13th International Educational Technology Conference

Web-based Instruction Model under Constructionism for Critical Thinking Development

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Abstract

The purposes of this research were to firstly construct the web-based Instruction model using the constructionism approach for critical thinking development of undergraduate students. Secondly, to compare critical thinking score between before and after learning via the web-based instruction and lastly to study the student satisfaction toward the web-based instruction that constructed by researcher. Results of the research were shown as follows: the web-based Instruction model using for critical thinking development the constructionism approach should include ten phases: 1) critical preparation, 2) review the issue, 3) elaborate learning, 4) arranging data, 5) thinking and diagnosing, 6) interpersonal communication, 7) verify the solution, 8) implementation, 9) transfer of innovations, and 10) yielding evaluation. It was found that after learning from the web-based Instruction the student’s critical thinking score was higher than before learning at .05 level of significance. The student’s satisfaction toward the web-based instruction were at the high level.

Keywords: Web-based Instruction Model, Constructionism, Critical Thinking.

Nomenclature

A Web-based Instruction Model
B Constructionism
C Critical Thinking

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Introduction

The critical thinking is an important element of all professional fields especially in the field of education and student’s development. In order to achieve the outcomes set out in the school curriculum framework, all the students should obtain the critical thinking skills. Critical thinking is a process of thinking carefully based on the use of knowledge, reflection, reasoning, and experiences in the interpretation, analysis, and rational evaluation. Integration of technology into a lifelong learning process according to constructionism model is one of the teaching and learning method, which requires the students to create knowledge by themselves and complete the tasks. The method focuses on learning by doing to create projects, works and results according to the interest of the learners by using media and technology on a computer network based learning program. The learners will understand themselves, understand the importance of their endeavour and practice on patience and problem solving. The media suitable for this method is one that correlates to the subject matter and can be self-taught. It can be seen that web-based learning is gaining popularity in today’s education system through its ability to bridge the knowledge gap between students, especially on the higher education (Tongdeelerd, 2004). Thailand’s education system is moving towards a network learning system and the web-based instruction is a teaching and learning method that has been supported by the attributes and resources of the internet. It means that teaching and learning methods on the internet can support the constructionism model. The learners must have the ability to push themselves for self-improvement, control their learning environment and gain support for learning material (Bumrungcheep, 2012). Also, the previous research concluded that web-based instruction with mixed media can help the learner develop and create their own knowledge base, with the learner being the central focus of critical thinking process (Mai, 2005). Therefore, the author chose to apply the web-based instruction model to develop her teaching method, focusing on constructionism and critical thinking.

Objectives

The objectives of this research were to: 1) to construct the Web-based Instruction model using the constructionism approach for critical thinking development of undergraduate students 2) to compare critical thinking score between before and after learning via the web-based instruction and 3) to study the student satisfaction toward the web-based instruction that constructed by researcher.

Methodology

1. Population and Sample of Student: The population was 190 students in 2nd semester, 2012 academic year, Faculty of Education, Kasetsart University. The sample of this experimental research was 28 students selected by simple random sampling.

2. Content: The 28 students who enrolled in the course 01173112 Personal and Community Health were selected as the subjects in this research study. This research experiment took 7 weeks and each week the students learn the contents by using the constructionism cycle on the internet and study the materials as planned. In each week, the students will choose one health problem issue that they were interested in, and study through the web-based instruction designed by the researcher. Before the experimental started on the first week and after the experimental was ended on the 7th week, the students were given the critical thinking test.
3. Research Instruments

3.1 Web-Based Instruction under Constructionism for Critical Thinking Development
3.2 Web-Based Instruction Assessments suitability
3.3 Satisfaction questionnaire
3.4 Lesson plan
3.5 Cornell Critical Thinking Test (Level Z) (Ennis, R.H. and Millman, J. 1985)

The Cornell Critical Thinking Test was developed and translated into Thai language by Asst. Prof. Dr. Panita Wannapirun. It took 50 minutes for 52 questions, 6 skills in critical thinking test (Ennis, 1985) as follows: 1) interpretation 2) analysis 3) evaluation 4) inference 5) explanation and 6) self-regulation.

4. Data collection and analysis: Data were analyzed by mean, standard deviation, and Dependent Samples t-test.

The research focus was to develop the Web-Based Instruction model. This research experiments were designed into three phases to achieve the objectives as follows.

**Phase 1**: Literature review related research studies in the current state in order to find out a way to develop a new form of teaching and learning method. The conclusion of the literature review was for creating a prototype method of the Web-Based Instruction to develop critical thinking skills and then use for discussion among ten experts in a focus group.

**Phase 2**: Developing Web-Based Instruction under model to develop critical thinking skills (Rampai N. and Sopeerak S. 2011).

**Phase 3**: Evaluating Web-Based Instruction Model under Constructionism for Critical Thinking Development on the subjects. The research experiment was the One Group Pretest-Posttest Design.

**Analysis and discussion**

The analysis, synthesis and comparison of the teaching curriculum according to the constructionism method for developing critical thinking was done through a focus group between ten experts. The conclusion of activities can be concluded as follows to be a model for web-based instruction model under constructionism for critical thinking.
Figure 1 CREATIVITY CT Model

Figure 2 Critical preparation
Figure 3 Review the issue

Figure 4 Elaborate learning
Figure 5 Arranging data

Figure 6 Thinking and diagnosing
Figure 7 Interpersonal communication

Figure 8 Verify the solution
**Figure 9** Implementation

**Figure 10** Transfer of innovations
Table 1: Depicts the comparison between critical thinking test results before and after going through the web-based instruction model under constructionism for critical thinking. It was found that students achieved an average pre-test score of 35.93 and a post test score of 42.36 from a total of 52 points. Hence, it was found that after learning from the web-based instructions, the students’ critical thinking score was higher than before learning at .05 level of significance.

The result of this study for the satisfaction of the students towards the web-based instructions found that the students using the new type of learning method have a satisfaction score of $\bar{X} = 4.91$. The student’s satisfaction toward the Web-based Instruction was at the high level.

Conclusions and recommendation

The process, activities and method of learning that were developed can be improved the critical thinking of the students and can be applied in real teaching environment. The testing and evaluation for each learning program can be done when the learning activities for each process was completed such as assignment completion, activities participation level, class participation during brain storm process and evaluation of six dimension of

Learning method developed through the web-based instruction under constructionism for critical thinking development has created a web-based learning system that can help the students challenge themselves, satisfy their own need for realization of their learning potential and ultimately improve the learning process of the students.

Acknowledgement
This research was supported by Faculty of Education, Kasetsart University, Thailand.

References

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