 19.1%, the remaining 80.9% is influenced by other variables that are not included in the research model.*

Keywords: *learning style, learning achievement, influence, significant, student.*

INTRODUCTION

Learning Style is considered to play an important role in the success of learning activities. As expressed by Bobbi DePorter and Mike Hernacki is a combination of how a person absorbs, organizes, and processes information. James and Gardner in their book Ghufron and Risnawati revealed that learning style is the most effective and efficient way that students can use process, storing and remembering what they have learned. The explanation of learning styles according to Dunn and Dunn in their book Sugihartono that learning styles are a collection of characteristics that a person has in making effective learning for themselves and not necessarily effective for others. Furthermore, Nasution stated that learning style is a way that a student does in capturing stimuli or information, how to remember, think and solve problems consistently. Based on various understandings of learning styles according to these

experts, the author can conclude that learning styles are ways of learning that students have in processing information effectively and efficiently and carried out consistently [1], [2].

There are three kinds of learning styles based on the modality a person has, namely visual, auditory and kinesthetic (V-A-K). Visual learning style is a learning style that emphasizes the sense of sight. That is, students with a visual learning style will more easily capture the subject matter through writing, images, diagrams, or related symbols. Auditory learning styles can absorb information from the auditory aspect. Students with this learning style will more easily understand the material taught by the teacher using lectures, discussions or auditory media tools. Kinesthetic learning style is a learning activity by moving, working and touching. This type of learning is unique in learning to always move, five sensory activities, and touch. It is difficult to sit still for hours because their desire for activity and exploration is very strong [3], [4].

The characteristics of visual learning styles are: a) Always neat and organized. b) Speak quickly. c) Meticulous in detail. d) Attach importance to appearance, both in terms of clothing and presentation. e) Spellers are good and can see the actual words in their minds. f) Remembering what is seen rather than heard. g) Remembering with visual associations. h) Fast and diligent readers. i) Likes to read rather than be read to. j) Likes to doodle meaninglessly when talking or listening. k) Often answer questions briefly such as yes and no. l) Prefer to demonstrate rather than speak. m) Prefer art to music. n) Often know what to say, but are not good at choosing words. o) Sometimes lose concentration when they want to pay attention. p) It is easier to remember if assisted by images [5], [6].

Furthermore, the characteristics of auditorial learning styles are: a) Easily distracted by commotion. b) Move their lips and say the writing in the book while reading. c) Love to read aloud and listen. d) Can repeat back and mimic tones. e) Finds it difficult to write, but great at telling stories. f) Speak in a patterned rhythm. g) Usually fluent speakers. h) Prefer music to art. i) Learning by listening to and remembering what is discussed rather than what is seen. j) Likes to talk, likes to discuss, and explain things at length. k) It is better to work out loud than to write it down. l) Prefer verbal jokes over reading comics [7], [8].

Furthermore, the characteristics of kinesthetic learning styles are: a) Speak slowly. b) Easily distracted by commotion. c) Touching people to get their attention. d) Always physically oriented and move a lot. e) Have early development of large muscles. f) Learning through manipulation and practice. g) Memorization by walking and seeing. h) Use fingers as instructions when reading. i) Lots of use of body cues. j) Unable to sit still for long periods [9].

Learning style is the key to developing performance in learning. Each student certainly has a different learning style. The tendency of the learning style that students have, of course, some factors influence. Dunn, a pioneer in the field of learning styles stated that he had discovered "many variables that influence students' learning styles, these include physical factors, emotional factors, sociological factors and environmental factors". Everyone has and develops their learning style that is influenced by personality type, habits or habits and develops with time and experience [10]-[12].

The diversity of individual or student characteristics certainly has different learning styles. Some students prefer to write things that have been conveyed by the teacher during the learning process. Some students prefer to listen to the material delivered by the teacher, and some students prefer to practice directly. Therefore, knowing or being aware of learning styles will make it easier to achieve learning achievements. As Bobbi DePorter and Mike Hernacki express in their book Quantum Learning: "learning styles are key to developing performance in work, school, and interpersonal situations" [13]-[15].

Recognizing one's learning style does not guarantee a person becomes more intelligent, but recognition of learning styles can help a person find more effective ways to learn. For teachers, understanding student learning styles can be used by teachers to maximize student

learning abilities, so that student learning outcomes can be optimal. Everyone has a different learning style. Although everyone uses these three learning styles in learning activities, the majority of people are more inclined to one of the three [16]–[18].

Everyone can choose the most optimal way of learning information. Therefore, everyone has their own learning style and each learning style chosen has its advantages as well. However, whatever learning style is chosen is expected to be maximal in achieving learning goals so that students can have good learning results or achievements. As Umi Machmudah and Abdul Wahab Rosyidi explain in their book *Active Learning in Arabic Learning*: "research shows that students who learn using the dominant learning style when taking tests will achieve much higher scores than if they learn in a way that is not in line with their learning style" [19], [20].

Learning style is the key to developing performance in learning. Each student certainly has a different learning style, "Knowing these different learning styles has helped teachers everywhere to be able to approach all or almost all students just by conveying information in different styles". Rita Dunn, a pioneer in the field of learning styles stated that she has discovered "many variables that influence students' learning styles, these include physical factors, emotional factors, sociological factors and environmental factors". David Kolb in his book *Gufron and Risnawati entitled Learning Style of Theoretical Studies* states that: "Everyone has and develops their learning style that is influenced by personality type, habit or habit, and develops over time and experience". This learning style is influenced by the field involved, which can further affect success in achieving achievements [21], [22].

Learning achievement is one of the parameters of student learning success at school. Learning achievement has an important position in education because it is a benchmark for the success of the learning process, as well as evaluation material for educational actors. To know the learning success that has been established in the interaction or learning process requires assessment or evaluation. According to Tulus Tu'u about learning achievement states that learning achievement can be interpreted as the result of student achievement in doing learning tasks or activities, through mastery of knowledge or skills in subjects at school which are usually indicated by test scores or score numbers given by teachers. Wirawan stated that learning achievement is the result achieved by a person in his learning efforts partly expressed by the values in his report card. According to Sumadi Suryabrata, learning achievement includes psychomotor changes, so learning achievement is the ability of students in the form of mastery of knowledge, attitudes and skills achieved in learning after they carry out learning activities [23]–[25].

From several opinions according to experts regarding learning achievement, it can be concluded that learning achievement is the result of student learning carried out in a certain period where in proving the learning results are expressed in numbers, letters, and sentences according to certain levels. Reviewing several opinions about the understanding of learning achievement, researchers concluded that learning achievement is the result of a good learning process characterized by the ability to master material about related subjects and is the result of a comprehensive assessment [26], [27].

LITERATURE REVIEW

The success or failure of an individual's learning process is also influenced by many factors, both factors that come from within (internal), and factors that come from outside (external). Student achievement is essentially an interaction of several factors. Recognition of the factors that affect learning achievement is very important to monitor students in achieving the best achievement. According to Wingkel, two factors affect student achievement, namely factors that come from within the students themselves and factors that come from outside the students. The factors that come from within students are physical state, intelligence, creativity, interests, talents, learning styles, attention, motivation, discipline, and attitude. The factors that come from outside the student are family, school, community, and situational factors such as

climate, time, and place. Merson U. Sangalang in Tulus Tu'u revealed that 6 factors affect learning achievement, namely intelligence, interest and talent, motive factors, learning style, family environment and home environment. Meanwhile, Munif said that many students' failures in receiving information were due to the incompatibility of the teacher's teaching style with the student's learning style [28].

All efforts made are certainly none other than to succeed in the goals of national education. Academic achievement is one indicator of a school's success in managing the learning process. The quality of a school can be recognized through the achievement of academic achievements that have been produced. Schools that achieve a lot of academic achievement contribute to improving the overall standard of education. Excellent education is expected to have an important role in developing the nation's life potential, in line with the educational objectives outlined in the Law of the Republic of Indonesia No. 20 of 2003 concerning the National Education System. National education aims to develop the potential of students to become human beings who believe and are devoted to God Almighty, have noble character, healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens [29]–[31].

The initial point explained in the purpose of national education is to produce students who have faith and respect for God Almighty and have good character. However, the effort to achieve this goal in shaping human resources as outlined in the core objectives of education is not simple. It cannot be ignored that there are currently various events that reflect bad behaviour in this country, especially the most worrying is the bad behaviour encountered among school students. Therefore, teaching the values of creed and morals in the school environment is very important to achieve the main target of education [32]–[34].

Religious and moral education is a system that implies the application of character values to members of the school community, which includes aspects of knowledge, awareness or desire, as well as actions in practising these values, both with God Almighty, individuals themselves, others, the environment, and the nation. The main function of creed and moral education in madrasah is to involve all parties who play a role, including the core elements of education such as curriculum content, teaching and assessment methods, relationships between individuals, management of subject matter, school administration, extracurricular activities, use of facilities, funding, and morale of all members of the school community and the surrounding environment [35], [36].

Akidah Akhlak subjects that have long been part of the school curriculum have great potential as a means to imply values and norms to shape character and improve students' academic achievement. Akidah Akhlak subjects should be able to provide provisions for students to develop their beliefs, devotion, and behaviour so that they can explore their potential, talents, and interests through special activities in the school environment. It is expected that through Akidah Akhlak subjects, social skills and a sense of responsibility can develop, while students' potential and achievements can also be improved [37].

The results of an interview with a teacher of Akidah Akhlak SMP Muhammadiyah 6 Yogyakarta, said that almost 75% of children's learning achievement in class had met the KKM (Minimum Completeness Criteria). This is certainly still homework for the school and students to continue to improve their learning achievement. As for the efforts that have been made by the school to improve learning achievement, namely by collaborating with psychologists to help children find their respective learning styles, this is certainly expected to make it easier for students to follow learning at school. But the fact is that there are still learning achievements that children have not met in the KKM. Therefore, this is the basis for the research conducted, which is to find out the influence of visual, auditory and kinesthetic learning styles (VAK) on the learning achievement of Akidah Akhlak grade VIII students of SMP Muhammadiyah 6 Yogyakarta. The formulation of the problem in this study includes the extent to which visual, auditorial, and kinesthetic learning styles together affect student

achievement, as well as how visual, auditorial, and kinesthetic learning styles each affect student learning achievement. Here's the frame of mind in this study [38]:



Figure 1. Thinking Framework

METHODOLOGY

The research approach used in this study is quantitative research, where this research emphasizes research results through statistical analysis. As Sugiyono said, "Quantitative data is data in the form of numbers". Thus this research allows statistical analysis techniques to be used to process data. The type of research used is field research. The object of research in this study was carried out at SMP Muhammadiyah 6 Yogyakarta with the subject of research of all grade VIII students. The data collection method used in this study was using questionnaires, documentation and field observations [39]–[41].

The data analysis method used in this study is multiple linear regression analysis. The hypothesis tests used in this study are Test F, Test T and coefficient of determination (R²). Multiple linear regression analysis to analyze the influence of visual, auditorial, and kinesthetic learning styles together on learning achievement, and simple linear regression analysis to partially analyze the influence of visual, auditorial, and kinesthetic learning styles on student achievement. Both analyses are done with the help of using apps SPSS 28 Statistics for Windows [42].

RESULTS AND DISCUSSION

Learning style is a way of learning that students have in processing information effectively and efficiently and is done consistently so that it can affect learning outcomes. The results of this study show that visual learning style, auditorial learning style, and kinesthetic learning style simultaneously affect the learning achievement of Akidah Akhlak grade VIII junior high school students at SMP Muhammadiyah 6 Yogyakarta. The test results of multiple linear regression analysis showed that a calculated F value of 7.235 and a significance value of 0.000 ($0.000 < 0.05$) were obtained. So the hypothesis that states "Visual, Auditory and Kinesthetic together have a positive and significant effect on Learning Achievement" is accepted. The results of multiple linear regression are shown in the following table [43], [44]:

Table 1. Multiple Linear Regression Results

Variable	B	Beta	t hitting	Sig t	Keterangan
(Constant)	73.813				
Visual	0.045	0.244	2.165	0.034	Significance

Audio-Visual	0.042	0.256	2.453	0.016	Signifikan
Kinestetik	0.054	0.302	2.684	0.009	Signifikan
F hitung	7.235				
Sig F	0.000				
R square	0.191				
Variabel Dependent	: Prestasi Belajar				

Based on the table above, multiple linear regression calculations using the SPSS program obtained the following results:

$$Y = 73,813 + 0,045X1 + 0,042X2 + 0,054X3$$

Information:

- Constant = 73.813, meaning that if there are no Visual, Auditory or Kinesthetic variables that affect Learning Achievement, then Learning Achievement is 73.813 units.
- $X1 = 0.045$, meaning that if the Visual variable increases by one unit then Learning Achievement will increase by 0.045 assuming another independent variable is fixed.
- $X2 = 0.042$, meaning that if the Auditory variable increases by one unit then Learning Achievement will increase by 0.042 assuming another independent variable is fixed.
- $X3 = 0.054$, meaning that if the Kinesthetic variable increases by one unit then Learning Achievement will increase by 0.054 assuming another independent variable is fixed.

The results above show that the better a person uses a learning style, the better his learning achievement. As stated by Merson U. Sangalang in Tulus Tu'u one of the factors that affect learning achievement is learning style. If we can understand how different each person's learning style is, maybe it will be easier for us if one day, for example, we must guide someone to get the right learning style and provide maximum results for himself. Therefore, knowing learning styles and being able to maximize their use in learning activities is very important so that learning activities run well they can increase learning achievement [14].

When a person is aware of his learning style, he can take appropriate steps to improve his learning efficiency and effectiveness. Understanding the ways others learn, such as superiors, peers, teachers, spouses, parents, and children, can also strengthen interpersonal relationships with them. This suggests that knowledge of learning styles is not only helpful in educational contexts but also has broader benefits in building relationships and interacting with various people in different aspects of life [38].

Partial Hypothesis Testing (t-Test) Visual Learning Style to Learning Achievement

The results of multiple linear regression analysis testing show that there is a t value in the visual learning style of 2.165, this shows that the relationship between visual learning style to learning achievement is positive which means that the better the visual learning style, the more learning achievement will increase. And the significance value is 0.034 ($0.034 < 0.05$) which means that there is a significant influence. So the hypothesis that states "visual learning style has a positive and significant effect on learning achievement" is accepted. As the term implies, the meaning of visual learning style is a learning style that emphasizes the sense of sight. That is, students with a visual learning style will more easily capture the subject matter through writing, images, diagrams, or related symbols. In addition, he has a strong sensitivity to colour, while having a sufficient understanding of artistic issues [45].

Visual learning styles focus on visual ability. This means students need concrete evidence first to understand the concept. Students who tend to have a visual learning style have a high

need to get information visually before understanding it. They also tend to be neat and meticulous and prioritize appearance and detail in doing tasks, especially in moral creeds. Students with visual learning styles prefer reading and viewing illustrations rather than listening or hands-on practice. They include faster readers and are more receptive to written instructions. Visual learning styles support the selection of learning methods and media that utilize the sense of sight (eyes) [46], [47].

Individuals with a visual learning style can quickly understand the material presented in writing, in the form of charts, graphs, and images. However, they may face difficulties if the material is presented in the form of sound or movement. Visual learning styles have a major impact on learning achievement, especially in subjects such as aqidah akhlak which often use Arabic letters. Visual learning styles make it easier for students to understand the material presented in visual form [48].

Auditory Learning Style on Learning Achievement

Next is the test result of multiple linear regression analysis shows that there is a t value of 2.453, this shows that the relationship of auditory learning style to learning achievement is Positive which means that the better the auditory learning style, the more learning achievement will increase. And the significance value is 0.016 ($0.016 < 0.05$) which means that there is a significant influence. So the hypothesis that states "auditory learning style has a positive and significant effect on learning achievement" is accepted. Auditory learning styles can absorb information from the auditory aspect. Students with this learning style will more easily understand the material taught by the teacher using lectures, discussions or auditory media tools [49].

Auditorial learning style is a learning approach that relies on the sense of hearing for understanding and memory improvement. This means that information must first be retrieved by hearing to be understood and remembered. Students with this learning style tend to gain understanding through discussion and listening to the teacher's explanations. They rely heavily on their hearing for successful learning, including by listening to lectures, radio, dialogue, and discussion. In some cases, they may also learn through tones such as singing or song [50], [51].

Students with auditory learning styles prefer to discuss or listen to others rather than read or practice practically. This is also true in the context of learning. They are more interested in knowledge and insight because they have great curiosity. However, they may lack precision in detail, such as in mathematical materials that require precision. Therefore, they may find it difficult to focus for long periods on a lesson, especially if it is in written form [52], [53].

Students with auditory learning styles are better able to understand material delivered through sound, such as lectures or conversations. They are also quick at capturing material through discussions with friends or through audio media such as radio or tape recordings. However, they may encounter difficulties in understanding the material presented in the form of writing, movement, or touch. Students with auditory learning styles may have difficulty accepting material presented in writing. Especially if we associate it with aqidah akhlak subjects that tend to use pictures, charts, and calligraphy as the main form of material presentation. Therefore, the impact of auditory learning styles on the learning achievement of Aqidah Akhlak may be limited [54]–[56].

Kinesthetic Learning Style on Learning Achievement

The results of multiple linear regression analysis tests show that there is a t value of 2.684, this shows that the relationship of kinesthetic learning style to learning achievement is positive which means that the better the kinesthetic learning style, the more learning achievement will increase. And the significance value is 0.009 ($0.009 < 0.05$) which means that there is a significant influence. So the hypothesis that states "kinesthetic learning style has a positive and

significant effect on Learning Achievement" is accepted. Kinesthetic learning style is a learning activity by moving, working and touching. This type of learning is unique in learning to always move, five sensory activities, and touch. It is difficult to sit still for hours because their desire for activity and exploration is very strong [57].

In the kinesthetic learning style, the understanding of information occurs through touch and movement. This learning style focuses on physical activities, such as movement and touch. Students with this learning style find it difficult to sit still for long periods because the desire to move and explore the environment is very strong. Individuals with a kinesthetic learning style more easily understand material presented in written form, or movement, and have more difficulty in understanding material presented in sound or visual form. Kinesthetic learning styles are also closely related to practice or direct experience. Students who have an active kinesthetic learning style move and prefer to learn through hands-on practice. They tend to be less interested in learning that only involves reading or listening. The material will be more quickly infused if presented in practical form. They lean more towards things that are physical and enjoy trying new and challenging things. They can't sit still for a long time without moving [58].

Students with kinesthetic learning styles require a special approach to achieve optimal learning outcomes. They need to be more intensive in exploring the material because their understanding occurs through practice. If applied to the subject matter of *aqidah akhlak*, the right method can have a considerable positive impact. Therefore, students with a kinesthetic learning style can achieve good achievements in *aqidah akhlak* subjects through an appropriate approach [37].

Coefficient of Determination (R²)

Based on multiple linear regression analysis, it shows the magnitude of the coefficient of determination (R²) = 0.191, meaning that the independent variables together affect the non-free variable by 19.1%, and the remaining 80.9% is influenced by other variables that are not included in the research model. Learning style is not the only thing that affects learning achievement. Many other factors or variables can certainly affect learning achievement as revealed by Winkel two factors affect student learning achievement, namely factors that come from within the students themselves and factors that come from outside the students. The factors that come from within students are physical state, intelligence, creativity, interests, talents, learning styles, attention, motivation, discipline, and attitude. The factors that come from outside the student are family, school, community, and situational factors such as climate, time, and place. The number of student failures in receiving information can also be caused by the mismatch of the teacher's teaching style with the student's learning style. Therefore, knowing the learning style is important for students to be able to facilitate the learning process. Meanwhile, for teachers, it is mandatory to know the learning style of students because it can make it easier for teachers to design effective and efficient learning [59].

CONCLUSION

Visual, auditory and kinesthetic learning styles simultaneously or partially affect the learning achievement of *Akidah Akhlak* in grade VIII students of SMP Muhammadiyah 6 Yogyakarta. Based on the results of this study, it can be suggested for several parties, as follows. First, students, to know understand and use their learning style optimally so that they can carry out learning activities well can produce good learning achievements as well. Second, for teachers, to better know and understand student learning styles so that they can be used as material to adjust learning designs. Third, schools, to pay attention to student learning styles by facilitating students through school facilities and infrastructure in supporting the improvement of student achievement at the school [60].

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Author Contribution

All authors contributed equally to the main contributor to this paper, all authors read and approved the final paper, and all authors declared no conflict of interest.

Conflicts of Interest

All authors declare no conflict of interest.

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