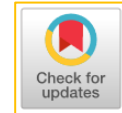# Exploring diverse learning styles in elementary schools: A study on student preferences

Vera Yuli Erviana [a,1,*] [iD], Syarief Fajaruddin [b,2] [iD]

[a] Universitas Ahmad Dahlan, Jl. Ki Ageng Pemanahan No.19, Yogyakarta 55162, Indonesia
[b] Universitas Sarjanawiyata Tamansiswa, Jl. Batikan UH-III/1043 Yogyakarta 55167, Indonesia
[1] vera.erviana@pgsd.uad.ac.id *; [2] syarief.fajaruddin@ustjogja.ac.id
* corresponding author

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ABSTRACT

This study aimed to describe the learning style preferences of elementary school students in 5 districts in Yogyakarta. The population is 4th-grade and 5th-grade elementary school students in 5 districts in Yogyakarta. The sample was 992 students. Data was collected with a survey questionnaire of learning style preferences. The results showed that the majority of elementary students have visual-kinesthetic (25.06%), the majority of students in the Sleman district have kinesthetic (33.33%), the majority of students in the Bantul district have visual-kinesthetic (31.93%), the majority of students in Gunungkidul district have the kinesthetic (27.45%) and the majority of students in Kulonprogo district have the visual-kinesthetic (29.36%). The elementary school students in Yogyakarta Province have more than one preference, a combination of two learning styles: visual-kinesthetic and auditory-kinesthetic. It can be concluded that most students in Yogyakarta tend towards two learning styles, i.e., visual and kinesthetic.

1. Introduction

Every child is born unique and has different characteristics, including the brain's ability to absorb, process, and convey information [1]. The human brain is divided into two parts: the right brain and the left brain. The left brain is dominant for processing logic, work that requires a systematic sequence, language comprehension, and cognition. At the same time, the right brain is for randomly and holistically processing aspects of visuals and intuition. People generally use one side of the brain, but it's not absolute [2]. The learning activity is a mental activity that involves the brain's ability. In learning activities, an individual has a variety of ways to absorb the information they have obtained. Some learn by listening, some by reading, and some by finding. This term is called a learning style. Learning style that refers to the concept of the individual differences in learning is the most effective [3]; most efficient and effective in understanding, processing, and storing in learning; individual quality that can affect a student's ability to obtain information to interact and participate in learning and experience [4], [5]; and different ways of individuals in learning that can optimize individuals by adjusting their learning style [6]. Learning style is influenced by experience and gender, which are correctly attached to every individual [7]. Learning style is like the open door. All information will quickly enter if the door is wide open. In the end, all information will be stored in long-term memory [8]. Learning styles classification is divided into three types, i.e., visual, auditory, and kinesthetic [9]. Visual is a learning activity with visual such as charts, graphs, and pictures. Auditory is a learning style that involves the sense of hearing to listen and read the material, whereas kinesthetic is learning by doing activities. According to Felder and Silvermen [10], students' learning styles are different, including seeing and listening, reflecting and acting, logical and intuitive reasoning, analysis, and visualization. Some students sometimes also have a combination of two or more learning styles.

Teachers' understanding of students' learning styles is the most crucial subject to improving learning quality. One of the keys to students' learning success is being aware of their learning styles [11]. The more they know and apply their learning style in learning, the more successful they will be. Manolis *et al.* [12] stated that students' learning styles could be crucial in improving curriculum and teaching. Teachers can combine students' learning styles in learning activities to achieve learning objectives in achieving educational goals [9]. Teachers have a big role in directing students in determining their learning styles and direct learning strategies according to them. The first step is to understand the uniqueness and characteristics of their students [1]. Understanding the characteristics and learning styles becomes a reference for teachers to determine the right teaching strategies, and finally, the expected learning outcomes can be achieved. Some studies in the educational environment that intend to identify students' learning styles found that students with a specific type of learning style show better performance because they are more active during the teaching and learning process. Other results indicated that students with appropriate learning styles tend to have better or higher levels of activity in the teaching and learning process. Many students prefer learning by utilizing their five senses. They like things in detail and want facts. They prefer everything to be arranged in an orderly manner; teaching is done in a structured step-by-step. Unlike intuitive learners, they are students who prefer to imagine and innovate.

2. Literatur Review

Every individual is unique. Their absorption ability in receiving lessons is different from one another. Some students are more creative and smart compared to other students. This individual diversity is known as learning style. Learning style is the ability possessed by students to absorb and process information obtained by the most preferred method and considered the easiest to understand [13]. Learning style leads to the students' efforts in analyzing learning situations that produce certain preferences used by students to respond to their learning environment [14]. Factors that influence learning styles are environmental factors and social factors [15]. Kolb [16] stated that the factors that influence learning styles are personality types, habits, and development over time and experience. Over a period of time, experiences and surrounding environmental conditions will affect the student's learning styles and habits depending on the strength or weakness of said environmental conditions in encouraging students to carry out these habits. Therefore, each student's learning style is different, as expressed by various experts. One of them is Kolb, who established four types of learning styles: diverger, assimilator, converger, and accomodator [17]. Diverger is an approach to every situation by "observing, not acting," as students like learning tasks that lead them to generate ideas and gather information. Assimilator assimilation-specific characteristic is making conceptual models and reflective observations. Usually, this type of student tends to be more theoretical and prefers to work with abstract ideas and concepts. In other words, their specific characteristics are making conceptual models and focusing on abstract concepts and ideas during the learning process. Converger is a characteristic of the individual learning style that depends on abstract conceptualization and concrete experiences. Usually, this type of students have good skills in problem-solving and decision-making. Therefore, they need to understand the whole and move from the whole to the parts.

Students who have accommodator learning styles tend to do decision planning and implementation. They adjust to change easily because they are open-minded in the learning environment. Learning occurs by doing and experiencing actively. They are always in a condition of discovery. Usually, this type of student asks "why". Different from the above opinion, Neil D. Fleming developed learning style types of VARK, which is the acronym of Visual, Aural, Read/Write, and Kinesthetic Preferences [18]. In order to support students to achieve better learning outcomes, teachers must maximize the learning process in accordance with the student learning styles. However, according to [13], the most prominent types of sensory-based cognitive learning styles are VAK (visual, auditory, and kinesthetic). Visual learning style characteristics are (1) organizing and paying attention to everything and appearance; (2) remembering with pictures and preferring to read rather than listening to a reading; (3) requiring a comprehensive picture and purpose, capturing details, and remembering what is seen. Auditory learning style characteristics are (1) their attention is easily divided, (2) speaking in rhythmic patterns, and (3) learning by listening. The kinesthetic learning style characteristics are (1) touching people and standing close together; (2) learning by doing, pointing the letters while reading, and responding physically; and (3) remembering while walking and looking. Based on the opinion above, each student has the ability to manage different information. Therefore,

teachers must be able to benefit all learning styles so that students are able to participate in learning activities to the fullest [19]. Felder and Brent [20] explained that understanding the learning styles can help teachers gain a broader view of the differences in the students' characteristics in managing information that can influence the learning design [21]. Learning design is inseparable from the student's learning environment. This is similar to the opinion of Erkan *et al.* [22] that the student's learning environment influences peers' attitudes, teacher attitudes, competencies development, and motivation so that it can be seen that the elementary school students' characteristics are imitating what they get. Similar to the statement above, [23] stated that "the characteristics of elementary school students are (1) enjoy playing, (2) likes to move around, (3) likes to work in groups, and (4) likes to try or do something that can help right away". Based on the above literature studies, the teachers must provide learning that corresponds with the learning styles so that learning activities will be successful, interesting, and pleasing to students. The teacher's understanding of student learning styles will increase student learning outcomes.

3. Method

This study adopted a quantitative approach by conducting a survey to assess learning styles among elementary school students in the Special Region of Yogyakarta. The research spanned five diverse districts, namely Yogyakarta, Bantul, Sleman, Kulon Progo, and Gunungkidul District, encompassing a total population of 4th-grade and 5th-grade students, amounting to 143,297 individuals. Employing a stratified random sampling technique, a sample size of 992 students was selected to ensure representation across the districts. The data collection methodology centered on a carefully designed questionnaire, meticulously crafted and validated through content validation using expert insights from Focus Group Discussions (FGD) and construct validation procedures. This questionnaire was specifically tailored to categorize students' learning preferences into three distinct styles: visual, auditory, and kinesthetic. Subsequently, the amassed data underwent descriptive statistics analysis to glean insights into prevalent learning preferences among the surveyed students.

4. Results and Discussion

4.1. Result

This research describes the learning styles and preferences of elementary school students in Yogyakarta using the questionnaire spread method to students. Questionnaires were distributed randomly to 992 respondents. The results of the data analysis obtained seven groups type of learning styles, which are Visual (V), Auditory (A), Kinesthetic (K), Visual-Auditory (VA), Auditory-Kinesthetic (AK), Visual-Kinesthetic (VK), and a combination of the three Visual-Auditory-Kinesthetic (VAK). In detail, the data description of the profile of learning style tendency in every district can be described as follows: The results of research on students in the Yogyakarta Province based on the data show that the combination VAK is only owned by 1.71% of students. The dominant learning style owned by students is a VA combination of 26.81%. The visual appearance can be seen in Fig. 1.
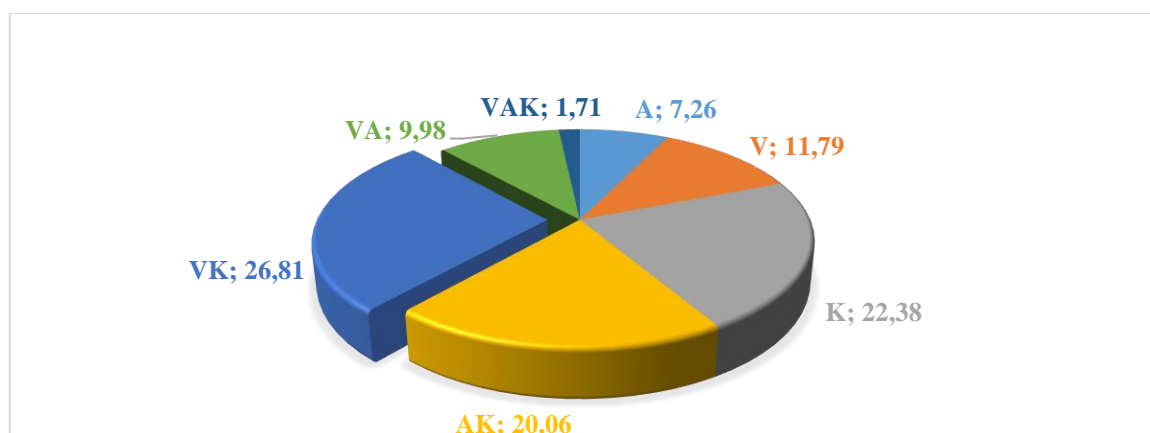

Fig. 1. Diagram of Students' Learning Style Preference in Special Region of Yogyakarta

The survey results in Yogyakarta, Indonesia, Fig. 2 showed that the students had a dominant preference towards the VK of 25.06%, while the lowest learning style owned by students is a combination of VAK of 0.49%.
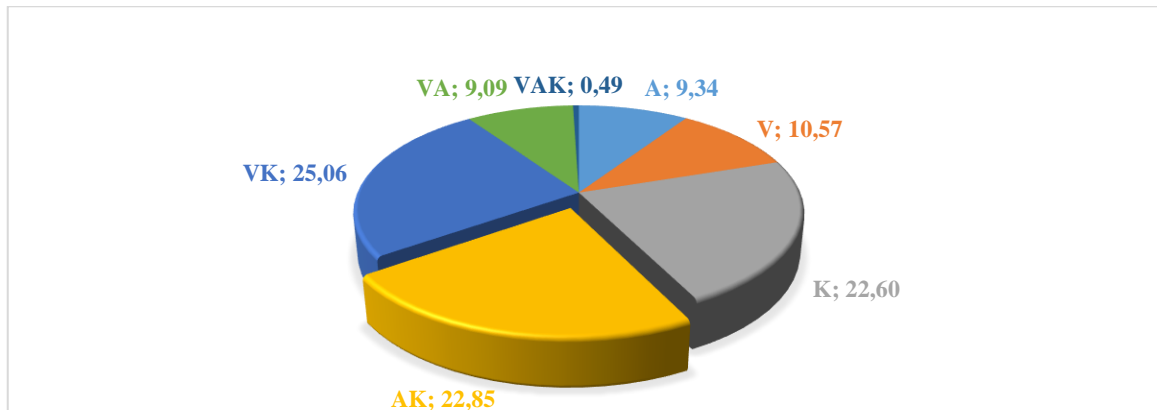

Fig. 2. Diagram of Students' Learning Style Preference in Yogyakarta

In Bantul District, the dominant VK is owned by students as much as 31.93%. The lowest learning style is a combination of VAK is 6.02%. Look at Fig. 3.
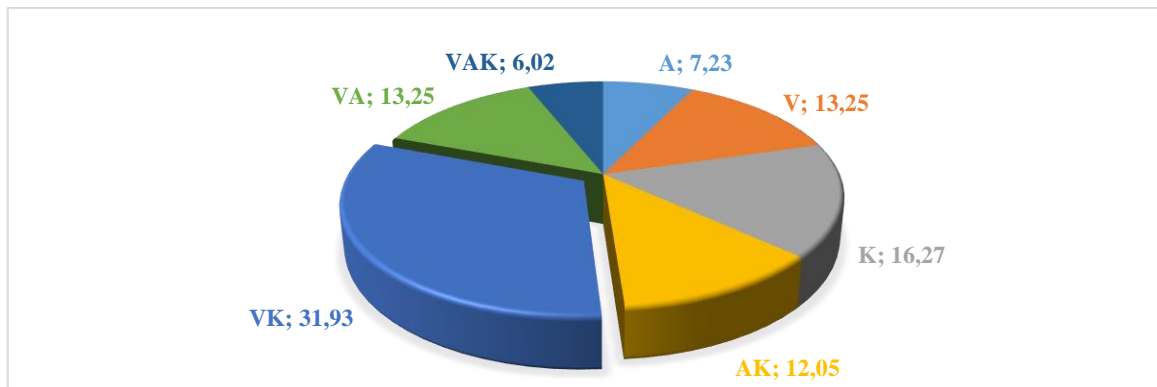

Fig. 3. Diagram of Students' Learning Preference in Bantul District

The results of research in Sleman District showed that the dominant learning style was kinesthetic, 33.33%, while the lowest learning style possessed by students is auditory, as much as 4%, see Fig 4.
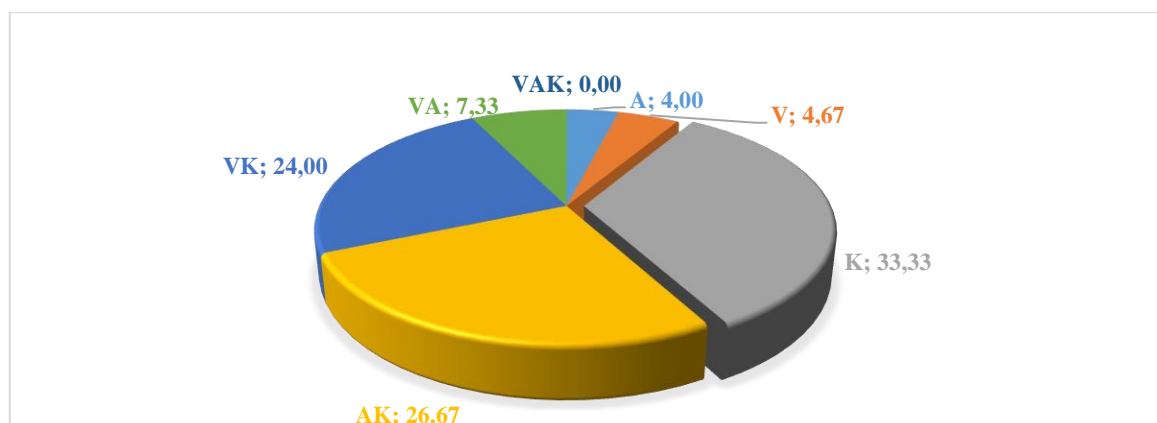

Fig. 4. Diagram of Students' Learning Style Preference in Sleman District

The most dominant learning style in Kulon Progo district is VK (29.36%), and the lowest is VAK (2.29%), see Fig. 5.
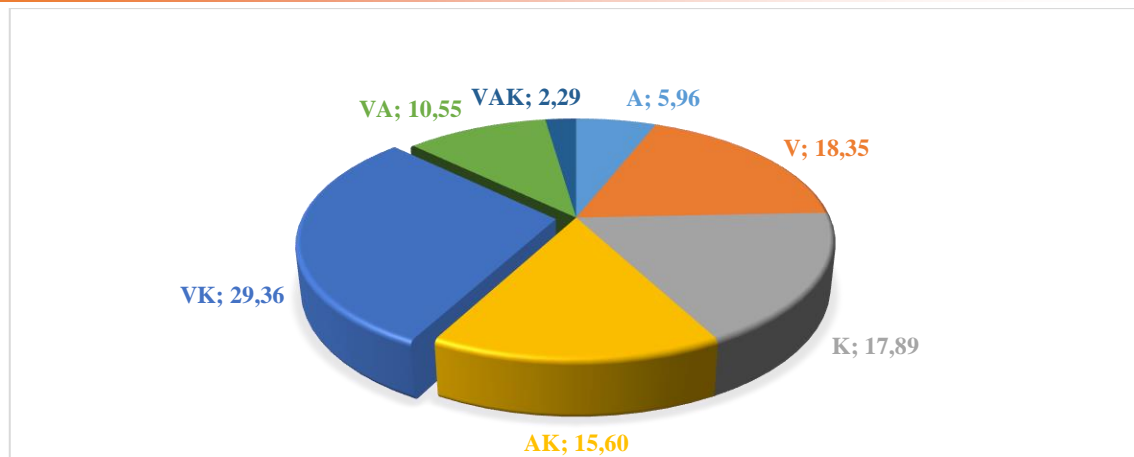
Fig. 5. Diagram of Students' Learning Style Preference in Kulonprogo District

The dominant learning style of students in Gunungkidul District is kinesthetic, 27.45%. The lowest learning style is auditory, 5.88%, see Fig. 6.
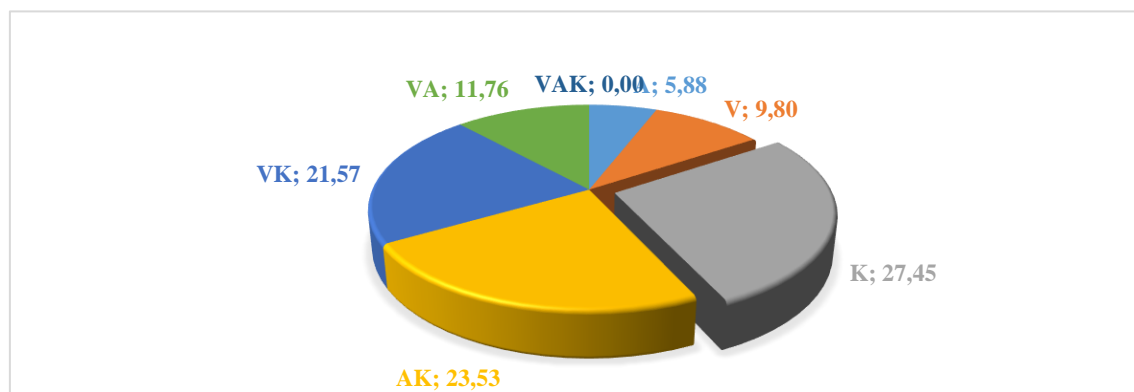

Fig. 6. Diagram of Students' Learning Style Preference in Gunungkidul District

4.2. Discussion

Every student is unique with the characteristics inherent in them, having their potential and interests. They are different from one another; one of the differences is in learning style. Learning style is the way someone prefers to get and process information. It is the easiest way to concentrate on receiving new, difficult information [24]. There are various types of learning styles: visual, auditory, and kinesthetic types of learning style [25]. Each learning style has weaknesses and strengths. A combination of 2 or 3 types of learning styles does not infrequently occur. Students who only use a kind of learning style absolutely cannot be ideal in learning [26]. This study showed that the majority of students' learning styles in Yogyakarta are towards combination, which is VK and AK, whereas the least learning style is VAK. A single learning style of visual and auditory does not dominate too much. Only a single kinesthetic dominates in 2 districts, Gunungkidul and Sleman Districts. Each learning style has characteristics. Visual students have symptoms of being thorough and detailed, speaking fast, paying attention to appearance, both in dress and presentation, being good at spelling, and truly understanding the words. They also remember what they have seen rather than heard and recognized with the visual association, usually not disturbed by noises. They generally have problems remembering verbal instructions unless written, reading fast and diligently, prefer to read rather than being read by others, scribbling without meaning while talking on the phone, and prefer to do a demonstration rather than give a speech. An auditory student has characteristics of being easily disturbed by noises, likes to read loudly and to listen, finds difficulty in writing but is great at telling stories, and is usually a fluent speaker. They learn by listening and remembering what is discussed rather than seen, like to talk and discuss, have problems with work related to visualization, and are better at spelling loud rather than writing. A kinesthetic student usually speaks slowly, responds to physical emphasis, touches people for attention, stands close when talking to people, and learns through manipulation and practice.

They are always bodily oriented and move a lot, memorize by walking and seeing, use the finger as a reading guide, use a lot of body cues, can't sit still for a long time, possibly the writing is terrible, use words that contain actions, love plot oriented books that reflect activity with gestures [25]. This research results describe the teachers' methods and strategies based on students' learning styles that are implemented in the learning process. According to the research conducted by Ünsal [27], students with visual learning styles are successful in individual studies, reading, and writing skills. Students with audio learning styles are successful in paired and group work, have speaking and listening skills, and have an advantage in oral examinations. Learners with a kinesthetic style are successful in bilateral and group work as well as in performance-based evaluations. This research also explains the importance of teachers' understanding of the characteristics that determine learning success. According to the research conducted by Altun [28], Kamışlı, and Özonur [29], it can be seen that identifying the students' learning styles since the beginning of the school year is very important because it will help students develop themselves in accordance with their preferences so as to improve the teaching efficiency and useful in determining the learning environment. The things that need to be considered by the teachers in accommodating student learning styles are the learning strategies. Teachers must ensure that implemented learning strategies can help students develop new concepts [30]. Cooperative learning is the right strategy to accommodate students with various types of learning styles. Cooperative learning can enhance academic collaboration among all students. The learning concept should be contextual, and the activities are specifically designed to ensure a deep learning experience [31].

The techniques for evaluating students' learning processes and outcomes are also things that teachers must pay attention to when teaching in classrooms with varied learning styles. Teachers must apply Various assessment techniques, for example, written, oral, and practice assessment techniques. This provides an opportunity for students to involve all of their senses in the learning process [32]. Teachers should understand the characteristics of students' learning styles; it can be used as a reference to choose an appropriate learning strategy. When teachers can analyze students' learning styles and tendencies, students' needs can be recognized more effectively, making it easier to choose teaching materials and appropriate learning media [33]. The results of this study contribute to elementary school teachers understanding the characteristics of student's learning styles and provide appropriate learning strategies in learning. For VK students, it will be more feasible for teachers to use visual media such as pictures, videos, graphics, etc. Visual media also helps students build concepts and practice critical thinking. However, in its use, visual media will only be maximal when combined with other learning devices such as audio or direct experience [2]. For AK students, it needs proper classroom management. This classroom must be considered in the learning success. Classes with students who have disruptive behavior can cause low academic development and also tend to have low grades in assessments. In contrast, in good classroom management, students learning calmly positively impacts learning [34]. The right teaching method is by lectures, presentations, discussions, and music [35]. For students with a combination of kinesthetic, it was recommended that the class be set to make it easier for students to move and change positions. It is also necessary for teachers to be active in handling students with kinesthetic learning styles [36].

5. Conclusion

Most elementary school students in Yogyakarta, Indonesia, tend to two combinations of learning styles, i.e., visual-kinesthetic (VK) and auditory-kinesthetic (AK). Therefore, the minority learning style is the learning style of three combinations: visual-auditory-kinesthetic (VAK). Learning styles can be used as a reference in determining and choosing the learning strategies that will be used. Therefore, teachers need to understand the characteristics of students' learning styles so that they can choose the right learning strategy. The selection of learning strategies can determine the level of students' involvement and learning success.

Declarations

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