



The Comparison in Learning Styles between Natural Science Students of Junior High School and Biology Students of Senior High Schools in Malang

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Abstract: Learning styles, according to some experts, are divided into three types, namely auditory, kinesthetic, and visual. Many researches related to learning styles have been conducted by some researchers, but there has not been any research investigating the comparison between students' learning styles at different class levels. This research is a qualitative research investigating the percentage of learning styles at different class levels. The research subjects were the students of class VII and class VIII of Junior High School Muhammadiyah 1 Malang, and the students of class X and class XI of Senior High School Muhammadiyah 1 Malang. The data were analyzed descriptively. The results of the research showed that the comparison of the percentage of learning styles of auditory, kinesthetic, and visual in class VII was 36.67%, 30.00% and 33.33%, in class VIII 13.34%, 33.33% and 53.33%, in class X 31.58%, 23.68%, and 44.74%, and in class XI 61.54%, 15.38% and 23.08%. The auditory, kinesthetic, and visual learning styles of junior high school students were 25.00%, 31.67% and 43.33% respectively, and those of senior high school students were 46.56%, 19.53% and 33.91% respectively. The auditory learning style of senior high school students is 86.20% higher than that of junior high school students, while the kinesthetic learning style was 62.13% lower than that of the junior high school students, and the visual learning style of senior high school students was also 27.78% lower than that of junior high school students. Further research on the learning styles of students at the other grade levels are still required, as well as in elementary school level to obtain more information related to students' learning styles.

Keywords: biology, junior high schools, learning styles, natural science, senior high schools

The role of teacher in learning activities is very essential, such as a motivator, facilitator, and evaluator. As facilitator, the teacher has a responsibility to facilitate students' learning. Fairhurst and Fairhurst (1995) stated that when a teacher was able to analyze the differences of students' needs, the education process was likely to be optimal and it could facilitate the students' learning. Dunn and Dunn (1986) argued that the concentration ability of each individual was different as well as their mental processes in receiving information. Thus educators should pay attention to how students learn, including their learning styles.

Abidin et al. (2011) stated that learning style was an important component in the learning environment. Furthermore, it was said that in a learning process, every individual had different learning styles because of a person's biological and psychological differences. Reiff (1992) stated that all learners had individual attributes related to their learning process. Keefe (1987) defined a learning style as a process of cognitive, affective, and psychological traits that served as a relative stable indicator of learners in relation to perceive, interact and respond to the learning environment. Brown (2000) defined a person's learning style as a way to receive and process information in a learning situation. Celce-Murcia (2001) defined learning styles as a general approach used by a person to interact and respond to the learning environment. Several



learning styles possessed by students are kinesthetic, audio and visual orientation (Dunn 1991). Dunn and Dunn (1986) explained that learning styles consisted of visual, auditory, kinesthetic, global, analysis, impulsive, reflective, individual, and group learning styles. Several kinds of the learning styles are divided into three specific dimensions, namely physiology (visual, auditory, and kinesthetic learning styles), psychology (global, analysis, impulsive, and reflective learning styles), and sociology (individual and group learning styles).

Biggs (2001) stated that learning styles had an important place in one's life. When a person realizes his learning style, he will integrate it into the learning process, so that he will learn easily and quickly and will become a successful learner. Coffield et al., (2004) stated that a learning style was important because of several reasons. The first reason is that people's learning styles differ one another, because everyone is naturally different from one another. Secondly, by knowing the students' learning styles, teachers will have an opportunity to teach using various learning strategies effectively. Learning by using one particular learning strategy will create a monotonous classroom atmosphere, so all students cannot enjoy. Thirdly, it can regulate many things in education, for example in terms of communication. In this regard, by realizing the students' learning styles, they will be more aware of the differences in students' motivation, so that the teacher will be able to organize a learning appropriately and in accordance with particular conditions.

Gilakjani (2012) stated that knowledge of learning styles also provided information for the students why they learned differently from each other. Thus, learning styles help to control the learning process. Furthermore, it is also said that it is essential that every person should be responsible for their own learning process, so that each individual needs to know their learning styles. The students who are aware of their learning styles, their confidence will consistently increase, which will affect their learning results.

Some previous researchers have found that learning styles have a correlation with students' academic achievement, such as Abidin, et al. (2011). A research on learning styles has also been conducted by Junko (1998) who found that students' learning styles had an effect on their learning behavior. Students having different learning styles will have different behaviors in relation to their way of looking at things, interacting and responding to their learning environment. Dunn, Beaudry and Klavas (1989), in their research, stated that the students had higher learning achievement when they learned in accordance with their learning styles.

Chuah Chong-Cheng (1988) stated that a person not only needed to understand his learning style, but also their academic regulation. Several other researches also reveal that the learning method which is appropriate with the students' learning styles and which pays attention to the students' learning styles can significantly improve their academic achievement in elementary and high school levels (Smith & Renzulli 1984). Therefore, it is important for teachers to examine the students' variations based on their learning styles both in junior high school level and in senior high school level.

METHOD

This research aimed at revealing the empirical data about students' learning styles in senior high schools. A survey research design was used to investigate, and to assess opinions and preferences on a certain issue. This study was a descriptive interpretive research, to investigate the students' learning styles including auditory, kinesthetic and visual learning styles. The subjects of this research were the students of class VII, VIII, X, and XI of Junior and Senior High School with a total sample of 111 students. The data were taken using the learning style questionnaire covering auditory, kinesthetic, and visual learning styles supported

with the Likert scale. The questionnaires were developed based on the indicators of DePorter and Hernacki (1992). The data were analyzed using descriptive analysis in the form of the percentage of learning styles from each class.

RESULTS

The results of this research related to the students' learning styles in class VII and VIII of Junior High schools as well as in class X and XI of Senior High Schools in Malang showed the following results

Table 1. Summary of the learning styles of class VII, VIII, X and XI students in Malang

Learning styles	The number of students				Total amount
	class VII	class VIII	class X	class XI	
Auditory	11	4	12	8	35
Kinesthetic	9	10	9	2	30
Visual	10	16	17	3	46
Total amount	30	30	38	13	111

Table 1 shows that in class VII the percentage of the students having auditory learning style was 36.67%, kinesthetic learning style was 30%, and visual learning style was 33.33%. In class VIII the percentage of the students having auditory learning style was 13.34%, kinesthetic learning style was 33.33%, and visual learning style was 53.33%. In class X the percentage of the students having auditory learning style was 31.58%, kinesthetic learning style was 23.68%, and visual learning style was 44.74%. In class XI the percentage of the students having auditory learning style was 61.54%, kinesthetic learning style was 15.38%, and visual learning style was 23.08%.

The results of this research show that the auditory, kinesthetic, and visual learning styles of the junior high school students were 25.00%, 31.67% and 43.33% respectively, and those of senior high school students were 46.56%, 19.53% and 33.91% respectively. The auditory learning style of senior high school students was 86.20% higher than that of the junior high school students, while the kinesthetic learning style of the senior high school students was 62.13% lower than that of the junior high school students, and the visual learning styles of senior high school students was also 27.78% lower than that of the junior high school students. These results are still a tentative picture obtained from this research. Further researches are needed to confirm the empirical data obtained from this research.

DISCUSSION

The results of the data analysis show that the learning styles of each individual were different, both in junior high school students and in senior high school students. Based on the results of the research which was limited to class VII, VIII, X, and XI, it can be seen that the percentage of auditory learning style of senior high school students was higher than that of the junior high school students, but the percentages of kinesthetic and visual learning styles of senior high school students were lower than that of the junior high school students. Rose and Malcolm (2002) stated that the tendency of the students' learning styles in the 5th grade until the 12th grade was mostly kinesthetic learning style with the percentage of 37%, followed by auditory learning style as much as 34% and visual as much as 29%. This research was conducted

on 5000 students in the United States, Hong Kong and Japan. The students' learning styles in elementary schools have been previously revealed by Barbe and Milone (1981), stating that the learning styles the elementary school students strongly have were visual, followed by auditory, and lastly by kinesthetic learning style. On the other hand, Peacock (2001) revealed that the learning styles of most EFL and ESL students was kinesthetic. Rose and Malcom (2002) explained that a person's learning style will change or vary as he/she grew up. The results differences uncovered between this research and the previous researches might be affected by the number of the research samples which was very different. Therefore, to get more information related to the tendency of the students' learning styles, further research using a bigger number of samples and using more various education levels, class levels, age levels is required.

Felder and Siverman (1998) stated that learning styles were defined as a person's characteristics, strengths, and preferences in receiving and processing information. Therefore everyone has their own method in managing their learning strategies. Franzoni and Assar (2009) stated that students tended to learn in different ways. Furthermore, it was said that teaching should not only reflect teachers' teaching styles, but also should be designed to suit with the students' learning styles. Gilakjani (2012) explained that there were several types of student's based on learning styles, namely visual learners, auditory learners, and kinesthetic learners. The students having a visual learning style will learn better by using graphs, charts, and pictures. Auditory learners will learn better by listening to a lecture and reading; while kinesthetic learners will learn better by doing, for example by doing practical work.

Different learning styles at each level of education might be influenced by various factors during the learning process. Dunn and Dunn (1978) wrote that the learners during the learning process were influenced by (1) the immediate environment (sound, light, temperature, and design); (2) personal emotionality (motivation, persistence, responsibility, and flexibility); (3) sociological needs (self, spouse, peers, team, maturity); and (4) physical needs (power of perception, nutrition, time, and mobility). Furthermore, it was also stated that when teachers implemented a learning model which suited the students' learning styles, the students would have a better attitude, more efficient in terms of the learning time and got higher test scores.

Dunn and Dunn (1978) also stated that although the students' learning styles in one class varied, teachers should try to make changes in the teaching and learning process in the classroom that could be beneficial to all learning styles, for example related to the learning model used, the design of the classrooms, the group formation, and the students' learning activities. Gilakjani (2012) stated that good students were those who were able to assess and understand the importance of an information / material presented in the classroom. However, if the students are not interested in the learning material presented, they will not learn the learning material. To achieve the learning objectives, it is essential for teachers to implement a learning model which makes the class environment interactive.

CONCLUSIONS AND RECOMMENDATIONS

Based on the data obtained from the junior and senior high schools in Malang with a total sample of 111 people, it can be concluded that the percentage of the auditory learning styles of students experienced an increase from Junior High school to Senior High School. However, the percentage of the kinesthetic and visual learning styles of students experienced a decrease from Junior High School to Senior High School. Thus, it can be seen that the learning styles at each school level cannot clearly be determined yet. Further researches related to learning styles on each level of education are required. Further researches can use a bigger number of samples and more complete data at various levels of education. It is very essential for teachers to know

their students' learning styles because the students will learn more optimally when learning models implemented are suitable with their learning styles.

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