Al-Ishlah: Jurnal Pendidikan
Vol.15, 4 (December, 2023), pp. 5583-5592
ISSN: 2087-9490 EISSN: 2597-940X, DOI: 10.35445/alishlah.v15i4.2618

Identify Student Learning Styles in the New Normal Era: Study on Prospective Biology Teachers

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ARTICLE INFO

Keywords:

Auditory;
Learning style;
Kinesthetic;
Prospective Biology teacher;
Visual

Article history:

Received 2022-08-05
Revised 2023-01-08
Accepted 2023-12-04

ABSTRACT

The diversity of students results in various learning styles and routines. This calls for lecturers to be flexible with students' learning preferences, as preferences play a significant role in the learning process amid a pandemic. This study seeks to identify and analyses prospective biology teachers' learning preferences at Puangrimaggalatung University's Faculty of Teacher Training and Education. Additionally, efficient teaching options in the new normal period. The total sample was 102 students, using the total sampling technique. The research was carried out in the even semester of the 2021/2022 academic year. The instrument used is a learning style questionnaire. The data obtained are analyzed descriptively. The results showed that most learning styles of prospective Biology teachers at Puangrimaggalatung University were dominated by visual learning styles by 60%, kinesthetic by 19%, followed by auditory by 14%, and the last one was a combination type by 7%. It can be concluded that the learning style of prospective biology teachers in the new normal era is a visual learning style, so it is necessary to develop learning tools or strategies that are able to accommodate student learning styles visually. The research sample is only present on one campus; additional sites and research samples may be included in larger studies. Certain tactics are necessary because the new normal needs learning new things. Therefore, further study is required to create learning models that can take into account different student learning preferences.

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1. INTRODUCTION

The new normal era has given a new color to the world of education in Indonesia, starting from the school level to tertiary institutions. The 2020 government policy to carry out the online learning process requires educational institutions to use technology to optimise learning activities (Habibah, Salsabila, Lestari, Andaresta, & Yulianingsih, 2020). These changes require lecturers and students to be able to master the use of technology in learning. The use of technology in learning allows for greater flexibility of involvement during the learning process (Shamsuddin & Kaur, 2020).

Besides the use of technology, teachers/lecturers also need to consider several things in the learning process including approaches, strategies, methods to support the success of the student learning process.

Learning can be in the form of teacher activities that are poured into learning designs to involve students in learning that emphasizes providing learning resources (Abdullah, 2019). Teachers can assess and analyze student learning progress, and then decide on appropriate follow-up actions between the needs of teachers and students to improve student learning outcomes (Brooks et al., 2021).

At present, the use of technology has been widely used in the world of education from the school to tertiary level (Habibah et al., 2020). This is to support the achievement of the objectives of the process of learning activities and improve the quality of education. Although the use of technology makes it easy for students to learn, this is not the only determining factor in achieving learning goals. One of the important things that need to get the attention of the teacher or lecturer in their learning activities is the learning style of students (Cabual, 2021).

Learning style is a separate way that students obtain, remembering, processing and applying the information they have received easily (Chania, Haviz, & Sasmita, 2017). By knowing student learning styles, this can help teachers or lecturers determine and choose appropriate learning strategies, in order to accommodate student learning activities according to learning style needs. Learning style is an important part that shows students' knowledge to understand what is taught by the teacher (Cabual, 2021).

Learning styles have an important role in the success of the learning process of students. As previous research found that learning styles contributed 47.3% to student learning outcomes in Seririt District (Putri Ningrat, Tegeh, & Sumantri, 2018). Other findings reveal that student learning styles not only represent what students like in learning, but also affect student learning outcomes (Anggrawan, 2019). Learning style has a positive relationship between academic achievement with a significance value of $p < 0.05$ (Hanawi et al., 2022).

Visual style emphasises their sense of sight, observing, drawing, using media and props (Lathifah & Fidiastuti, 2018). Students are more pleased with visual presentations in understanding the subject matter. Tend to be in the front position when learning takes place to obtain clear information. For teaching and learning activities, the teacher explains the material by writing it on the blackboard and showing some graphic info related to the material.

The auditory style depends more on hearing in order to comprehend and retain information. This learning approach has good access to different kinds of sound or audio (Wahyuni, 2017). Students who learn by listening can process the meaning communicated through speaking quickly and intonation. When reading aloud or listening to audio files, students with this learning style typically memorize information more quickly. For this kind of educational activity, the teacher reads the material aloud and divides the class into smaller groups for discussion activities.

Kinesthetic style, which stresses the use of a motor tool to gather information Students who study kinesthetically understand the value of experiential learning. The teacher gives students material for biology learning activities that might activate their motor tools, like experimental or exploratory exercises. Keeping in mind that pupils with auditory learning styles would find it challenging to just sit still for hours (Cicilia & Nursalim, 2019).

Various studies on learning styles were conducted before the pandemic. The majority of students' learning preferences at Bung Hatta University are auditory, accounting for 50% of all students (Wahyuni, 2017). Additionally, it was discovered that students at Tribhuwana Tunggadewi University preferred the kinesthetic learning approach above the aural and visual learning types (Lathifah & Fidiastuti, 2018). At Esa Unggul Univesrity, visual learning methods account for 43% of all student learning preferences (Syofyan, 2016).

Previous research identified student learning styles before the pandemic, where the learning process only took place face to face. Furthermore, this research was carried out during the new normal, learning was carried out in a blended learning manner. Learning activities are dominated online by using various learning applications. The purpose of this study was to identify and analyze the learning styles of prospective biology teacher students, as well as learning solutions that accommodate student modalities in the new normal learning era.

Puangrimaggalatung University, is a local campus in the Wajo district. Have students with diverse characters. They come not only from the Wajo region but also from various districts in Sulawesi with

different cultural backgrounds and habits. This diversity certainly causes different ways and habits of learning. This certainly requires lecturers to be able to accommodate student learning styles, considering that learning styles have an important role in the learning process, especially when a pandemic occurs. Therefore, in order to optimize the learning process in the era of new habits, it is necessary to conduct research related to identifying the learning styles of prospective biology teacher students. As well as effective learning solutions in the new normal era

2. METHODS

This research is a type of quantitative descriptive research. This study aims to identify the learning styles of Biology teacher candidates in the Teaching and Education Faculty of Puangrimaggalatung University in the new normal era. The research was conducted from April to May 2022. The subjects in the study were all active Biology students at Puangrimaggalatung University in the even semester of the 2021/2022 academic year.

The population in the study were all active students of the Biology study program class of 2018, 2019, 2020, 2021 totaling 102 people. The number of samples is determined by total sampling technique. Where the total population is a sample of 102 people.

To collect data and information on the learning styles of prospective Biology teacher students. Researchers used a questionnaire consisting of 30 statements. The 10 items each represent a learning style variable (Visual, Auditory, Kinesthetic). The type of questionnaire used is a closed questionnaire. The measurement uses a Likert scale, with answer choices (always = 4), (often = 3), (rarely = 2), and (never = 1). The learning style questionnaire is prepared based on the indicators of each type of learning style. Indicators and the number of statements for each type of learning style are shown in Table 2.1.

Table 1. Learning style questionnaire instrument indicators

Type	Indicator	Statement	
		Positive (+)	Negative (-)
Visual	1. Neatness/ regularity	4, 8	5
	2. Likes to take notes	6	1
	3. How to read	9	7
	4. How to concentrate	2, 10	3
Auditory	1. How to remember	16, 18	12
	2. Ability to speak	15, 17	13
	3. How to read	11, 14, 20	19
Kinesthetic	1. How to concentrate	22	21
	2. Activeness in motion	23, 25, 27	26, 29
	3. Eliminate boredom	28, 24	30

The questionnaire used was first tested for content validity by two expert validators. Content validity was calculated using Gregory's analysis, where the results of the assessment of the two experts were crossed. While item validity was analyzed using product moment and reliability was analyzed using Cronbach's alpha. Questionnaires were distributed to respondents via the Google Form link provided by the researcher.

The criteria for the validity of the Gregory test can be seen in table 2 below:

Table 2. Gregory test validity criteria

Number	Value intervals	Criteria
1	0,8 – 1	Very high
2	0,6 – 0,79	High
3	0,40 – 0,59	Medium
4	0,20 – 0,39	Low
5	0,00 – 0,19	Very low

The data that has been collected was carried out descriptive statistical analysis. This analysis describes the characteristics of the respondents' values in the form of average, median, standard deviation, variance, lowest value, highest value, histograms, and frequency distribution tables.

3. FINDINGS AND DISCUSSION

3.1. Content Validation of the Learning Style Questionnaire Instrument

Before the questionnaire was distributed to all respondents, the contents of the learning style questionnaire were validated by two experts who are competent in the field of education. The results of the assessment of two experts were carried out by crossing based on the Gregory formula. The crossover criteria are shown in table 3 below:

Table 3. Crossing Criteria for the Gregory Test

Tabulation 2x2		Validator 1	
		Less relevant (score 1-2)	Very relevant (score 3-4)
Validator 2	Less relevant (score 1-2)	**A**	**B**
	Very relevant (score 3-4)	**C**	**D**

Remarks (A : Number of items judged irrelevant by both experts), (B : Number of items judged irrelevant by expert 2), (C : Number of items rated irrelevant by expert 1), (D : Number of items rated relevant by both experts)

The final results of the assessment by the two expert validators are shown in table 4 below:

Table 4. The results of validating the contents of the learning style questionnaire

Indicators	Experts		Value
	I	II	
The controlling principle			
Clear instructions are provided for the student learning style questionnaire.	**4**	**3**	**D**
The evaluation standards are explained in detail.	**4**	**4**	**D**
Some aspects of how student learning styles are covered			
Learning demands-based categories of student learning styles	**4**	**4**	**D**
There are distinct categories of a student's learning preferences.	**3**	**4**	**D**
The category for student learning styles is completely loaded.	**4**	**4**	**D**

Learning styles of students can be accurately measured.	**3**	**4**	**D**
Language			
Using language in accordance with Indonesian language norms	**4**	**4**	**D**
Use plain, understandable language.	**4**	**4**	**D**
Use language and vocabulary that students can understand.	**3**	**4**	**D**
Amount			**9D**

The crossing results in Table 4 obtained a maximum number of D of 9. A, B, and C are all zero. Following the value's entry into the Gregory formula Vi = $\frac{D}{A+B+C+D}$. a value of 1 was attained using very strict validity criteria.

3.2. Instrument Reliability of the Learning Style Questionnaire

The reliability test was run once the items' validity had been examined. The findings of the reliability test of the learning style questionnaire items are presented in table 5.

Table 5. Displays the findings of the item reliability test for the learning style questionnaire

Element	Merit
Number of items	30
Number of item variances	10,10985
Total variance	113,8769
r11	0,942643
Alpha Cronbach	0.60

Table 5's statistics indicate that the value of r11 is 0.94. Whenever this number exceeds the Cronbach alpha threshold of 0.60. This indicates that the instrument for the learning style questionnaire is highly dependable.

3.3. The findings of a descriptive statistical analysis

The data were analyzed descriptively and presented in the form of a frequency distribution table, to describe the learning style data of the respondents. This is followed by a description of the characteristics of the respondents' learning style scores using mean, minimum, maximum, variance, and standard deviation data.

Table 6. Descriptive student scores for learning styles

	N	Minimum	Maximum	Mean	Standar deviation	Variance
Learning style	102	72	105	88.71	6.43	41.36

Based on the findings of the descriptive analysis in Table 6 collected from a total of 102 respondents. Demonstrates that the learning style score range is from 72 to 105. 88.71 is the average value, the standard deviation is 6.43, and the variance is 41.36.

Table 6 provides an overview of the different learning style categories for the 102 students who made up the sample of Biology teacher candidates.

Table 7. Distribution and frequency of different learning styles for prospective biology

Learning style	Frequency	Percentage (%)
Visual	61	59.80
Auditory	14	13.73
kinestesic	20	19.61
Combination	7	6.86
Total	**102**	**100**

Based on the information in table 3.3.2, it is evident that the visual learning style type, which accounts for 59.80% of biology teacher candidates at Puangrimaggalatung University's Teaching and Education Faculty, is predominate. Kinesthetic learning style type, which makes up 19.61% of candidates, auditory learning style type, which makes up 13.73% of candidates, and combination learning style type, which makes up 6.86% of candidates, are also significant.

3.4. Results of Analysis of Learning Style Types of Prospective Biology Teacher Students

The results of the analysis of the learning style questionnaire score found that the tendency of the type of learning style of prospective Biology teacher students within the scope of FKIP Puangrimaggalatung University for each batch can be seen in Figure 1.

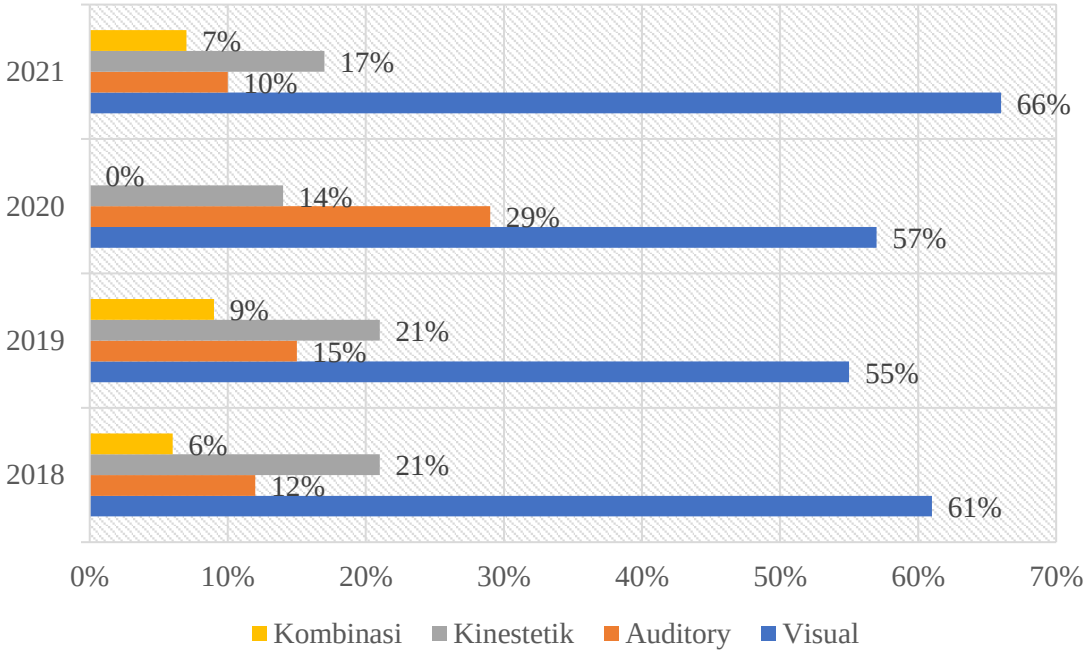

Figure 1. Percentage of Learning Styles of Prospective Biology Teacher Students per Batch

Figure 1 shows that the type of learning style of students who are prospective Biology teachers in the class of 2021 is dominated by the type of visual learning style, namely 66%, then the kinesthetic type by 17%, followed by the auditory type by 10% and the remaining 7% is the auditory learning style type. Furthermore, the type of learning style of prospective Biology teacher students in the class of 2020 is sequentially dominated by the type of visual learning style, which is 57%, then the auditory type is 29%, and the remaining 14% is the type of kinesthetic learning style. And no type of combination learning style was found in students of prospective Biology teachers in that batch. Prospective biology teachers of the class of 2019 are sequentially dominated by the type of visual learning style, namely 55%, then the kinesthetic type by 21%, the auditory type by 15%, and the remaining 9% is the type of combination learning style. The type of learning style of prospective Biology teacher students in the

class of 2018 is sequentially dominated by the type of visual learning style, namely 61%, then the kinesthetic type by 21%, the auditory type by 12% and the remaining 6% is the type of combination learning style. The recapitulation of the percentage of types of learning styles of prospective Biology teachers with a total of 102 people can be seen in Figure 2.

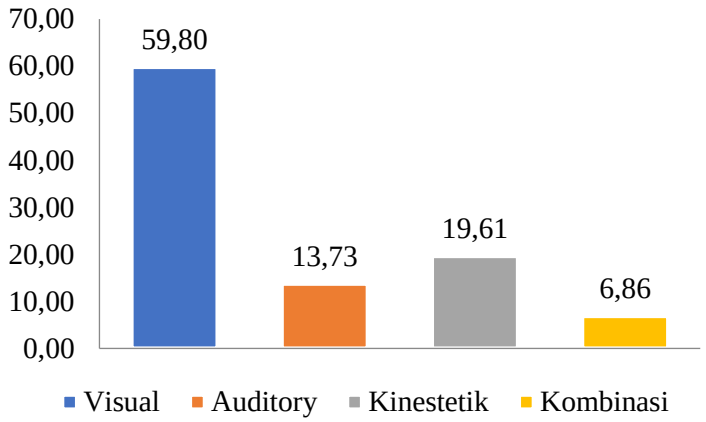

Figure 2. Percentage of Learning Styles of Prospective Biology Teachers

Based on the data in Figure 2, it shows that in general the trend of learning style types of students of prospective Biology teachers of Puangrimaggalatung University's Faculty of Teacher Training and Education is dominated by the type of visual learning style, namely 59.80%, kinesthetic type by 19.61%, auditory type by 13.73% and the remaining 6.86% type of combination learning style.

Discussion

The findings of this study revealed that 59.80% of biology teacher candidates at Puangrimaggalatung University's Teaching and Education Faculty tended to have a visual learning style type. Contrary to the diverse learning preferences of students at Bung Hatta University, the auditory approach is more prevalent here, accounting for 50% of all learning (Wahyuni, 2017). Another conclusion is that students at Tribhuwana Tunggadewi University prefer tactile learning over visual and auditory learning (Lathifah & Fidiastuti, 2018). This illustrates the wide range of learning preferences among students.

Students who have a visual learning style tend to focus more on their sense of sight in receiving knowledge or material and then processing it in their minds (Lathifah & Fidiastuti, 2018). Visual students master indicators of analytical skills, synthesis skills, problem-solving skills and evaluating and assessing skills (Mursari, 2020). This means that it will be easier for students to understand a subject matter if it is presented in the form of pictures, graphs, slides, animated videos or other visual symbols. In the learning process, for example, if the teacher or lecturer wants to teach protein metabolism material, it is not enough just to explain it, but must also visualize it in the form of attractive images, or display an animated video of the process of protein metabolism.

The second most common learning style is kinesthetic, namely 19.61%. Understand that students with a kinesthetic style are more stressed on their motor skills to obtain and process information. Where students with this type tend to prefer learning with real objects. kinesthetic learners learn by involving movement, experiencing, experimenting. Kinesthetic requires movement to enter and process information into the brain. Likes to manipulate objects or respond to something physical (Syofyan, 2016). To optimize kinesthetic potential in learning, one effective strategy for biology learning activities is that teachers provide material that can activate their motor skills, such as demonstration activities, exploration and experimental activities in the laboratory. Students with a kinesthetic style will feel heavy if they just sit still for hours (Cicilia & Nursalim, 2019).

The third type is auditory at 13.73%. It is known that students with an auditory style rely more on their sense of hearing to be able to understand what they are learning. Those with the auditory type have the ability to access sound or audio well (Wahyuni, 2017). One of the learning activities that

teachers can do in class is presenting material with the addition of audio. In addition, the teacher can group them into small groups to carry out discussion activities. Auditory learners easily digest information by hearing. It's hard to concentrate with noise while studying. Enjoy discussing and conveying information at length rather than just seeing information through pictures. The potential of auditory students can be optimized by using music, sound, recordings, dividing into small study groups and eliciting simple questions (Zagoto, Yarni, & Dakhi, 2019).

In addition to visual, auditory and kinesthetic learning styles. It was also found that the tendency of the combination learning style possessed by prospective biology teachers were 6.86%. This combination includes auditory visual, kinesthetic visual, and kinesthetic auditory. This reveals that not all Biology teacher candidates have one learning style tendency, but there are also those who have more than one learning style tendency or a combination. Basically, every student has a variety of learning styles, but there are some learning styles that are more prominent (Adawiyah, Harso, & Nassar, 2020). Therefore, teachers or lecturers need to identify the diversity of learning styles possessed by students so they can design effective

Knowing students' preferred modes of learning can help teachers create a supportive environment and help students get the most out of their ability to absorb knowledge (Hamidah & Kusuma, 2020). The material's content is so complex, especially in light of the distinctive features of biology lesson material. Therefore, we need the appropriate approach to accommodate the variety of student learning styles. Understanding one's learning style is crucial since it enhances creativity, productivity, achievement, and problem-solving abilities as well as one's ability to make better judgments and learn more efficiently (Jaleel & Mary, 2019).

The results of this study show that the tendency of the learning style of students who are prospective Biology teachers is a visual learning style. We recommend that lecturers or course advocates can also accommodate different student learning styles. So that the process in learning is expected that no student will be ignored. All students who have different learning styles can feel the learning process. The selection and use of various models, methods, approaches, and teaching media is something that needs to be done by lecturers for course effectiveness in the learning process.

In addition to visual, auditory, and kinesthetic learning styles. It was also found that the tendency of the combination learning style possessed by prospective Biology teacher students. These combinations include auditory visuals, kinesthetic visuals, and kinesthetic auditory. This reveals that not all students who are prospective Biology teachers have one learning style tendency, but there are also those who have more than one learning style tendency or combination. Thus, as a lecturer or a potent course, it is necessary to apply varied strategies, models, approaches and methods in the learning process. So that it can further optimize all the diversity of learning styles owned by students.

The current new normal era. The learning process does not only take place face-to-face, but almost half of the process is carried out online (in a network). In providing lecture material, this is a challenge for lecturers or course administrators. The use of technology is a must for lecturers or educators in order to optimize the lecture process. Learning will become more interactive if it utilizes technology-based learning media that is associated with student learning styles (Rahmi & Samsudi, 2020). Apart from being able to utilize technology, lecturers or educators should also be very clever in choosing and determining learning strategies. The selection of models, methods, materials or teaching media as much as possible is able to reach the diversity of learning styles owned by students.

In order to best accomplish learning objectives, lecturers or teachers must first identify their students' learning styles. Starting with curriculum planning, where the teacher is expected to be able to select and present subject matter that evokes emotions, feelings, and integrates students, complete sequential and logical analysis skills, as well as reasoning and problem-solving skills, is where this activity can be started.

The process of teaching comes next. Using various combinations of learning techniques, reflection, conceptualization, and experimentation, it is intended that students at this level will be able to construct learning processes and approaches that meet their requirements and learning preferences. the application of supporting media to communicate and portray experience-related components through

audio, music, visual pictures, movement, experiences, dialogues, and even the actions of the students themselves.

An evaluation approach is the last task. Whereas in this activity, instructors are anticipated to be able to apply a variety of assessment strategies that are designed to help students enhance their skills. In other words, it is tailored to the capacities and growth of the brain as well as the propensity of various personal learning styles. It is hoped that this research will serve as a guide for lecturers as they select and decide on the best methodology, strategy, media, and learning model in accordance with students' preferred learning modalities in order to establish a productive and fulfilling learning environment that encourages both lecturers and students to meet their learning goals.

4. CONCLUSION

Based on the results of the study, it can be concluded that most learning styles of prospective Biology teacher students within the FKIP of Puangrimaggalatung University, dominated by visual learning styles by 60%, kinesthetics by 19%, followed by auditory by 14% and the last is a combination type of 7%. In the new normal era, the use of technology in the learning process is a must and it would be better if its use was adjusted to the learning style of students. And knowing the students' preferred methods of learning biology. As a lecturer or instructor, you can utilize this to decide on learning strategy steps, starting with curriculum preparation, teaching procedures, and assessment techniques.

Conflicts of Interest: Declare conflicts of interest or state "The authors declare no conflict of interest."

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