

**TO DEVELOP AN UBIQUITOUS LEARNING ENVIRONMENT MODEL TO
INCREASE THE PROBLEM SOLVING THINKING SKILLS IN VOCATIONAL
EDUCATION STUDENTS**

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Abstract

This research aims to synthesize and develop an Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education Students and; evaluate the model developed. The sample group used in the study were consisted of 9 experts divided into 3 areas; U-Learning, Problem Solving Thinking Skills and Information Technology. All were selected purposively improvement the conceptual model and 5 experts for approved the conceptual model. Data were analyzed by arithmetic mean and standard deviation. The research findings were as followed; the development of the Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education students consists of three components as following Principles, which the principles are the basic concepts to develop a model curriculum, and Objectives, which of this Ubiquitous Learning Environment model is to increase the Problem Solving Thinking Skills; and Instructional process. The instructional process consists of two stages; the first stage is the preparation stage, and the second stage is the learning stage. The evaluation of learning is to measure the problem solving thinking skills development by authentic assessment. The development of the Ubiquitous Learning Environment model increases the Problem Solving Thinking Skills in Vocational Education students to very high proficiency level.

Keywords: Ubiquitous Learning Environment, Problem-Solving Thinking Skills

1. INTRODUCTION

Researchers conducted a study and review of documentaries concerning Vocational Education’s situation and found out why enterprises in the locality don’t cooperate seriously with internship/apprenticeship agreement with students. Students need to go outside their respective provinces to undergo training at their own expense. The reason is because the establishments think that students lack discipline, diligence, patience and skills to solve problems.

The researchers verified the problem by asking the personal opinion of various staff in establishments and the outcome of the research is consisted with the findings from the documentaries. The problem about lack of problem solving thinking skills continues to be a problem. The researcher studied and analyzed the causes of the problem by reviewing technical documents. Research, both at home and abroad found that the main cause is that teachers often use the regular classroom teaching methods then assess learners using a test that does not correspond to the real situation that students will face in their working life. This make the students not motivated to learn and lack Problem Solving, Thinking Skills.

Students of vocational mostly are those with relatively low academic achievement. Students rarely bothered to learn as much as they should. In addition, students have some difficulty to follow the rapid change of technology.

2. MATERIALS AND METHODS

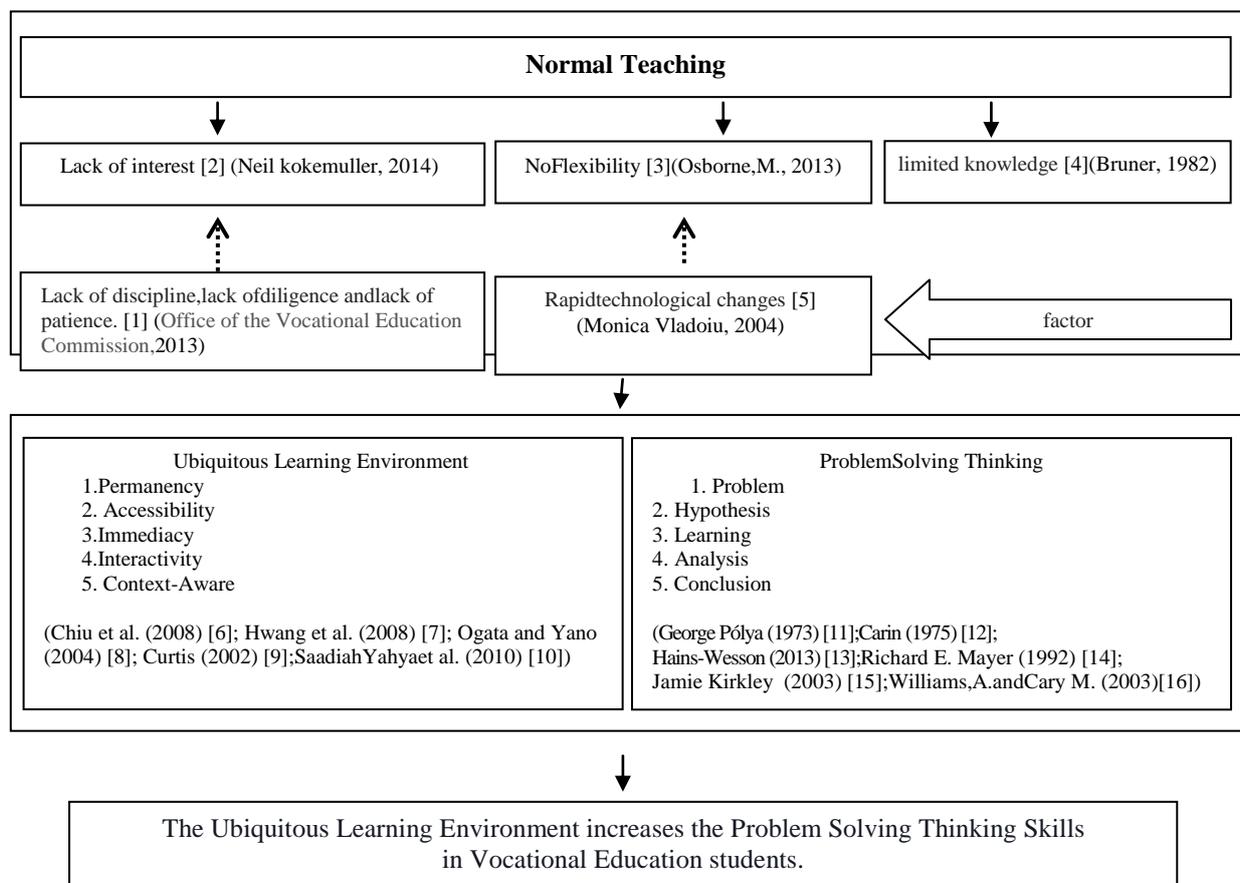


Figure 1. Conceptual Framework

Research Instruments.

1. A questionnaire for the Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education students. Present the model to the 9 experts for consideration by in-depth interview.
2. A questionnaire of needs assessment for the Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education students. Present the model to the 5 experts for evaluate the model's suitability.

The conceptual framework of this research is to integrate the design of learning of Ubiquitous Learning Environment and the Problem Solving Thinking Skills, as shown in Figure 1.

The instructional process consists of two stages.

The First Phase

Synthesize and develop the Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education Students. The researchers conducted the study and documents review Divided 5 Steps.

1. Analyze and synthesize former researches relevant to the elements of
 - 1.1 Analyze and synthesize former researches relevant to the elements of
 - 1.1.1 ubiquitous learning environment
 - 1.1.2 problem-solving skills
 - 1.1.3 Create the materials for research
 - 1.1.4 Study former researches
 - 1.2 Define Conceptual Frame Work
 - 1.3 Collect data by in-depth interview.
2. Select experts

The sample group used in the study were consisted of 9 experts divided into 3 areas; U-Learning, Problem Solving Thinking Skills and Information Technology. All were selected purposively improvement the conceptual model and 5 experts for approved the conceptual model. Data were analyzed by arithmetic mean and standard deviation.

3. Create Instruments by in-depth interview.
4. Collect data
 - 4.1 Study about learning process by interviewing the instructors in order to synthesize the data of learning activity; and by interviewing the students about their ability to use ICT tools for learning, their learning and cognitive style.
 - 4.2 Design the Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education Students.
 - 4.3 Present the model to the advisors for consideration and revision.
 - 4.4 Present the model to the 9 experts for consideration by in-depth interview.
 - 4.5 Present the model to the 5 experts for confirmation.
5. Final data to create model.

The Second Phase

This phase was to evaluating the Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education students

- 5.1 Present the designed model to the 5 experts.
- 5.2 The model is modified according to the experts' suggestions.
- 5.3 After modification, presenting the model in the form of diagram with report.
- 5.4 Analyze the results of evaluation of the model by mean (\bar{x}) and standard deviation ($S.D.$) consisting of 5 criteria for evaluation according to the idea of Likert scale.

The average of 4.51 - 5.00 = Very High
The average of 3.51 - 4.50 = High
The average of 2.51 - 3.50 = Moderate
The average of 1.51 - 2.50 = Low
The average of 1.00 - 1.50 = Very Low
The acceptable average was omitted of 3.51.

3. RESULTS

Research findings show that:

A. Ubiquitous Learning Environment model increases the Problem Solving Thinking Skills in Vocational Education students. The learning environment in the Ubiquitous Learning Environment model increases the Problem Solving Thinking Skills in Vocational Education students. It consists of seven modules, namely

- 1) Teacher Module.
- 2) Students Module.
- 3) Ubiquitous Learning Environment Module.
- 4) Resources Module.
- 5) Communication Module
- 6) Learning Module.
- 7) Evaluation Module.

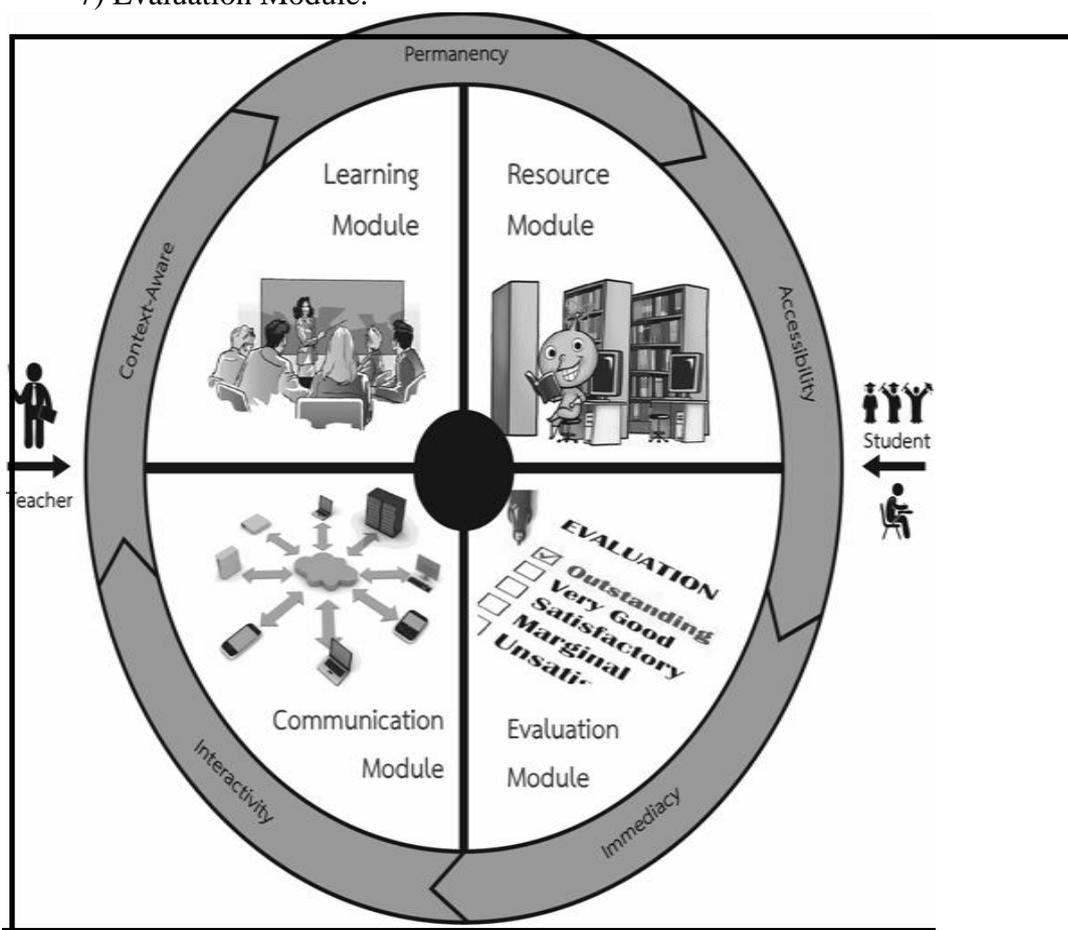


Figure 2. The Ubiquitous Learning Environment model to increase the Problem Solving Thinking Skills in Vocational Education students Model.

B. Evaluation of model feasibility

Evaluation of model feasibility was conducted by five experts and the results thereof were represented in Table 1-4.

Table 1. Evaluation of Principles and basic concepts to develop the model.

Evaluation Lists	Results		Appropriateness
	\bar{x}	S.D.	
1. Provide students with the opportunity to bring new knowledge.	5.00	0.00	Very High
2. Use authentic assessment.	5.00	0.00	Very High
3. Students to create new knowledge.	4.80	0.45	Very High
4. Student analysis.	4.80	0.45	Very High
5. The students learn in different conditions	4.80	0.45	Very High
6. The students are doing work using differing assumptions.	4.60	0.55	Very High
7. Students' cognitive equilibrium.	4.20	0.84	High
Summary	4.74	0.39	Very High

Table 1: The experts found that the overall elements of this instructional model were suitable at Very high level (\bar{x} = 4.74, S.D. = 0.39). This means the elements and the process of this instructional model were suitable to be appropriate to bring to the design model of learning.

Table 2. Evaluation of The Elements of model

Evaluation Lists	Results		Appropriateness
	\bar{x}	S.D.	
1. Communications	4.90	0.22	Very High
2. Evaluation	4.77	0.39	Very High
3. The instructors	4.71	0.51	Very High
4. Ubiquitous Learning Environment	4.55	0.70	Very High
5. The learners	4.46	0.64	High
6. Learning resources	4.40	0.91	High
Summary	4.63	0.56	Very High

Table 2: The experts found that the elements of model was suitable at very high level (\bar{x} = 4.63, S.D. = 0.56). It means elements of model of learning are conducive for learning.

Table 3. Evaluation of Learning Stage.

Evaluation Lists	Results		Appropriateness
	\bar{x}	S.D.	
1. Analysis Step	4.78	0.39	Very High
2. Learning Step	4.76	0.43	Very High
3. Problem Step	4.64	0.55	Very High
4. Hypothesis Step	4.64	0.55	Very High
5. Conclusion Step	4.58	0.61	Very High
Summary	4.68	0.51	Very High

Table 3: The experts found that the learning stage was suitable at very high level (\bar{x} = 4.68, S.D. =0.51). This means the teaching process is suitable to be defined as activities that promote the teaching of thinking skills to solve problems.

Table 4. The evaluation results of the review model of the curriculum as a whole.

Evaluation Lists	Results		Appropriateness
	\bar{x}	S.D.	
1. Consistency and relevance during the process of learning each step.	4.80	0.45	Very High
2. Learn the 5-step process can lead to the purpose of research.	4.80	0.45	Very High
3. The appropriateness of the management model to learn about the context of vocational education.	4.80	0.45	Very High
4. The appropriateness of the management model of learning with the students' courses.	4.80	0.45	Very High
5. The possibility of bringing this model of learning in vocational education.	4.80	0.45	Very High
6. Innovative learning to develop the ability to think of a solution. For vocational education.	4.80	0.45	Very High
7. The clarity of the diagram presented in the form of learning.	4.60	0.55	Very High
8. Learn the five steps to comply with the framework for research.	4.60	0.55	Very High
Summary	4.75	0.47	Very High

Table 4: The experts found that the review model of the curriculum as a whole was suitable at very high level (\bar{x} = 4.75, S.D. = 0.47). This means the model is suitable for increasing the problem solving thinking skills and it is really practical.

4. CONCLUSIONS AND DISCUSSION

According to the results of this research, the discussion is as follows:

1. According to the evaluation, the overall elements of this instructional model were suitable at a high level. This is because the development of this model applied the concepts of Ubiquitous Learning Environment. This corresponds to the research of Bruner, J.S. [4] who found that to create interesting learning. Flexible context that limited knowledge exists only in the classroom.
2. According to the evaluation, it is found that the elements of the model were suitable at a very high level. It is important to make the learners well learning is appropriate to be set to the environment for learning.
3. According to the evaluation, the learning stage was suitable at a very high level. This will help increase the problem solving thinking skills. This is consistent with research of Hains-Wesson. [13] Found that the adoption process solutions. Instruction can be used to promote solutions and achievement high learning as well.
4. According to the evaluation, the review of the model curriculum as a whole was suitable at a high level.

This model can increase the problem solving thinking skills and use u-learning model. Because of today's technology with the availability of devices such

astablets,smartphones,etc.canmakethe learningenvironmentbased on the modeldevelopedforreal.

ACKNOWLEDGEMENTS

I would like to thank all the people who contributed in some way to the work described in this thesis. First and foremost, I thank my academic advisors, Dr. Kanok Samawattana and Dr. Sanit Teemueangsai for their support and advice. I'm thankful also to Ms. Marilou Ranay and Ms. Roselyn Cagampang for helping me in my report.

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