International Journal of Engineering Research and Technology. ISSN 0974-3154, Volume 13, Number 12 (2020), pp. 5349-5353

Learning Style as a Variable to Develop a Smart Learning Management System

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Abstract

Every human being has their learning style that will affect their effectiveness in absorbing information from a learning process. Usually, the closest relationship is with the type of media used in learning. The purpose of this study is to investigate student learning styles that will be used as one of the factors considered in developing the Smart Learning Management System (SLMS) model. This research is a descriptive study with survey data collection methods. The questionnaire consisted of 24 items that asked students' learning styles related to Visual, Auditory, and Kinesthetic types. Data was taken directly through a questionnaire of 110 students in the Faculty of Engineering. The results of data processing showed students learning styles 41.82% Visual, 20.91% Auditory, 9.09% Kinesthetic, 5,45% Visual-Auditory, 9.09% Visual-Kinesthetic, 10% Auditory-Kinesthetic, and 3.64% Visual-Auditory-Kinesthetic. This means that the dominance of student learning styles in the Faculty of Engineering is Visual. Based on these data a Smart Learning Management System model will be developed with dominant learning media based on images and videos.

Keywords: Learning styles, Visual, Auditory, Kinesthetic, Smart LMS.

I. INTRODUCTION

Learning style is owned by each individual in absorbing, organizing, and processing the information received. The key to success for students in learning is the appropriate learning style [33]. If students are limited to using only one learning style, especially in learning styles that have verb or auditory properties, it can give the result that the information absorbed by students which can cause differences. Therefore, teachers must be able to help and direct students to be able to identify their learning styles in learning activities, so that students can find a learning style that suits them, and they can learn more optimally [32]. The implementation of various learning models by educators including will make the learning process more meaningful, however, the various learning models as far as possible make the learning process successful in creating a pleasant learning atmosphere and can achieve the expected academic achievement results, the learning model should be standardized and dynamic to be created in the atmosphere of student learning styles [14].

Realizing that each student has the difference of learning styles, it is very important to identify their learning styles so that educators can prepare learning models and implement learning strategies that can accommodate all types of student learning styles to increase their motivation and involvement in learning activities [21]. Every human being has their learning style that will affect their effectiveness in absorbing information from a learning process. Usually, the closest relationship is with the type of media used in learning [6]. Students undoubtedly have a major learning style they like, but it can be a part of it when all three are combined. Very strong preferences had by people, some others have mixed learning styles that consist of two or three learning styles. When students can see their preferred learning style, students can understand the type of learning that is suitable for them. This means that students have chosen a suitable type of learning to match, there is no right or wrong in the learning style. For all types of learning styles chosen by students, students must have a learning style that they like, so that they can also get the right type of learning, such as visual, auditory, and kinesthetic. Visual learning styles focus on vision, for auditory learning styles, rely on hearing as the recipient of information and knowledge. Kinesthetic learning styles enjoy learning that involves movement [22].

Learning styles and learning modalities are one of the individual differences that exist between students. Students 'preferences when they receive and process information are interpreted as a function of students' learning styles. When students can understand the information they get, then construct the information into their minds, then based on this information students understand their environment, this is the main feature of the learning style. When students can develop based on their experience and not develop based on genetic traits, this is another major characteristic of the learning style [1]. The learning style favored by students over time data changes and does not remain stable, this depends on the content and abilities of students [28]. Different learning styles focus on different types of information and how to process it in various ways [9]. Various types of learning style models can be found in many pieces of literature and based on these models many research instruments have been developed. The

perceptual model, the Kolb learning style model, the Dunn, and Dunn learning style model, the 4MAT system learning style model, the Honey and Mumford system learning style model, and the Grasha system learning style model, and the Riechman learning style are some of the popular learning styles in the literature [15].

Many things make this model look the same as other models, but this model is different from other models, how this model can distinguish and determine different learning styles is one of the fundamental differences of these models. For example, students with sensory modalities (visual, auditory, kinesthetic) understand information according to what they like, this is classified into perceptual learning styles. The process that underlies the formulation of the model is when people perceive information through thoughts and feelings (abstract conceptualization and concrete experiences) and process that information through doing and watching (active experiment and reflective observation) [17]. There are five sources of stimulation identified by Dunn and Dunn's learning style model, namely environmental, emotional, sociological, physiological, and psychological, where student learning and 21 elements of student learning styles can be influenced by these five sources of stimulation [3]. Kolb's experiential model underlies the creation of the 4MAT model, where learning is identified as being related to information processing (doing-watching) and people's perceptions (thinking-sensing) [20]. The redefinition of the Kolb learning cycle was carried out by Honey and Mumford's learning style model, this was done based on students' experiences in solving problems and making decisions (activist, theorist, pragmatic, reflector) [13].

The topic of learning styles continues to be a concern. Meanwhile, new aspects are developing continuously. More than one learning style can be used by students (Griffiths, 2012) because teachers must be prepared to be faced with situations to change the way they teach to ensure a good fit because various kinds of learning styles can be used by students [34]. Kawai (2010) [16] also explained his agreement that teachers must choose the right teaching style, and teachers teach to develop their teaching style sequentially so that the mismatch between the teaching style that the teacher enters and learning that suits students can be avoided. Anticipating different learning styles in each country is a natural thing to do because given the cultural differences in each country. Teachers consider the need for cultural bias in carrying out teaching practices, because of the ethnic and ethnic diversity in the classroom. Pratt (1992) [26] also argues that the benchmark of cultural errors they experience against people's behavior patterns causes students to have different learning styles. For decades, the idea that there is a relationship between learning styles and culture has long been the subject of academic research. The results of the study state that ethnic groups whose ethnicity is different from the ethnicities that have been studied [4]. Learning styles that are built by cultural factors have been preserved a lot in research, note that it becomes new if there are recommendations about the relationship between culture and learning styles.

Different learning styles are used by the student of different races such as Americans Saudis and Egyptians [31]. De Vita (2001) [2] was confirmed the result that the students enrolled in his class have different learning styles based on students of 20 different nationalities. Furthermore, Goodridge, Lawanto, and Santoso (2017) [10] the learning styles of their students who learned based on online instruction also affected the previous educational experience. The factors that influenced student learning style are cultural factors that search usage at an educational level, this result was found by other researchers (Inal, Büyükyavuz, & Tekin, 2015). The different learning style is also used by students that achieve high and low achievement [31]. A meta-analysis was conducted by Kanadli (2016), He investigates the relationship between academic achievement and learning style, he found that there is an inconsistent result of this relationship because of many other cultural factors will influence this. Sudria, Redhana, Kirna & Aini (2018) [30], Effendi (2019) [5], Effendi & Hendriyani (2017) [6] were confirmed the result, the research shows that learning achievement can give a significant effect on the learning style, it is for certain types of learning style. The relationship between academic achievement and learning style knowledge, and also between learning style and discipline, this can help teachers Too fast student learning style and design the learning material according to their student learning style in various fields of study [8]. Moreover, there rarely has been studied about the relationship between school curriculum type and learning style, and to add the existing research in this study And field, the three relationships that make up these learning goals have been clarified.

There are many ways to be grouped in the learning style. The example, Honey and Mumford have categorized the learning style into four types are the following: there are activists, reflectors, theorists, and pragmatists. Also, Neuro-Linguistic Programming (NLP) has categorized The learning style into three types based on how humans learn, namely: (1) Visual, (2) Auditory, and (3) Kinesthetic. Several classifications of other learning styles are also proposed by some other experts. In the example, Kolb classifies the student into a convergent, divergent, assimilator, and accommodator. Categorizing of learning style into intuitive Versus sensitive, also global versus sequential, visual versus verbal, active versus reflective had been conducted by Felder & Silverman. Classification of learning style in the study according to ALP.

II. METHOD

This research is a descriptive study with survey data collection methods. The survey consists of 24 items that asked students' learning styles related to Visual, Auditory, and Kinesthetic types. The study is conducted in the Semester of July-December 2019. There are 110 students as the subject of this study, the subject is the electrical and electronic engineering study program students, faculty of engineering, Universitas Negeri Padang. the descriptive analysis has been used in this study for covering mean, percentage, and proportion. The instrument validity content has been guaranteed by the instrument developers.

The questionnaire consisted of 24 items that asked students' learning styles related to Visual, Auditory, and Kinesthetic types.

III. RESULTS AND DISCUSSION

III.I Result

If the students are grouped according to visual (V), auditory, (A). Kinesthetic (K), Visual-Auditory (VA), visual-kinesthetic (VK), auditory-kinesthetic (AK), and visual-auditory-kinesthetic (VAK), a large number of student (41.82%) is included in visual, followed by auditory (20,91%), auditory-kinesthetic (10%), kinesthetic (9,09%), visual-kinesthetic (9.09%), visual-auditory (5,45%), and visual-auditory-kinesthetic (3.64%). This result is shown in Figure 1.

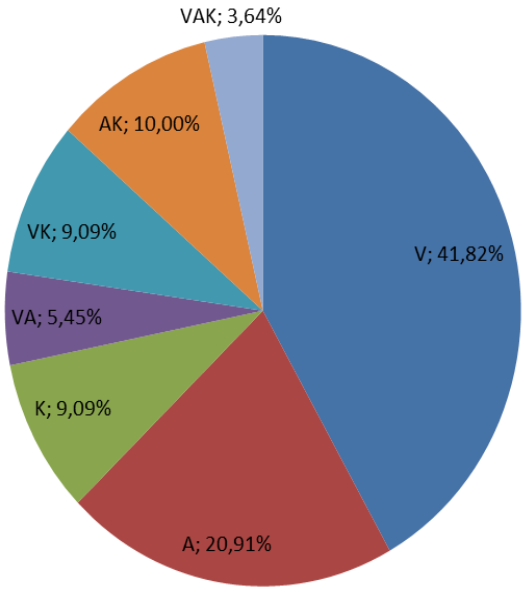

Figure 1. Comparison of learning styles

Table 1. The comparison of learning styles between the male and female student

Learning Styles	Male Students		Female Students		Male + Female Students	
	Total	Percentage	Total	Percentage	Total	Percentage
V	24	21,82%	22	20,00%	46	41,82%
A	16	14,55%	7	6,36%	23	20,91%
K	8	7,27%	2	1,82%	10	9,09%
VA	3	2,73%	3	2,73%	6	5,45%
VK	3	2,73%	7	6,36%	10	9,09%
AK	6	5,45%	5	4,55%	11	10,00%
VAK	2	1,82%	2	1,82%	4	3,64%
Total	**62**	**56,36%**	**48**	**43,64%**	**110**	**100%**

IV. DISCUSSION

Knowing that student learning styles are very important to collect data about student learning trends, especially in designing learning systems in general. In connection to accommodating learning styles in designing learning systems, Muir (2001: 3) [23] provides an opinion summarized in Table 1.

Also, understanding your learning style will create awareness for students. This awareness provides a better opportunity for students to gain knowledge and also more motivated to learn. The awareness is not only created by learning style for a student but learning style can be used by the student to inform them of their strength and weakness. When students are aware of their strengths and weakness in the learning process, these strengths and weaknesses can motivate the student to learn effectively [25; 7].

If you have a strong preference for Visual (V) learning [12], you should use some or all of the following:

INTAKE [To take in the information, use]: underlining different colors, highlighters symbols, flow charts, charts, graphs pictures, videos, posters slides, different spatial arrangements on the page, white space, textbooks with diagrams, pictures lecturers who use gestures, and picturesque language

SWOT [Study without tears] To make a learnable package Convert your lecture 'notes' into a learnable package by reducing them (3:1) into page pictures; Use all techniques above to do this Reconstruct the images in different ways - try different spatial arrangements; Redraw your pages from memory; Replace words with symbols or initials; Look at your pages

OUTPUT [To perform well in the examination] Recall the 'pictures' of pages; Draw - use diagrams where appropriate Write exam answers; Practice turning your visuals back into words; You are holistic rather than reductionist in your approach; You want the whole picture; Visual learners do not like handouts, words, lectures, textbooks or assessment that hinge on word usage, syntax and grammar.

V. CONCLUSIONS

The study is to investigate the students' learning style(s) to be used as a factor to develop the Smart Learning Management System. The method is a descriptive study with survey data collection. The result shows that 41.82% of students have a visual learning style. This means that the dominance of student learning styles in the Faculty of Engineering is Visual. Based on these data, a Smart Learning Management System model will be developed with dominant learning media based on images and videos.

ACKNOWLEDGMENTS

Thanks to several parties to give support and the study so that this study can be conducted well and effectively. The authors will deliver thankfulness and gratefulness to the head of PSU and faculty of engineering Dean Who had given the opportunity and supports so that the author can be able to research this study programs and faculty. Also, the authors will deliver thankfulness and gratefulness to the coordinator of the electrical engineering study program, electronic engineering study programs that had permitted after student to be the sample of this study and thankful to the student who willingly provides any information by completing the questionnaires properly.

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