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The Effect of Learning Style on Academic Achievement of Prospective Teachers in Mathematics Education

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Abstract

This study aims to determine the effect of learning styles on academic achievement of prospective teachers in mathematics education. The method used in this research is descriptive analytic with cross sectional approach. The subjects in this study were 66 students of 5th semester mathematics education teacher candidates at the State Islamic University of Sunan Ampel Surabaya, Indonesia. Data were collected by two methods, namely the questionnaire method or questionnaire through the Visual Auditory and Kinesthetic (VAK) test to collect student learning style data and the documentation method to collect student academic achievement data which was carried out by using the chi square test to see the relationship between learning styles and academic achievement. The results showed that the most student learning styles were visual learning styles (54.5%), then auditory learning styles (24.2%) and finally kinesthetic learning styles (13.6%). Furthermore, there were some students who chose more than one learning style, namely visual-auditory (3.1%), visual-kinesthetic (3.1%), and auditory-kinesthetic (1.5%). After performing the statistical test, namely the chi square test, it is obtained that X^2 count = 4.497 is greater than X^2 table = 3.9403 at a significant level of 0.05. This shows that there is a relationship between learning styles and academic achievement of prospective mathematics education teacher students.

Keywords: learning style, academic achievement, prospective teachers, mathematics education

Abstrak

Penelitian ini bertujuan untuk mengetahui pengaruh gaya belajar terhadap prestasi akademik mahasiswa calon guru pendidikan matematika. Metode yang digunakan dalam penelitian ini adalah deskriptif analitik dengan pendekatan cross sectional. Subjek dalam penelitian ini adalah 66 mahasiswa calon guru pendidikan matematika Semester 5 di Universitas Islam Negeri Sunan Ampel Surabaya, Indonesia. Pengambilan data dilakukan dengan dua metode yaitu metode kuisioner atau angket melalui tes Visual Auditory and Kinesthetic (VAK) untuk mengambil data gaya belajar mahasiswa dan metode dokumentasi untuk mengambil data prestasi akademik mahasiswa yang dilakukan dengan uji chi square untuk mengetahui adanya hubungan antara gaya belajar dengan prestasi akademik tersebut. Hasil penelitian menunjukkan gaya belajar mahasiswa terbanyak yaitu gaya belajar visual (54.5%), kemudian gaya belajar auditory (24.2%) dan terakhir gaya belajar kinestetik (13.6%). Selanjutnya ada beberapa mahasiswa yang memilihi lebih dari satu gaya belajar yaitu visual-auditory (3.1%), visual-kinestetik (3.1%), dan auditory-kinestetik (1.5%). Setelah melakukan uji statistic yaitu uji chi square diperoleh X^2 hitung = 4.497 lebih besar dari X^2 tabel = 3.9403 pada taraf signifikan 0,05. Hal ini menunjukkan terdapat hubungan antara gaya belajar dengan prestasi akademik mahasiswa calon guru pendidikan matematika.

Kata kunci: Gaya belajar, prestasi akademik, mahasiswa calon guru, pendidikan matematika

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Introduction

Learning is the process by which an activity originates or is changed through training procedures or whether in the laboratory or in the natural environment that brings changes in performance, behavior and new skills because of experience or practice in a deliberate attempt (Suryabrata, 2004). Learning can improve knowledge, skills, and attitudes (Baartman & De Bruijn, 2011). In line with that, according to Machfoedz (2005) learning is a process of effort carried out by a person to obtain a whole new change in behavior, as a result of his own experience in interaction with his environment. Meanwhile, according to Wulandari (2011), learning is an effort to acquire new knowledge and behavior with psychological

activities alone. Some of the principles in learning include the requirements for learning methods, learning facilities, the nature of learning, the material provided and the material purchasing techniques (Machfoedz, 2005).

Students' success or failure in learning is influenced by several factors, namely individual factors or factors that exist in a person and social factors, namely factors that are outside a person (Van Dinther, 2011). One of the individual factors is the learning style. Learning style is defined as a combination of cognitive, affective, and physiological characteristics that serve as a relatively stable indicator of how students perceive, interact with, and respond to the learning environment. Learning styles are the way a person accepts, absorbs, and retains new or difficult information and skills (Dunn, 1984). Everyone has different learning styles and if the method of conveying certain learning styles to them is acceptable, they can learn well.

By recognizing learning styles, student-teacher candidates can easily learn and teachers can easily teach in the learning process (Dunn et al., 2002). Students will be able to study well and their learning outcomes are good if they understand learning styles. As a result, students can easily implement classroom learning. In addition, students can also improve their intelligence which greatly affects learning outcomes. Several studies have shown that there is a relationship between learning styles and student achievement in midwifery programs (Wulandari, 2011), learning styles have an effect on the science learning achievement of grade VII students (Schroeder et al., 2007), and there is an effect of learning styles on learning achievement of accounting students (Marriott, 2002). Based on the results of several studies, the researcher was interested in seeing the learning styles of mathematics students.

Furthermore, many experts found different learning styles, including learning styles according to Kolb (1984) which consisted of divergent, convergent, assimilator, and accommodator. According to Honey and Mumford (1992), the learning styles are activist, reflector, theorist, and pragmatic. According to Vermunt et al (2004), learning styles are undirected learning style, reproduction learning style, meaningful learning style, and application learning style. Meanwhile, according to De Porter and Hirarcky (2002), learning styles are divided into 3, namely visual learning styles (V), auditory learning styles (A), and kinesthetic learning styles (VAK).

VAK learning styles are the most common and easy to use (Febriani et al., 2019). The type of visual learning style is a type of learning style that receives and understands information by seeing. According to Takeuch et al (2021) the characteristics of individuals or students who have a visual learning style are skills, and neatness, like to talk, like to make careful planning for the long term, very thorough and detailed, she attaches great importance to good appearance in clothes as well as presentations, it is more comfortable to remember what he saw than what he heard if he remembered something with visual interactions, and was not easily distracted by the crowd while studying. Meanwhile, the auditory learning style is a person's learning style which is done by listening. Individuals are easy to learn, easy to respond to stimuli or stimuli when through the sense of hearing. In line with that, the characteristics of students with an auditory learning style are that when working often talk to themselves, are easily distracted by the noise around them, often move their lips and speak in books when reading, like to read aloud, remember what which is discussed rather than what is seen, likes to talk, and explains things at length (Saputri, 2016).

For the type of kinesthetic style, someone who learns by doing something he is learning or can be said to more easily capture lessons when moving, feeling or taking direct action (Altun & Serin, 2019). There are characteristics of a kinesthetic learning style, namely speaking slowly, touching, groping for attention, standing close when talking to a teacher, often physically oriented and moving a lot, memorizing by looking and walking. , uses fingers as cues when reading, often uses body gestures, cannot sit still for long, his writing is often messy, and likes games that keep oneself busy.

There is no right or wrong way to learn in the learning process because everyone who learns is different and has a positive and negative impact on each individual. When students can understand their

learning styles, the student learning process will be more effective and efficient. Recognizing your learning style doesn't necessarily make you smarter. But with a learning style will be able to determine a more effective way of learning so that learning outcomes can be obtained maximally. Therefore, this study was designed to influence learning styles on prospective mathematics education teacher students' academic achievement.

Method

This study used an analytical research design with a cross-sectional approach, namely the independent variable and the variable that depend on observation only once at the same time (Ary et al., 2018). There were 66 prospective teachers studied at the Department of Mathematics of a state university in Sunan Ampel State Islamic University Surabaya, Indonesia, as the research participants. They were in the fifth semester so that the present study used the convenience sampling method (Miles et al, 2018). The students consisted of 56 female and 10 male students (aged around 20 years old).

For data collection, this study uses two methods, namely the questionnaire or questionnaire method to retrieve student learning style data is distributed to them via online (Google Form). The questionnaire was prepared based on the VAK Learning Styles Questionnaire (LSQ). This questionnaire consists of 3 styles which are assessed by 30 items, each of which is 10 items for each style. Each item requires students to answer multiple choices a, b, and c, where A = visual style, B = auditory style, and C = kinesthetic style. The second method is the documentation method to collect student academic achievement data. Data processing was carried out by using the chi-square test to determine the relationship between learning styles and student academic achievement with alpha degrees = 0.05 through the SPSS program.

Result and Discussion

The results of this study will be presented in narrative and table form. By dividing the GPA from 2.00-2.75; 2.751-3.50 and 3.501-4.00. The statistical test used to test the learning style variables and student academic achievement is the chi square which is carried out with the SPSS program, with an alpha degree of 0.05.

Table 1 Results of Student Learning Styles

No.	Learning Style	Learning achievement						Total	%
		2.00-2.75		2.751-3.50		3.501-4.00			
		f	%	f	%	f	%		
1	Visual	1	1.5	25	37.8	10	15.2	36	54.5
2	Auditory	0	0	14	21.2	2	3.1	16	24.2
3	Kinesthetic	0	0	6	9.1	3	4.5	9	13.6
4	Visual-Auditory	0	0	1	1.5	1	1.5	2	3.1
5	Visual- Kinesthetic	0	0	2	3.1	0	0	2	3.1
6	Auditory- Kinesthetic	0	0	1	1.5	0	0	1	1.5
	Total	1	1.5	24	74.2	16	24.3	66	100

From Table 1 shows that the learning style most prospective teachers of mathematics education have is the visual learning style of 36 students (54.5%), where 1 student (1.5%) with a GPA of 2.00-2.75, 25 students (37.8%) with a GPA of 2.751 -3.50, and 10 students (15.2%) with GPA 3,501-4.00. Then, the auditory learning style with 16 students (24.2%) where 14 students (21.2%) with a GPA of

2.751-3.50 and 2 students (3.1%) with a GPA of 3.501-4.00. Furthermore, the kinesthetic learning style is owned by 9 students (13.6%) where 6 students (9.1%) with a GPA of 2.751-3.50 and 3 students (4.5%) with a GPA of 3.501-4.00.

In addition to the three learning styles, it was found that the results of the study also showed that 5 students had more than one learning style (the VAK test results had the same high score). The first is the visual-auditory learning style of 2 students (3.1%) where 1 student (1.5%) with a GPA of 2.751-3.50 and 1 student (1.5%) with a GPA of 3.501-4.00. The visual-kinesthetic learning styles were 2 students (3.1%) where 2 students (3.1%) where both of them had a GPA of 2.751-3.50 and finally the auditory-kinesthetic learning styles were 1 student (1.5%) with a GPA of 2.751-3.50.

Table 2 Chi Square Statistical Test Results

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.497[a]	10	.922
Likelihood Ratio	5.609	10	.847
Linear-by-Linear Association	.084	1	.771
N of Valid Cases	66		

a. 14 cells (77.8%) have expected count less than 5. The minimum expected count is .02.

Based on Table 2, after the statistical test was carried out, it turned out that there was a significant relationship between learning styles and academic achievement of prospective mathematics education teacher students. With degrees of freedom (db) = (6-1) (3-1) = 10 and $\alpha = 0.05$, it is obtained X^2 count > X^2 table, namely 4.497> 3.9403 with $p < 0.05$. This shows that the hypothesis is accepted with a significance degree of less than 0.05 and shows that there is a significant relationship between learning styles and academic achievement of prospective mathematics education teacher students.

Based on the results of the above research, the learning styles of prospective mathematics education teacher students are different. There are 61 students who have one learning style and 5 students have two learning styles. According to Irham and Wiyani (2013) differences in learning styles in students are something that can explain student differences in the teaching and learning process even though they are in the same conditions and learning process. In addition, according to Rose and Nicholl (1997), it is stated that people learn in different ways and all ways are equally good. Each method has its own strength. In fact, we all have all three learning styles, it's just that usually one style dominates those (DePorter & Hernachi, 2000).

There are characteristics of differences between each student and other students based on their learning style. Students who have a visual learning style tend to use their eyesight a lot to carry out their teaching and learning processes. They better understand a lesson when shown through pictures or concrete objects. They will find it difficult if the learning process is packed with few pictures or shows a little real objects, because the power of their learning method is more dominant in visual matters. In this study, students who have a visual learning style of 36 students have an average value of 54.5%. Visual learning styles are the learning styles that are mostly chosen by students. In addition, visual learning styles are also mostly practiced by students with the highest GPA, namely 3,501-4.00. This is

in line with Wulandari's (2011) research that visual learning style is the highest learning style among midwifery students, as many as 43.1% of students have chosen this learning style.

The results obtained from the calculation of this study note that the learning outcomes of prospective teacher students who have a tendency to visual, auditory, kinesthetic, visual-auditory, visual-kinesthetic, auditory-kinesthetic learning styles and after being tested with the chi square test, the X^2 count = 4.497 is greater than X^2 table = 3.9403 at a significant level of 0.05. This means that there is a significant relationship between the learning styles of prospective teacher students and the academic achievement of student teacher candidates for mathematics education. Students must understand their learning styles, so that they can choose a good way of learning that suits them, so that it has an impact on good learning outcomes. As stated by Jalil (2014), the learning process that is in accordance with student learning styles can improve student biology learning outcomes. Ghufron and Risnawita (2013) also argue the same thing, that a person's ability to know his own learning style and the learning styles of others in his environment will increase his effectiveness in learning.

Conclusion

Based on the results of the research above, it can be concluded that there is a relationship between learning styles and academic achievement of prospective mathematics education teacher students. After performing the statistical test, namely the chi square test, it is obtained that X2 count = 4.497 is greater than X2 table = 3.9403 at the significant level of 0.05. Then the learning styles possessed by prospective mathematics education teacher students are more visual learning styles, then auditory learning styles, and finally kinesthetic styles. Furthermore, there are some students who choose more than one learning style, namely visual-auditory, visual-kinesthetic, and auditory-kinesthetic.

References

Altun, H., & Serin, O. (2019). Determination of Learning Styles and Achievements of Talented Students in the Fields of Science and Mathematics. *Cypriot Journal of Educational Sciences*, *14*(1), 80-89.

Ary, D., Jacobs, L. C., Irvine, C. K. S., & Walker, D. (2018). *Introduction to research in education*. Cengage Learning.

Baartman, L. K., & De Bruijn, E. (2011). Integrating knowledge, skills and attitudes: Conceptualising learning processes towards vocational competence. *Educational Research Review*, *6*(2), 125-134.

De Porter, B., & Hernacki, M. (2000). *Quantum learning*. PT Mizan Publika.

Dunn, R. (1984). Learning style: State of the science. *Theory into practice*, 23(1), 10-19.

Dunn, R., Beaudry, J. S., & Klavas, A. (2002). Survey of research on learning styles. *California Journal of Science Education*, 2(2), 75-98.

Febriani, S., Taufik, M., & Verawati, N. N. S. P. (2019). Pengaruh Model Guided Discovery Learning Dengan Metode Eksperimen Terhadap Hasil Belajar Fisika Peserta Didik MAN 1 Mataram Ditinjau Dari Gaya Belajar VAK. *Jurnal Pendidikan Fisika dan Teknologi*, *5*(1), 82-90.

Ghufron, M. & Risnawita, S. (2013). *Gaya Belajar Kajian Teoritik*. Jogjakarta: Pustaka Pelajar

Irham, M dan Wiyani, N.A. (2013). *Psikologi Pendidikan: Teori dan Aplikasi dalam Proses Pembelajaran*. Yogyakarta: Ar-Ruzz Media

Jalil, R., M. (2014). *Hubungan Gaya Belajar (Visual, Auditorial, Kinestetik) Siswa dan Hasil Belajar Biologi Siswa Kelas VIII SMPN 1 Bontomarannu Kabupaten Gowa*. Makassar: UNM

Machfoedz, I. (2005). Teknik Membuat Alat Ukur Penelitian Bidang Kesehatan, Keperawatan dan Kebidanan.

Marriott, P. (2002). A longitudinal study of undergraduate accounting students' learning style preferences at two UK universities. *Accounting Education*, *11*(1), 43-62.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2018). *Qualitative data analysis: A methods sourcebook*. Sage publications.

Rose, C & Nichol, M.J. (1997). *Accelerated Learning for the 21st Century.Translated by Deddy Ahimsa*..Bandung: Nuansa

Saputri, F. I. (2016). Pengaruh Gaya Belajar Visual, Auditori, dan Kinestetik Terhadap Prestasi Bejajar Siswa. *Jurnal Prima Edukasia*, *3*(01), 25-36.

Schroeder, C. M., Scott, T. P., Tolson, H., Huang, T. Y., & Lee, Y. H. (2007). A meta-analysis of national research: Effects of teaching strategies on student achievement in science in the United States. *Journal of Research in Science Teaching: The Official Journal of the National Association for Research in Science Teaching*, *44*(10), 1436-1460.

Suryabrata, S. (2004). *Psikologi Pendidikan.* Yogyakarta: Rajawali Pers.

Takeuchi, M. A., & Liu, S. (2021). "I am more of a visual learner": The disciplinary values and identities in school mathematics learning and group work. *The Journal of Mathematical Behavior*, *61*, 100835.

Van Dinther, M., Dochy, F., & Segers, M. (2011). Factors affecting students' self-efficacy in higher education. *Educational research review*, 6(2), 95-108.

Vermunt, J. D., & Vermetten, Y. J. (2004). Patterns in student learning: Relationships between learning strategies, conceptions of learning, and learning orientations. *Educational psychology review*, *16*(4), 359-384.

Wulandari, R. (2011). Hubungan Gaya Belajar dengan Prestasi Belajar Mahasiswa Semester IV Program Study D IV Kebidanan Universitas Sebelas Maret. *Jurnal Kesehatan Kusuma Husada.*Vol (2): 1, 45-52.