



# Interactive online learning development by learners' dominant aptitude result of VARK in computer-based learning and teaching course for computer education students

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## Abstract

The objectives of this research are to: 1) develop an interactive online learning by learners' dominant aptitude result of VARK in Computer-based Learning and Teaching Course for computer education students; 2) identify the effectiveness of interactive online learning media; 3) compare the learners' performance after receiving the treatment; and 4) find learners' satisfaction after receiving the treatment. The sample of this research is 26 3-year undergraduates of Nakhon Pathom Rajabhat University who enrolled in Computer-based Learning and Teaching Course in semester 2/2020, derived by cluster random sampling. The treatment of this research is the effectiveness of interactive online learning media development by learners' dominant aptitude result of VARK, and the research tools are a learning achievement test and a satisfaction test. The statistics used are percentage, average, standard deviation, and dependent t-test.

This research found that:

- 1) The media of the interactive online learning by learners' dominant aptitude result of VARK in Computer-based Learning and Teaching Course consists of 4 units: design of computer instruction, development of learning management on a cloud computing system, design of individual learning presented with a video demonstration, and filming and editing technique a video demonstration.
- 2) The effectiveness of media had been improved at E1/E2 or equal 81.41/80.22, which the maximum value is greater than the research standard at 80/80.
- 3) The learners' performance after learning with the interactive online learning by learners' dominant aptitude result of VARK is higher than that before learning at .05 level.
- 4) The learners' satisfaction after learning with the interactive online learning by learners' dominant aptitude result of VARK is at the highest satisfaction level.

**Keywords:** Interactive online learning, VARK, dominant aptitude result

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## 1. Introduction

Education is the fundamental foundation of a country's sustainable development from the National Education Act that stated that lecturers have a must to realize the significance of developing and improving children's performance and to enhance teaching potential. According to National Education Act 1999, Chapter 4, Education Management Section 24, Number 1 stated that the host of the learning management system will be responsible for educational concerns to craft a suitable content and activity that links to learners' interest and aptitude. This will be considered on individual differences [1]. It is also cited in National Education Act, Rajabhat University 2004, Chapter 1, General Chapter, Section 8, Number 5 that emphasize and strengthen lecturers; teaching potential to reach

the standard of the advanced profession [2]. To serve the standard of an advanced profession, the education personnel had to improve and develop their teaching potential. Moreover, the research had been conducted to improve their teaching performance and share this know-how with the public. Nowadays, there are many dynamic impacts on teaching methods. One of the most significant impacts is technology, 21<sup>st</sup> Century Skills [3], especially the characteristics that reflect the human basic educational foundation.

Individual learning performance will differentiate how they learn and how they implement their action [4]. The theory of VARK learning will assess the difference of learners' ability which can be specified into 4 groups: 1) Visual learners (Visual: V) who learn through visibility, 2) Aural learners (Aural: A) who learn through listening, 3.) Read and write learners (Read/Write: R) who learn through reading and writ-

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ing skills, and 4) Kinesthetic learners (Kinesthetic: K). Thus, the difference of learning style designs the media of learning as the researcher surveyed by applying the VARK Test in 16 items to 250 year 1–4 students majoring in computer education, Faculty of Science and Technology of Nakhon Pathom Rajabhat University, as shown in Figure 1.

Figure 1 showed a significant difference in learning aptitude between 4 groups (V, A, R, K) of year 1–4 students majoring in computer education, therefore the researcher created all 4 kinds of lessons.

Several influencing methods of developing education media both online and offline relate to learner extraction of the utmost proficiency. Roungrong [5] claimed that educational media or computer tasks are meant to utilize computer programs as an apparatus to allow self-learning in an attractive atmosphere; the program will be found in alphabets, letters, graphics, animation, and audio.

According to Tiantong [6], designing a computer program required a related aptitude of learners. Additionally, each awareness frame needs to acquire a direct interaction with learners such as question answering, and activity participation, not one-way communication.

Interactive online learning is designing a computer program to acquire a direct interaction with learners. This type of content responds to your explicit queries, staying genuinely interactive. Examples of such content include video games, high-fidelity simulations, immersive tutorials, problem sets, and so on. Interactive content will promote the experience of learning in real social ecologies or situations.

The Computer-Based Learning and Teaching is a compulsory course for the 3<sup>rd</sup> year students majoring in computer education, Faculty of Science and Technology of Nakhon Pathom Rajabhat University. This subject aimed to provide knowledge of learning society, learning in the information and communication technology era, information searching with computers, computer-based instrument invention for learning and teaching, and practice. As the tremendous scope course description, learners' understanding obstacle had been found. The revealed complication was the accumulated score throughout the semester. It implies that 1) the subject content is very intensive so that it requires to conduct an additional class for learners to gather all the contents; 2) the diversity of learners' education-varying from high school, non-formal education, and vocational certificate-produces a multi-perception of learning; 3) the primitive educational media is to convey content by documents and Power Points; and 4) the teaching time is limited.

To establish a niche from the authentic obstacles, the researcher considered that developing online education media by Learners' dominant aptitude with VARK in Computer-based Learning and Teaching Course for undergraduates will stress and accelerate

learners to achieve advanced proficiency. Besides, this developed media connects to technological aspects and it is fruitful for learners to access anytime and everywhere.

## 2. Objectives

This research has the following objectives:

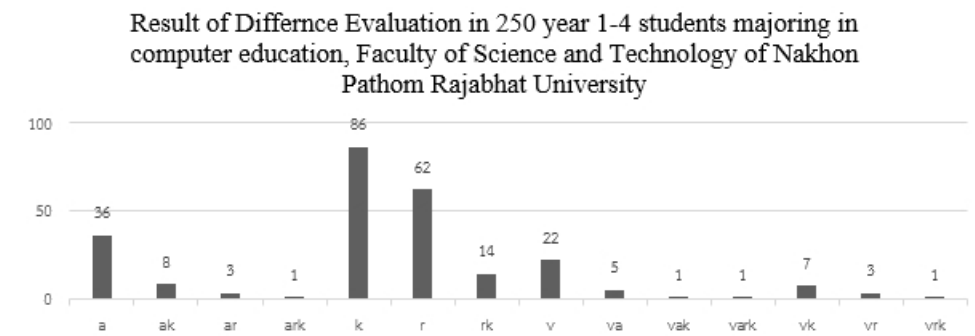
1. To develop the interactive online learning development by learners' dominant aptitude result of VARK in Computer-based Learning and Teaching Course for computer education students.
2. To find the effectiveness of interactive online learning media.
3. To compare the result of learners' performance after receiving the treatment.
4. To find learners' satisfaction after receiving the treatment.

## 3. Research Hypothesis

1. The interactive online learning development by learners' dominant aptitude result of VARK in Computer-based Learning and Teaching Course for computer education students should own an excellent level of quality of content and media production techniques.
2. The effectiveness of media should improve at research standard with E1/E2 formula of 80/80.
3. The learners' performance after interactive online learning media treatment should be higher than before at a statistical significance of .05.
4. The learners' satisfaction after, interactive online learning media treatment should be scaled at an excellent level.

## 4. Scope of the Research

1. The variables used in the research were:
  - 1.1 The independent variable is the developed interactive online media by learners' dominant aptitude of VARK in Computer-based Learning and Teaching Course for computer education students of the Faculty of Science and Technology.
  - 1.2 The dependent variables are quality of content and media production techniques, learners' performance, and learners' satisfaction
2. The population is 76 3<sup>rd</sup> year students majoring in computer education of Nakhon Pathom Rajabhat University who enrolled in the Computer-based Learning and Teaching Course in semester 2/2020.
3. The sample is 26 3<sup>rd</sup> students of class 61/13 of Nakhon Pathom Rajabhat University in semester 2/2020, derived by cluster random sampling.



**Figure 1:** The result of evaluating the students' differences assessment by VARK.

## 5. Research Methodology

The researcher had applied ADDIE MODEL [7] to develop an interactive online Learning by learners' dominant aptitude result of VARK in Computer-based Learning and Teaching Course for undergraduates of Nakhon Pathom Rajabhat University, by designing teaching based on system approach theory. This is widely accepted to combine with computer education lessons because of macro scope manageable and closed system. The research is divided into 5 phases as follows:

1. **Analysis:** The researcher considered several major important factors in developing the teaching media. The learners' characters in the population of 76 3<sup>rd</sup> year students majoring in computer education that would be treated with the VARK test were analyzed. The result revealed that 68% are kinesthetic learners. The next process was to evaluate the students' needs in the Computer-based Learning and Teaching Course. Then the researcher had divided the content into 4 learning units: computer instruction design, development of learning management on a cloud computing system, design of individual learning presentation with a video demonstration, and filming and editing technique for video demonstration. Finally, the lesson media development strategy decision, outline planning, and overall scope media settlement had been conducted.

2. **Design:** The researcher determined objectives of behavioral learning outcomes of the media; set up course syllabus; designed lesson plans according to the learners' dominant aptitude by learning style V, A, R and K; developed the interactive online learning content based on the V, A, R, and K learning style; and initiated an evaluation form for the quality of content and media production techniques, learners' performance, and learners' satisfaction.

3. **Development:** The researcher handled as mentioned above as follows: prepared 135 exam items with 45 behavioral objectives with an IOC (The Index of Item Objective Congruence) evaluation from 3 experts. All 135 items had been graded between 0.67–1.00, which meant they are qualified to use in this research. The researcher selected 2 items from each ob-

jective, totaling 90 items, and administered this exam to students that had been treated in this research. Next were 1) finding a confidence level by KR-20 which was 0.65 or 65%, and 2) finding a P exam difficulty that which was 0.03–0.88. There were 2 too difficult items and 3 too simple items. The researcher, therefore, eliminated 5 items so the applicable exam was 85 items. It was divided into 3 parts: 35 items for pre-test, 35 items for post-test, and 30 items for mid-test. After that, the researcher developed the interactive online learning media and 3 experts had been evaluated this developed media. The result of expert evaluation confirmed that content is at an excellent level with  $\bar{x} = 4.78$  and S.D. = 0.42, while media production technique is at an excellent level with  $\bar{x} = 4.85$  and S.D. = 0.36.

4. **Implementation:** The researcher had developed this media since the previous class of 23 4<sup>th</sup> year students majoring in computer education of Nakhon Pathom Rajabhat University; and reexamined the accuracy, difficulty, control of the interaction of teaching materials, and imported erroneous and modified to further the process.

5. **Evaluation:** The media of interactive online learning by learners' dominant aptitude result of VARK in the Computer-based Learning and Teaching Course had been applied, evaluated, and reexamined to the sample to acquire effectiveness of teaching and learning media, learners' performance, and learners' satisfaction after receiving the treatment.

## 6. Results

1. The interactive online learning development by learners' dominant aptitude result of VARK in the Computer-based Learning and Teaching Course for computer education students consisted 4 learning units: 1) computer instruction design, 2) development of learning management on a cloud computing system, 3) design of individual learning presentation with a video demonstration, and 4) filming and editing techniques for a video demonstration. The content was created into 4 lessons. There were 5 developing phases as follows:

- 1) Learners took a pre-test.

2) Learners participated in the interactive online learning development by learners' dominant aptitude result of VARK in the Computer-based Learning and Teaching Course.

3) Learners took a mid-test of each learning unit.

4) Learners took a post-test.

5) Learners responded to a satisfaction form after receiving the learners' dominant aptitude result of VARK treatment in the Computer-based Learning and Teaching Course.

2. The result of interactive online learning development by learners' dominant aptitude result of VARK on 26 3<sup>rd</sup> year students in the class of 61/13 in semester 2/2020 derived by cluster random sampling are reported as shown in Table 1.

**Table 1.** The results of developed online learning materials.

Test score	N	Total Score	$\bar{x}$	Effectiveness
Score of mid-test (E1)	26	30	24.42	81.41
Score of post-test (E2)	26	35	26.73	80.22

According to Table 1, the effectiveness of media had been improved at E1/E2 equal to 81.41/80.22, while is higher than the research standard at 80/80.

3. The comparison of the result of learners' performance after receiving treatment of the interactive online learning by learners' dominant aptitude result of VARK as shown in Table 2.

**Table 2.** The results of comparison of learners' performance before and after receiving treatment.

Test score	N	Total Score	$\bar{x}$	S.D.	t	sig
Pre-Test	26	35	12.54	3.83	16.58*	0.00
Post-Test	26	35	26.73	2.93		

\*\* With statistical significance at the level of .05,  $df = 25$

According to Table 2, the learners' performance after receiving treatment of the interactive online learning development by learners' dominant aptitude result of VARK is higher than before with a statistical significance level at .05.

4. The result of learners' satisfaction after receiving treatment of the interactive online learning development by learners' dominant aptitude result of VARK is shown in Table 3.

In Table 3, the result of learners' satisfaction after receiving treatment of interactive online learning development by learners' dominant aptitude result of VARK is at an excellent level ( $\bar{x} = 4.52$ , S.D. = 0.56).

**Table 3.** The results of students' satisfaction after receiving treatment of interactive online learning development by learners' dominant aptitude result of VARK.

Evaluation report	$\bar{x}$	S.D.	Opinion
Content and Continuity of Lesson	4.69	0.46	Highest
Visual Language and Audio Font and Color	4.54	0.56	Highest
Lesson Management	4.47	0.62	High
Test	4.42	0.63	High
<b>Total</b>	<b>4.43</b>	<b>0.50</b>	<b>High</b>
	<b>4.52</b>	<b>0.56</b>	<b>Highest</b>

## 7. Research Discussion

1. The expert evaluation of the developed interactive online learning in the Computer-based Learning and Teaching Course confirmed that the content ( $\bar{x} = 4.78$ , S.D. = 0.42) and the media production techniques ( $\bar{x} = 4.85$ , S.D. = 0.36) are at an excellent level, which is greater than research standard. This is the results from the researcher's developing process before conducting this research, as well as analyzing importance and necessity elements to accomplish the research objective and to be capable of an authentic class.

2. After learning with the developed interactive online learning, the performance of 26 3<sup>rd</sup> year students of class 61/13 in the Computer-based Learning and Teaching Course has been improved with E1 is higher than E2 at 81.41/80.22, which is greater than the research standard with E1/E2 formula at 80/80. This is because learners were asked to take the test immediately after finishing each lesson. To develop the teaching media, the researcher designed the content to respond to the objectives. It is in line with the research of Srichailard & Sinthanakul [8] on "The Development of Web-based Instruction on A Learning Management System for A Competency-Based Lesson Plan with Blended Learning and MIAP Process for A Computer Graphics and Animation Course" that performs at 84.89/82.15 and with the hypothesis appointed the web performance higher than standard at 80/80.

3. The learners' performance after receiving treatment ( $\bar{x} = 26.73$ , S.D. = 2.93) is higher than of before ( $\bar{x} = 12.54$ , S.D. = 3.83) with statistical significance level at .05. Thus, the result of performance attains the hypothesis established. This is because the researcher had analyzed the significant factors that affected the development of learning media for example learners' aptitude analysis, managed and developed the content to cope with established objectives, and analyzed the content of teaching media that yielded more efficient and suitable for learners. It is in line with the research of Siksen, Phumeechanya, and Laisema [9], "The Development of System and Collaborative Learning Activities in Ubiquitous Learning Environments Using Computer Tablet with QR Code", which the samples'

learning achievement through the developed system and activities was higher than the pretest at the .05 level of significance.”

4. The learners’ satisfaction after receiving treatment is at an excellent level ( $\bar{x} = 4.52$ , S.D. = 0.56), which is greater than the set hypothesis. Learners’ eagerness and satisfaction in the content and flow of content possess is average at 4.69. It is correlated with the research of Chawanapaisarn, Varasunun, & Arunyanart [10], “The Development of Mathematics Achievement in Pythagorean Theorem by integrated STEM education of students in Mathayomsukasa 2 of Banglane Wittaya School.”, which stated that students’ satisfaction with STEM learning management is at a high level.

## 8. Recommendations for Further Research

Recommendations for applying the research results were as follows:

1.1 Lecturers must survey and analyze learners’ dominant aptitude before conducting any lesson in class.

1.2 Lecturers must clearly explain the process of taking pre-, mid-, and post-test. So, the actual score will be gained from a certain learning environment.

1.3 According to this research, learners possessed better performance. However, partial of these lessons might have room to reexamine and validate learners’ potential based on learning by learners’ dominant aptitude result of VARK in of the Computer-based

Learning and Teaching Course for undergraduates of Nakhon Pathom Rajabhat University.

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