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ASSESSMENT OF STUDENTS' ABILITIES ON THE BASIS OF INTEGRATED DEVELOPMENT OF ANALYTICAL ACTIVITY

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Annotation

This study aimed to examine the analytical thinking skills development through learning management plans. Research and development design coupled with case study method was employed to Thai Basic Education University students from a public university in Khon Kaen province, Thailand. There were two groups of samples consisted of 45 teacher educators and 1,575 Basic Education university students. The quantitative finding indicated that teacher educators' analytical thinking score was 36.54 out of the full score as 45, higher than defined criterion of 70 percent while focus group interviews showed positive feedback including analytical thinking knowledge and practices in handling learning management.

Key words: Analytical thinking, university students, learning management plans

ОЦЕНКА ВОЗМОЖНОСТЕЙ СТУДЕНТОВ НА ОСНОВЕ КОМПЛЕКСНОГО РАЗВИТИЯ АНАЛИТИЧЕСКОЙ ДЕЯТЕЛЬНОСТИ

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Аннотация

Это исследование было направлено на изучение развития навыков аналитического мышления с помощью планов управления обучением. Дизайн исследований и разработок в сочетании с методом тематического исследования был применен к студентам Тайского университета базового образования из государственного университета в провинции Кхон Каен, Таиланд. Было две группы выборки, состоящие из 45 педагогов-педагогов и 1575 студентов университетов с базовым образованием. Количественный результат показал, что аналитическое мышление педагогов-педагогов составило 36,54 из общего балла, равного 45, что выше определенного критерия в 70 процентов, в то время как интервью с фокус-группами показали

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положительную обратную связь, включая знания аналитического мышления и практики управления обучением.

Ключевые слова: Аналитическое мышление, студенты вузов, планы управления обучением.

Introduction

Analytical thinking skills are critical in today advanced technology work place, particularly in the teaching profession. This is because analytical thinking skills help teachers or teacher trainees to gather information, articulate, visualize and solve complex problems in the rapid information age of changing trend world. Hence it becomes a necessity for every country to develop its future human resource to be able to think analytically, critically, know how to solve problems, acquire creative and initiative thinking skills, know how to acquire knowledge from multiple sources, learn and construct bodies of knowledge by themselves, adapt themselves in time for the ever-changing situations and be prepared to confront the challenge of the world. University students are expected to develop analytical thinking mind and they must not only understand what they read but also pick it up apart, question it, evaluate it and assess it. Analytical thinking involves questioning and reflecting upon ideas.[1]. University students must look deeper into what they are learning and think about its relation to the bigger picture. They must be able to present their critique and a structured, clear, and well-reasoned and supported way. It is essential to develop teachers' analytical thinking skills so that they are able to integrate analytical thinking skills in their learning management. Even teachers have gone through comprehensive training, there will be many times where teachers will put on the spot to think analytically and the right or wrong answer could make a difference with regard to their upward mobility within the schools. To what extent teachers are able to incorporate training of analytical thinking skills, thinking process, management, and situation confrontation in their learning management so that students learn from real experiences is still questionable. In order to develop analytical thinking skills among the learners in current rapid changes, the world is extremely vital because learners have to be prepared by teachers to face it. As a result, Basic Education pre-service teachers have to be appropriately equipped to practice the integration of analytical thinking skills in their learning management as

they are going to become Basic Education teachers in the future. Pre-service teacher trainees or Basic Education university students have to be trained accordingly so that they will be responsible for developing their students with strong analytical thinking skills to live in the 21st Century. Thailand Basic Education Core Curriculum (2008) stipulated the significant competencies of students which mainly cover thinking competency especially analytical thinking, synthetic thinking, creative thinking, which will lead to the construction of bodies of knowledge or information, or to appropriate decision for themselves and the society (Ministry of Education, 2008). The importance analytical thinking skill-oriented instruction has been highlighted in National Education Act of 1999 and the amendment versions 2002 and 2010 (Ministry of Education, 2015) whereby teachers are required to incorporate analytical thinking process, situation confrontation practices, and application of knowledge in prevention and solution of problems in students' learning process.[2]. As a consequence, the capability of teachers to instill thinking skill in their teaching processes is extremely vital in order to fulfill the Thailand educational goal. Although some research studies had been carried out on students' analytical thinking for the past decades, findings revealed that Thai students' analytical thinking still failed to optimally be developed and seemed to reach only at certain limitation. The evaluation of students' analytical thinking competence indicated that the achievement level requires improvement and is not satisfied.

Researcher utilizes Benjamin Bloom and his associates' discussions about analytical thinking as the theoretical foundation of this study. Their taxonomy for information processing skills (Bloom, 1956) is one of most widely cited sources for educational practitioners when it comes to teaching and assessing higher order thinking skills like analytical thinking skills. Bloom's taxonomy is hierarchical, with 'comprehension' at the bottom and 'evaluation' at the top. The three highest levels (analysis, synthesis, and evaluation) are frequently said to represent analytical thinking. The benefit of this Bloom's educational approach is that it is based on years of classroom experience and observations of student learning (Sternberg, 1986). However, some have noted that the educational approach is limited in its vagueness. Concepts within the taxonomy lack the clarity necessary to guide instruction and assessment in a useful way. Furthermore, the frameworks developed in education have not been tested as vigorously as those developed within philosophy or psychology (Sternberg, 1986). On this line of reasoning, researcher considers

analytical thinking abilities according to past researchers of analytical thinking typically agree on the specific abilities encompassed by the definition, which includes:

- Analyzing argument, claims, or evidence (Ennis, 1985; Facione, 1990; Halpern, 1998; Paul, 1992).
- Making inferences using inductive or deductive reasoning (Ennis, 1985; Facione, 1990; Paul, 1992; Willingham, 2007).
- Judging or evaluating (Case, 2005; Ennis, 1985; Facione, 1990; Lipman, 1988; Tindal & Nolet, 1995), and
- Making decisions or solving problems (Ennis, 1985; Halpern, 1998; Willingham, 2007).[3]. Other abilities or behaviors identified as relevant to analytical thinking include asking and answering questions for clarification (Ennis, 1985); defining terms (Ennis, 1985); identifying assumptions (Ennis, 1985; Paul, 1992); interpreting and explaining (Facione, 1990); reasoning verbally, especially in relation to concepts of likelihood and uncertainty (Halpern, 1998); predicting (Tindal & Nolet, 1995), and seeing both sides of an issue (Willingham, 2007). According to Bloom, Engelhart, Furst, Hill, and Krathwohl (1979), the analysis is the major component of analytical thinking skills in this study. Therefore analytical thinking skills have to be operationally defined into three types of analytical thinking namely analysis of elements, analysis of relationships, and analysis of organizational principles. At the first level, Basic Education university students are trained to break down the material into its constituent parts. This is followed by identification and classification process of the elements of the original material. At the second level, Basic Education university students are required to make explicit reports on the relationships among the elements, thus to determine their connections and interactions. The final level involves recognition of the organizational principles, the arrangement and structure, which hold together the learning process as a whole. Analysis of elements Most of the learning management may be conceived as composed of a large number of elements. Some of these elements are explicitly stated or contained in the learning processes hence these elements can be recognized and classified easily and relatively.[4]. However, there are also high possibilities that learners have difficulty in recognizing the elements which are taught and identified by teachers. Learners may be unable to recognize the conclusions drawn by their teachers due to the analysis of elements are not explicitly stated by teachers. There are still many other

elements during the learning management which are not clearly communicated, labeled or identified by the teachers that may cause the students cannot do their thinking appropriately. On top of that, many of these elements may be of paramount importance in determining the nature of learning management until the stage that learners cannot detect and have difficulty in fully comprehending or evaluating the whole learning. Thus there are some unstated assumptions being made by teachers which can only infer from an analysis of a series of statements within learning materials. It is also the value to the learner if he or she can detect the nature and function of particular statements including statements of fact, statements of value, and statements of content in the learning management. The following are the analytical thinking skills related to an analysis of elements which should be considered to integrate into learning objectives.

- Ability to recognize unstated assumptions.
- Skill in distinguishing facts from hypotheses. Ability to distinguish factual from normative statements.
- Skill in identifying motives and in discriminating between mechanisms of behavior with reference to individuals and groups.
- Ability to distinguish a conclusion from statements which support it. Analysis of relationships Having identified the different elements within a learning management, learner still has to have the ability to determine some of the major relationships among the various parts of the learning process. Learners may need to determine the relationship of the hypotheses to the evidence and in turn the relationship between the conclusions and the hypotheses as well as the evidence. This type of analysis includes the relationship between different kinds of evidence presented. In addition, analysis of relationships can be quite difficult when the essential parts of learning are contradicted between each other, which in turn hinder learners to expand, develop, or support their learning progress. Most of this type of analysis may deal with the consistency of part to part, or element to element or the relevance of elements or parts to the central idea. The following are the analytical thinking skills related to an analysis of relationships which should be considered to integrate into learning objectives.
- Skills in comprehending the interrelationships among the ideas in a passage.
- Ability to recognize what particulars are relevant to the validation of a judgment.

- Ability to recognize which facts or assumptions are essential to the main learning or to the argument in support of the learning.
- Ability to check the consistency of hypotheses with given information and assumption.
- Ability to distinguish cause-and-effect relationships from other sequential relationships.
- Ability to analyze the relations of statements in an argument, to distinguish relevant from irrelevant statements.
- Ability to detect logical fallacies in arguments.
- Ability to recognize the causal relations and the importance details from historical account. Analysis of organizational principles.[5]. The most complex and difficult level of analytical thinking is analyzing the structure and organization of the learning process. It is rarely teachers will explicitly point out the organizational principles they have used frequently they may not be aware of the principles they have utilized. Thus their purpose, point of view, attitude or general conception of the learning process may be discerned in their teaching and learners may be unable to fully comprehend or evaluate the learning until they have determined them. Similarly, some teachers select some form, pattern or structure to organize their arguments, evidence or other elements. This type of analyzes underlying organizational qualities to assist in the comprehension as well as evaluation of the entire learning process. Frequently it is impossible to make an evaluation until the analytical thinking process has been done. The following are the analytical thinking skills related to an analysis of organizational principles which should be considered to integrate into learning objectives.
- Ability to analyze, in a particular work of art, the relation of the materials and means of production to the ‘elements’ and to the ‘organization’.
- Ability to recognize form and pattern in literacy or artistic works as a means of understanding their meaning.
- Ability to infer the teacher’s purpose, the point of view or traits of thought and feeling as exhibited in his or her teaching.
- Ability to infer the teacher’s concept of science, philosophy, history, or his or her art as exemplified in his or her practice.

- Ability to see the techniques used in persuasive materials, such as advertising, propaganda, etc.
- Ability to recognize the point of view or bias of a teacher in a historical account.

The major aim of this study was to investigate the analytical thinking skills in learning management for Basic Education students. Researchers seek to investigate: Researchers utilized Research and Development design to develop analytical thinking of Thai Basic Education university students from a public university located in Khon Kaen province, Thailand. Researcher aimed to develop pre-service teachers' competency to emphasize analytical thinking in their learning management. Case study research design was utilized. Case study research intensively investigates a small set of cases, focusing on many details within each case and context.[6]. In short, it examines both details within each case's internal features as well as the surrounding situations. Case study enables researchers to link the micro level that is undergraduate program pre-service university students to the macro level, or large-scale structures and processes. The logic of the case study is to demonstrate a causal argument about how general social forces shape and produce results in particular setting. The research and development procedure was used as a guideline for the study and conducted in two phases. The first phase was to develop educators' learning management through training. Researchers worked with the sample group to identify problems and to find effective ways of solving them. Several meetings were organized in order to make the objectives of the project clear to the participants who are teacher educators and to discuss a training workshop which emphasizes on analytical thinking learning management. This is followed by evaluation of the results of the development.

Results of this study are presented in accordance with the research aims that are indicated above. The initial finding is the result of analytical thinking test of teacher educators and evaluation of learning management plans after training. This is followed by the Basic Education university students' achievement test on analytical thinking skills according to defined criteria. Finally, results of feedback from teacher educators after implementing learning management. Results were organized according to quantitative and qualitative methods. Quantitative results The result indicates that teacher educators' analytical thinking score was 36.54 out of the full score as 45 (standard deviation = 3.68) after training.[7]. This shows that teacher educators' analytical thinking skills were higher than the defined criterion of 70

percent. Besides, the result of evaluation of their learning management plans which emphasized analytical thinking skill after training was at 'good' and 'very good' quality level. Finally, the results were derived from the fact that learning management with integration of analytical thinking activities is learner-centered. Students are able to do the activities and construct their own knowledge to practice thinking analytically according to the given situations, stories or events. Students learned the content of the course and at the same time practiced analytical thinking.

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