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Theoretical and Practical Studies Relating to Learning Management to Develop Analytical Thinking

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Abstract

The intention of National Educational Act 1999, and the Revised Edition (the Second Issue) 2002, was to develop Thai Society as Wisdom and Learning Society, and create the opportunity for every Thai people to be able to think, do, be reasonable, have life long learning. In addition, the guidelines of learning process management were specified that the teacher should organize learning content and activity for students to practice their skill, thinking process, management, situational coping, and knowledge application in order to prevent and solve the problems. Besides, core curriculum of Basic Education 2008 specified the studentsí competency in analytical thinking which would lead to construction on body of knowledge or information technology, making decision for themselves and society appropriately. As a result, both of Thailand and foreign countries were interested in the studentsí analytical thinking. There were various research studies in learning management model for developing the analytical thinking. Furthermore, there was a promotion for teachers in learning manage for developing the studentsí analytical thinking. There were many guidelines of learning management for developing the analytical thinking including: 1) the selection of different teaching models, teaching techniques or methods on learning management for developing the studentsí analytical thinking such as the 4 MAT Learning Model, Inquiry Cycle Model (5Es), Student-Centered CIPPA Model etc, 2) the usage of teaching model constructed for using in learning management to develop the analytical thinking directly such as the learning management model focusing on the analytical thinking. Therefore, the teachers should select the teaching models from various ones to be used for learning management in order to efficiently develop the studentsí analytical thinking.

Keywords: analytical thinking, learning management model, basic education

Introduction

The core curriculum of the Basic Education Act of 2008 focuses on the development of the students on whom the strength of the nation rests. They are expected to be educated to become a balanced human being in terms of physical health, knowledge and virtue. They are also expected to be conscious of their obligations as a Thai citizen and a member of world community. And as such they should hold fast to the democratic form of government with H.M. the King as head of the state. They will be educated to gain basic knowledge and skills as well as desirable attitudes necessary for the furtherance of their studies in the future, for making a living and for a life-long education. The Act emphasizes the learner as the center of educational activities based on the belief that everyone can learn and develop to the fullest of his/her potential. Developing the learner to become a qualified person in accordance with learning standards would eventually enable the learner to become competent in five important areas. One of which is the learnerís thinking ability, especially the ability to think analytically, synthetically, creatively, critically and systematically (The Ministry of Education, 2008). The end result of such thinking ability would be, itís hoped, the creation of a new body of knowledge or information for proper decision making regarding oneís own or social affairs which is in accordance with the objectives of the National Education Act of B.E. 2542 (1999) and the Amended Act of B.E. 2545 (2002). The latter called for the development of a new Thai society of learning, of the availability of opportunity for every Thai citizen to learn how to think, to do, and be sensible and capable of learning continuously for life. The Act specifically prescribes in Section 4, Article 24 that teachers should organize subject content and learning activities that are relevant to the learnerís interest and aptitude. The activities so organized should provide an opportunity for the learner to do skill practice and thinking process, to learn about management and how to cope with problematical situations, and lastly, to apply what one has learned for preventing and solving problems (The Ministry of Education, 2003). It also prescribes in the educational standard IV for the learner to be capable of thinking analytically, synthetically, critically and creatively, and to be a person of vision. These are objectives for the development of thinking ability of the learner.

Analytical Thinking

Thinking is a cognitive process used by a person in creating the meaning or understanding of different things obtained from oneís experiences (Kammanee, 2003) The term ìanalysisî originated from the Greek word ìanalusisî which means breaking into parts.

Analytical thinking is an ability to classify composite parts of anything which can be an object, a story or things that happen, to identify causal relationship between the parts to see how they are connected, and to find out what are the causes and effects in order to appreciate the relationship between given things (Bloom, 1956, Bloom 1971, Kammanee, 2001; Jaroenwongsak 2006). According to Bloom (1956), there are 3 aspects of analytical thinking
as follows:

1. **Analysis of significance.** It is a classification of what is significant or important.

Which one plays the most significant role? What are the causes and effects?

2. Analysis of relationship. It is an identification of how are the story or happenings of lesser significance related. How are they compatible with or contradict one another?

3. Analysis of principles. It is a search for the structure and system of a particular object, the story and actions. What causes them to combine to remain in that state? What are the cores or principles which they are based on? What links them together and what is the technique of the combination?

Learning Management for the Development of Analytical Thinking

The development of analytical thinking has been an object of great interest both in the local and foreign academic circles. There have been numerous research works concerning learning models that encourage analytical thinking. However, it is evident that for the past two decades efforts to develop analytical thinking in students have been done only at a limited scale and have not yet reached the fullest desired goal (The Ministry of Education, 2006). This problem of Thai childrenís unable to think analytically needs immediate action to ameliorate. A survey of a number of research studies on learning activities for the development of analytical thinking reveals that teachers were aware of the significance of learning management for such purpose, but they lacked the knowledge about teaching models or procedures that encourage analytical thinking. This teachersí ineptitude has inevitably caused ineffective learning activities that failed to help develop analytical thinking in the students (Art-in, 2010). For this reason, there should be some kind of a program to train teachers to be well-versed in the models and procedures for learning management that encourage analytical thinking. This need is in line with the policy of the Ministry of Education as stated in one of its objectives in the program "2006 the Year of Instructional Reform" (The Office of Basic Education, Ministry of Education, 2006). The policy calls for the development of analytical thinking in students as one of the goals of the reform.

The significance of learning activities for the development of analytical thinking has been recognized by academics who, working cooperatively, have been trying to search for suitable methods that would help develop such ability. In 1984 academics from around the world met at The Wingspread Conference Center in Racine, Wisconsin to find proper means of developing analytical thinking in children. It was proposed by the participants that 3 possible ways of conducting research and experiment should be as follows (The Office of National Education Commission, 1997b):

1. Teaching for Thinking. This is the teaching of academic content in which enriching or altering of the content are made in order to enhance the learnerís thinking ability.

2. Teaching of Thinking. It is another way of teaching with an emphasis on mental process that does the thinking only. Itís a kind of thinking practice in which the content of teaching are not related to the subjects of study at the school, and ways of teaching are varied depending on the theories and basic beliefs applied by teachers in accordance with the teaching programs.

3. Teaching about Thinking. It is a kind of teaching emphasizing the use of

thinking skill as the focal point of instruction. This approach attempts to help the learner to be aware of his own thinking process in order to give rise to a thinking skill called Meta Cognition. This type of thinking skill enables the learner to be aware of what he has or has not learned, what he want to learn, as well as his ability to control and examine his own thinking.

As for the programs and teaching methods for the development of thinking ability, as organized by schools at present, could be classified into 2 major approaches (The Office of National Education Commission, 1997b) as follows:

1. Specific Program. This is a specially organized program for teaching the learner how to think effectively apart from regular learning activities. It is a teaching program specifically designed for the enhancement of thinking ability.

2. General Program. It is a program based on subject contents in the regular curriculum as a means of developing thinking skill. This approach for teaching thinking skill, therefore, is to supplement the existing objectives of the curriculum by linking the instruction with the objectives of the subject content.

From the description of the two approaches above, it is worthwhile to reiterate that the Specific Program is specially organized for the enhancement of the learnerís thinking ability apart from regular instructional activities, while in the General Program the training for thinking ability is done simultaneously with the instruction of the subject content in the curriculum. Most of the basic education schools prefer to use this General Program for the enhancement of their studentsí thinking ability.

In learning management for the enhancement of the learnerís analytical thinking ability, the teacher can rely upon a variety of approaches which has been compiled by the present writer as follows:

Approach I: Using various available instructional models to learning management for the development of analytical thinking

A survey by the present writer revealed that there are various instructional models which can effectively help develop the learnerís analytical thinking (The Ministry of Education, 2006). These include the 4 MAT Learning Model, Inquiry Cycle Model (5Es), Student-Centered CIPPA Model, Project-Based Instruction, Cooperative Learning Model, STAD Cooperative Learning Model, Jigsaw Cooperative Learning Model, Explicit Instruction Model, Group Process-Skill Instruction, Storyline Instruction Model, Science Process Instruction, Simulation Instruction, Communication Process Instruction, Mind Mapping Technique, Advance Organizer Model, Problem-Based Learning Model, Observation Process Instruction, Six-Hat Instructional Technique, Process Skill Instruction, etc. A list of research studies for the development of the learnersí analytical thinking are shown on Table l as follows:

Table 1
Research studies using different teaching models for the development of analytical thinking

Learning Area	Models/Teaching Techniques	Researcher Names/ Year	University
1. Thai Language	1. Student-Centered CIPPA Model	Jiranan Boonruen, 2001	Chulalongkorn University
	2. Co-op-Co-op Instruction	Saiphon Unjit, 2004	Mahasarakam University
	3. Science Process Instruction	Ladda Kwaipan, 1999	Silpakon University
	4. Language Experience Instruction	Wipawee Panreung, 2003	Srinakarintarawirot University
	5. OK 5R Instruction	Hiranya Upatam, 1998	Chiengmai University
2. Mathematics	1. 4MAT Learning Model	Rawitnuch Tongman, 2004	Mahasarakam University
	2. STAD Cooperative Learning Model	Pranee Jongsri, 2002	Silpakon University
	3. Communication Process Instruction	Prapawadee Teptong, 2002	Chulalongkorn University
	4. Simulation Instruction	Renu Saicheu, 2004	Mahasarakam University
	5. Explicit Instruction Model	Naksawan Srichan, 2002	Sipakon University
3. Science	1. 4MAT Learning Model	Kanda Sutapan, 2004	King Mongkuts Institute of Technology Ladkrabang
	2. Inquiry Cycle Model (5Es)	Sutanping Nonesirchai, 2007	Khon Kaen University
	3. Project-Based Instruction	Aranya Chokesawad, 2007	Khon Kaen University
	4. Mind Mapping Instruction	La-po Tabtim, 2003	Pranakon Rajabaht University
	5. Advance Organizer Learning Model	Wittaya Sansuk, 1998	Khon Kaen University
	6. John Dewey's Science Technique Instruction	Chariya Pooseerit, 2007	Khon Kaen University
	7. Mind Mapping Technique	Arm Popat, 2007	Srinakarintarawirot University

Table 1
Research studies using different teaching models for the development of analytical thinking (cont.)

Learning Area	Models/Teaching Techniques	Researcher Names/ Year	University
4. Social Studies, Religion, and Culture	1. 4MAT Learning Model	Pacharapon Pimlamad, 2001	Chulalongkorn University
	2. Student-Centered CIPPA Model	Sutirat Lerdjaturawit, 2001	Chulalongkorn University
	3. STAD Cooperative Learning Model	Apinya Singsombat, 2002	Silpakon University
	4. Storyline Instruction Model	Nuanjan Cheubamrung, 2003	Sukothai Dharmatirach University
	5. Problem-Based Learning Model	Sombat Paopongklai, 2003	Chulalongkorn University
5. Health Education and Physical Education	1. 4MAT Learning Model	Charanya Mensudsai, 2004	Mahasarakam University
	2. Project-Based Instruction	Sawad Kaewlon, 2003	Srinakarintarawirot University
	3. STAD Cooperative Learning Model	Damrong Panyamee, 2003	Khon Kaen Univeristy
	4. Jigsaw Cooperative Learning Model	Ungsumon Cheuchai, 2000	Chulalongkorn Univeristy
	5. Explicit Instruction Model	Wanchai Satitapiradee, 2002	Kasetsat University
6. Art	1. Project-Based Instruction	Nutiyapon Wongnen, 2001	Chulalongkorn University
	2. Group Process Instruction	Keerati Srisuchat, 2001	Chulalongkorn Univeristy
	3. Six-Hat Instructional Technique	Preeyapon Potibandit, 2001	Chulalongkorn University
	4. Observation Process Instruction	Tanyarat Asawanon, 2002	Chulalongkorn University

Table 1
Research studies using different teaching models for the development of analytical thinking (cont.)

Learning Area	Models/Teaching Techniques	Researcher Names/ Year	University
7. Vocational education	1. Project-Based Instruction	Wanna Chukao, 2003	Mahasarakam Univeristy
	2. Cooperative Learning Model	Chalerm Aj-kla, 2003	Mahasarakam University
	3. Group Process Skill Instruction	Sujitra Suti, 2002	Khon Kaen University
	4. Process Skill Instruction	Supapon Songkrau, 2004	Mahasarakam Univeristy
	5. Problem-Based Learning Model	Suwaree Kongman, 2002	Khon Kaen Univeristy
8. Foreign Language	1. 4MAT Learning Model	Ponchai Nachaiwieng, 2003	Khon Kaen Univeristy
	2. Student-Centered CIPPA Model	Darin Tanatip, 2002	Chulalongkorn University
	3. Process Skill Writing	Ladda Wnagpasit, 2003	Srinakarintarawirot University
	4. Self Questioning Technique	Sararat Chanklin, 2001	Chulalongkorn Univeristy
	5. Communication Process Instruction	Pawadee Srisang, 2001	Silpakon University

According to Table l above, various models, techniques and teaching methods have been applied in teaching for the development of analytical thinking, and the experiments all showed effective results (The Ministry of Education, 2006). This study seeks to discuss the steps of teaching as demonstrate by 3 teaching models for the development of analytical thinking as follows:

1.1 The 4MAT Learning Cycle

McCarthy (1997) developed an instructional model based on Kolb's ideas which described four types of learners, i.e. imaginative learners, analytic learners, common sense learners and dynamic learners. McCarthy and his associates combined Kolb's ideas with the working of the two hemispheres of the human brain. The result is a new instructional approach based on 4 key learning questions of "Why?", "What?", "How?", and "If." The 4MAT Learning Cycle comprises 8 steps of instruction as follows: (McCarthy, 1997 cited in Nirantawee and Poomman, 1999)

Step I: Creating Learning Experience. At this step the teacher creates a learning experience for the learners to appreciate the value of the subject they are about to learn so that they can answer the question of "why" they have to learn them.

Step II: Analyzing or Reflection on the Learning Experience: This step helps the learners to be aware of and recognize the significance of the subject they are about to learn.

Step III: Developing the Experience into Ideas or Concepts: When the learners appreciate the value of the subject to be learned the teacher can start learning activities designed to help the learners to develop concepts by themselves.

Step IV: Enlarging One's Knowledge and Ideas: When the learners have experienced the activities and developed sufficient ideas or concepts, it's time for the teacher to encourage them to enlarge their thinking larger and deeper by asking them to do additional study from various learning resources. Learning activities in Steps III and IV are for answering the question of "what" they have learned.

Step V: Practicing in Accordance with What One Has Learned: At this step the teacher allows the learners to practice what they have learned from Steps III and IV and to investigate the results.

Step VI: Creating One's Own Piece of Work: From practicing what they have learned at Step V, the learners would have realized the weak or strong points of their ideas and consequently the ideas would become clearer. The teacher should grasp the opportunity to encourage the learners to develop their ability further by applying what they have learned at Step V to create a piece of creative work. The key question for Steps V and VI, therefore, is "How to do it?"

Step VII: Analyzing the Performance and Ways for Application: After the learners have created their pieces of work to their liking, the teacher should allow them an opportunity to display and feel proud of their works. While the other learners participate in creative criticism, the displayers listen and accept their peers' comments amicably in order to improve their works and future application.

Step VIII: Exchanging Knowledge and Ideas: This step is for the enlargement of the scope of knowledge the learners have learned by exchanging their ideas in a discussion session. The learners also can discuss how to associate their learning with real life and the future. The key question in the discussion is "If" which may lead to a new point for the start of another learning cycle.

1.2 The Student-Centered Teaching Model Based on the CIPPA Model:

The CIPPA Model was developed by Associate Professor Kammanee (2009) of the Faculty of Education, Chulalongkorn University. The Model is based on a combination of several educational components, i.e. letting the learners do the construction of knowledge (C), interaction with other persons and environment (I), process skills (P) as a tool for the construction of knowledge, proper physical participation (P), and the application (A) of what they have learned in various situations. There are 7 steps of instruction in this teaching model as follows:

Step I: Review of Previous Learning: At this step the teacher reviews what the students have learned previously in order to get them ready to link it with the new material they are about to learn. The teacher may use any techniques for the purpose.

Step II: Searching for New Knowledge: This step is designed for the learners to search for new knowledge on their own from various sources which the teacher has made ready for them or to advise them where they can find the needed information.

Step III: Understanding the New Information/Knowledge and Linking it with Previous Learning: At this step the learners will have to try to comprehend the new information they have obtained from their searching. Then they need to treat and assign a meaning to the new information/experience so obtained through processes such as thinking process and group discussion before they can make a conclusion. Such action depends very much on linking the new information with previous learning.

Step IV: Sharing Knowledge and Ideas among Group Members: This step allows an opportunity for the learners to rely on one another as a tool to examine their comprehension of the knowledge they have just learned and to enlarge further the knowledge. In the end the group members share and gain knowledge from one another.

Step V: Concluding and Arranging the Knowledge: This step is for the learners to do a conclusion on all the old and new knowledge they have learned, and to arrange it in a systematic sequence for an easy recall.

Step VI: Practicing and/or Displaying One's Performance: If the learners have not put what they have learned into practice this step allows them to display it. Recapitulation of what they have learned will also help the learners to at the same time examine their knowledge and to apply their creative thinking into practice.

Step VII: Applying the Knowledge: This step is for the learners to practice how to apply their knowledge and ideas in various situations in order to increase their skills and ability in solving problems.

1.3 The Inquiry Cycle Model (5Es)

BSCS (1997 cited in the Institute for Promoting Science Teaching and Technology, 2005) stated that learning is like a cycle as new learning is built upon the previous one. Learning cycle is a procedure for constructing scientific lessons basing on the Constructivist theories. Roger Bybee, a curriculum development expert from an educational organization called Biological Science Curriculum Study (BSCS) in the U.S., introduced an Inquiry Cycle Model comprising 5 steps as follows:

Step I: Engagement: It's an introduction to a lesson or interesting subject in which the learners are interested in. The subject of interest may arise from the learners' own skepticism, curiosity or a group discussion. It can also be a current incident, or a matter connected with their previous learning which stimulates the learners to pose a question and to prescribe the points for study, but the teacher should never coerce the learners to agree to accept his/her interest as the point for study. When such interesting question exists and the majority of the learners agree to study it, they will work together to prescribe their scope of study and to discuss it in full detail. This step can be a gathering of past experience, previous learning or information obtained from sources which may lead to a better understanding of the points they study.

Step II: Exploration: When the learners understand the points or questions for study thoroughly, the next step is for them to make plans for investigation, hypothesis specification, prescribing possible alternatives, and then time for practice to collected

information, data or incidents. Investigation can be done through various means such as conducting an experiment, doing field activities, using computers to create a simulation, studying for collecting information from reference documents or other information sources in order to gain sufficient information to be used in the next step.

Step III: Explanation: After the learners have gathered a sufficient amount of information, the next step is for them to analyze, interpret, summarize and then present what they have found in any suitable forms such as giving a brief, constructing a mathematical model, drawing a picture or a table, etc. There are possible several findings at this step. They can be either in support or opposition to the pre-set hypothesis, or are not related to the points under study at all. Whatever form the findings are in they still can cause the learners to learn new knowledge.

Step IV: Elaboration: This is the step in which the learners link their newly found knowledge with their previous learning or new ideas derived from additional inquiry. They might also apply the model or their conclusion to explain the situations or other incidents. If their findings can be used to explain many matters it means that there are very little limitations, and they can be linked with various matters to increase the learners' knowledge.

Step V: Evaluation: It's for an evaluation of the learning by means of various processes in order to ascertain just how much the learners have learned. After this the learners will apply the knowledge they have learned for in any situations.

The application of knowledge or the model to explain the incidents or matters could lead to arguments or limitations which, in turn, can cause new points, questions or problems that ought to be investigated further and hence a new, continuous cycle of inquiry or Inquiry Cycle begins. The process of inquiry therefore enables the learners to learn main subject content, principles, theories, as well as to do a practice in order to gain knowledge as a basis for future learning.

Approach II: Using Teaching Models Specially Designed for the Development of Analytical Thinking

There have been efforts to develop specially-designed teaching models for the development of analytical thinking. One of these is a model for learning management for learning area of science with an emphasis on analytical thinking by Art-in (2010) of the Faculty of Education, Khon Kaen University. The model had been a success consisting of 5 instructional steps as follows:

Step I: Orientation: This step is for the teacher to inform the learners the learning objectives in order to motivate them to learn, to appreciate the values of the subject they are about to learn, how to take cognizance of and to react to it, including a review of their previous learning so that they can connect it with the new learning.

Step II: Presentation of Learning Task: The teacher presents his lesson in learning area of science. The presentation can be in the forms of a situation, the subject contents, a story, an academic article, an incident, a phenomenon or anything relating to the subject contents within learning area of science. This step aims at getting the learners to learn the subject content as prescribed in the curriculum and at the same time to practice analytical thinking.

Step III: Practicing Analytical Thinking:

1. Practicing Thinking Individually: This part of practicing is designed to provide each of the learners an opportunity to practice analytical thinking individually according to a situation, subject contents, a story, an academic article, an incident, a phenomenon or a given matter. The learners are asked to analyze the significance, and/or the relationship, and/or the principles of the things they study. The learners are urged to classify them into small composite parts in order to see what they are consisted of and to find causal relationship among the parts. They are to analyze what are the causes and what are the effects so that they can arrive at an understanding and appreciation of the given task. To practice analytical thinking, one may rely on the rules of 5 W and l H when asking question, i.e. Who, What, Why, When, Why, and How, or asking the learners to practice the thinking and then, at the conclusion, do the mind mapping. The role of the teacher at the practice stage is to organize the situations with an aim to encourage the learners to think analytically.

2. Practicing Thinking in Small Group: This approach is to organize the learners in small groups in which each of them takes turns to present the results of their thinking to group members. The purpose of small discussion is to let the learners discuss their ideas while listening to others' as well. At such group discussion each learner will have an opportunity to compare results of his/her analytical thinking with the other members, then group members work together to conclude their answer in accordance with the prescribed situation.

Step IV: Presentation and Discussion: This step is for all the small groups to assemble to present results of their groups' thinking so that each can assess his/her thinking and to compare results of their thinking with other groups'. Such comparison would make the learners become aware of how their thinking similar to or different from other groups. Why they are similar or different? What are the causes? At this point the teacher and the learners participate in a discussion in order to arrive at a conclusion. Such free discussion among the teacher and learners opens an opportunity for the learners to enlarge their scopes of thinking which would become increasingly complex.

Step V: Conclusion: At this step the teacher begins by posing a question with an aim to draw a conclusion about the lessons or the prescribed situations. The students are encouraged to bring into discussion what they have learned at the steps of practicing analytical thinking and presentation and discussion so that a conclusion can be drawn and a new body of knowledge found. The teacher may help the learners make a complete conclusion by giving additional explanations for any incomplete points made by the learners.

Conclusion

In learning management, whether for the kindergarten, the primary, the secondary or the tertiary levels, the teacher should place an emphasis on the process of analytical thinking so that the learners can learn the subject content and have an opportunity to practice thinking analytically at the same time. This is to be in line with the guidelines as stipulated by Section 4, Article 24 of the National Education Act of B.E. 2542 (1999) and the Amended Act of B.E. 2545 (2002) which stated that the teachers should organize

the learning subject content and activities to meet the learners' aptitude and interest, to allow them an opportunity to practice skill, thinking process and management, to cope with the situations and to apply what they have learned to daily life for preventing and solving problems. To do that the teachers have a variety of teaching models that suit the subject content and the learners to choose from. The most prominent and effective ones among these include the 4 MAT Learning Cycle Model, the Inquiry Cycle Model (5Es), the Student-Centered CIPPA Model, Project-Based Instruction, Cooperative Learning, Group Process Instruction, and Scientific Process Instruction. The teachers may choose to develop their own instructional model for the learning management that specifically designed for the development of analytical thinking such as the one designed by the present author for teaching in learning area of science, or any other models that provide enough opportunity for the learners to increasingly develop their own analytical thinking. The end results would be the learners' higher level of competence in analytical thinking, synthetic thinking, creative thinking, critical thinking and systematic thinking which meets the curricular objectives and is in accordance with the 4th educational standard which stipulates the learners' ability to do analytical thinking, synthetic thinking, critical thinking, and creative thinking with a vision.

In order to make the students' analytical thinking to be efficient, The persons involved in educational management, should implement as follows:

1. Educationists or experts in curriculum and instruction should endeavor to develop learning models with an emphasis on analytical thinking for the learning area as prescribed in the Core Curriculum of the Basic Education B.E. 2551 (2008), or for the learners in every level so that the teachers can use the models for the learning management effectively.

2. Offices of affiliated authorities such as the Basic Education Commission, the Office of Educational Service Area and the schools should set up training workshops on learning activities for teachers to develop their analytical thinking ability, and after the training, there should be a follow-up program of supervision to ensure that the trainees are able to effectively manage learning to develop the students' analytical thinking.

3. The teachers should select various teaching models for the learning management that stimulate analytical thinking in the students and to enable them to develop analytical thinking further.

4. There should be more research studies in the area of analytical thinking in which various learning models can be used for the development of new bodies of knowledge. There should be also an exchange of experience in learning activities that emphasizes analytical thinking among teachers or educationists which, hopefully, would lead to various means of the learning management for analytical thinking.

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