

Determination of Elementary Students' Learning Styles Reviewed from Gender Aspects

Marleny Leasa¹, John Rafafy Batlolona², Javier Julian Enriquez³, Mehmet Altan Kurnaz⁴

^{1,2}Primary Teacher Education, Faculty of Teachers Training and Education, University of Pattimura, Ambon, Indonesia

³Department of English Education, Polytechnic University of Valencia, Spain

⁴Department of Mathematics and Science Education, Kastamonu University, Turkey

Article Info

Article history:

Received Feb 12, 2018

Revised Jun 20, 2018

Accepted Jul 04, 2018

Keywords:

Gender

Learning style

Multimodal

Sensory modality

Unimodal

ABSTRACT

Students use different styles or ways of receiving and managing information during learning. VARK learning style was developed based on the physiological aspect of students in the form of sensory modalities. This survey research was conducted at 30 elementary schools in Ambon City. The data of student learning was obtained by filling out the learning style questionnaire developed by Fleming. The results showed that 88.7% of students used a learning style (unimodal) and 11.3% of students combined more than one learning style (multimodal). For the unimodal learning styles, kinesthetic is most prevalent in male and female students with a percentage of 58.6%, whereas visuals are least found with a percentage of 6%. The study also revealed that multimodal learning styles were found at all bimodal, trimodal, and quadmodal combinations. The more blend of learning style, hence the frequency of determination of student learning style even less. The combination of multiple unimodal learning styles with large numbers will result in multimodal learning styles with large numbers..

Copyright © 2018 Institute of Advanced Engineering and Science.
All rights reserved.

Corresponding Author:

Marleny Leasa,

Primary Teacher Education

Faculty of Teachers Training and Education, University of Pattimura

Jl. Dr. Tamaela, Campus PGSD Ambon 97114, Indonesia.

Email: marleny.leasa@yahoo.com

1. INTRODUCTION

Classroom is a heterogeneous learning community for both teachers and students. As educators, each teacher has a different personality, age, economic, social, and teaching style. As learners, students also come from diverse backgrounds of academic, culture, social, and economic. These factors can lead to different students' characteristics, academic ability, cognitive development, learning motivation, learning experiences, and learning styles varied from one another.

Learning styles are seen as part of a broad concept of personality [1]. Another study also has explained that learning styles are a combination of cognitive, affective, and psychological characteristics that affect how students interact and respond to the learning environment [2]. From the cognitive aspect, learning styles are seen as various methods in creating perceptions and processing information in the form of concepts and principles [3]. Learning styles are the means by which students processes information and new knowledge, as well as strategies used to be consistent in learning [4]. Learning style a description of how a person learns, as well as a special way to acquire knowledge and skills [5]. So learning style is a mechanism used by students to process information in learning.

Fleming developed the VARK learning style model in 2001. It refers to the human physiological dimension particularly the sensory modal aspect [6]. Based on the model students are grouped into four types of learners i.e. Visual, Auditory, Read, and Kinesthetic. Students who have only one learning style are called

unimodal, while students who have more than one learning style are called multimodal. VARK learning styles can be identified on students and the results are relatively stable.

VARK stands for Visual (V), Auditory (A), Read (R), and Kinesthetic (K). Earlier the VARK model was known as the VAK developed based on the nervous system in receiving information, then modified by Fleming in 2006, where each name of each model was taken from its first letter. In contrast to other learning style models, VARK is a perceptual model that focuses on the way in which a person accepts and manages information. Therefore, the visual is divided into 2 categories that consist of people who are oriented to images, graphs, tables in obtaining information (V) and who like textual forms (R) [7].

Students with visual characteristics like information presented in figures, images, and symbols such as graphs, charts, tables, flowcharts, and models [8, 9]. They are easy to learn by way of demonstrations and descriptions, in addition to frequently using lists or lists to strengthen understanding and organize ideas. Another feature is that they more easily remember someone's face, rather than his name. The way used to explain something to others is usually by drawing.

Auditory students more optimize the sense of hearing in processing information. In connection with that, it has been stated that students with auditory learning are easier to learn by listening, rather than writing. After the learning is over, they also like to have discussions on certain things that have been discussed previously with classmates in an attempt to clarify the understanding. Auditory students are easily distracted when learning in a noisy atmosphere, they read aloud when they find something new. Another characteristic is that they are easy to read quickly, speak fluently, easily write poetry, have a good vocabulary, and are capable of remembering facts or names [3].

Students with read learning styles like the information printed and in the form of text. They tend to use certain lists, glossary, textbooks, and lecture notes to obtain information. In addition, they are good at taking or quoting notes while studying, usually in the form of sketches. They also learn through questions in multiple-choice tests [6]. Therefore, students in this learning style group prefer notes taken from lectures, difficult reading materials, or during learning.

The kinesthetic student is a reflection of the sensory blend of modalities. They tend to learn by using experience and practice directly. Kinesthetic students have high energy and prefer to apply touch gestures and interaction with their environment [10]. In addition, they do not like learning just by listening and reading, as well as seeing visually. If the conditions are so, then they become passive.

At various levels of education, including at the level of basic education information about learning styles benefit teachers and students. Information about learning styles is very useful for both teachers and students. Learning styles help students in building awareness of learning, enhancing individual abilities, as well as exploring opportunities during classroom learning, improving students' understanding and learning outcomes. On the other hand, there was another study also has stated that learning styles are useful to improve the learning process. By knowing the learning styles of students, teachers gain a deep understanding of their students to prepare the materials and learning process as good as possible. For students, learning styles express their awareness of the strengths and weaknesses that exist in them [11]. Accordingly, students attempt to minimize their weaknesses and increase their strength. Learning styles are also useful for improving interactive communication between students and teachers, so that their learning process is always controlled and evaluated.

Previously it has been reported learning style information on junior high school students [5, 12], high school students [13], college students [3], [7], [10], [14-20]. The unavailability of detailed information on student learning styles at elementary level encourages this research.

Gender is one of factors that affect students' learning styles [21]. Other factors are age, academic ability, culture, and creative thinking. Gender is the sociocultural and psychological dimension of men and women. Gender should be distinguished from sex [22]. Sex leads to the biological dimensions of men and women, while gender assessment refers to how men and women should think, feel, and do. It was mentioned earlier that the VARK learning style refers to the physiological aspect. Related to the fact, another study has been reported that physiologically male and female are different. In visual perception, the eyes of men are generally more sensitive to movement whereas women's eyes are more sensitive to color [9]. Similarly, to the voice, women are more sensitive to the sounds than men are.

Men and women differ in learning style preferences [23]. Similarly, another research has conducted using a VARK questionnaire [24]. The results showed that 54% of the respondents were female and only 12.5% of the men preferred the unimodal learning style. The 33.3% female respondents were kinesthetic learners. In male samples, auditory, read, and kinesthetic learning styles were found to be spread evenly. In addition, 45.8% of women and 87.5% of men favored multimodal. Thus, it is concluded that male and female students have different learning style preferences. Based on the study presented, the questions raised in this study include:

- a. What learning styles are generally owned by 5th graders?

- b. How is the determination of student learning styles viewed from the aspect of gender?

2. RESEARCH METHOD

This research was conducted in the form of a widespread survey at 30 elementary schools spread over 5 districts in Ambon city, namely Nusaniwe, Sirimau, Baguala, Ambon and South Leitimur districts. Determination of the school where the study conducted was done randomly. This study lasted for 3 months, i.e. from July to September 2016.

2.1. Participant

Participants involved in this study reached 900 of 5th grade elementary school students aged 9-10 years. From the number, only 867 students who consist of 51% females and 49% males filled out the complete learning style questionnaire, which resulted the data used for the study, while 33 other students did not complete the questionnaire, so the data was ignored.

2.2. Instrument

The instrument in this study is the learning style questionnaire of a young's version [25] which is available online (<http://www.vark-learn.org>). The instrument is a questionnaire packed in multiple choice and consists of 16 statement items, and is the latest instrument, compared to the previous one consisting of only 13 items. Each statement has a different order of learning style choices with each other. The questionnaire has an answer key guide, and can generally be completed by students within 15-20 minutes, without significant difficulty. Before the students fill out the questionnaire, the researcher gives an explanation of it. During the filling of the questionnaires, the researcher and the classroom teacher assist the students.

2.3. Data Analysis

The researcher corrected the questionnaires that have been collected based on the available answers guides. Each statement item contains four choices of answers (V, A, R, and K). Based on the correction's result of the 16 statement, it is known the student's response to each question and the total score for each choice of learning style, for example: student X, 3, A = 7, R = 2, K = 4, The student X belongs to learning style A. If student X has the following gain V = 5, A = 2, R = 4, K = 5, then the student X is determined to have a bimodal learning style (VK). Thus, from the total correction result based on the students' choice, students' learning style preferences are either unimodal or multimodal. Therefore, it is concluded that each student has a particular learning style. The data of the research were analyzed descriptively. Data presented in the form of percentage and in pie chart to describe determination of students' learning style.

3. RESULTS AND DISCUSSIONS

3.1. Results

Based on the learning style's result analysis to all 867 students, it is found that generally students have unimodal learning style (V, A, R, K). Table 1 shows these results.

Table 1. Overall Learning Style Data

Gender	Learning Styles		Bimodal		Trimodal		Quadmodal		Total
	F	Percentage	F	Percentage	F	Percentage	F	Percentage	
Male	369	86.8%	47	11.1%	7	1.6%	2	0.5%	100%
Female	400	90.5%	32	7.2%	4	0.9%	6	1.4%	100%
Total	769	88.7%	79	9.1%	11	1.3%	8	0.9%	100%

Table 1 shows that 88.7% of all students have only one learning style (V, A, R, and K). Multimodal learning styles that students tend to have are bimodal (9.1%), trimodal (1.3%), and quadmodal (0.9%) based on the frequency sequence and percentage from highest to lowest. From Table 1, it is known that elementary students are more likely to have unimodal learning styles (V, A, R, and K).

The determination of unimodal learning styles, as well as their distribution to both male and female students is shown in Table 2 and Figure 1.

Table 2. VARK Learning Styles By Gender

Gender	Unimodal Learning Style				Total
	V	A	R	K	
Male	20	78	54	217	369
Female	26	77	70	227	400
Total	46	155	124	444	769

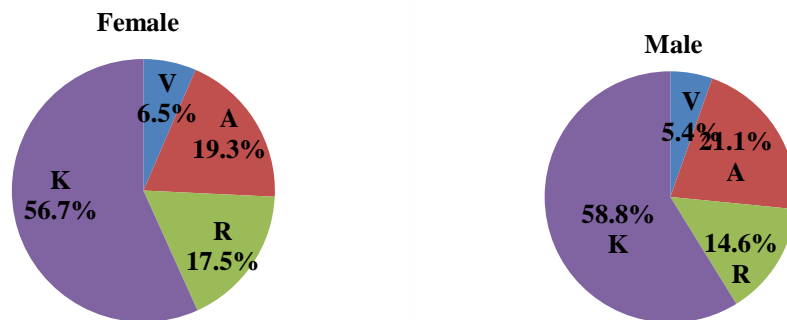


Figure 1. Determination of Unimodal VARK Learning Style by Gender

These results indicate that kinesthetic is the dominant learning style found in elementary students, both in male students (58.8%) and females (56.7%). Although in a much different frequency than kinesthetic, the auditory learning style is also favoured by male students (21.15%) and females (19.3%). Similarly, the learning style of reading (male 14.6%, women 17.5%). While the visual learning style is less referenced by students (5.4% male) and female (6.5%).

At the level of multimodal learning style, it is differentiated into 3 main parts of learning styles namely the combination of 2 learning styles (bimodal), the combination of 3 learning styles (trimodal), and the combination of 4 learning styles (quadmodal). The data are shown in Table 3 and Figure 2.

Table 3. Multimodal Learning Style Based on Gender

Gender	Multimodal Learning Style										Total
	VA	VR	VK	AR	AK	RK	VAR	VAK	ARK	VARK	
Male	4	2	11	9	9	12	2	1	4	2	56
Femalae	0	3	1	5	12	11	0	1	3	6	42
Total	4	5	12	14	21	23	2	2	7	8	98

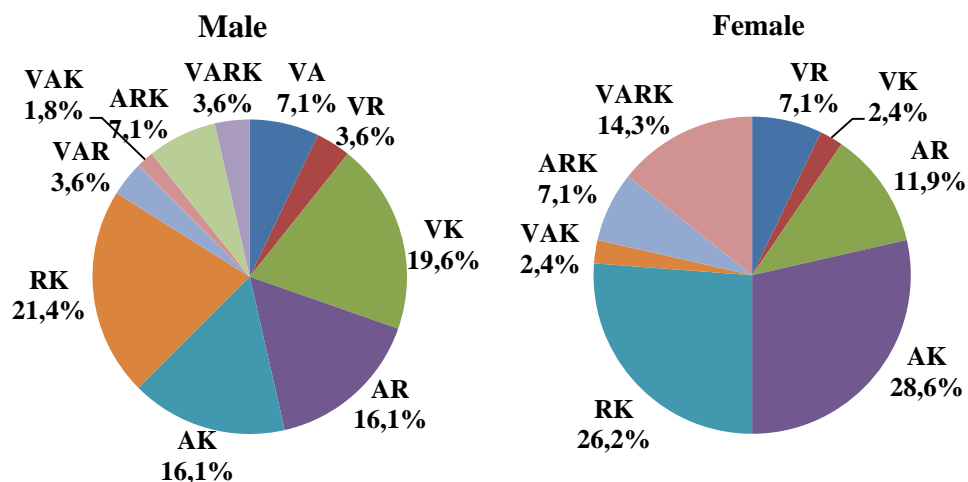


Figure 2. Determination of Multimodal VARK Learning Styles by Gender

In processing information during learning, there are students who function more than one sensory. In bimodal learning style found six models of combination, that is RK, AK, AR, VK, VR, and VA. The six models are found in male students, except for VA, which is not found in female students, so there are only five combinations on women's gender. The blend model shows that there is a significant difference in both gender. Such as RK (male 21.4%, female 26.2%), AK (male 16.1%, female 28.6%), AR (male 16.1%, female 11.9%), VK (male 19.6%, female 2.4 %), VR (men 3.6%, women 7.1%), and VA (men 7.1%).

In the trimodal learning style there are also three combinations, of the four types of unimodal learning styles that exist. VAK and ARK are found in both gender, but VAR is only for male students (3.6%). ARK dominates two other blend models, in which ARK (male and female are 7.1%), while in the VAK combination, model, male results are 1.8% and female 2.4%. In the quadmodal model, there is only one combination of VARK. Nevertheless, the percentage of this model in women and men looks different (men 3.6%, women 14.3%). Thus, in the multimodal learning style, it is found that kinesthetic (K) is always present and the result of its combination becomes a combination of learning styles with more frequency and presentation than others.

3.2. Discussion

Based on the data of learning styles as a whole, 5th grade elementary school was determined by unimodal learning style. It means that students are more likely to use only one sensory to receive information during learning. Related to these findings, we need to explain the logical argument. The argument was obtained based on the results of observations related to the pattern of learning that teachers used during this time. Teachers generally tend to use learning models or conventional teaching methods that focus more on teachers, lectures, assignments, group work. No matter, if the students are bored, teachers tend to force students to follow the pattern of teaching. The variation of less maximized learning strategy or learning model is thought to be the cause of the students tend to activate only one of the senses. Such processes take place continuously, thus ultimately forming the student habits of optimizing unimodal learning styles, resulting in a less explored multimodal pattern.

Elementary school students tend to have unimodal learning styles, and kinesthetic is the dominant learning style referenced by students [26]. More than half of the students in one class show their preferences in kinesthetic learning style, then auditory, and read. Along with the cognitive development of students, there is a change in learning style from the nature of unimodal to the multimodal. It is very clearly seen at the college level, where students tend to use several ways of learning to manage the learning process.

Students' learning style preferences can be clarified for several reasons. This statement is not much different from the report findings before saying that the learning environment became one of the factors that helped determine the learning style preferences [27]. Learning environment related to the learning process encourages learning behavior, and is considered suitable or appropriate to the needs of students. Students need a learning experience that suits their stage of development, so they can show appropriate learning behaviors. Elementary students who tend to imitate the behavior of teachers are predicted to bring up a learning style that is relevant or similar to the style of teachers in teaching. It can even survive for a period of time, as long as teacher' style in teaching is still practiced in learning. Therefore, students can also adopt learning styles through a long adaptation process. Teachers become a source of adaptation of student learning behavior, in addition to the conformity factor of student learning behavior based on the content of the material he studied. Students' learning styles can be identified by teachers in order to develop relevant teaching styles in delivering the subject matter through that styles. Students who are accustomed to work solitarily tend to manage learning in a solitary way and vice versa [28].

Another study conducted on medical students reveal that 68.7% of students were determined as multimodal students and only 31.3% were determined as unimodal students. Multimodal combinations found are quadmodal 36.6%, followed by 18.1% bimodal and trimodal 14%. During instructional, instructors always use Power Point Presentations; write on whiteboards, classroom practices and demonstrations [19]. Another study more has also reported similar findings, saying that medical students prefer to use multimodal learning styles compared to unimodal support this finding. They use a variety of learning activities and presentations in the classroom [9, 29]. Related to that, it has been mentioned that junior high students are more likely to use multimodal learning styles than unimodal ones. The findings informed that they used a variety of activities and classroom presentations [30].

In the VARK dimension that includes four learning style choices, kinesthetic is a learning style that has a higher preference than the others do. Elementary students generally learn by doing it directly do it. Direct participation takes precedence, as well as shows students are concerned and active in building their knowledge and not relying on other students. More information is received, processed or transferred again, and is used in the decision-making process of a condition. The best learning is to experience yourself or directly what is being studied. Learn to take a role in creating meaningful experiences for students to be able

to determine the best decisions on other conditions in the future. The phase of do it (active) in learning is the key that encourages students to understand the meaning of the content of learning. This phase is able to help students absorb 90% of the learning load delivered by the teacher, and higher achievement compared with the verbal (20%), visual (30-50%), and involved (70%) phases [31].

In the active age of growing and developing elementary school children have a desire to know many things. Students feel happy if they are involved or directly perform certain instructions while learning takes place. By doing something directly or self-directed practice, students are trained to store more information and experience. Information processing theory by the brain explains that the brain's ability to receive information takes place optimally in 10 minutes; the rest has led to saturation. Therefore, that information is no longer meaningful in the student's knowledge structure [22].

Based on gender aspect, it is known that female students tend to use kinesthetic learning style. Read and visual are also used but the comparison is not the same as kinesthetic. This similar information has also explained by another study saying that kinesthetic was the preferred unimodal learning style for female students (women 33.3%, men 4.2%) [24]. Women have a strong preference for kinesthetic learning styles compared to men [32]. Likewise, auditory and visual are referenced in female students rather than male students. This implies that female students prefer to obtain information or knowledge through the activation of the sense of hearing and sight.

Gender differences in learning styles are also interpreted as a result of the socialization process that occurs throughout one's life and also occurs within an educational context. Gender is even considered to accommodate some components of personality attributes, aspects of physical appearance, interests, abilities, and social roles. Each androgynous individual uses the feminine and masculine attributes to describe him/her. Undifferentiated individuals clearly do not characterize themselves in any of these attributes. Feminine individuals use feminine and non-masculine attributes, and vice versa applies to masculine individuals. Teacher's consideration of gender differences in learning styles can have a positive effect on student learning [33].

Characteristics of male students in learning is impulsivity, happy to be involved in learning outside of the classroom, which is useful for activating special kinesthetic activities, and physical aggression. While female students like the environment in the classroom as a more suitable place, involving emotions verbally, can sit still, and able to perform many tasks [34]. The research findings reveal that women's kinesthetic, read, and visual preferences are higher than men's. Women basically love learning by actually doing what they learn, using all their senses in good measure, both through conversation, hearing, explanation, and articulation regularly and cooperatively. In contrast to more nonverbal men, using abstract mental processes, able to manipulate objects and symbols through hidden mental processes, as well as more spatial abilities than women [35].

Multimodal learning style is a combination of several learning styles. Multimodal describes that one does not only use one method to access information but also combine more than one-way. In this study, it is revealed the multimodal learning style combination between kinesthetic, auditory, and read learning styles more often found from other combinations. This condition ensures that the determinants of unimodal learning styles of elementary students are kinesthetic, auditory, and read sequentially from highest frequency to lowest frequency in accordance with the results presented in Table 2.

Multimodal learning styles are also owned by students other than unimodal. Its existence is very dependent on the situation, where each learning style has its own unique strength and weaknesses. Each student can develop his skills or agility in using all learning styles. It has also been found that certain students have high sensitivity to their learning process. They begin to recognize the need to broaden their own learning style preferences. Teachers naturally like the students' preferred learning styles, but an expansion of student learning styles is expected so that they can work optimally with all members of their class [36].

Female students are more likely to use multimodal learning styles in the form of quadmodal compared with bimodal and trimodal. In other words, bimodal and trimodal percentage in men is greater than female, but inversely proportional to quadmodal. Overall, it is found that male students have a greater preference in using multimodal learning styles than women. In connection with our study, there was another study also founded that multimodal learning styles were more likely to be found in male students (87.5%) than in women (45.8%) [24].

Teachers need to identify and recognize their students' learning styles. Likewise, students who are aware of the learning process must be able to know how to learn, as well as his potential in learning. Through the introduction of learning styles, students can determine how to learn more effectively, students do not feel compelled and forced to learn. Similarly, teachers can realize the role that has been done so far in making students learn. Therefore, both teachers and students can do ways that is more effective in utilizing the ability of learning. Teachers are stimulated to reflect on the extent of their success in facilitating students' learning by modelling it has made. In addition to the students, also aware of internal character in him that has existed

since the beginning, even which has been formed in the process to form a learning pattern more relevant to the needs of students.

Based on the results of research and discussion concluded that elementary school is more likely to optimize just one learning style (unimodal) in accessing information. Along with the level of cognitive development of children in the formal operational phase, facilitate students in accessing information by way of engaging or conducting directly. Kinesthetic becomes the student's choice, followed by auditory and read. Descriptively, it was found that female students had more preference for kinesthetic, read, and visual learning styles, while men stood out with auditory learning styles. Although multimodal learning styles are of little frequency, they are still found with different frequencies in boys and girls. The combination of unimodal learning styles that form multimodal with high frequency, found only in dominant learning styles such as kinesthetic, auditory, and read combinations.

4. CONCLUSION

The results showed that the learning style of students varied, both unimodal and multimodal. However, more students tend to use unimodal learning styles compared to multimodal. Therefore, the researcher recommends research that correlates student's learning style with teacher's teaching style, other factors that also influence student's learning style need to be revealed besides gender. Although learning has not been entirely constructivist which means that students are active in building their knowledge, students are likely to use a kinesthetic pattern of access to information. Therefore, teachers should use various learning strategies that facilitate students in order to experience learning directly. It also need to be studied the influence of VARK learning style on student learning motivation, How teachers can accommodate different student learning styles in learning. The study also revealed that elementary students are less dominant in using the multimodal learning style, so it needs to be studied, whether this apply to all subjects or only certain ones and why such patterns occur in students at the elementary level.

REFERENCES

- [1] T. I. Hawk and A. J. Shah, "Using learning style instruments to enhance student learning," *Decision Journal of Innovative Education*, vol. 5, no. 1, pp. 1-17, 2007.
- [2] A. Duff and T. Duffy, "Psychometric properties of honey & mumford's learning styles questionnaire (lsq)," *Personality and Individual Differences*, vol. 33, no. 1, pp. 147-163, 2002.
- [3] N. Othman and M. H. Amiruddin, "Different perspectives of learning styles from VARK Model," *Procedia-Social and Behavioral Sciences* 7 (C), pp. 652-660, 2010.
- [4] L. Robertson, T. Smellie, P. Wilson and L. Cox, "Learning styles and fieldwork education: students' perspective," *New Zealand Journal of Occupational Therapy*, vol. 58, no. 1, pp. 36-40, 2011.
- [5] S. Sriphai, S. Damrongpanit and J. Sakulku, "An Investigation of Learning Styles Influencing Mathematics Achievement of Seventh-Grade Students," *Educational Research and Reviews*, vol. 6, no. 15, pp. 835-842, 2011.
- [6] S. B. Eom, H. J. Wen and N. Ashill, "The determinants of students' perceived learning outcomes and satisfaction in university online education: an empirical investigation," *Decision Journal of Innovative Education*, vol. 4, no. 2, pp. 215-233, 2006.
- [7] J. A. Slater, L. Lujan, S. E. DiCarlo, "Does gender influence learning style preference of first year medical student?," *Advances in Physiology Education*, vol. 31, pp. 336-342, 2007.
- [8] L. Thomas, M. Ratcliffe, J. Woodbury and E. Jarman, "Learning styles and performance in the introductory programming sequence," *ACM*, pp. 33-36, 2002.
- [9] M. M. Sinha, S. S. Naik, J. M. Jadeja and A. H. Patel, "Gender differences in preferences of various modalities of learning styles among undergraduate medical students," *International Journal of Basic and Applied Physiology*, vol. 2, no. 1, pp. 88-93, 2013.
- [10] R. Murphy, S. A. Gray, S. R. Straja and M. C. Bogert, "Student learning preferences and teaching implications," *Journal of Dental Education*, vol. 68, no. 8, pp. 859-866, 2004.
- [11] S. Graf, Kinshuk and T. C. Liu, "Supporting teachers in identifying students' learning styles in learning management systems: an automatic student modelling approach," *Educational Technology and Society*, vol. 12, no. 4, pp. 3-14, 2009.
- [12] A. I. Saadi and K. Abdulaziz, Gender and Learning Styles in Saudi Arabia Schools, The Clute Institute International Academic Conference: San Antonio-Texas USA, 2014.
- [13] N. Yahaya, A. Yahaya, J. Ramli, S. Hashim and Z. Zakariya, "The effects of motivational factors in learning among students in secondary school in negeri Sembilan," *International Journal of Psychological Studies*, vol. 2, no. 1, pp. 96-106, 2010.
- [14] S. Cassidy, "Learning style and student self-assessment skill," *Education and Training*, vol. 48, no. 2/3, pp.170-177, 2006.
- [15] B. D. Ictenbas and H. Eryilmaz, "Determining learning styles of engineering students to improve the design of a service course," *Procedia-Social and Behavioral Sciences* 28, pp. 342-346, 2011.

- [16] P. Phantharakphong, "English learning styles of high and low performance students of the faculty of education, Khon Kaen University," *Procedia-Social and Behavioral Sciences* 46, pp. 3390-3394, 2012.
- [17] C. Babadogan and I. Budakoglu, "Learning style scales and studies used with students of health departments of universities between 1998-2008," *Procedia-Social and Behavioral Sciences* 46, pp. 2462-2466, 2012.
- [18] L. Samarakoon, T. Fernando, C. Rodrigo and S. Rjapakse, "Learning styles and approaches to learning among medical undergraduates and postgraduates," *BMC Medical Education*, vol. 13, no. 42, pp. 1-6, 2013.
- [19] R. P. Urval, A. Kamath, S. Ullal, A. K. Shenoy, N. Shenoy and L. A. Udupa, "Assessment of learning styles of undergraduate medical students using the vark questionnaire and the influence of sex and academic performance," *Advances Physiology Education*, vol. 38, pp. 216-220, 2014.
- [20] H. S. Afshar and M. Rahimi, "The relationship among critical thinking, emotional intelligence, and speaking abilities of Iranian EFL learners," *Procedia - Social and Behavioral Sciences* 136, pp. 75-79, 2014.
- [21] A. Honigsfeld, A comparative analysis of the learning styles of adolescent from diverse nations by age, gender, academic achievement level and nationality (doctoral dissertation), Dissertation Abstract, 2001.
- [22] J. W. Santrock, Psikologi Pendidikan, Jakarta: Pustaka Kencana, 2004.
- [23] R. Choudhary, P. Dullo and R. V. Tandon, "Gender differences in learning style preferences of first year medical students," *Pak J Physiol*, vol. 7, no. 2, pp. 42-45, 2011.
- [24] E. A. Wehrwein, H. L. Lujan, S. E. DiCarlo, "Gender differences in learning style preferences among undergraduate physiology students," *Advances Physiology Education*, vol. 31, pp. 153-157, 2007.
- [25] N. D. Fleming, *The VARK Questionnaire*, Retrieved From <http://www.vark-learn.com/english/page.asp?p=questionnaire>, 2013.
- [26] M. Leasa, A. D. Corebima, Ibrohim and H. Suwono, "Emotional intelligence among auditory, reading, and kinesthetic learning styles of elementary school students in ambon-indonesia," *International Electronic Journal of Elementary Education*, vol. 10, no. 1, pp. 83-91, 2017.
- [27] D. D. Nulty and M. A. Barrett, "Transitions in students' learning styles," *Studies in Higher Education*, vol. 21, no. 3, pp. 333-345, 1996.
- [28] F. Hill, B. Tomkinson, A. Hiley and H. Dobson, "Learning style preferences: an examination of differences amongst students with different disciplinary backgrounds," *Innovations in Education and Teaching International*, pp. 1-13, 2014.
- [29] H. Peyman, J. Sadeghifar, J. Khajavikhan, M. Yasemi, M. Rasool, Y. M. Yaghoub, M. M. H. Nahal, H. Karim, "Using vark approach for assessing preferred learning styles of first year medical sciences students: a survey from Iran," *Journal of Clinical and Diagnostic Research*, vol. 8, no. 8, pp. GC01-GC04, 2014.
- [30] A. I. Saadi, An Examination of the Learning styles of Saudi Preparatory School Students who are High or Low in Reading Achievement, *Thesis*: Victoria University, Faculty of Arts, Education, and Human Development Melbourne-Australia, 2012.
- [31] Pusat Kurikulum, Buku I: Panduan Pengembangan Pendekatan Belajar Aktif, Jakarta: Kemdiknas, Badan Penelitian dan Pengembangan, 2010.
- [32] C. C. Park, "Learning style preferences of korean, mexican, armenian-american, and anglo students in secondary schools," *NASSP Bulletin* 81, pp. 103-111, 1997.
- [33] S. Severiens and G. T. Dam, "Gender and gender identity differences in learning styles," *Educational Psychology*, vol. 17, no. 1&2, pp. 79-93, 1997.
- [34] S. J. Carrier, "Environmental education in the schoolyard: learning styles and gender," *The Journal of Environmental Education*, vol. 40, no. 3, pp. 2-12, 2009.
- [35] R. Mittal, "Gender disparity in engineering colleges: is the difference in the preferred learning style the reason?" *Institute for Learning Styles Journal*, vol. 1, pp. 11-34, spring 2013.
- [36] C. A. Lowery, "Adapting to student learning styles in a first year electrical/electronic engineering degree module," *Engineering Education*, vol. 4, pp. 52-60, 2009.

BIOGRAPHY OF AUTHORS

Marleny Leasa is a Doctor of Biology Education.

Lecturer at Primary Teacher Education, Faculty of Teachers Training and Education, Pattimura University, Ambon-Indonesia. Jalan Dr. Tamaela Kampus PGSD, Ambon-Maluku, Indonesia.

Email: marleny.leasa@yahoo.com.

Interest research: biology education, science education, teaching and learning model, primary education, and educational design.



John Rafafy Batlolona is a Master of Physics Education.

Lecturer at Primary Teacher Education, Faculty of Teachers Training and Education, Pattimura University, Ambon-Indonesia. Jalan Dr. Tamaela Kampus PGSD, Ambon-Maluku, Indonesia.

Email: johanbatlolona@gmail.com; johnrafafybatlolona@gmail.com

Interest research: physics education, science education, teaching and learning model, primary education.



Javier Julian Enriquez is a Master in Languages and Technology

Department of English Education, Polytechnic University of Valencia, Spain

Email: jajuen@alumni.upv.es

Interest research: Teaching and Learning, Pedagogy and Education, Academic Writing, Language and Teacher Training



Mehmet Altan Kurnaz, Department of Mathematics and Science Education, Kastamonu

University, Turkey Email: makurnaz@kastamonu.edu.tr & altan.kurnaz@gmail.com

Interest research: physics education, science education, teaching and learning model, primary education.