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A conceptual framework of project-based learning by analyzing of VARK

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Abstract

This research aims to study for 1) Synthesizing and creating a framework of project-based by analyzing through VARK theory 2) Evaluating the appropriateness of a framework of project-based by analyzing through VARK theory in order to shape a protocol of improving the content management for bachelor degree students majoring in Computer Education of Nakhon Pathom Rajabhat University. The research will proceed in 6 stages; 1) Literature reviewing on related theory and journals 2) Synthesizing and creating protocol learning style 3) Setting up the expert in focused field 4) Crafting a questionnaire regarding to the comment of an expert on the appropriateness of the learning style designed. 5) Evaluating the appropriateness of the learning style designed of the sample group. 6) Summarizing the result of focused group discussion from experts. According to result of PjBL-A-VARK had found that there are 3 sections out of 6 modules as following, Data Input 1) VARK Analyzing Module 2) VARK Classification Module The process by 3 procedures 3) Student Learning Style Database Module 4) Interface Module 5) Content Module and the section of result which is 6) Examiner module. The experts had certified the appropriateness evaluation result stated that the conceptual framework synthesized possess the high level at 4.62±0.50 and supported to conduct as the protocol of the classroom content management for bachelor degree students majoring in Computer Education of Thai western Rajabhat Universities.

Keywords: Learning style, project-based learning, analyzing of VARK
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1. Introduction

Nowadays in Thailand's education system had reformed into a new structure of emphasizing the student center as to create an ecstatic atmosphere of learning as well as to share and equality of education access. According to education media, communication and technology enhance the learning ability and allowed a wide spread of knowledge source throughout the Kingdom of Thailand which is in line with National Education Act: 1999 and the additional (volume no. 2) 2002 chapter 4, policy of education management section 22 had announced that "Education must adhere to the principle that all students are able to learn and develop themselves and consider students to be the most important. The educational management process must encourage students to develop naturally and fully according to their potential by considering the differences between individuals." [1]

Students' acquisition of knowledge had been considered as to strengthen more effectiveness of learning efficiency which will concern with the individual learning style linked to VARK (VARK Learning Style) that had been developed by Neil D. Fleming in 1992. [2] The apparatus of the evaluation of individual aptitude-oriented learning style of students is conducted on the concept of that everyone can learn according to knowledge and academic sights. The concept will allow the students to learn in their individual comfort aptitude learning style. [3] Known as VARK that evaluates the learning style from their individual comfort aptitude learning style. This is divided into 4 categories; 1) Visual: V, Learners' aptitude on visual (2) Aural: A, Learners' aptitude on aural 3) Read/Write: R, Learners' aptitude on reading and 4) Kinesthetic: K, [2] Learners' aptitude on doing. These 4 categories are applicable to improve the classroom management quality by focusing on individual learning aptitude to design techniques and learning activity. [4] The most effective learning style is learning by doing that is totally differ from listening to lecture from lecturer which found the most tiresome and lack of appetite for learners. [5] The project-based learning is to support students learning by doing that intensively

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work in a peer group. Project based awarded student to work in a process and gain more creativeness and skilled experience as well as to be eager to establish their new quest and conduct a conceptual project by their own. [6]

Asserting the theory and basic information, researcher had conducted a conceptual framework of project-based learning by analyzing theory by VARK, in order to improve Teaching and learning is consistent with quality management education strategies. [7] as well as to encourage students to develop their full potential according to their individual learning aptitude.

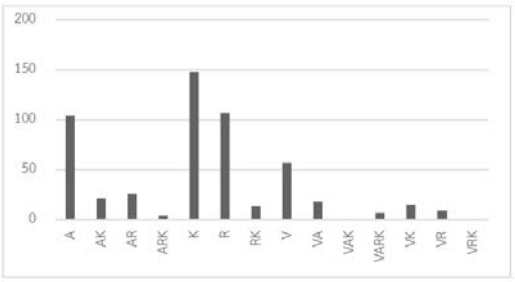

Figure 1: Result from an evaluation form of learners' aptitude relies on VARK learning style of bachelor degree students majoring in Computer Education of Thai western Rajabhat Universities.

2. Objective

2.1 To Synthesize and create a framework of project-based by analyzing through VARK theory.

2.2 To evaluate the appropriateness of a framework of project-based by analyzing through VARK theory. For equation.

3. Methods

The steps to synthesize and create a framework of project-based by analyzing through VARK's theory are as follows.

3.1 Literature reviewing on related theory and journals found categories in bachelor degree students majoring in Computer Education of Thai western Rajabhat Universities and project-based learning as shown below.

3.1.1 The concept or theory of learning style of VARK had been improved by Neil D. Fleming in 1992 [8] is the tool to evaluate learners' aptitude of learning style known as VARK that evaluates the learning style from their individual comfort aptitude learning style [8]. This is divided into 4 categories.

1) Visual (V) is the group of learners that can learn what they have seen by their visual experience especially picture and slide of a presentation.

2) Aural (A) is the group of learners that can learn what they have heard by their aural experience especially listening to lecture, audio record and discussing in a team.

3) Read/Write (R) is the group of learners that can learn what they have read and written by their skilled experience especially their literature reviews.

4) Kinesthetic (K) is the group of learners that can learn what they have experienced especially through simulations and apparatuses.

As a result of research on project-based by analyzing through VARK theory of bachelor degree students majoring in Computer Education of Thai western Rajabhat Universities can be seen in Figure 1 that samples at 533 students reacted the evaluation form by VARK concept. Thai version 16 items, question improved by [9] translated by [10]

According to Figure 1 Result from an evaluation form of learners' aptitude relies on VARK learning style of bachelor degree students majoring in Education Computer of Thai western Rajabhat Universities revealed that as follows.

1. There are 416 students who hold only one learning aptitude which delegate to
   1) V: 57 students
   2) A: 104 students
   3) R: 107 students
   4) K: 148 students.
2. There are 94 students attained two learning aptitudes that are as follows
   1) AK: 21 students
   2) AR: 26 students
   3) RK: 14 students
   4) VA: 18 students
   5) VK: 15 students
   6) VR: 9 students.
3. There are 6 students attained three learning aptitudes are
   1) ARK: 4 students
   2) VAK: 1 student
   3) VRK: 1 student.
4. There are 7 students who attained four learning aptitudes.

3.1.2 The learning of PjBL (Project-Based Learning) is one of the learning styles that accelerates eagerness of doing by learning that supports knowledge, solving problem skill and achieved the project. Thus, this project provides creativeness, a presentation from their peer group work as well as to advocate the 21st-century skill that the learners study by themselves before expanding of their understanding, their experience on later stage on their own dominant.

The comments of computer experts regarding structure of learners' aptitude rely on VARK learning style of bachelor degree students majoring in Education Computer of Thai western Rajabhat Universities can be seen in Table 1.

Table 1. The comments of computer experts regarding to learners' aptitude rely on VARK learning style of bachelor degree students majoring in Education Computer of Thai western Rajabhat Universities.

No	Evalution Items	N	$\bar{x}$	S.D.	Appropriateness Level
1	Project based on learners aptitude of V	51	4.80	0.53	Highest
2	Project based on learners aptitude of A	51	4.57	0.64	Highest
3	Project based on learners aptitude of R	51	4.78	0.58	Highest
4	Project based on learners aptitude of K	51	4.86	0.35	Highest

According to Table 1 The comments of computer experts regarding to learners' aptitude relies on VARK learning style of bachelor degree students majoring in Education Computer of Thai western Rajabhat Universities found that the appropriateness from experts comments are

1) project based on learners aptitude of V is at the highest level at = 4.80, S.D.= 0.53

2) project based on learners aptitude of A is at the highest level at = 4.57, S.D.= 0.64

3) project based on learners aptitude of R is at the highest level at = 4.78, S.D.= 0.58 and

4) project based on learners aptitude of K is in the highest level at = 4.86, S.D.= 0.35.

3.2 Synthesizing and creating a classroom management

3.2.1 The result of project-based by analyzing through VARK theory and the experts comment regarding bachelor degree students majoring in Computer Education of Thai western Rajabhat Universities that conducted and finally created a conceptual framework through project-based in Figure 2.

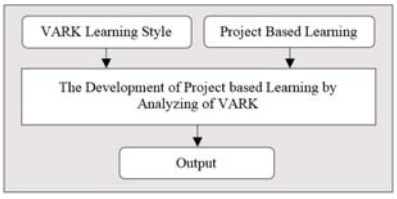

Figure 2: Basic conceptual framework

3.2.2 Applying conceptual framework from analyzing through VARK theory

3.2.3 Implementing comments from experts of appropriateness on a conceptual framework "A conceptual framework of project-based learning by analyzing theory by VARK"

3.2.4 Revising classroom management refers to experts' comments and summarizing into learning style.

3.3 Setting up an expert group and sample which had been divided into 2 groups.

3.3.1 The expert group

3.3.1.1 Group no. 1 is a group of 10 doctoral experts in computer and classroom management field with a minimum 5 years of education experience to comment on a conceptual framework by doing focused group discussion.

3.3.1.2 Group no. 2 is a group of 51 doctoral experts in computer and classroom management field to comment on the appropriateness of learning style of bachelor degree students majoring in Computer Education of Thai western Rajabhat Universities by simple sample random.

3.3.1.3 Group no. 3 is a group of 5 doctorial experts with educator and teaching research experience in computer and classroom management field to comment on the appropriateness of protocol designed from the conceptual framework by specific methods.

3.3.2 Sample group

3.3.2.1 Sample group of 532 students of bachelor degree students majoring in Computer Education of Thai western Rajabhat Universities by simple sample random.

3.4 Create an evaluation form to certify the appropriateness of learning style by experts according to the analyzing on the theory of VARK which can be divided into 2 steps.

3.4.1 Step 1: the comment on the appropriateness of learning style by experts according to the analyzing on the theory of VARK" which contains as following items questioned on the module as following;

1) Primary Holistic of conceptual framework

2) Learning style aptitude tester module

3) Categorized sampling group module

4) Data collection on learning style aptitude module

5) Project-based learning module

6) Interface module

7) Content module

8) Project assessment module

9) Holistic appropriateness of PjBL-A-VARK and

10) Authentic presentation appropriateness of PjBL-A-VARK.

3.4.2 Step 2: recommendations and further suggestions that support learning style by analyzing on the theory of VARK.

3.5 Evaluating the appropriateness of conceptual framework learning style of group discussion by 10 computer experts that are experts in computer education, technology education, and Information technology field to acquire a developed apparatus for research.

3.6 Summarizing the learning style concern on rec-

ommendation from experts discussion by analyzing average $\bar{x}$ and standard deviation (S.D.) from question section no. 1 obtained and improving the classroom learning style refer to experts comment on question section no. 2.

4. Result and Discussion

4.1 The project-based learning by VARK's concept or known as PjBL-A-VARK-Model can be seen as shown on Figure 3 PjBL-A-VARK-Model

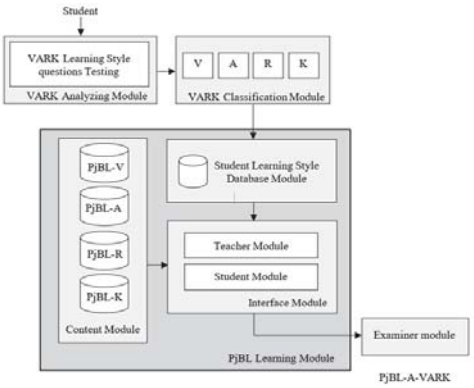

Figure 3: PjBL-A-VARK Model According to picture no.1 Project-based learning style from analyzing learners' aptitude with VARK concept found 3 sections that are Input, Process, and Output as the following detail.conceptual framework.

4.1.1 Input contains

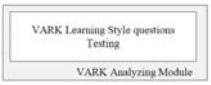

Figure 4: VARK Analyzing Module

4.1.1.1 VARK Analyzing Module in Thai Version with 16 questions with 4 multiple choices that inquire students learning aptitude in 4 types; V, A, R, and K

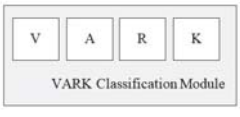

Figure 5: VARK Classification Module

4.1.1.2 VARK Classification Module set up student sample group then analyze from the question asked regarding their learning aptitude in terms of particular learning style as to authorize educator to categories students which learning style they belong; V, A, R, and K.

4.1.2 Process contains

Figure 6: Student Learning Style Database Module

4.1.2.1 Student Learning Style Database Module had been applied after treatment.

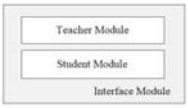

Figure 7: Interface Module

4.1.2.2 Interface Module is the key section that correlates the program, educator, learners, VARK Classification Module, content module, and project assessment module.

Figure 8: Content Module

4.1.2.3 PjBL Content Module compiles a relevant learning style to learners in V, A, R, and K. contains

1) Preparing before the project
2) Plan the project
3) Implementation of the project
4) Summary of the project implementation
5) Presenting the Project
6) Evaluation

4.1.3 Output contains

Figure 9: Examiner module

4.1.3.1 The Examiner module is to assess the project that produces from project-based learning by means of VARK.

Table 2. The result of PjBL-A-VARK Model assessment.

No	Evalution Items	$\bar{x}$	S.D.	No. of Experts		%
				Agree	Disagree	
1	Appropriateness of primary holistic conceptual framework	4.6	0.52	10	-	100
2	Appropriateness of VARK Analyzing Module	4.8	0.42	10	-	100
3	Appropriateness of VARK Classification Module	4.8	0.42	10	-	100
4	Appropriateness of Student Learning Style Database Module	4.6	0.52	10	-	100
5	Appropriateness of Interface Module	4.7	0.48	10	-	100
6	Appropriateness of Content Module	4.7	0.48	10	-	100
7	Appropriateness of Examiner Module	4.5	0.53	10	-	100
8	Appropriateness of PjBL-A-VARK's holistic	4.5	0.53	10	-	100
9	Appropriateness of PjBL-A-VARK's appliance	4.5	0.53	10	-	100

4.2 The result of 10 expert's assessment on analyzing learners' learning style of VARK by the procedure of group discussion had been stated in Table 2.

According to Table 2 as the result of 10 experts certified the project-based learning style from analyzing learners' aptitude with VARK as following

1) Appropriateness of primary holistic conceptual framework

2) Appropriateness of VARK Analyzing Module

3) Appropriateness of VARK Classification Module

4) Appropriateness of Student Learning Style Database Module

5) Appropriateness of Interface Module

6) Appropriateness of Content Module

7) Appropriateness of Examiner Module

8) Appropriateness of PjBL-A-VARK's holistic

9) Appropriateness of PjBL-A-VARK's appliance

Stated that this protocol obtained a high level of appropriateness at = 4.63 and S.D. = 0.49. Furthermore, the experts had endorsed the protocol framework at 100%.

5. Conclusions

5.1 The comments of experts to this protocol framework refer to VARK had been elicited to

1) Appropriateness of primary holistic conceptual framework obtained the highest level at = 4.6 and S.D. = 0.52

2) Appropriateness of VARK Analyzing Module obtained the highest level at = 4.8 and S.D. = 0.42

3) Appropriateness of VARK Classification Module obtained the highest level at = 4.8 and S.D. = 0.42 that logical linked with [4] cited their research that the empirical improvement by categorizing learners into their belong aptitude along with to manage a process and techniques in a particular learning style produced an efficient learning outcome.

4) Appropriateness of Student Learning Style Database Module obtained the highest level at = 4.6 and S.D. = 0.52

5) Appropriateness of Interface Module obtained the highest level at = 4.7 and S.D. = 0.48

6) Appropriateness of Content Module obtained the highest level at = 4.7 and S.D. = 0.48. As a result, this conclusion related to the concept of [11] announced that the project-based learning is the stratagem of learning by firsthand experience and conduct the total process until learners achieved and gain the knowledge as well as to be able to generate and declare their project.

7) Appropriateness of Examiner Module obtained the highest level at = 4.5 and S.D. = 0.53

8) Appropriateness of PjBL-A-VARK's holistic obtained the highest level at = 4.5 and S.D. = 0.53

9) Appropriateness of PjBL-A-VARKs appliance obtained the highest level at = 4.5 and S.D. = 0.53. These numbers guaranteed that this protocol is applicable to learners' learning aptitude and learners are motivated to learn by themselves as to conduct the project that needs a multiskilling to complete.

5.2 Summarizing the agreements of experts focus discussion on analyzing learning style to be suited to learner' aptitude through project-based relies on VARK or as known in learning style of PjBL-A-VARK Model, the result had been agreed among experts as following;

1) Input Module consisted of VARK Analyzing Module that examines the learning aptitude of learners from questionnaire and categorizing learners into their learning style as VARK Classification Module

2) Process Module is to conduct in project-based learning style that determined student Learning Style Database Module. This is to manage data collection of learners' learning style and asserts to subject and Content Module that content contains

2.1) Appropriateness of project-based to learners' learning aptitude as Visual

2.2) Appropriateness of project-based to learners' learning aptitude as Aural

2.3) Appropriateness of project-based to learners' learning aptitude as Read/Write

2.4) Appropriateness of project-based to learners' learning aptitude as Kinesthetic. The attendance of process appropriateness of project-based on learners' learning aptitude roles an interface module is a

key section that correlates the program, educator and learners.

3) Output module abides Examiner module which derived analysis results from learning based on the project-based learning model that facilitates project collection and assessment.

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