International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:9, No:2, 2015

The Attitudes of Pre-Service Teachers towards Analytical Thinking Skill Development Based On Miller's Model

Thassanant Unnanantn, Suttipong Boonphadung

Abstract**—**This research study aimed to survey and analyze the attitudes of pre-service teachers' the analytical thinking development based on Miller's Model. The informants of this study were 22 third year teacher students majoring in Thai. The course where the instruction was conducted was English for Academic Purposes in Thai Language 2. The instrument of this research was an open-ended questionnaire with two dimensions of questions: academic and satisfaction dimensions. The investigation revealed the positive attitudes. In the academic dimension, the majority of 12 (54.54%), the highest percentage, reflected that the method of teaching analytical thinking and language simultaneously was their new knowledge and the similar percentage also belonged to text cohesion in writing. For the satisfaction, the highest frequency count was from 17 of them (77.27%) and this majority favored the openness or friendliness of the teacher.

Keywords**—**Analytical thinking development, Attitudes, Miller's Model, Pre-service teachers.

I. Introduction

IT is highly expected that education reform can be successfully conducted due to human resource development. This is a great potential to better Thailand's competitive performance but, among the selected 60 countries for ranking by IMD, 2013, Thailand was the 51st among them all [1]. Several years until the present, educational organizations have tried many strategies to make the educational system better by focusing on human development. A variety of related policies have been launched and a large amount of budget has been used to facilitate many projects. Nevertheless, achieving the successful development still requires much endeavor and a long period of time to investigate phases of improvement. Therefore, educational reform is prioritized whereby teacher quality is primarily important [2]-[4] added that teacher quality is a factor supportive to successful education as teachers with good competence are, with greater expectation, able to improve learning achievement of students and, then, quality of education effectively. Furthermore, [5]-[7] purposed that well-trained professional teachers are capable of developing the society and educating the young generations with the values of intelligence, virtue and happiness in order to support the country's development.

Further to the Higher Education Development Plan Version 11 [8], educational institutes in Thailand follow the direction of human development for educational reform by doing their curriculum development. This adaptation is conducted with intention to promote the analytical thinking skill instead of memorization and to enhance practical skills instead of theoretical knowledge. Regarding teacher education, these changes are made in order to strengthen teacher students of the nation the character of socially accepted citizen and intelligence for 21st century world community. As a result, the more quality teachers in the society there are, the more possible the successful educational reform is [9]. In addition, there can be more of effective thinkers to direct positive changes to the society and they can be considered as potential mechanisms to move the country forward sustainably.

The obvious pathway to effective educational reform to boost competitive performance of the country is human resource development, especially the quality of teachers, but the challenge of doing so at the tertiary level is analytical thinking improvement [10]. In spite of the difficulty, it is imperative as this is valued as the core that professional teachers must attain for their future instruction, not being indulged in the flow of unscreened information, contemplating social currents knowingly and making better living quality [11]. Due to its importance, [12] unfolded the following reasons ensuring of necessity to grow this ability into the students: (1) The competitive potentials of Thai students are inadequate when compared to those in the global context and (2) They are to be taught to ponder news, information and emerging knowledge before judging, believing and using. To put this realization into practice, several tertiary educational institutes have included this character of intelligence in their curricula [13]. That is, it is highly expected that people well-educated through this thinking skill development must be able to think analytically and reasonably. Reference [14] presented that properties of an analytical thinker are developing his own set of viewpoint towards knowledge or information and contemplating about choice of solutions in case of facing problems. Consequently, a teaching method that can be of a good match to teaching the mentioned thinking skill is to be investigated and, then, applied appropriately.

From several studies in the light of the analytical thinking, researchers and theorists defined a wide range of meanings. From the illustration by [15], the analytical thinking is process of decision making which comprises of reasoning ability and

Thassanant Unnanantn is with the Faculty of Education, SuanSunandhaRajabhat University, BKK, Thailand (corresponding author to provide phone: 6681309-1998; fax: +662160-1057; e-mail: thassanant.un@ssru.ac.th).

SuttipongBoonphadung is with the Faculty of Education, SuanSunandhaRajabhat University, BKK, Thailand (e-mail: suttipong.bo@ssru.ac.th).

reflective thinking. Reference [16] shared more in detail that it is the ability to pinpoint an issue, select appropriate information for implementation, assume a related hypothesis and conclude in a logical manner. An explanation by [15] identified that the ability to convey ideas clinically and evaluate the gained knowledge are altogether the property of analytical thinking. The definition of the analytical thinking by [17] is skepticism, flexibility and ability to learn from or connect to other ideas. Reference [15] also stated that investigating the core of a subject matter and deciding whether to believe or deny it is the feature of analytical thinking. Reference [17] viewed it as the critical evaluation based on available evidence. Reference [16] clarified that the analytical skill is a process string of reasoning and judging according to settled principles. Also, [16] denoted that systematic evaluation with valid standards can also be considered as the analytical intelligence. According to [17], it is maintaining one's aim and directing it to make judgment on the basis of well-considered principles. However, this intelligence property cannot be reached unless the more basic ones at the primary stages are solidified. To make this competence thrive among students, particularly pre-service teachers, systematic instruction and procedural assessment are prospective to be brought into the development process.

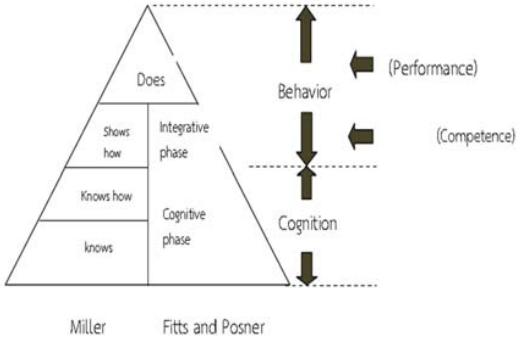

Fig. 1 Miller's Model

From exploration on concepts or approaches of skill teaching, Miller's Model is one of pedagogical methods widely accepted to be used in skill development. This model of instruction contains 4 stages: (1) Knows, (2) Knows how, (3) Shows how and (4) Does [18]-[20]. For the primary step, Knows, it is to pass on knowledge to the students. Any techniques to help them know, memorize or understand are allowed. Knows how is the next step where their accuracy, completion and retention of knowledge will be proved or assessed through activities or assignments, depending on the teacher. After this stage, giving them an opportunity for experiential practice or demonstration refers to Shows how. Lastly, Does is to scrutinize their autonomous performance quality while doing a task. Therefore, once it is adopted, a course will be fully overwhelmed by the string of all these steps starting from cognition, competence and performance, respectively, and crossing over any of these is considered invalid.

The above information reflects the importance of the analytical thinking as a necessary skill to be grounded in the pre-service teacher education. Besides, the systematic teaching method which includes deductive and inductive instruction and open for applying experiential or practical activities can hone the students for this crucial performance. Nonetheless, the effectiveness and efficiency of this skill development cannot be measured by only evaluating achievement in terms of scores but the attitude investigation can also present reflection, satisfaction degrees and useful feedback as a good assistance to further instructional delivery [21], [22]. Hence, this study aims to survey the attitudes of the pre-service teachers using a questionnaire. For the questionnaire design, it was made open-ended for the reason that the informants are allowed to give a diverse set of answers without feeling influenced [23]. Though the answers collected are very various, categorizing and summarizing information can help the analysis more effective and yield accurate results [24].

II. Research Objective

This research aims to survey and analyze the pre-service teachers' attitudes towards analytical thinking skill teaching through Miller's Model.

III. Materials And Method

A. Population

The third and fourth year student teachers majoring in Early Childhood Education, English, Mathematics, Science and Thai were population of this study. Only the Thai majors were comprised of 1 group while the others were classified into 2 for each. All of them enrolled in semester 1 and 2 of academic year 2013.

B. Participants

The informants of this study were 22 third year Thai majors enrolling in semester 2 of academic year 2013 and studying English for Academic Purposes in Thai Language 2. They were purposively selected.

C. Instrument

The questionnaire implemented in this study was made open-ended whereby the questions were written as topics for each part.

As it aimed to survey the attitudes of the informants towards analytical thinking skill teaching based on Miller's Model in the English course, it was classified into 6 parts: gained knowledge, good impression, unclear content, bad impression, further implication and other opinions towards the course. These questioning issues were created in order to collect more information in the broader scopes and made well-balanced among the investigations for (1) what they learned, what they could apply and what they did not understand and (2) what they preferred, what they disliked and what other feelings were. The questions in each part were written in the topic wording.

D.Procedure

The course in which analytical thinking was taught and overwhelmed by Miller's Model instructional process was English for Academic Purposes in Thai Language 2. The analysis of language use and structure (word, sentence and discourse levels) were emphasized in this course. In the final week, all the students were asked to answer the questionnaire and, then, the researcher categorized their written attitudes found in the individual parts according to similarities and differences. The number of comments by the individuals after grouping was displayed as frequency and calculated into percentage.

IV. Findings

The information from the distributed questionnaire was collected and arranged into individual parts and presented in the tabular format.

From Table I, analytical thinking development methods used in language teaching and text cohesion in writing were considered by the majority of the informants, 12 students (54.54%) for each, as new knowledge. Besides, mind mapping for knowledge arrangement and systematic language teaching came the second with the frequency count of 6 students (27.27%) for each. The other pieces of information showed that knowledge from readings, ICT approaches for English self-study and types of constituents were new to the minority proportion, 1 student (4.54%) for each.

Considering knowledge application, half of them, 11 students (50%), agreed that analytical thinking in language learning was applicable and the same number, 11 students (50%), supported employing various formulaic writing techniques. There were the others they found useful and intended to bring into their further application: types of language structure for 8 students (36.36%), mind mapping for knowledge arrangement for 6 students (27.27%), analytical thinking development used in language teaching for 5 students (27.22%), text cohesion in writing for 3 students (13.63) and idea arrangement in pre-writing stage for 2 students (9.09%), respectively.

However, 7 (31.81%) and 2 Thai majors (9.09%) were in doubt of grammar and word choice, relatively. In the part of positive impression from the course, learning activities involving class participation were preferred by the largest number of the students, 12 Thai majors (54.54%), and followed by teacher's assistance after class at the frequency proportion of 7 students (31.81%). Analytical thinking development methods used in language teaching and simple language in explanation were ranked after the previous ones due to the less proportion of 6 Thai majors (27.27%) for each. Next, 5 students (22.72%) favored mind mapping for knowledge arrangement. The satisfaction for various formulaic writing techniques, ICT approaches for English self-study and better translation ability were of the satisfaction of 1 Thai major (4.54%) for each. Though the doubt in the previous part, they had no dissatisfaction towards the teaching methods.

TABLE I
The Frequency and Percentage of the Written Attitudes by the Pre-Service Teachers Participating in Analytical Thinking Development Based On Miller's Model

List of Attitudes	Respondent frequency (N=22)	Percentage
New Knowledge		
Analytical thinking development methods used in language teaching	12	54.54
Text cohesion in writing	12	54.54
Mind mapping for knowledge arrangement	6	27.27
Systematic language teaching	6	27.27
Knowledge from readings	1	4.54
ICT approaches for English self-study	1	4.54
Types of constituents	1	4.54
Further Implication		
Analytical thinking in language learning	11	50.00
Various formulaic writing techniques	11	50.00
Types of language structure	8	36.36
Mind mapping for knowledge arrangement	6	27.27
Analytical thinking development used in language teaching	5	22.72
Text cohesion in writing	3	13.63
Idea arrangement in pre-writing stage	2	9.09
Unclear Content		
Grammar	7	31.81
Word choice	2	9.09
Good Impression		
Learning activities involving class participation	12	54.54
Teacher's assistance after class	7	31.81
Analytical thinking development methods used in language teaching	6	27.27
Simple language in explanation	6	27.27
Mind mapping for knowledge arrangement	5	22.72
Various formulaic writing techniques	1	4.54
ICT approaches for English self-study	1	4.54
Better translation ability	1	4.54
Bad Impression		
N/A	N/A	N/A
Other Opinions towards the Course		
The teacher was open.	17	77.27
The teacher greatly shared facilitation to the students' learning.	8	36.36
The class atmosphere was motivating.	6	27.27
The knowledge on English was very detailed.	4	18.18
The teacher provided so many helpful examples that the students clearly understood.	3	13.63

In addition, the investigation for other opinions in this open survey unfolded the following: 17 and 8 of them (77.27% and 36.36%) had positive attitudes towards the teacher's friendliness and helpful assistance to their learning, enjoyable class atmosphere and detailed language learning were of the preference of 6 and 4 students (27.27% and 18.18%) and 3 students (13.63%) considered providing more of examples to solve their confusion helped them feel more ensured and solidified their understanding.

V. Conclusion

The students involved in this study were 22 undergraduates studying in Thai major and communicative English skills and

analytical thinking to language or text analysis were the focuses that the students were expected to achieve. In conducting this research, a questionnaire was designed to collect 2 dimensions of data: academic dimension and mental dimension. The first was divided into 3 portions: new knowledge, further implication, unclear content. Furthermore, the other aimed to investigate good impression, bad impression and other opinions towards the course.

In the academic dimension of the attitudes, the highest percentage belonged to the majority of 12 (54.54%). They informed that the method of teaching analytical thinking and language simultaneously was newly gained knowledge and the same number of this majority was also for text cohesion in writing in the same portion. For the other dimension, the result revealed there was the highest frequency count from 17 informants (77.27%) who were the majority in the part of other opinions, especially the openness or friendliness of the teacher.

From the percentage and frequency count above in the academic dimension, many learned the very analytical as new knowledge and so was the certain number of them for study skill and true knowledge areas. As they were Thai majors, they may not have been experienced these or may have focused more on general communicative English rather than analysis especially when it came to learning a foreign language. Importantly, these learned ones and related content were also rated practical for further use in their future writing and reading comprehension. However, in case of studying the course unrelated to a pedagogy discipline, it seemed surprising in that it was a new exposure for them to assimilate teaching techniques used in the class no matter what techniques the teacher applied. Their character of being keen on observing or memorizing any teaching method during the attendance may be, in addition, a supportive factor to this new exposure. This possible learning is beyond just the content understanding or learning outcomes stated in course objectives they were expected to achieve. If an instructional technique is effective, their occurred assimilation can be of adequate quality to make use in their future classrooms. In addition, learning by doing through a variety of activities and meaningful content throughout the process of Miller's Model may have been supportive factors portraying them further implementation. However, the understanding of grammar and word choice was needed to be strengthened through frequent use and a greater exposure of English.

Regarding the satisfaction or mental dimension, the feedback was very diverse. They had positive attitudes towards the development in this course. This may have been resulted from several factors related to the course content, teaching method and the teacher's assistance. This course was made digestible whereby mind mapping to teach analysis and collaborative learning activities were added as a good contribution along the stages of Knows, Knows how and Shows how. During the stage of giving a lecture, chunking all the complicated content was also done and it was passed on together with clear examples and detailed explanation for each. However, those having queries were given an extra time by appointment and other online self-study resources plus demonstration were also suggested for further revision and self-improvement. As a result of teaching the analytical thinking and English simultaneously, some of them were satisfied with their better knowledge on English which promoted their translation ability. In the final stage of Miller's Model, Does, they were assigned to write a more complicated and longer piece of writing where they were to retrieve all the knowledge and skills previously gained to complete the final task. Along the process of teaching, in spite of differences in learning speed, background knowledge and learning styles, no one was left behind; therefore, the class was motivating for all to develop themselves and learning the very academic was more approachable for all.

ACKNOWLEDGMENT

This research was supported by Higher Education Research Promotion grant (HERP) and National Research University (NRU), Office of the Higher Education Commission that included of Suan Sunandha Rajabhat University. This attempt could not be successfully accomplished without the kindness of Prof. Dr. Sumalee Tungpradabkul, Assoc. Prof. Dr. Rattana Margee, Assoc. Prof. Dr.Sageewan Thappawasu, Asst. Prof. Dr. Chanon Chuntra, Asst. Prof. Dr. Chanisawara Lertamoarnpong, Asst. Prof. Winith Teakthong, Dr. Araya Lee - Dean the Faculty of Education, and Dr. Wachirasorn Seangsuwan.

REFERENCES

[1] N. Ramasut, and B. Rohitsathien, *Office of the Minister Newsline 212/2013*. Retrieved on 3 July 2013 from http://www.moe.go.th/websm/2013/jul/212.html

[2] S. Boonphadung, "Developing Student Teachers to be Professional Teachers", *International Journal of Social, Management, Economics and Business Engineering*, 2013, 7 (1), pp. 19-25.

[3] A. Aypay, "Teachers' Evaluation of Their Pre-Service Teacher Training", *Educational Sciences: Theory and Practice*, 2009, 9(3), pp. 1113-1123.

[4] E. J. Klein, and M. Riordan, Wearing the "Student Hat" Experiential Professional Development in Expeditionary Learning Schools", *Journal of Experiential Education*, 2011, 34(1),pp 35-54.

[5] J. Y. Fandiño, "Research as a Mean of Empowering Teachers in the 21st Century", *Educ*. 2010, 13(1), pp. 109-124.

[6] A. A. Ifanti, and S. K. Fotopoulou, "Undergraduate Students' and Teachers' Perceptions of Professional Development and Identity Formation: A Case Study in Greece", *Journal of Educational Policy*, 2010, 7(1), pp. 157-174.

[7] L. Lucilio, "What Secondary Teachers Needs in Professional Development", *A Journal of Inquiry and Practice*, 2009, 12 (1), pp. 53-75.

[8] Office of the Higher Education Commission. Higher Education Development Plan Version 11, (2012-2016). Chulalongkorn University Printing House. 1st ed, 2013, pp. 1-80.

[9] P. Seubsang, and S. Boonphadung. "Voice in Pre-service Teacher Development", *International Journal of Social, Management, Economics and Business Engineering*, 2013, 7(1), pp.49-54.

[10] G. L. Geissler, S. W. Edison, and J. P. Wayland , "Improving students' critical thinking, creativity, and communication skills",*Journal of Instructional Pedagogies*, 2012, pp. 1-11.

[11] J. R. Reid, and P. R. Anderson, "Critical Thinking in the Business Classroom", *Journal of Education for Business*, 2012, 88, pp. 52-59.

[12] A. Tripatara,*Handbook of Analytical and Critical Thinking Instruction*. Khonkaen Printing LP. 2nd ed., 2006.

[13] A. Ahern, T. O. Connor, G. McRuairc, M. McNamara, and D. O'Donnell, "Critical Thinking in The University Curriculum- The Impact on Engineering Education", *European Journal of Engineering Education*, 2012, 37(2), pp. 125-132.
[14] C. D. DoĞan, "A Modeling Study about the Factors Affecting Assessment Preferences of Pre-service Teachers", *Educational Sciences: Theory & Practice*, 2013, 13(3), pp. 1621-1627.
[15] L. Incikabi, A. Tuna, and C. A. Biber, "An Analysis Of Mathematics Teacher Candidates' Critical Thinking Dispositions And Their Logical Thinking Skills", *Journal of International Education Research*, 2013, 9(3), pp. 257-266.
[16] M. Kaddoura, "New Graduate Nurses' Perceived Definition of Critical Thinking During Their First Nursing Experience", *Educational Research Quarterly*, 2013.
[17] H. J. Carmel, and J. E. Yezierski, "Are We Keeping the Promise? Investigation of Students' Critical Thinking Growth",*Research and Teacher*, 2013, 42(5), pp. 71-81.
[18] G. E. Miller, "The assessment of clinical skills/ competence/ performance", *Academic Medicine*, 1990, 65(9), pp. s63-s67.
[19] L. Allery, "How to Teach Practical Skills",*Education for Primary Care*, 2009, 20, pp. 58-60.
[20] K. Boursicot, L. Etheridge, Z. Setna, A. Sturrock, J. Ker, S. Smee, and E. Sambandam, "Performance in assessment: Consensus statement and recommendations from the Ottawa conference", *Medical Teacher*, 2011, 33, pp. 370-383.
[21] V. A. Paulins, "An analysis of customer service quality to college students as influenced by customer appearance through dress during the in-store shopping process",*Journal of Retaining and Consumer Services*, 2005, 12, pp. 345-355.
[22] R. Emanuel, and J. N. Adams, "Assessing college student perceptions of instructor customer service via the Quality of Instructor Service to Students (QISS) Questionnaire",*Assessment& Evaluation in Higher Educ.*, 2006, 31(5), pp. 535-549.
[23] W. Foddy, *Constructing Questions for Interviews and Questionnaires: Theory and Practice in Social Research*. Cambridge: Cambridge University Press, 1993.
[24] E. Taylor-Powell, "Questionnaire Design: Asking questions with a purpose", *University of Wisconsin-Extension: Co-operative Extension*, 1998.

Thassanant Unnanantn was born in Bangkok, Thailand. He was awarded his Bachelor Degree in English from Faculty of Humanities and Social Sciences, Phranakhon Rajabhat University, Bangkok, Thailand, in 2001. In 2006, he obtained his Master's Degree in Business English for International Communication from Faculty of Humanity, Srinakharinwirot University, Bangkok, Thailand. At present, he is a doctoral candidate in Curriculum and Instruction at Faculty of Education, Kasetsart University. About his work, he worked at Faculty of Humanities and Social Sciences, Suan Sunandha Rajabhat University as a lecturer of English from 2007 to 2009 and has been working for Faculty of Education since 2009. His recent research study was "The Development of Analytical Thinking Skill of Teacher Students at Suan Sunandha Rajabhat University Using Miller's Concept", granted by Higher Education Research Promotion (HERP) and National Research University (NRU), Office of Higher Education Commission including Suan Sunandha Rajabhat University, 2013. Besides, his academic service projects and lectures by invitation in the recent years were conducted and delivered in the areas of classroom research knowledge development, test construction and assessment, English teaching methods and curriculum development and he was also invited as a judge to English speech contests. For his research interests, they involve English communicative skill development, automaticity and language learning, English curriculum development and technological approaches for English teaching and learning.

Suttipong Boonphadung was born in Bangkok, Thailand on July 3rd, 1968. In 1990, he obtained his first degree of Bachelor of Education (Honors) from Suan Sunandha Teacher College, Bangkok, Thailand. Then in 1997, he furthered his studies in Educational Measurement (M.Ed) at Srinakharinwirot University in Bangkok, Thailand. In 2006, he graduated Doctorate in Curriculum and Instruction from Kasetsart University.

Today, he is a lecturer in Curriculum Design and Instructional Theory, Applied Mathematics, Mathematical Modelling, and Research for Learning Development at Suan Sunandha Rajabhat University, Bangkok, Thailand. Since 2008, he is also the Head of the Department of Master of Education Program in Curriculum and Instruction at Suan Sunandha Rajabhat University. Main research topics concern the principle of educational measurement and evaluation, the development of learning management, teaching for thinking skill enhancement, the development classroom action research for pre-service and in-service teachers. Recent studies include Sustainable Development of the Life Quality for the Elderly by Applying Sufficiency Economy-Based Schooling (South Korea, Jeju Island: Education and Management Technology, 2012), Life Long Education: Professional Development Guideline for Partnership in Practicum Placement of English Teacher Candidates in Suan Sunandha Rajabhat University (South Korea, Jeju Island: Education and Management Technology, 2012), and The Effects of Cooperative Groups as Communicative Language Teaching Techniques for Teaching Grammar to English Teacher Candidates in a Rajabhat University (South Korea, Jeju Island: Education and Management Technology, 2012)Developing Student Teachers To Be Professional Teachers (World Academy of Science, Engineering and Technology 73, WASET Switzerland 2013), and Voice in Pre-service Teacher Development (World Academy of Science, Engineering and Technology 73, WASET Switzerland 2013). ARCS for critical information retrieval development (World Academy of Science, Engineering and Technology 81, WASET Singapore, September 2013).