CHAPTER 5
SUMMARY, MAJOR FINDINGS, CONCLUSIONS, SUGGESTIONS FOR EDUCATIONAL IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER STUDY

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CHAPTER 5
SUMMARY, MAJOR FINDINGS, CONCLUSIONS, SUGGESTIONS FOR EDUCATIONAL IMPLICATIONS AND RECOMMENDATIONS FOR FURTHER STUDY

5.1 SUMMARY
The expansion of information and technology has increased the need for individuals to encompass transferable skills that enable them to address different problems in different contexts at different times throughout their lives. This need requires thinking in conscious ways to achieve certain purposes, which include the process of remembering, questioning, forming concepts, planning, and reasoning, imagining, solving problems, making decisions and judgments, or translating thoughts into words. Analytical thinking skill is a practical behaviour, which is developed through cognitive challenge, and acquired through teaching and learned through practice. Since the growth of human brains occurs in early childhood, analytical thinking skills are best to be conveyed in the early years of children education, through both interpersonal communication and media literacy. Thus, educational institutions are considered important body to employ the analytical thinking management practices for increasing analytical thinking skills.

Analytical thinking skills is highly value and is one of education’s most central goals and one of its most valued outcomes. In the recent years there has been growing interest across the world in ways of developing children’s thinking skills. This interest has been fed by new knowledge about how the brain works and how people learn, and evidence that specific interventions can improve children’s thinking and intelligence. Many researchers suggest that analytical thinking skills are essential to effective learning. If thinking is how children make sense of learning then developing their analytical thinking skills will help them get more out of learning and life. (Robert Fisher, 2005)\(^1\)

Educational institutions are responsible for administering learning development which emphasizes analytical thinking management practices and confronting real situations and the application of knowledge for preventing and solving problems; organizing activities to enable learning from actual experience; arranging practical exercises to enhance
analytical thinking and facilitating learning processes to enable learners to be all round knowledgeable.

The present study looks at the implications of research into ways to develop analytical thinking management practices of school administrators. Therefore, the main purpose of the present study is to study the analytical thinking management of primary school administrators in order to be the reference for other schools in Thailand, so that appropriate educational implications will be suggested according to the obtained results.

Statement of the problem

The present research studied under the problem:

"A STUDY OF ANALYTICAL THINKING MANAGEMENT PRACTICES OF PRIMARY SCHOOL ADMINISTRATORS IN THAILAND"

Definition of the important terms

In order to avoid the misunderstanding regarding the key words, it is obligatory on the part of the researcher to define the terms which are as follows:

(1) Thinking skills

Thinking skill is the human capacities to think in conscious ways to achieve certain purposes. It involves the mental process used in cognitive functions that enable people to make meaning from and create with a significant amount of memory, leading to bodies of knowledge creation or information for judicious decision-making and problem solving regarding oneself society and environment.

Thinking skills includes creative, critical, and analytical thinking. These skills are activated when students of any age encounter unfamiliar problems, uncertainties, questions, or dilemmas. Successful applications of these skills result in explanations, decisions, performances, and products that are valid within the context of available knowledge and experience, and promote continued growth in higher order thinking, as well as other intellectual skills.

(2) Analytical thinking

Analytical thinking is the human ability to separation a whole into its constituent parts or element parts order to study the parts and their relations. It is the ability to scrutinize
and break down facts and thoughts into their strengths and weaknesses. It is the process of separating and distinguishing elements of a concept, idea, problem and issue in order to understand its essential nature and inner relationships.

The analytical thinking is based on the deductive thinking. The deductive thinking is the act of reasoning which move from a whole to its part, from the general to the particular, from the universal to individual, from broader generalizations to specific observation, and from general theories to specific instance. It is based on reasoning, experience, experimentation and draws conclusions from them. There are four abilities included in analytical thinking: Analyzing relationship of the two things or more, Separation the whole into the parts, Analyzing patterns or order, and Comparison of the things.

(3) Analytical thinking management practices

Management is the act of coordinating the efforts of people in accordance with certain policies to accomplish desired goals and objectives using available resources efficiently and effectively i.e. human resources, financial resources, technological resources, and natural resources.

Management practices is the method or technique or process of doing something which is found to be the most effective and practical means in achieving goals and objectives while making the optimum use of the firm's resources.

In the present study, management practices refers to the method or technique or process of coordinating the efforts of school members in accordance with certain policies to accomplish desired goals and objectives on analytical thinking of students using eight aspects of resources efficiently and effectively:

- **Analytical thinking management policy**

  Analytical thinking management policy refers to the administrative process which encourage analytical thinking skills of students. The administrators have to formulate the policy with co-operation of students, teachers, parents, communities and educational personnel in order to improve the analytical thinking of students.

- **Curriculum design and building**

  Curriculum design and building refers to the curriculum stipulates learning
standards for learners development on analytical thinking skills. Educational institutions have to create additional subjects to form a new learning unit, or variety of intensive course for learners to select those to satisfy their inclination, interest, needs, and individual difference.

**Personnel development**

Personnel development refers to the process of refinement and development of professional instructors. Personnel development aims at creating academic leadership and competency of teachers in conducting the classroom for encouragement of the analytical thinking skills of students.

**Learning materials and resources support**

Learning materials and resources support refers to the supporting which focus on promoting learners analytical thinking skills. The learning materials and resources must encourage the students to be self taught as well as to motivate skillful search for new knowledge.

**Learning management**

Learning management refers to the capacity to achieve learning outcomes in all learners and is based on the notion of “design with intent”. The application of learning management occurs through a series of capabilities which are organized using the learning management schematic. The learning management must be emphasized on thinking process, management and confronting real situations and the application of knowledge for preventing and solving problems; organizing activities to enable learning from actual experience; arranging practical exercises to enhance skills in doing, analytical thinking and satisfactory achievement, the thirst and continuous search for knowledge, inculcating skills for well balanced integration of all subjects.

**Learning measurement and evaluation**

Learning measurement and evaluation refers to the procedures to be used by instructors for learner quality development. The outcomes of these two activities are data and information concerning learners’ development on analytical thinking skills, progress and achievement, as well as data useful for promoting learner’s full development potential on analytical thinking skills.
Supervision, follow-up and report

Supervision, follow-up and report refer to the process established regarding the supervision, follow-up and report. There must be jointly responsible to produce learners whose qualifications meet standards and expectation of analytical thinking skills. The instructors must be given opportunities to co-operate, assist, encourage and support planning and implementation of plans to achieve high potential on analytical thinking of students. Supervision, follow-up and report are parts of quality assurance mechanism to meet analytical thinking standards.

Research for learning development

Research for learning development refers to the requirement of research procedures consist of series of actions in respective order, namely problem analysis, establishment of plans to solve problems or to create development activities, implementation of plans, data collection, research output conclusion, report and utilization of research results. The result researches on analytical thinking skills will be used for development of analytical thinking potential of students.

In the operational definition, analytical management practices refers to the scores obtained from the scale which measures the analytical thinking management practices of primary school administrators. Analytical thinking management practices scale comprise of eight aspects: (i) Analytical thinking management policy, (ii) Curriculum design and building, (iii) Personnel development, (iv) Learning materials and resources support, (v) Learning management, (vi) Learning measurement and evaluation, (vii) Supervision, follow-up and report, and (viii) Research for learning development.

Objectives of the study

In order to arrive the results of the study, the objectives are determined as follows:

(1) To study the level of analytical thinking management practices of primary school administrators.

(2) To compare the mean scores of analytical thinking management practices of primary school administrators classified by different variables i.e. sex, age, work experience, educational qualification, type of school, size of school, and area of school.
Variables of the study

There are two types of variables in this study: independent variable and dependent variable.

(1) Independent Variables

There are seven independent variables in this study:

(i) Sex i.e. male and female
(ii) Age i.e. 31-40 years, 41-50 years, and 51-60 years
(iii) Work experience i.e. 1-10 years, 11-20 years, and 21-30 years
(iv) Educational qualification i.e. bachelor degree and master degree
(v) Type of school i.e. state and private school
(vi) Size of school i.e. small, medium, and large school
(vii) Area of school i.e. urban and rural school

(2) Dependent variable

Analytical thinking management practices of primary school administrators which comprise of 8 aspects:

(i) Analytical thinking management policy
(ii) Curriculum design and building
(iii) Personnel development
(iv) Learning materials and resources support
(v) Learning management
(vi) Learning measurement and evaluation
(vii) Supervision, follow-up and report
(viii) Research for learning development

Research questions

The major research questions to be answered of this study were as follow:

(1) What is the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development)?
(2) What is the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by sex, age, work experience, educational qualification, type of school, size of school and area of school?

Hypotheses of the study

Based on the objectives of the study and the research questions, the hypotheses in the study can be grouped into 7 major hypotheses as follow:

(1) There will be no significant different between mean scores of the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by sex.

(2) There will be no significant different between mean scores of the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by age.

(3) There will be no significant different between mean scores of the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by work experience.

(4) There will be no significant different between mean scores of the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building,
Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by educational qualification.

(5) There will be no significant different between mean scores of the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by type of school.

(6) There will be no significant different between mean scores of the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by size of school.

(7) There will be no significant different between mean scores of the level of analytical thinking management practices of primary school administrators (total score and different aspects i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development) classified by area of school.

Limitation of the study

The limitations of this study are as follows.

(1) The present study was confined to the analytical thinking management practices of primary school administrators in central part of Thailand.

(2) The study was further delimited to the data which collected in academic year 2010 - 2011.

(3) The data were collected through five point rating scale and were constructed by the researcher.
Importance of the study

One of the major challenges society faces today is to prepare individuals and organizations to deal with change and rapid proliferation of information and continually update their knowledge. The majority of valid knowledge today will be obsolete in a short period of time (Tenreiro-Vieira and Vieira, 2000). It requires from each one an enormous capacity to adapt to new situations. More creative, critical and analytical people are more able to adapt to change and cope with the challenges of present.

It is important to train individuals to adapt themselves to the changing world. Analytical thinking skills are valued today, on problems solve and decision making processes. More than just acquiring knowledge and information, students need to train their analytical thinking skills, to be able to apply knowledge acquired, take decisions and acquire new knowledge (Lau, 2011). Using analytical thinking skills, individuals can form an opinion about present issues, take rational and creative decisions, wide the range of possibilities and select the best amongst them.

The school administrators are responsible for administering learning development which emphasizes processes, management and confronting real situations and the application of knowledge for preventing and solving problems; organizing activities to enable learning from actual experience; arranging practical exercises to enhance thinking skills in doing, analyzing and satisfactory achievement to enable learners to be all round knowledgeable.

Educational management aims to foster everyone to be capable of learning and self-development, learners should be encouraged to develop themselves in line with their natural inclinations, and fully realize their own potential. School administrators should encourage teachers to emphasize on students’ analytical thinking skills. They must change the roles from knowledge transferring to helping, promoting and encouraging learners to improve their analytical thinking skills.

The finding of this study may a source of encouragement for the widespread ideas of developing the analytical thinking management practices of primary school
administrators i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, Research for learning development. The findings of the study gave the guideline to meet the high level of analytical thinking management of primary school administrator for developing of higher standard of educational quality.

Research design

In the present study, descriptive research was selected to be the research method. According to this type of research method, this study aims to find out the analytical thinking management practices of primary school administrators. The description is used for frequencies, mean ($\bar{X}$), standard deviation (S.D.), t-test (independent) and F-test statistical calculations.

As the present study was mainly interested in finding out the level of the analytical thinking management practices of primary school administrators, the researcher decided to make use of descriptive research design (survey method) which was considered appropriate design for obtaining specific information about the research situation.

Tool used in the study

The researcher desired to make use of the tool in form of the Likert scale. This scale was to measure the analytical thinking management practices of primary school administrators in total score and in different aspects. This scale was constructed by the researcher and consisted of 70 statements. Each statement has five levels of primary school administrators' opinion regarding the analytical thinking management practices of primary school administrators i.e. "the most" or "much" or "moderate" or "less" or "the least".

The Item-Test Correlation ($r_{xy}$) was applied for establishment of validity of the scale. The scale which measures the analytical thinking management practices of primary school administrators indicated the validity index ($r_{xy}$ value) between 0.61 - 0.82 which were at excellence level.
was used to establish the discrimination index of the scale. It was found that the statement in the scale which measures the analytical thinking management practices of primary school administrators obtained the \( t - value \) greater than 1.96 which given statements differentiated between upper group and lower group.

Test-retest method (Pearson Product Moment Co-efficient Correlation: \( r_{xy} \)) was used to establish the reliability of the scale. The scale which measures the analytical thinking management practices of primary school administrators was found the correlation efficient \( (r_{xy}) = 0.90 \).

**Population and Sample of the study**

The population of the present study was the primary school administrators in the Central part of Thailand. 840 primary school administrators were selected by stratified random sampling method to be the sample of the study.

**Technique of analysis of data**

The data collected by the tool was analyzed according to the hypothesis. In order to determine the level of the analytical thinking management practices of primary school administrators in total score and in different aspects, mean (\( \bar{X} \)) and standard deviation (S.D.) was calculated. The analysis of variance (ANOVA) was used to test the significance of difference between mean scores of the analytical thinking management practices of primary school administrators in total score and in different aspects rated by primary school administrators belonging to different groups of age, work experience and size of school. The analysis of t-test (independent) was used to test the significance of difference between mean scores of the analytical thinking management practices of primary school administrators in total score and in different aspects rated by primary school administrators belonging to different groups of sex, educational qualification, type of school and area of school.

**5.2 MAJOR FINDINGS**

The major findings of this study were as follow:

(1) The analytical thinking management practices in total score and in different aspects (i.e. Analytical thinking management policy, Curriculum design and building,
Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, and Research for learning development) rated by 840 primary school administrators was at moderate level.

There are eight aspects of analytical thinking management practices. The aspect of “learning management” obtained the highest mean scores on the analytical thinking management practices which is at moderate level. The aspect of “learning measurement and evaluation” obtained the second priority mean score on the analytical thinking management practices which is at moderate level. The aspect of “research for learning development” obtained the lowest mean scores on the analytical thinking management practices which is at moderate level.

(2) The total mean score of the analytical thinking management practices rated by male and female primary school administrators were at moderate level.

(3) The total mean score of the analytical thinking management practices rated by primary school administrators belonging to different age-group i.e. 31-40 years, 41-50 years and 51-60 years were at moderate level.

(4) The total mean score of the analytical thinking management practices rated by primary school administrators belonging to different groups of work experience i.e. 01-10 years, 11-20 years and 21-30 years were at moderate level.

(5) The total mean score of the analytical thinking management practices rated by primary school administrators belonging to bachelor degree group of educational qualification was at moderate level whereas the total mean score of the analytical thinking management practices rated by primary school administrators belonging to master degree onwards group of educational qualification was at high level.

(6) The total mean score of the analytical thinking management practices rated by state primary school administrators was at high level whereas the total mean score of the analytical thinking management practices rated by private primary school administrators was at moderate level.
(7) The total mean score of the analytical thinking management practices rated by primary school administrators belonging to large school was at high level whereas the total mean score of the analytical thinking management practices rated by primary school administrators belonging to medium and small school were at moderate level.

(8) The total mean score of the analytical thinking management practices rated by urban primary school administrators was at high level whereas the total mean score of the analytical thinking management practices rated by rural primary school administrators was at moderate level.

(9) There was the significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by male and female primary school administrators.

Male primary school administrators obtained greater value of mean score on the analytical thinking management practices in total score and in different aspects than that of female primary school administrators.

(10) There was no significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different age-groups.

The primary school administrators with older age and younger age obtained equal value of mean score on the analytical thinking management practices in total score and in different aspects.

(11) There was no significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different groups of teaching experience.

The primary school administrators with more years and less year of work experience obtained equal value of mean score on the analytical thinking management practices in total score and in different aspects.
(12) There was the significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different groups of educational qualification.

The mean score of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to bachelor degree group of educational qualification has smaller value than the mean score of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to master degree onwards group of educational qualification.

(13) There was the significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different types of school.

The mean score of the analytical thinking management practices in total score and in different aspects rated by private primary school administrators has smaller value than the mean score of the analytical thinking management practices in total score and in different aspects rated by state primary school administrators.

(14) There was the significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different sizes of school.

The mean score of the analytical thinking management practices in total score and in different aspects rated by smaller primary school administrators has smaller value than that of the mean score of the analytical thinking management practices in total score and in different aspects rated by larger primary school administrators.

(15) There was the significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different areas of school.

The mean score of the analytical thinking management practices in total score and in different aspects rated by rural primary school administrators has smaller value than the mean score of the analytical thinking management practices in total score and in different aspects rated by urban primary school administrators.
5.3 CONCLUSIONS

From the results of the study, it can be concluded that the analytical thinking management practices in total score and in different aspects (i.e. Analytical thinking management policy, Curriculum design and building, Personnel development, Learning materials and resources support, Learning management, Learning measurement and evaluation, Supervision, follow-up and report, and Research for learning development) rated by 840 primary school administrators was at moderate level.

There was the significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different groups of sex, educational qualification, type of school, size of school and area of school. Therefore, sex, educational qualification, type of school, size of school and area of school does effect on the mean score of the analytical thinking management practices in total score and in different aspects.

Male primary school administrators obtained greater value of mean score on the analytical thinking management practices in total score and in different aspects than that of female primary school administrators.

The mean score of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to bachelor degree group of educational qualification has smaller value than the mean score of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to master degree onwards group of educational qualification.

The mean score of the analytical thinking management practices in total score and in different aspects rated by private primary school administrators has smaller value than the mean score of the analytical thinking management practices in total score and in different aspects rated by state primary school administrators.

The mean score of the analytical thinking management practices in total score and in different aspects rated by smaller primary school administrators has smaller value than that of the mean score of the analytical thinking management practices in total score and in different aspects rated by larger primary school administrators.
The mean score of the analytical thinking management practices in total score and in different aspects rated by rural primary school administrators has smaller value than the mean score of the analytical thinking management practices in total score and in different aspects rated by urban primary school administrators.

There was no significant difference between mean scores of the analytical thinking management practices in total score and in different aspects rated by primary school administrators belonging to different groups of age and work experience. Therefore, age and work experience does not effect on the mean score of the analytical thinking management practices in total score and in different aspects.

The primary school administrators with older age and younger age obtained equal value of mean score on the analytical thinking management practices in total score and in different aspects.

The primary school administrators with more years and less year of work experience obtained equal value of mean score on the analytical thinking management practices in total score and in different aspects.

5.4 SUGGESTIONS FOR EDUCATIONAL IMPLICATIONS

Education is not just learning knowledge and skills, but the development of children's learning capacity. Education is the development of thinking clearly and creatively, implementing their own plans and communicating their ideas to others in a variety of ways.’ (Sue Palmer and Galina Doyle, 2004)³

Thinking is a complex process that involves a variety of skills that are often used together when confronted with a new and interesting situation. Sharing the process of thinking with a child in meaningful and playful situations supports the development of thinking skills. It is also a fantastic opportunity for an adult to become more aware of children’s understanding and knowledge of the world, how they make sense of what is happening around them, how they communicate their thoughts and what they can do with the ideas in their minds.

Thinking skills are about how knowledge is acquired and how to use this knowledge. They include an element of knowing about thinking called ‘metacognition’. 
Metacognition is the knowledge of one's own thinking process, evidenced by planning an approach to a learning task, monitoring the understanding and evaluating the whole process to completion. Being motivated to continue with the task, however difficult it is, is part of metacognition too.

Thinking skills are related to encouraging children to learn to think for themselves, learning through real situations in a highly motivating environment. The thinking skills which involves the breaking down information into parts or trying to understand the organizational structure of information is term ‘critical thinking’. Being aware of analytical thinking skills enables adults to provide safe, creative environments and play situations where thinking can be sustained.

In order to improve the students’ analytical thinking skills, the suggestion can be provided as follow:

**Suggestion for school administrators**

(1) School administrators should formulate the analytical thinking management policies according to the goals of Basic Education Core Curriculum, 2008 which aims at the full development of students in analytical thinking. There should be the policies to encourage students to have the reflective thinking such as the wait-time for students to reflect when responding to the questions, ask questions that seek reasons and evidence, guide students’ thought processes during explorations, provide a less-structured learning environment that prompts students to explore what they think is important, provide social-learning environments such as those inherent in peer-group works and small group activities to allow students to see other points of view, give reasons to support what they think, show awareness of opposing positions and the weaknesses of their own positions.

School administrators should formulate the policies incorporated to learning environment to help students develop their ability to reflect on their own learning such as the model meta-cognitive and self-explanation strategies on specific problems to help students build an integrated understanding of the process of reflection, study guides or advance organizer should be integrated into classroom materials to prompt students to reflect on their learning, social learning environments that prompt collaborative work with peers/teachers/
experts, learning experiences that designed to include advice from instructors and co-
learners, classroom activities that relevant to real-world situations and provide integrated
experiences and classroom experiences that involve enjoyable, concrete, and physical
learning activities whenever possible to ensure proper attention to the unique cognitive,
affective, and psychomotor domain development of students.

School administrators should formulate the policies incorporated to prompts and
scaffolding suggestions to promote reflective thinking by structure lesson plans to support
reflective thinking and provide lesson components that prompt inquiry and curiosity.

(2) School administrators should stipulates learning standards in school
curriculum for learners development on analytical thinking skills. The additional subjects
should be formed with a new learning unit, or variety of intensive course for learners to select
those to satisfy their inclination, interest, needs, and individual difference. Curriculum should
focuses on learning for quality of development, basic thinking skills. Emphasis should lay on
well balanced integration in analytical thinking in every subject. Students should have enough
time to participate in development activities and others for improving their analytical thinking.
Discussion should be promoted for students to share their opinions to others. As the
discussion begins, an open ended question is asked, and the heart is given to someone in
the circle. The teacher is a facilitator in these discussions, and participates on an equal level
with the students. If one person begins to dominate the discussion, facilitator can say something
like that is interesting, but it is time to pass the heart so others have time to participate.

(3) School administrators should set the main target of the personnel development
on the development of high efficacy of students’ analytical thinking skills. Therefore, it is
essential to develop the teachers constantly and continuously until the end of their
professions. Training should be arranged for teachers about technique for improving the
analytical thinking skills. Mentoring programme should be used to help in the personal
development, by experienced teachers with special talents who are entrusted to give
recommendation to the new teachers, with an intention to assist and advise continuously, and
personally. Skill-development programmes should be comprised of many operational
meetings for many months. Participant is given assistance and advice during the training.
The teacher can adapt these skills to the teaching. Teacher centers should be a place where teachers can meet and discuss about the learning and teaching, develop their teaching skills, and make innovation planning, or compile and create learning-teaching media. Network can be done through the cooperation of teachers from various schools. They can exchange information, and interchange understanding and successes. Some schools may use the computer network, and some through other means of communications. Teacher leadership can be done by the teachers assisting in preparing the leaders and assist other teachers in playing the roles of a leader, such as to present the training, or act as an expert, or lead in the teaching, etc. Teachers acting as a leader, do not only assist other teachers, but also get some experience in developing their professional themselves.

(4) School administrators should support the learning materials and resources for promoting and encouraging the students to be self taught as well as to motivate skillful search for new knowledge. Learning materials and resources should be served as tools for promoting and supporting management of the learning process for developing analytical thinking, enabling learners to efficiently acquire knowledge, skills, processes and characteristics as prescribed in the curriculum standards. There are several kinds of learning materials and resources, i.e., natural media, print media, technological media and various local learning networks.

School administrators should provide the learning sources or learning material centres, learning information systems and efficient learning networks both in schools and communities for the purposes of study, research and exchange of learning experiences among educational institutions, local areas, communities and the world community; provide and procure learning materials and resources for study and research by learners to whom additional knowledge is given, and utilize duly adjusted locally available materials as learning materials and resources; choose and utilize learning materials and resources of high quality, which are suitable, diversified and consistent with the learning methods, the intrinsic nature of the learning contents and individual differences among learners; evaluate quality of the learning materials and resources selected for use on a systematic basis; study, explore and conduct research for development of learning materials and resources that are appropriate to
the learners’ learning process; and periodically and continuously supervise, monitor and assess the quality and efficiency of the learning media and their application.

(5) School administrators should emphasize the learning management on thinking process. Teachers, instructors and administrators must change their roles from guiding and knowledge transferring to helping, promoting and encouraging learners in acquiring knowledge from various media and learning centres. Teachers have to provide correct information to learners for use in creating their own knowledge. Teachers must, periodically and continuously, focus their attention on individual learners’ total development i.e. body, intelligence, learning methodology, interest and ability. Therefore, different forms and methodologies must be applied in each level learning management, emphasizing actual teaching-learning situation, self learning, group learning, and learning from nature, from actual practice, and integrated learning. Researches must be integral parts of learning processes; similarly, learning academic subject must be integrated with moral issue.

The principles of learning management should focus on learners are most important; all are capable of learning and self-development; priority is given to learners’ benefits; the process of learning management must enable learners to develop themselves naturally to their highest potentiality; consideration must be given to differences among individuals and their brain development; and emphasis must be given to both knowledge and morality.

Learning management should be managed through the learner-centred approach; learners will depend on a variety of learning processes that serve as tools for enabling them to achieve the curriculum goals. Among the essential learning processes for learners are: integrated learning process; knowledge-creating process; thinking process; social process; heuristic learning process; learning process from actual experience; process of actual practice; management process; research process; self-learning process; and process of developing characteristics.

Teachers are required to study the curriculum of the educational institution concerned in order to understand the learning standards, indicators, learners’ major
capacities, desirable characteristics and learning contents suitable to the learners. The teachers then proceed to design learning management by choosing teaching methods and techniques, learning media/resources, and evaluation measures, so as to allow the learners to develop to their highest potentiality and thereby attain the established goals.

(7) School administrators should establish the process of supervision, follow-up and report. There should be jointly responsible to produce learners whose qualifications meet standards and expectation of analytical thinking skills. The instructors must be given opportunities to co-operate, assist, encourage and support planning and implementation of plans to achieve high potential on analytical thinking of students. Supervision, follow-up and report are parts of quality assurance mechanism to meet analytical thinking standards.

Well-established mechanisms for supervision, follow-up and report, the performance and progress of students, classes, the school as a whole, and improvement programmes, are important features of many effective schools. These procedures may be formal or informal, but either way they contribute to a focus on teaching and learning and often play a part in raising expectations and in positive reinforcement.

(8) Research for learning development should be encouraged by the school administrators in order to improve the analytical thinking skills. The research for learning development is the requirement of research procedures consist of series of actions in respective order, namely problem analysis, establishment of plans to solve problems or to

Suggestions for teachers

Teachers play vital roles in mobilizing the students’ analytical thinking skills In order to improve the students’ analytical thinking skills, teachers should play the important roles such as study and analyze individual learners, and then use the data obtained for planning learning management in order to stimulate and challenge the learners’ capacities; set the targets to be achieved by the learners in regard to knowledge, skills, process of conceptualization, principles, relationships as well as desirable characteristics; design and organize learning responsive to individual differences and different levels of brain development, so as to enable the learners to attain the goals of learning; provide an
To create an ambience and atmosphere conducive to learning, and provide necessary care and assistance enabling the learners to learn; prepare and utilize media that are suitable to the activities organized, and avail of local wisdom and appropriate technologies for teaching-learning activities; assess the learners’ progress through a variety of methods suitable to the intrinsic nature of the subjects and the learners’ developmental level; analyze assessment results for remedial and developmental measures for the learners’ benefit, as well as improve their own teaching-learning methods and activities; get involve with students to set the goals of learning, make plans and take responsibility on learning process; seek knowledge, make serious efforts to access learning resources, analyze and synthesize bodies of knowledge; and interact with students, parents, other teachers and community, work and join in activities organized by school; and continuously assess and improve learning process.

Andrew Loh (2011) states that nothing can be more effective in enhancing students’ analytical thinking skills than asking the right type of questions in an easy going manner. Questions that teachers ask should have simple, proper wordings and lead to a mental stimulation of students’ thought process. One of the most important things to remember while asking probing questions to students is to creating questions by using different types or levels or platforms of thinking. Enhancing analytical thinking skills is best performed in a systematic and well calibrated manner. Students will not be ready to think on many aspects of life. Teachers’ main goal should focus at motivating his or her inner level of consciousness.

Council for Exceptional Children (2011) suggested Six Major Thinking Skills for teachers to improve the students’ thinking skills. One of the simplest and easiest ways to develop students’ thinking skills is by wording questions in the right way. When teachers learn to ask questions that stimulate students’ thought processes, learning can be fun for students of all ages. Open-ended and complex thinking allows for multiple responses, unspecified answers, various perspectives and interpretations. This kind of thinking assists students in their quest for greater understanding and responsible, independent inquiry which regarded as equivalent to higher-level thinking. The application of different levels of thinking
can vary by environment. In the general education classroom, most activities take place in the knowledge and comprehension range with few opportunities for more advanced thinking.

According to Bloom's Taxonomy (2011), it is recognized that human thinking skills can be broken down into six categories, knowledge, comprehension, application, analysis, synthesis, and evaluation.

**Knowledge:** Knowledge involves remembering or recalling appropriate, previously learned information to draw out factual (usually right or wrong) answers. Use words and phrases such as: how many, when, where, list, define, tell, describe, identify, etc., to draw out factual answers and test the child's recall and recognition skills.

**Comprehension:** Comprehension involves grasping or understanding the meaning of informational materials. Use words such as: describe, explain, estimate, predict, identify, and differentiate, etc., to encourage the child to translate, interpret, and extrapolate.

**Application:** Application involves applying previously learned information (or knowledge) to new and unfamiliar situations. Use words such as: demonstrate, apply, illustrate, show, solve, examine, classify, and experiment, etc., to encourage the child to apply knowledge to situations that are new and unfamiliar.

**Analysis:** Analysis involves breaking down information into parts, or examining (and trying to understand the organizational structure of) information. Use words and phrases such as: what are the differences, analyze, explain, compare, separate, classify, and arrange, etc., to encourage the child to break information down into parts.

**Synthesis:** Synthesis involves applying prior knowledge and skills to combine elements into a pattern not clearly there before. Use words and phrases such as: combine, rearrange, substitute, create, design, invent, what if?, etc., to encourage the child to combine elements into a pattern that's new.

**Evaluation:** Evaluation involves judging or deciding according to some set of criteria, without real right or wrong answers. Use words such as: assess, decide, measure, select, explain, conclude, compare, and summarize, etc., to encourage the child to make judgements according to a set of criteria.
Suggestions for parents

Parents must help kids learn to assess, evaluate, and see relationships between events and ideas. Parents should encourage children to ask questions about the world around them, listen actively and respond seriously, but without judgement, to the questions they raise. When reading together, ask children to imagine what will happen next in the story. When kids express feelings, ask why they feel that way, ask children to find facts to support their opinions, use TV and other forms of entertainment as the basis of family discussions, use daily activities as occasions for learning. Let children estimate cost and time and guess at how things work, reward children for being curious and creative.

Elizabeth Shaunessy (2010)\textsuperscript{7} explains that parents should also foster analytical thinking at home. Ask questions that lack a single correct answer, and ask them casually, rather than quizzing the child. If the child is interested in social issues, then engage him or her in thoughtful discussions about them. The personality and interests of children are the keys in interacting with them and addressing critical thinking at home. If interacting aloud is not appealing, take a less direct route by observing the child at play, with others or alone, and determine the level of complexity he or she shows during these activities. Parents can use Bloom’s guide, if the child is comparing or evaluating the functions of toys, computer programmes, or social events through phone calls or discussions with siblings or friends. Listening to the child and gauging how he or she makes sense of the world will enable parents to understand what analytical thinking skills the child uses and whether intervention is needed at home to extend his or her level of thinking.

Parents can demonstrate analytical thinking by pondering aloud the most efficient way to do household chores, considering the most economical purchase to make at the grocery store, monitoring the progress toward personal goals, or approaching social issues in community. Describing how to think and solve problems is the best way for parents to instill similar thinking patterns in children. The process of thinking, as well as its uniqueness to each individual, should be emphasized through these interactions. The ultimate goal is for child to employ critical-thinking strategies in everyday life without prompting from parents. Reasoning
at high levels is one of the most valuable skills parents can foster in their children, one that will prepare them for success.

Suggestions for school

In formulating the analytical thinking management strategies and policies, there should be a long-term perspective and do not manage for short-term, but consider cause and effect in the long run. School should continuously develop materials and resources based on the development of analytical thinking skills. Government and school should continuously develop and retain the teachers for highly ability in the global changes. The resources should be effectively and efficiently utilized. Local technologies should be used because they are not expensive. Usually, this technology is developed from local materials and wisdom. Local wisdoms and technologies can bring about strategic advantage and a better ability for teachers.

School should offer the teachers’ information about the technique for improving students’ analytical thinking skills. The teachers should have a part to think and make a decision toward an activity in the context of analytical thinking skills activities. The understanding on technique for improving analytical thinking skills of teachers will lead a success in students.

Assessment is another factor to appraise the level of students’ analytical thinking skills. When the school arranges an activity based on the students’ analytical thinking skills, it should have an assessment in order to appraise the activity. The result could be used to develop and improve for the next activity. Therefore, as the analytical thinking management practices are applied in the school, an assessment should be carried out next so as to improve the application of the management.

5.5 Recommendations for further studies

The following are the recommendations for further study related to the analytical thinking management practices.

(1) There should be a study of analytical thinking management practices: An Application and Impact to Students’ learning achievement and students’ daily life.
(2) There should be a study of barrier and obstacle in managing of analytical thinking management in schools.

(3) There should be a study of factors affecting on students’ analytical thinking management practices in schools.

(4) There should be a study of Model of analytical thinking management practices: An Application to different school levels.

(5) There should be a study of teacher professional development for learning organization on students’ analytical thinking skills.

(6) There should be a study of the analytical thinking management practices: An evidence in every level of educational institutions.

(7) There should be a study of the development of the analytical thinking management practices: An evidence in educational perspective and implementations.

(8) There should be a study of analytical thinking management practices: A Contribution to Happy life and professional Development.
REFERENCES


