LEARNING STYLE PREFERENCES AMONG DIPLOMA IN INFORMATION TECHNOLOGY (DDT) STUDENTS USING VARK MODEL

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ABSTRACT*: Teaching and learning is a key factor in determining the successes education that contribute great strides for creating to the sustainability of a country. Learning programming closely related with variable and constant usage to store values that will be used throughout the program. These fundamental knowledge is compulsory that a programmer needs to be mastered in order to write a good programs. From the observation has been done with teaching experience more than 13 years, student's faces difficulty to visualize the basic programming concept at the fundamental stage. This study is concerned to overcome this problem by identify the learning styles and preferences for the semester 1 students who take the Programming Fundamental course. Survey was conducted by distributing the VARK inventory for the students from semester 1 and analysed to see the learning styles which is dominant. Four learning styles such as visual, auditory, read/write and kinaesthetic learning styles has been identified from the questionnaire given. DDT 1 students learning style preferences are more dominant for kinaesthetic and auditory and least toward visual and read/write. Educator can prepare the suitable teaching learning materials that meets the students learning styles by injecting the suitable elements to meets the learner's preferences without neglecting any learning style of the students.*

KEYWORDS - *Learning , Learning Style, Learning Preferences, VARK*

1.0 INTRODUCTION

Educators play an important role in creating students who are proficient in both public institutions and private institutions. Educators' tasks are increasingly challenging in responsibility of helping each student to improve their performance in the involved lesson. Good and interesting lesson planning as well the various approaches used are the factors to make the learning atmosphere is more appealing to students. There are many learning styles and preferences, but different people learn in different way. Learning can be optimized if the learning style that has been chosen suits best with the learner [1]. Identifying the learning style preferences among learner and teaching using the approach that meet their learning style will results a better impact on their level of knowledge [2]. To ensure the better learning, the educators must sensitive with their students learning style by preparing materials and find suitable teaching approach that can be benefits by students with different learning styles.

Programming subjects become a core subjects for students from Information Technology and Communication Department students who took Diploma in Information Technology (DDT) in Polytechnic Sultan Idris Shah (PSIS). Every semester, at least one of the course structure will be a programming subject. Without a good foundation on the programming fundamental knowledge it would be a great challenge for the students to make sure they can complete their education with good results. This effort would be even tough since the programming fundamental subject DFC2073 Programming Fundamentals, become the pre-requisite subject for other programming subjects. Pre-requisite subject is a core subject where students need to pass the subject in order to qualify them to take other subject. Summary of the programming pre-requisite subject for DDT programme as shown in Table 1.1.

Table 1.1 : Programming Pre-Requisite Subject For DDT Programme

SEMESTER	COURSE	PRE-REQUISTE SUBJECT
1	**DFC 2073 : Programming Fundamentals**	DFC1042: Problem Solving and Program Design
2	DFT 4024 : Object Oriented Programming	**DFC 2073 Programming Fundamentals**
3	DFP 5013 : Mobile Application Development	DFT 4024 Object Oriented Programming
4	DFP 4013 : Visual Programming	DFT 4024 Object Oriented Programming

Students who take DFC2073 Programming subjects must pass this subject to eligible them for Object Oriented programming subject in semester two. Then, the object oriented subject will become pre-requisite subject for two more programming subject such as Mobile Application Development in semester 3 and Visual Programming subject in semester 4.

Generally, students face difficulties to visualize the characteristics between variables and constant. Lack of programming concepts especially in declaring variable and constant with suitable primitive data type may cause errors such as integer overflow in C and C++ programs are difficult to be detected and may lead to fatal errors or exploitable vulnerabilities. Besides tools to find the errors, knowledge and good understanding in using those data types would reduce the error occurrences since not all of the bugs detected by a compiler is overflow bug [3].

The expected outcome for this study is to prove the existence of different learning style. It is also as contribution for educators to be more flexible, creative and innovative in classroom especially to prepare a teaching

tools that can attract students from different learning styles. More precisely this research aim is to help students that face difficulties to visualize the characteristics between variables and constant for DFC2073-Programming Fundamental with C++ subject. To make sure a successful teaching learning process, both students and the learning material should be prepared to meet each other. This can be done by identifying the students learning style preferences in order to prepare or develop suitable learning material. DDT 1 students who are taking the DFC2073-Programming Fundamental with C++ will be chosen as the sample of the research.

2.0 LITERITURE REVIEW

2.1 Learning

Learning is the way toward obtaining new or altering existing information, practices, attitudes, qualities, or inclinations. The process in gaining the knowledge can be either formal or informal. Formal knowledge can be gained or learned in in institution such as school, college, polytechnics and universities. Informal knowledge learned through own experience, other people's experience, readings such as books, blogs or even by chatting in face to face mode or virtual mode. Learning process can be optimized to better extend by determining the learning styles preferences of the learner [4].

2.2 learning Styles

Learning styles point to the difference in ability of way in accepting knowledge. Fundamentally, learning style is the strategy that best enables person to pick up and utilize information in a particular way. Every individual may holds a solitary style or could have a mixture of various learning styles. This learning style can be identified even in young age [5]. Identifying specific learning style can help person to increase the level of knowledge acceptance, some learners may learn better through visual images, some learners may prefer deal with theories and others may learn better hand-on activity and experiments [4]. The same author mentioned that, there are more than 70 theories has been created for past 30 years. Since there are so many learning styles theories, only three learning theories on learning styles such Gardner's Multiple Intelligences, VARK (known as Visual, Auditory, Reading and Kinaesthetic) and Kolb's theory were selected to narrow down the scope.

2.2.1 Gardner's Learning Styles (Gardner, 1983)

There are seven distinct intelligences were identified such as visual-spatial, bodily-kinaesthetic, musical, interpersonal, intrapersonal, linguistic and logical-mathematical. Figure 2.1 visualize the respective learning style with the model invented. Each sort of insight contains various aptitudes, and is a framework with its own particular capacities that are distinctive for every person [6].
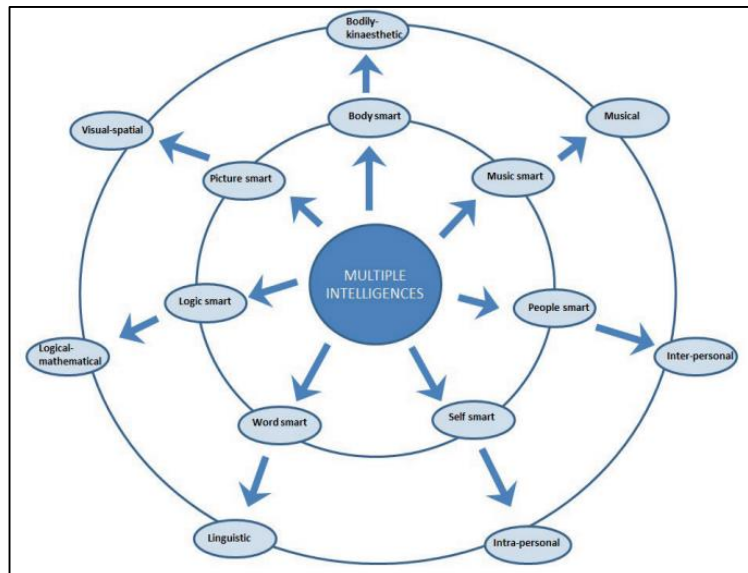

Figure 2.1: Gardner's Multiple Intelligences Model (Gardner, 1983)

2.2.2 VARK Learning Styles (Flemming, 1987)

The VARK Learning styles are a mainstream idea in psychology and education [7]. This model main goal is to recognize how individuals learn best. The VARK model of learning styles proposes that there are four fundamental kinds of learners such as visual learners, auditory learners, reading/writing learners and kinaesthetic learners. Figure 2.2 illustrate the VARK model.
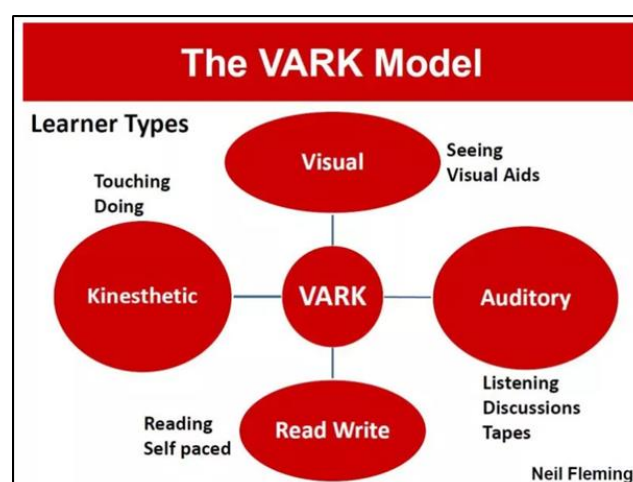

Figure 2. 2: VARK Model by Neil Fleming, 1987

The learners who are categorized as Visual Learners, learns best by seeing graphical elements, for example diagram, videos, charts, illustration and other visual forms. Individuals who lean toward this kind of learning

would preferably observe data introduced in a visual form better than by reading written texts. Auditory Learners or also known as aural learners learn best by listening information.

They have a tendency to gain a great deal out of lectures and are able to remember things when they are told. Learner from Read/write Learning Style category would prefer best to gain information where it displayed as words. Learning materials that are primarily text-based are strongly preferred by these learners. Kinaesthetic learners also known as tactical learners who learns best by touching and doing. Hands-on experience is a main element to kinaesthetic learners to gain better knowledge.

2.2.3   Kolb's Learning Styles (Kolb, 1984)

According to Kolb (1984), learning is process of knowledge transformation based on experience earned from 4 stages such as concrete experience, observation and reflection, generalization and abstraction and applying and testing. Figure 2.3 shows the Kolb's Learning Style model.
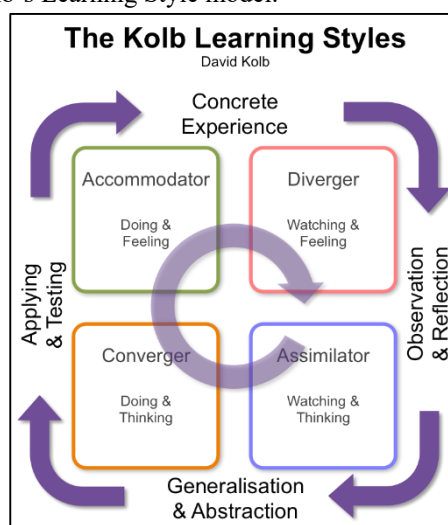

Figure 2. 3: Kolb's Learning Style model

There are 4 learning styles that can be categorized from this models which are assimilators who learns through watching and thinking, converges doing and thinking, accommodators doing and feeling and diverges watching and feeling.

3.0 VARK LEARNING MODEL

3.1 Introduction of VARK Model

The rational of this VARK model has been selected is due to the features of this models that has moderately few style classes and consequently are not very unpredictable. Moreover, the online inventories for these models don't just characterize their styles, they likewise give far reaching clarifications of their style classifications and of learning methodologies inclining toward by understudies in every classification. Moreover these clarifications give direction to understudies (and instructors) for overseeing and broadening ("extending") their learning inclinations, accordingly influencing the inventories to go about as learning devices. VARK is a learning styles models that categorizes and labels learning styles by means of assessment instruments. Each model focuses on different sensory or processing aspects and thus classifies learning styles differently. However, these categorizations are somewhat arbitrary – and not nearly as important as recognizing that students differ in their learning preferences and that we can adjust our teaching to accommodate, as much as possible, these differing preferences. It's also very important to remember that the models describe generalizations only, not labels, and as such are guides rather than prescriptions for our teaching. The models look at only small slices of the learning process; it's up to us to put them all together to create a vibrant learning environment. Faculty can most help students by using a variety of teaching/learning methods so that all have opportunities to learn in ways

compatible with their preferred styles, yet also learn to recognize when they need to stretch in other ways, not just in their preferred styles.

Any one learning-style instrument assesses only certain learning-style dimensions and will therefore give an incomplete picture of learning style, however, each one can contribute to a student's self-awareness. And taken in combination with another learning styles inventory reflecting a different learning styles model, results can be compared to provide a more complete picture of an individual's particular learning preferences, strengths, and limitations. VARK model differentiate learners in to four learning style such as visual learners, auditory learners, read/write learners and kinaesthetic learners.

3.1.1 Visual Learning Style

Visual Learning Style where the individuals learn best through visual guides. Visual guides incorporate outward appearances and gestures of educators, pictures, writings with outlines, DVDs and more. Visual students think and learn in pictures. Particular focal points to being a visual student incorporate making clear outlines and charts to express ideas and having solid spatial abilities that can control in mapping bearings or mapping idea structures. Be that as it may, an extraordinary disservice of the visual learning style is the trouble experienced when visual guides aren't accessible and just messages and addresses are utilized as a part of the learning procedure.

3.1.2 Auditory Learning Style

Auditory Learning Style, is a learning style where the learner learn by hearing what they need to realize. To learn, such individuals would lean toward tuning in to discourses, talking matters over, perusing out of writings or making utilization of e-courses containing sound chronicles. One exceptional preferred standpoint of this style is that you acclimatize and hold data without seeing it in writings or pictures.

3.1.3 Read and Write Learning Style

Read and Write Learning Style learner learn best by perusing writings or recording notes from what they read, see or hear. Read and write students require recording materials to take focuses they believe are critical from what they read, hear or see. The read and write style has the benefit of making the students more free. With note-taking, they can learn and hold a greater amount of the ideas all alone with a learning style

that works for them. Be that as it may, they likewise confront the disservice of not having the capacity to learn effectively with just visual or sound direction or where they don't approach composing materials.

3.1.4 Kinaesthetic Learning Style

Kinaesthetic Learning Style students learn by moving and doing. They lean toward intelligent getting the hang of, learning through viable difficulties and hands-on understanding and learning as they move starting with one place then onto the next. Kinaesthetic students, are not happy with sitting in a place for long. The Kinaesthetic learning style has the benefit of presenting students quicker to practice and proof. They learn as they practice and practice what they realize

4.0   RESEARCH METHODOLOGY

4.1 Research Samples

DDT 1 students from Politeknik Sultan Idris Shah, that consist of 43 students that has two class which is DDT1A (25 students) and DDT1B (18 students). Only semester 1 student has been chosen since this DFC2073-Programming Fundamental with C++ course is only offered for semester 1 students.

4.2 Research Instruments

Questionnaire "How do I Learn Best" version 7.8 from www.stellarleadership.com that consist of 16 multiple choice question. There can be more than one answer can be selected by the students. This questionnaire which also known as VARK inventory provide the marking schema that could be used to calculate the learning style preferences score to identify the learner style. Students will be categorized in to their most dominant learning style (Visual, Auditory, Read/Write or Kinaesthetic). The highest mark scored for the inventory, shows the most dominant learning style of the students. Since there can be more than one answer for one question of the inventory,   there is possibility for a student to have more than one dominant learning style. All of the DDT 1

that consist 43 students given VARK inventory to identify the students learning preferences. VARK inventory version 7.8 used and each students learning styles identified and analysis on the collected data conducted.

4.3 Results and Discussion

Analysis was performed for all the 43 students that has been selected. the results shows that, the most preferred learning style by the DDT1 students is kinaesthetic with 31.43% and followed by auditory 29.41%, read/write 21.32% and visual is the least preferred learning style with 17.8%. Table 4.1 shows the DDT 1A and DDT 1B result.

*Table 4.1: DDT 1 Students Learning Style Preferences*

LEARNING STYLE	DDT 1A (%)	MEAN VALUE	DDT 1B (%)	MEAN VALUE
Visual	17.38	4.46	18.54	3.15
Auditory	29.41	7.35	29.06	4.94
Read/Write	21.32	5.33	18.31	3.11
Kinaesthetic	31.43	7.86	34.10	5.80

Data above shows that both DDT 1A and DDT 1B students have the same sequence of preferred learning style. Kinaesthetic learning style is the most preferred learning style followed by auditory learning style in the second rank, read/write in the third most preferred learning style and the least preferred learning style is visual learning style. Data also has been analysed to see the difference of mean value in choosing the learning style preferences among DDT 1A and DDT 1B students in Department of Information Technology and Communication, Polytechnic of Sultan Idris Shah.

Table 4.1 shows that the both group has the similarity in their learning styles preferences, but somehow there is a different mean value among both DDT 1A and DDT 1B group of students where the frequency of kinaesthetic learning style and auditory learning style in DDT 1A students of group much dominant than DDT 1B group of students. The frequency for the Visual learning style and read/write learning style are quite similar with

the mean different only about 0.04. The kinaesthetic learning style still a dominant learning style which is also preferred by DDT 1B students where the frequency of this learning style with 5.8 mean value.

DDT 1B student's learning preference for auditory learning style versus kinaesthetic learning style mean different is about 0.86 compared to DDT 1A students different is 0.51. The mean different for this two dominant learning style which is auditory learning style and kinaesthetic learning style among DDT 1A and DDT 1B students shows that the DDT 1B students are the most dominant students of group in in kinaesthetic learning style compared to DDT 1A .

Figure 4.1: Learning Style Preferences among DDT 1A and DDT 1B
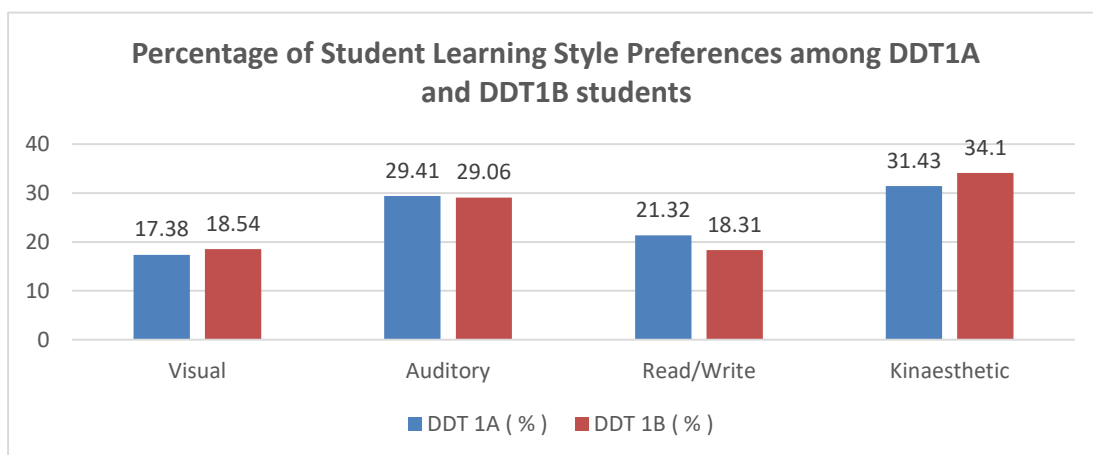
the finding from this study shows that educator or the lecturer who are teaching this two group of students need to use teaching learning strategy that is more dominant in kinaesthetic and auditory learning style.

The kinaesthetic learners prefer hands-on activities where the information is represented in tactical form. Learners from this learning preferences prefers learning through practicing, experiencing or simulated reality. The educator can do teaching learning activities such as case study, demonstration, tools and application, movies or video recording of real life example to increase the knowledge acceptance level. The educator can attract the learners with auditory learning style by doing collaborative learning, where they prefer the information by hearing or speaking and talking with peer. This learners also prefer group discussion, tutorial and listening to audios.

5.0 CONCLUSION

DDT 1 students learning style preferences are more dominant for kinaesthetic and auditory and least toward visual and read/write. It is recommended that educators to consider the existence of the different learning styles among the students without neglecting any learning preferences. Educator also may tailor their teaching learning material by implementing all the learning style with suitable activities. This is important to contribute for student's better understanding.

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