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

Miller's Model for Developing Critical Thinking Skill of Pre-Service Teachers at Suan Sunandha Rajabhat University

Suttipong Boonphadung, Thassanant Unnanantn

***Abstract*—**This research focused on comparing the critical thinking of the teacher students before and after using Miller's Model learning activities and investigating their opinions. The sampling groups were (1) fourth year 33 student teachers majoring in Early Childhood Education and enrolling in semester 1 of academic year 2013 (2) third year 28 student teachers majoring in English and enrolling in semester 2 of academic year 2013 and (3) third year 22 student teachers majoring in Thai and enrolling in semester 2 of academic year 2013. The research instruments were (1) lesson plans where the learning activities were settled based on Miller's Model (2) critical thinking assessment criteria and (3) a questionnaire on opinions towards Miller's Model based learning activities. The statistical treatment was mean, deviation, different scores and T-test. The result unfolded that (1) the critical thinking of the students after the assigned activities was better than before and (2) the students' opinions towards the critical thinking improvement activities based on Miller's Model ranged from the level of high to highest.

***Keywords*—**Critical thinking, Miller's model, Opinions.

I. Introduction

HUMAN resource development is one of supportive factors to help education reform successful and it does make an expectation to leverage the competitive performance of our country but the ranking result by IMD, 2013, revealed that the quality of Thai education was ranked at 51st among 60 countries [1]. This reflection shows that the effort of the Thai education system still has not reached success in human potential development. Evertson et al. informed that the competency of teachers also plays an important role in driving the educational system to success because the more professional teachers are, the better learning achievement students can reach [2]. Then, this improvement can effectively support the educational quality development [3], [4]. Moreover, according to the expectation of the society, the property of being professional teachers is valued as a mechanism to make progress to the society and hone the students for being human resources with intelligence, virtue and happiness to be the mainspring in the society and country development [5]-[7].

Regarding the single-minded resolve for educational improvement, the year 2011 was determined by the Ministry of Education's announcement as the Year of Teacher's Quality Development [8] and the period of the year 2013 onwards was also announced by the minister of education as the years of empowerment for successful educational quality enhancement. To take it into action, he proposed the aim to ground critical thinking, self-regulated learning, socially accepted characters and 21st century skills to students and declared the aim on human resource development which was an important agenda for education and reform [1]. In the framework of educational reform promotion in a total scale, since the development of pre-service teachers can help accelerate the reform's success, it has been determined as a subject matter of the Higher Education Development Plan Version 11 which underlines the roles of educational institutions to do more on strengthening the critical thinking skill than memorization and to ground more practical working skills than learning theories [8]. For sustainable and worthwhile efficiency, teachers' performance improvement is absolutely crucial and needs to be taken action continuously. As a consequence, the Faculty of Education, having been responsible for teacher education as a key mission to serve the country, has a strong intention to grow the property of thinking intelligence into the students, especially to prepare them for the 21st century world of work.

According to the research studies by Peter D. Hart Research Associates, Inc., and Ackerman, Gross, and Perner, fulfilling the character of critical thinker to the students has long been a great challenge as this ability is important for them to keep up pace of the world knowingly and to deal with several matters in their lives smartly [9], [10]. Phillips and Bond added that the critical thinking is one of the cognitive intelligence and, as a result, has been included in curricula for complete development in class [11]. Reference [12] proposed the necessities to teach the critical thinking are derived from important aspects. The first point is that, in the global arena, the Thai students' thinking skills were found inadequate when ranked by international standards. The other indicates that, due to the rapid widespread of current information and newly emerging knowledge in the advanced communication technology era, the critical thinking to filter and digest them is a must to ground. Therefore, Pintrich et al. indicated that individuals with well-trained critical thinking always focus on facts and make an effort to produce a variety of solutions when facing problems [13].

From several dimensions of critical thinking significance, teaching methodology is to be consequently adapted to hone

Suttipong Boonphadung is with the Faculty of Education, Suan Sunandha Rajabhat University, BKK, Thailand (corresponding author to provide phone: +6687700-1348; fax: +662160-1057; e-mail: suttipong.bo@ssru.ac.th).

Thassanant Unnanantn is with the Faculty of Education, Suan Sunandha Rajabhat University, BKK, Thailand (e-mail: thassanant.un@ssru.ac.th).

the students for possessing the characters as described in National Education Act of 1999 in which thinking skill development, critical thinking for problem solving and creative thinking to better communities are emphasized. Likewise, Park informs that the property of well-educated individuals is to definitely possess critical and creative thinking as these help accelerate the progress to workplaces and careers. Importantly, the leadership skill for the future should also be taught and included as another dimension in the educational system [14].

With this realization, to enable the critical thinking support to prepare the students for the coming 21st century [15], its meaning and concept are to be primarily understood [16] but, actually, it is difficult to make the only one standard meaning and concept for that ability as there is a variety of different definitions and views from several researchers [17], [18]. An example to this is the meaning of its components. Gill and Burke informed that the critical thinking is the analytical evaluation when considering obvious evidence [19]. Herreid proposed that the critical thinking is curiosity, flexibility and ability to consider other ideas [19]. Lauer referred to Bloom's cognitive domain to define that the critical thinking sequentially starts from analysis, synthesis and evaluation [19]. White et al. defined it as maintaining an aim and independently making a decision or judgment with principles [19]. Ennis explained this ability is to delve into a subject matter and judge whether to accept or not. Johnson stated about this intelligence that it is to express an idea with an ability to scatter, classify and, then, evaluate the information [20]. Norris and Ennis mentioned it on the basis of logic and presented that it is the process of decision making in which reasoning and reflexive thinking are involved [20]. Vaughn defined that this cognitive property is a systematic and standardized evaluation. De-Young illustrated that it is an ability to identify problems, make use of knowledge or information to solve, make consistent hypotheses and create reasonable conclusions [18]. Facione gave a definition that it is process of giving reasons and make judgment on belief or action with principles [18]. In CCTST (California Critical Thinking Skill Test), it is pinpointed that the components of critical thinking assessment are interpretation, analysis, criticism, discussion, evaluation, deduction, induction and logic. Though, the differences above, these lead to some clarification and point out the direction of the critical thinking concept, a method of critical thinking development as well as assessment instrument design [16]. This is supported by [21] in that the great challenge to teach critical thinking is methodology and assessment. These important aspects on instructional design will be answered through literature review of thinking [11].

Of all teaching methodology for skill development, Miller's Model unfolds clear instructions of assessing and evaluating learners' skill improvement [22]-[24]. This teaching model starts from giving knowledge (Knows), checking understanding (Knows how), giving an opportunity for demonstration or hands-on practices (Shows how) and examining the quality of hands-on tasks or projects (Does). Furthermore, in supporting the retention of critical thinking, it is proved that group discussion, experiential practices, and instructional activities help maintain the learning retention at moderate to highest level at the percentage of 50, 75 and 90, relatively [25]. From the above reasons and advantages of the critical thinking, it is crucial to fulfill the character of an intelligent thinker among student teachers in order to become quality teachers. Above all, these quality teachers are, then, expected to leverage the quality of Thai education to become excellent among those in the global context.

II. Research Objectives

The objectives of this research were:

1) To analyze and compare the critical thinking of the student teachers of Suan Sunandha Rajabhat University before and after applying Miller's Model learning activities.
2) To investigate the student teachers' opinions towards Miller's Model learning activities in improving their critical thinking.

III. Conceptual Framework

To enhance the critical thinking of the students, Miller's Model was implemented. In Fig. 1, it is based on the steps of performance and the assessments that can be taken in each. Also, the cognitive and integrate progress are made orderly interrelated whereby the stage of teaching knowledge, understanding, principles and application are primarily underpinned and followed by experiential practices where all the actions or performance reflecting the critical thinking are scrutinized. In this concept, this study focused on the outcomes in terms of knowledge and practices observed along the process of critical intelligence.

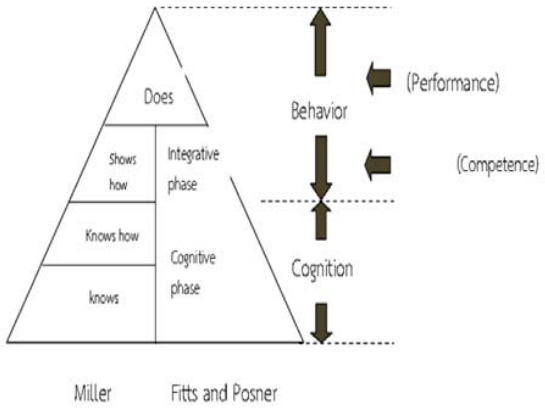

Fig. 1 Conceptual framework

In building the retention of the critical thinking, there is evidence showing that running activities can promote the learning retention at the levels of moderate to highest. Dale's research study indicated that the least effective teaching method, auditory approach, is organized on the top of the Cone of Experience while the most effective one refers to

learning from hands-on experience for practicality in real life, placed at the lowest [26].

Its usefulness enables the learning retention to reach 90%. However, the Cone of Experience by Dale refers to learners while Fig. 2 [25] refers to effect of teaching methods to learning. This figure clarifies that the upper four approaches are deductive while the lower three are inductive. Reference [27] claimed that the retention differences between the deductive and the inductive instruction can be considered from learners' reflection and prudent cognitive process. So, Fig. 2 clearly shows that Discussion, Practice by Doing and Teaching Others help the learning retention rate soar to 50%, 70% and 90%, respectively

Fig. 2 Learning activities supporting learning retention

In this research, Miller's Model was employed as a principle to develop the critical thinking of the student teachers whereby they normally studied the content of the courses they had registered and these were taught by the individuals of the research team. The students were assigned to participate in group discussions, practice tasks, and peer-to-peer teaching to help those underperformed. As a consequence, their critical thinking would be sustainably leveraged through the range of these effective instructional strategies.

IV. Methodology

A. Setting and Participants

The population of this study was student teachers studying in third and fourth years majoring in Early Childhood Education, English, Mathematics, Thai and Science. They were classified into 9 groups, enrolled in semester 1 and 2 of academic year 2013.

The 3 groups of the teacher students were purposively selected: one group of fourth year Early Childhood Education majors, 33 students, enrolling in semester 1 of academic year 2013 and each one of third year English and Thai majors, 28 and 22 students, enrolling in semester 2 of academic year 2013.

B. Procedure

The procedure of this research is as follows:

1. The difficulties and levels of the critical thinking of the third and fourth year Early Childhood Education, English and Mathematics majors were surveyed and the information, both individual and overall, was collected.
2. The supplementary documents for the researchers' courses were designed and created on the basis of Miller's Model, starting from Knows, Knows how, Shows how and Does, to systematically develop the critical thinking of the sampling groups.
3. After running the activities following Miller's Model, the critical thinking of the participants in each of the enrolled courses was assessed through the planned practical activities.
4. The attitudes towards learning activities based on Miller's Model: opinion sharing, group discussion or interview and content analysis to reach a conclusion were investigated.
5. The overall results of this research were concluded.

V. Findings and Conclusion

1) The participants involved were 83 student teachers: 33 fourth year Early Childhood Education majors, 28 and 22 third year English and Thai majors, relatively.
2) The analysis and comparison results of the Early Childhood Education majors revealed the following:

2.1. The critical thinking score of the students after using the range of Miller's Model based learning activities were higher than before (t=10.01, Sig=.000). The average score and deviation of the critical thinking before the activities were 2.17 and .531 while after teaching, their average score and deviation increased to 3.76 and .742, respectively. Measuring the skill with the standard evaluation of 70% (3.50) and 75% (3.75) unfolded that this skill was rated higher than 70% but not better than 75%.

2.2. The critical thinking scores of 28 English major students were recorded at each steps of Miller's Model and there were progress at each step. In the first learning activity, the pre-test score was 5.89 out of 20 while the post-test score was 15.93 out of 20 and the difference was 10.04. In the latter activity, the pre-test score was 7.5 out of 20 but the post-test score was 17.53 out of 20. Therefore, the difference was 10.03. In the third assessment, the pre-test score was 7.14 out of 20 whereas the post-test was 17.28 out of 20 and these made the difference of 10.14. In the final activity designed as a project-based one, it was found that the overall critical thinking soared to the very high level (more than 90% or 13.5 points) and the average score was 13.86 out of 15.

2.3. For the Thai majors, the results were measured and calculated into percentage. In the stage of gaining knowledge (Knows), a wide range of result percentage and the number of students for each were: 97 for 1 student, 95 for 2 students, 94 for 2 students, 93 for 2

students, 92 for 2 students, 91 for 4 students, 90 for 2 students, 88 for 2 students, 87 for 2 students, 86, 85 and77 for each one of the rest.

In the stage of explaining knowledge plus demonstration (Knows how), five of them made an improvement to the percentage of 90 and there was only one who had an increase to 80. Among all of the rest, 16 students made a decrease in percentage: 90 for 6 students, 80 for 8 students and 60 for 2 students. Showing their competency to analyze formulaic written tasks or paragraphs was the next step of the instruction (Shows). The result percentage of all soared to the percentage of 100.

The final stage was to analyze essay structures which were more complicated than the paragraphs (Does). The students were to do promptly oral analyses and answered the researcher's analytical questions. In this stage, they all were not informed in advance for preparation. The result showed that 7 students still maintained their 100 while the other 15 made a slight decrease to 90.

3) The opinion investigation of the sampling groups towards the instructional activities based on Miller's Model was conducted by using questionnaires, in-depth interview and individual/group discussion with the students. The result was as follows:

3.1. The Early Childhood Education majors had a positive attitude towards teaching critical thinking through the process of Miller's Model. They were satisfied with the teaching methodology and peer-to-peer review as it helped increasing mistake awareness and was resourceful for improving their assigned work and fulfilling their research ability.

3.2. The English major participants' attitude towards teaching critical thinking through the process of Miller's Model was also positive. They were satisfied with the teaching methodology and knowledge sharing in group activities. In addition, the feedback from their instructor and this experience were greatly applicable to their internship.

3.3. For the Thai majors, their frequency of critical thinking and behavior were investigated. The result disclosed that the frequency was rated from moderate to the highest level. In the first part of the survey, pre-task, the majority of the students (approximately 45%-68%) made the highest frequency in the items as follows: 15 students (68.18%) planned before doing an assignment, 12 students (54.55%) determined a topic sentence/main idea, 11 students (50%) organized information, 10 students (45.45%) planned for information search and 10 students (45.45%) checked the accuracy of details.

In the second part, language use and analysis, the majority of approximately 50% of all made the high frequency in the following items: 13 students (59.09%) checked the accuracy of language, 12 students (54.55%) checked the accuracy of punctuation and 11 students (50%) drafted an assignment in English.

In the part of behavior in learning and doing assignments, the majority of 50% made up the high frequency. The result showed that 13 students (59.09%) considered peers' comments and teacher's feedback before decision, 13 students (59.09%) made an analysis based on reliable sources and 12 students (54.54%) made a conclusion without bias.

VI. Discussion

1) The learning activities placed in the four steps of Miller's Model (Knows, Knows how, Shows how and Does) helped enable the critical thinking of the sampling group. In conducting the activities, the assessments were arranged in each step in order to test the participants' knowledge in terms of accuracy, comprehension and provable sources. Dawson also supported that learners should be trained to think rather than to memorize and encouraged to be skeptical or investigate for evidence rather than being totally overwhelmed [21]. Furthermore, the Shows how and Does of Miller's Model helped the sampling group see the prospect of using knowledge and, then, fortify their knowledge application in the real world. To clarify, the teacher students of this study were exposed to a proactive approach of learning to solidify their competence and to enhance the retention of knowledge and skill for the future profession [26]. That is to say, the ultimate advantage of designing hands-on experience activities along each steps of Miller's Model was the students' longer-lasting retention of learning and performance for the future work.

However, Miller proposed that the competence observation in a classroom or a situation can portrait a student's performance in an authentic context but it does not cover other problems or factors in a workplace that might impact and the concern of whether learning outcomes in a class are an adequate predictor to the performance quality in a real situation or not as there are various aspects that cause difficulties in measuring validity and reliability. Consequently, an important role of an instructor is to research for more suitable teaching methods, assessment and measurement to better the learning achievement.

2) The satisfaction of the informants was positive because most of them reflected that they were impressed with the teaching techniques and gained more knowledge and skill from Miller's Model based instruction. Therefore, this impression caused changes in their learning behavior in terms of being more autonomous and more assertive in sharing different ideas. Once these grow in them, they will become life-long characters of a smart learner which support life-long learning effectively.

VII. Recommendations

A. Recommendations for Implementation

1) To design instructional activities along the 4 steps of Miller's Model, the details and principles of each step are a must to be thoroughly understood for the consistency and the quality of teaching. For the utmost advantage to students, discussion, knowledge sharing and collaborative learning should be included to make the students realize the importance of a subject matter, enable them to explore

and discover several dimensions of knowledge and develop related academic skills for application and knowledge extension in the future.

2) Since the activities systematized along Miller's Model successfully nurtured the participants' characters of professional teacher, for example, critical thinking, reasoning, argumentative discussion, reliable data source concern, pondering and making a reasonable conclusion, this model should be further used as a framework for developing the critical thinking of the teacher students. When they possess the skill, it will also be passed on to their future pupils. Then, it is expected that more of people with higher order thinking will be able to leverage the quality of Thai education and make progress to the nation.

B. Recommendations for Further Research

1) Besides Miller's Model, which allows several activities to be used in each step, has a focus on assessment in each learning step and has an aim on knowledge application, there are factors supporting better learning outcomes and one of these playing an important role is motivation. It can be promoted through several methods, namely, Bandura's Theory-based instruction or collaborative learning. These can also lead to knowledge and skill development and make more positive attitude towards learning. Therefore, the proposed teaching methods should be brought into research to leverage students' thinking quality.
2) As the critical thinking is an intellectual property of professional teachers, this intelligence should be made life-long competence. When the students possess this life-long skill, they will have a cognitive ability to analyze, judge and evaluate information around them knowingly and insightfully. As a result, learning activities that are made suitable to the nature of mature learners should be employed to teach the teacher students a variety of courses in order to strengthen their critical thinking skill.
3) Factors related to critical thinking development and learning retention through the teaching process of Miller's Model should be investigated to prove the effectiveness and the efficiency of practicality-based activities.
4) In-depth research should be conducted to leverage necessary skills for being a professional teacher as they can fulfill the teacher students' teaching quality and lead them to progress in future career.

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 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. Dr. 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] A. Aypay, "Teachers' Evaluation of Their Pre-Service Teacher Training", *Educational Sciences: Theory and Practice*, 2009, 9(3), pp. 1113-1123.
[3] 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.
[4] S. Boonphadung, "Developing Student Teachers to be Professional Teachers", *International Journal of Social, Management, Economics and Business Engineering*, 2013, 7 (1), pp. 19-25.
[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] 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.
[10] J. R. Reid, and P. R. Anderson, "Critical Thinking in the Business Classroom", *Journal of Education for Business*, 2012, 88, pp. 52-59.
[11] A. Ahern, T. O. Connor, G. McRuairc, M. McNamara, and D. O'Donnell, "Critical Thinking in TheUniversity Curriculum- The Impact on Engineering Education", *European Journal of Engineering Education*, 2012, 37(2), pp. 125-132.
[12] A. Trirat, *Handbook for Teaching Critical Thinking*, KhonKaen University, 2nd edition, 2006.
[13] 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.
[14] T. Jiriyasin, Critical Thinking Skill in The 21st Century, Translation from the Material of Prof. Dr. Park, Jin Whan, 2013.
[15] Partnership for 21st Century Skills, P21 framework definitions. Retrieved from http://www.p21.org/documents/P21_Framework_Definitions.pdf
[16] D. L. Hatcher, "Which Test? Whose Scores? Comparing Standardized Critical Thinking Tests New Directions for Instructional Research, no. 149", *Wiley Periodicals Inc*., 2011.
[17] M. Fahim, and M. Pezeshki, "Manipulating Critical Thinking Skills in Test Taking", *International Journal of Education*, 2012, 4(1), pp. 153-160.
[18] M. Kaddoura, "New Graduate Nurses' Perceived Definition of Critical Thinking during Their First Nursing Experience", *Educational Research Quarterly*, 2013.
[19] 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.
[20] 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.
[21] J. W. Mulnix, "Thinking Critically about Critical Thinking", *Educational Philosophy and Theory*, 2012, 44(5), pp. 464-479.
[22] G. E. Miller, "The assessment of clinical skills/ competence/ performance", *Academic Medicine*, 1990, 65(9), pp. s63-s67.
[23] L. Allery, "How to Teach Practical Skills",*Education for Primary Care*, 2009, 20, pp. 58-60.
[24] 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.

[25] The National Training Laboratories, Bethel, Maine, Retrieve from http://rising.blackstar.com/dont-just-talk-to-your-audience-engage-it.html
[26] H. Anderson, Dale's Cone of Experience, 2004, Retrieved from http://www.etsu.edu/uged/etsu1000/documents/Dales_Cone_of_Experience.pdf accessed on 2013-06-20
[27] J. Hall, Teaching Methods and Retention, 2012, Retrieved from http://www.simulations.co.uk/pyramid.htm

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, 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).

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 Critical 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.