Report on Research and Development of Science, Mathematics, and Computer Teachers through English for Integrated Studies Leading to International Standard of the Schools within EIS (English for Integrated Studies) Networks

Montree Yamkasikorn*

montree.go@buu.ac.th

LC Pongtep Jiraro**

Wilawan Phothong ***

ABSTRACT

This research project is called the Project for Development of Science, Mathematics and Computer Teachers through English for Integrated Studies (EIS) Leading to International Standard of Schools within the EIS Network. This teacher development project aims to develop teachers' competencies in managing student's learning abilities through EIS via the use of electronic communication system. The target group participated in this research were teachers from the school under guidance of the Office of the Basic Education Commission. The selected schools are those that use English for Integrated Studies as part of the lessons. There were 528 participants which are teachers from 3 different subjects, namely, mathematics, sciences and computer. The research procedure was divided into 4 phases: Phase 1: Development of EIS system via electronic communication, which included revision of relevant documents for designing the e-CLIP system by 14 experts; Phase 2: Readiness preparation for implementation of teachers' competencies development projects, which focused on development of an implementation handbook, and assessment and evaluation instruments; Phase 3: Implementation of teachers' e-CLIP competencies development project; and Phase 4: Results reflection and evaluation of the implementation, which contained

*Associate Professor in the field of Educational Technology, Director of Teacher Professional Development Institude

**Assistant Professor in the Department of Research and Applied Psychology, Faculty of Education, Burapha University

***Full-time lecturer at School of Education, University of Phayao

the following up of results by the research team. A combination of methods of quantitative and qualitative research approaches were carried out from September 2014 to March 2015.

The research results revealed that the development of learning management system through content and language integrated pedagogy via electronic communication system consist of 5 steps. 1) team building 2) establish common goals 3) design and plan activities to achieve the set goals 4) implement the planned activities and observes lessons and 5) conclusion of action plans and reflection. More importantly, evaluation of learning management implemented in classroom had contributed to practical policy recommendation that lead to future use and study of English for Integrated Studies (EIS) via electronic communication system.

Keywords: Lesson study research, English for Integrated Studies, e-CLIP

Rationale

Teachers and educational personnel are the most important factors to drive the impact and effectiveness of education reform of the Office of Basic Education Commission. These reforms are applied in order to achieve the goals set by the policy which aim to enhance education quality and establish readiness for the ASEAN Community and global society. The global society in the 21st Century is particularly focused on the advance of technology and economic competition. It is thus necessary for Thailand to train and develop Thai youth to be equipped with knowledge, competencies, skills, aptitude, and readiness to enhance development standard of the country. Hence, in order to advance the student quality, it requires contribution from the educational reformation of personnel in all sectors, provision of sufficient learning resources, and betterment of students' academic achievement in order to set Thailand's educational standard at higher ranking internationally.

The Office of Basic Education Commission (OBEC) has operated learning management based on the approach of innovation development in learning process which is English for Integrated Studies or EIS. It is a learning innovation that encourages the role of teacher in development of school curriculum, Instructional process, instructional media, and new approach of assessment and evaluation process. These important functions in school are focused on the learning behavior based on EIS principles. EIS is an innovation of learning process which can be managed through bilingual instruction relying on self-support principles. In addition, EIS develops the core of knowledge from practices in real situation and development of the new approaches for teacher training system. For instance, the technique of bilingual communication by integrating the uses of simple English vocabularies and sentences in class, applying the use of familiar English via media, learning through teachers' owned-designed learning management, participating in

conversation and discussion activities, opinion exchange in classroom/school. These methods are applied based on integrated basic education curriculum which aim to connect activities in school with the value of internationalization and creating networks for learning through the use of technology.

In addition, the theory emphasizes on the principle of learner-center which evolve around the basis of PIL principle which are P: Participation; I: Integration; L: Learning. Also, the supervision of the instruction is done by instructional leaders taking the role of coaching and mentoring, including the system of following up of performance and outcomes through P-D-C-A Cycle. To help visualize the application of EIS, in the case of science, mathematics and computer classrooms, the use of English language can be applied with the emphasis of subject contents, learning skills, and language altogether. It is an instruction related with basic knowledge, skills, and learners' attitude, or an experience-oriented approach. In the content and language integrated learning classroom, teachers will insert English language by teaching vocabulary and subject contents to lead the learners into achieving instructional activities in a concrete form. Teachers are the facilitators of subject contents and language at the same. When the learners encounter obstacles in language for communication, the teachers will have an opportunity to participate in response to the learners' need for using language in the real context occurring during instructional activities.

The teachers will take into consideration the learners' foundation in both subject contents and language. Therefore, revision and repetition, which might take a long time, are necessary for English language learning to be efficient but promising to be effective. Consequently, it is essential to set up researches project on the development of science, mathematics, and computer teachers' competencies within EIS schools network. Hence, the research topic will be Teachers Competencies development on Content and Language Integrated Pedagogy via Electronic Communication system: (Teacher's E – CLIP Competencies Development (Teachers' E-CLIP competencies development) within EIS network.

English for Integrated Studies (EIS) is an instructional approach for integration of subject contents with English language skills. This module will set a a natural environment of learning English in classroom which can be used effective for daily life. The main elements of applying EIS comprise: (1) Knowledge and understanding of learning objectives of the curriculum; (2) Learning management strategies; (3) English contents in accordance with the subject being taught; (4) Teachers' fluency in English; and (5) Evaluation for development. All of these five components are the core competencies that the teachers must possess, which can be developed through the procedure comprising at least 2 steps: Direct training, and implementation based on led - evaluation.

Direct training is basically done by instructional activities in the form of lecture, seminar, self-study and review. Also, the set of classroom environment that would facilitate learning that lead to taking action as well as studying from the best practices. All of which are done through the integration of English in subject content. This Direct training method would contribute to developing teachers' background knowledge of the subject, understanding of learning objectives of the curriculum and management strategies as well as know more of English contents relevant to subject, and well equipped with evaluation method for futher development

Implementation based on led-evaluation will contribute to the Change of Teachers' Behavior which follows the so-called Quality Cycles. The idea behind this cycle begins with the setting of goals and planning by the teach, follow by evaluating teaching performance in classrooms and then reflection of implementation. After, the teachers will plan for the new class by using the lessons of last implementation as a basis for new planning. This cycle will repeat itself with on-going enhancement of teaching and learning quality.

Teacher development based on the Research and Development Project of Content and Language Integrated Pedagogy via Electronic Communication System: e-CLIP is aimed at enhancing the teachers' competencies in designing, organizing and implementing instructional activities in classroom based on the concept of subject content and English language integrated pedagogy via electronic communication system.

Research Objectives

Primary Objective

To enhance the teachers' learning management competencies for students through subject content and English language integrated pedagogy via electronic communication system (Teachers' E-CLIP competencies development).

Secondary Objective

1. To develop the system of learning management through the integration of English in teaching subject content by utilizing electronic communication system.

2. To equip the target group of teachers with important skills prior to the implementation of content and language integrated pedagogy via electronic communication system or the application of EIS module.

3. To implement the system of content and language integrated pedagogy via electronic communication or the application of EIS module.

4. To evaluate the implementation of content and language integrated pedagogy via electronic communication or the application of EIS module.

5. To develop and able to offer policy recommendations for learning management development through content and language integrated pedagogy via electronic communication or the application of EIS module.

Literature Review of relevant document and researches

There are numbers of approaches and theories that aim to quality of management of learning process through the integration of English language in classes via electronic communication system;

1. Lesson Study Approach

2. Education Research and Development

3. English for Integrate Studies: EIS

4. Approaches Theories and Research works that support the module of Teacher Development based on EISC

5. Content and Language Integrated Learning: CLIL

6. Google Apps for Education (New tool for Education in Thailand)

7. Learning through solving problems

Procedure

1. The stage of development of system of learning management through content and language integrated pedagogy via electronic communication system

The objective of this stage is to review relevant literature, principles and theories relating to EIS, psychological principles and other related documents in order to create a fundamental model, including a critical review by 14 experts.

2. The stage of emphasizing on ensuring clear preparation and solid readiness of the system, work plans and the teachers before engaging into teacher's development training program.

This stage focuses on communicating and preparing background information of the target group, developing a handbook for implementation guideline, organizing the training for teachers and personnel concerned with learning management through content and language integrated pedagogy via electronic communication system, including providing supplementary experiences to create confidence in using English for teachers, mentors, and administrators by providing a study visit and English training in Singapore.
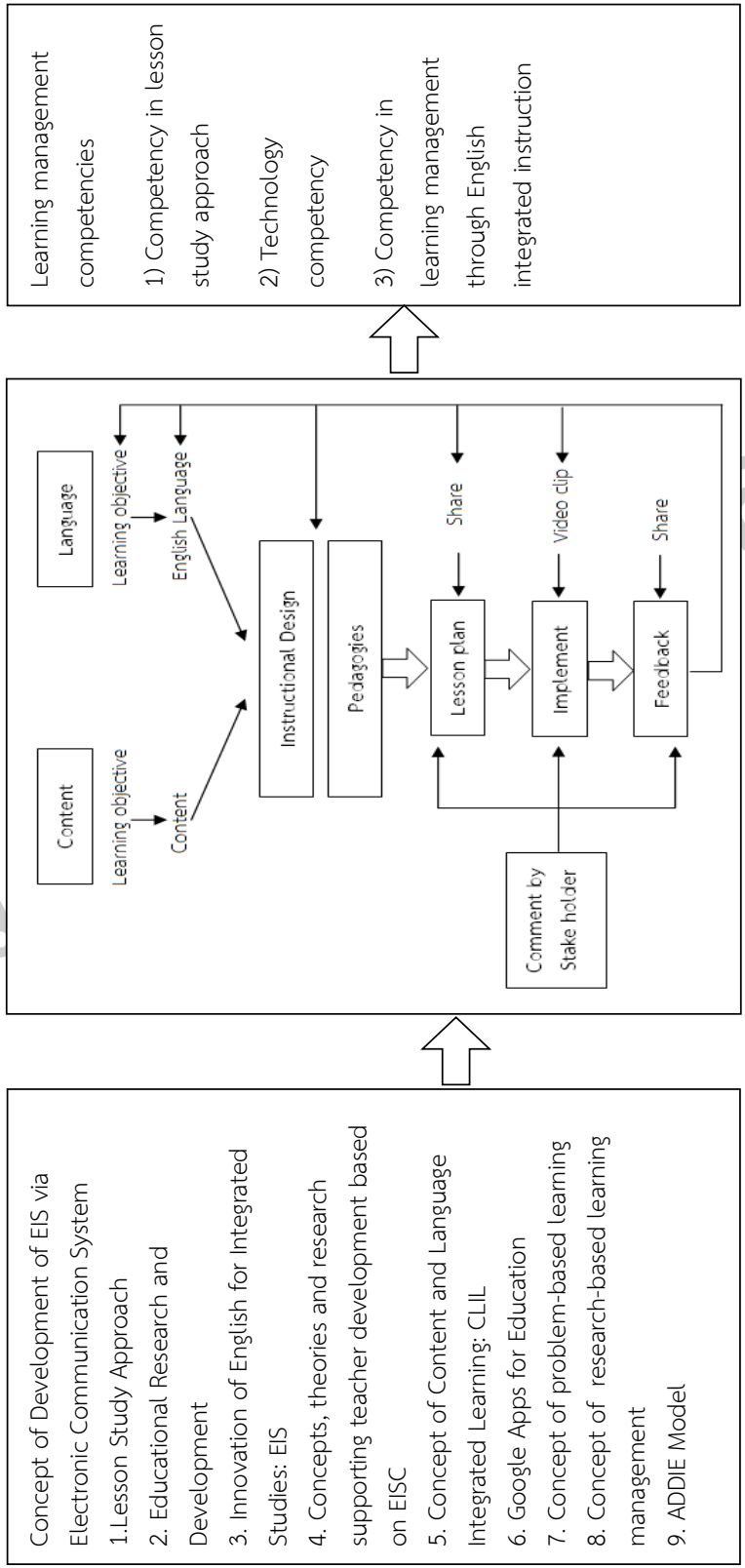
3. The stage of implementation of teachers' E-CLIP competencies development

This stage aimed at implementing the model of teachers' e-CLIP competencies development. This stage involves arranging training program according to the developed e-CLIP model. The program will cooperate with the schools and the teachers participate in the project under voluntary bases. They will be informed with training detail. They will be taking pre-test as well as post-test examination for the comparison of teacher's competency improvement. They will, then, receive training as planned. One-Group Pretest and Posttest Design is used in this experiment.

4. The stage of result reflection and evaluation

The objectives of this stage are to evaluate the efficiency of e-CLIP implementation, to evaluate satisfaction of the teachers on the use of e-CLIP and to be able to provide policy recommendations.

Research Conceptual Framework

e-CLIP System

Content
- Learning objective
- Content

Language
- Learning objective
- English Language

Instructional Design

Pedagogies

Lesson plan → Implement → Feedback

Share

Video clip

Share

Comment by Stake holder

Learning management competencies
1) Competency in lesson study approach
2) Technology competency
3) Competency in learning management through English integrated instruction

Concept of Development of EIS via Electronic Communication System
1. Lesson Study Approach
2. Educational Research and Development
3. Innovation of English for Integrated Studies: EIS
4. Concepts, theories and research supporting teacher development based on EISC
5. Concept of Content and Language Integrated Learning: CLIL
6. Google Apps for Education
7. Concept of problem-based learning
8. Concept of research-based learning management
9. ADDIE Model

Research Conclusion

Results of the research on development of competencies in learning management through content and language integrated pedagogy via electronic communication system are as follows:

1. The development of learning management system through content and language integrated pedagogy via electronic communication system consist of 5 steps; 1) team building 2) establish common goals 3) design and plan activities to achieve the set goals 4) implement the planned activities and observes lessons and 5) conclusion of action plans and reflection. The implementation of all 5 steps integrated the use of technology communication combination with English language to help set language that would be appropriate for Thai teacher (Lingua Franca).

2. There were 3 teacher trainings which were targeted to provide preparation and establish readiness of the target groups teachers before the implementation of the learning management system through content and language integrated pedagogy via electronic communication system. The trainings were organized for 528 teachers (Eastern Region, Bangkok Metropolitan Region, Southern Region, Northeastern Region, and Northern Groups). After that, only 210 teachers were selected to participate in the knowledge extension development at YWCA Fort Canning Lodge in Singapore for 5 days under the training management run by Singapore Teachers' Union (STU). The selection criteria were based on the pretest and posttest together with the performance scores.

3. The implementation of learning management through content and language integrated pedagogy via electronic communication system resulting in success of quality development of mentors revealed feedback in the aspect of quality in the following areas:

1) Creating unity of opinions among the mentors, school directors, and the Committee of EIS Association of Thailand by fostering awareness of teacher development concept of not having to neglect the class. With the model of e-CLIP, everybody could understand the goals of the development and keep in mind that the most essential basic skills of teachers who were the target group comprising development goals setting, courseware design, courseware presentation to the mentor committee, university lecturers, teaching colleagues, and school directors to get recommendations for courseware improvement and development. Teaching implementation of the courseware being reflectively reviewed was carried out with data collection and video recording while teaching. After that, reflective thinking was shared and feedback was given to the teachers. Finally, the teachers gathered all reflective thinking gained as what they had learned for self-improvement in the later stage.

2) Creating cooperative working system consisting of one administrator responsible for 2 mentors, and 1 mentor taking care of 5 teachers

3) Designing steps for teacher development and setting work schedule

4) Setting a continual action plan for sustainable extension by letting teachers form their own group consisting of the teacher him/herself (a teacher who performs his/her teaching development), a colleague, the director or deputy director, a mentor, a lecturer from Faculty of Education, and an educational supervisor. There must be at least three persons as a working team in each one-teacher development team. Also, two cycles of development must be performed by each teacher.

5) Task assignment in the form of network with the supervision system divided into three areas: the central and southern regions having 44 mentors, the northeastern region having 21 mentors, and the northern region having 5 mentors.

6) Rule formulation for working collaboratively

6.1) Performance according to the cycle of teacher development by the e-CLIP model with an emphasis on development of content and language integrated learning based on efficient learning management designed is a working process for teachers' self-development derived from their own internal inspiration rather than any other external stimuli.

6.2) Reflective thinking is mainly aimed at creativity not at fault finding or discouragement. In addition, it will focus on opinion suggestions as alternatives for teachers who are undertaking their self-development.

6.3) Summary of the outcome from team members' reflective thinking and teachers' freedom to make decision for their alternatives will be taken into consideration for at least three rational factors: academic principles, one's own information and background, and existing situations and problems of the classroom and school. The teacher will process information and then make a decision. The issue derived from reflective thinking will lead to conclusions for self-improvement or development, and self-change at a later stage.

6.4) Implementation will be carried out via electronic communication system with explicit appointments.

7) It has been agreed upon and set up in advance among the trainers of teacher development training who to be leading trainers or co-trainers. These people will be available to render assistance for an individual teacher in the proportion of 1:10. List of activities for teachers' performance will be designed and the same materials and activities will be employed for all training sites.

8) As for building up empowerment for the leading trainer group members, the administrator team will provide visualization to the mentoring team to ensure that working can be collaboratively undertaken along with the concrete action plan and confidence. All issues raised in the seminar of core trainers will be seriously and intensively taken through direct and straightforward opinion exchange. Finally, it must be completely ensured that each one

will be able to perform their roles as a leading trainer or a co-trainer.

4. The evaluation of teachers' competencies on learning management through content and language integrated pedagogy via electronic communication system is carried out under supervision and in-depth analysis by 7 universities lecturer and research teams from: 1) PetchaboonRajabhat University, 2) Naresuan University, 3) ChiengmaiRajabhat University, 4) MahaSarakham University, 5) PiboonSongkramRajabhat Univerity, 6) UttaraditRajabhat University, 7) NakhornSawanRajabhat University. After having completed the training, 35 teachers developed their own instructional procedure by setting up goals, procedure, and teaching approaches as received training in the project for at least 3 cycles. The results can be summarized as follows:

4.1 In the aspect of teachers' competencies in learning management through the lesson study process, it was found out that the learning management at the initial stage of the first cycle still employed the teacher-centered approach without diverse activities. In the second cycle, the observation record revealed that the learning management changed to learner-centered approach with more various activities. In the third cycle, it indicated that learning management competencies in the lesson study process became learner-centered with much more variety of activities and teaching technique adaptation. However, some teachers

were found not preparing their lesson plans and not following the steps of critical review. Approximately eighty percent of the teachers (4 in one team) were able to complete the work process contributing to their own teaching improvement.

4.2 Regarding learning management through integrated studies from the first cycle of the learning management plan, the recorded observation data indicated that teachers used both English and Thai alternatively. In the second cycle, it was revealed that teachers used both English and Thai but with much higher consistencies. In the third cycle, the data indicated that eighty percent of the teachers were able to better integrate both English and Thai in their teaching.

4.3 In the aspect of information technology learning management, the recorded data in the first cycle showed that filming was operated from the camera fixed at a certain corner of the classroom. This not only prevented the display of the whole atmosphere of the classroom but also resulted in unclear voice and shaking camera. In the second cycle, eighty percent of the teachers were found to have paid more attention to camera angle adjustment but the camera was still fixed at a certain corner. In the third cycle, more than eighty percent of the teachers had camera angle adjustment but the camera was still fixed at a certain corner. Thus, the overall atmosphere and pictures of class activities were better displayed, more assistants

in filming were required and the camera was still shaking.

4.4 After having accomplished instructional activities of the lesson study process, all students' academic achievement after learning was found having increased by 100 percent.

4.5 Teachers' satisfaction towards the project was found at a high level (average mean scores between 3.50 - 4.49). The conclusion of data records from observation revealed that there were mentors' supervision, work plan, follows-up, participation in exchange group, and learning with the team, mentors, and colleagues in the project as well as support from the administrators. Most of the students had good responses and more confidence in demonstrating their ability and giving presentation. In general, the teachers were highly satisfied with the recognition.

5. Policy Recommendations for Expanding Results to Relevant Units

The followings are policy recommendations for further result expansion to other relevant institutions and organization at different level, including, the level of the Office of Basic Education Commission, the Office of Educational Service Area, and schools.

Results from the research and development of science, mathematics, and computer teachers through the integration of English language into class subjects reveal practical findings for which if enforce into policy, it is believed to contribute positive impacts on

educational management efficiency. Hence, the policy recommendations are as follows:

1. Policy Recommendations for the Ministry of Education:

1.1 The important aspects for intensive reformation and improvement of teacher development should include:

1) Instructional design competency;

2) English for integrated instruction competency of Thai teachers.

1.2 One of the main factors that had significant impact on the efficiency of teacher development is the academic leadership ability of the school directors. Therefore, the ability and knowledge on instructional expertise in teaching and learning management of the director should be taken into consideration for recruitment, development, and appraisal of persons being appointed when appointing school directors.

1.3 Teacher development should include sharing and discussing actual classroom performance with other colleagues teaching experiences in the same field, as well as with university experts in learning management at certain subject groups. This is because individual performance reflection is a means to contribute efficient teacher competency development and to form good attitudes and pride in the teaching profession as well as duty performance strength.

1.4 Area clusters should be teacher development base. Schools should be grouped in an area cluster and work closely with Faculty of Education of the university nearby. This

collaborative mechanism should be proceeded to facilitate teacher development.

1.5 Reduction of workload irrelevant to learning and teaching works should be arranged. Individual cases should be taken into consideration in which should not be done on the basis of rules and regulations, proportion or general limitations without relying on reasons or necessity in reality.

1.6 Development of school information technology infrastructure should be practically implemented according to the master plan in order to yield good results.

1.7 Production of new generation teachers should be carried out on the basis of teacher production innovation with insertion of practical procedure to build up learning management competency, instructional information technology competency, and English integrated instruction competency.

1.8 Fostering culture of using technology for instruction and communication to new generation teachers should be more frequently done, including building up confidence and empowerment within the teachers; so that the teachers will gain more self-confidence and self-development. Moreover, consultation via information technology system should replace face-to-face communication to increase convenience in long-distant communication and diversify channel of consultation.

1.9 Budget allocation for teacher development should be granted directly to schools. Decision making should be empowered

at the school level but monitoring by outcomes and efficiency of governance.

1.10 The lecturers of Faculty of Education should be strongly encouraged to participate often and actively in teacher development in schools.

2. Recommendations at the level of the educational service area

2.1 Defining educational supervisors' roles and responsibilities for continual instructional development together with class teachers.

2.2 Building up networks among teachers having expertise in certain subject groups, including setting up, developing and forming cooperative working strategies.

2.3 Coordinating with the faculty of education of a university within the area for teacher development by using results of classroom-based performance, or coaching, or lesson study.

2.4 Developing and signaling to the demonstration of school directors paying attention to academic affairs and quality development of learning management, or to those neglecting to develop the quality of teaching and learning (because teachers are a precursor of education quality.

3. Recommendations at the level of schools

3.1 School directors must consider the task of quality development of teachers' learning management as the most important one.

It is also an urgent necessity to do it intensively, continuously, and earnestly.

3.2 English integrated instruction is important and necessary for learners' competencies development to achieve desirable competencies required by the core curriculum. English integrated instruction can be applied at various levels, namely, keywords, classroom language, explanations for simple practice to document usage, including tests, exercises, and media written partially or wholly in English.

3.3 English integrated instruction targets at developing schools to have strengths and sustainability rather than provision of foreign teachers to teach in classes. English integrated instruction run by Thai teachers is the policy that can be immediately implemented by schools.

Factors Leading to Success and Obstacles

The factors leading to success and challenges encountered found during the observation and evaluation of project implementation by research teams from 7 universities are as follows:

1. A certain number of teachers lack awareness in the importance of education and taking the goals of the core curriculum into actual implementation in the classroom.

2. A certain number of teachers lack essential skills to design learning and teaching methods that would lead to effective development of the learners' competencies in achieving the goals as stipulated in the indicators of the core curriculum.

3. A certain number of teachers lack lesson plan development skills which are considered as guidelines for instruction. Some do not prepare lesson plans or prepare them without quality.

4. Teachers shared that they have too much workload which prevent them from being able to put teaching development as the first priority. The importance of teaching development is often placed secondary after report preparation required by the superior units, school administration work, and certain tasks assigned by the school.

5. Teachers lack inspiration to develop the quality of their own teaching. Only very few have a real intention to develop his/her teaching skills.

6. A certain number of teachers accept self-development through the lesson study process of e-CLIP system because they were either former students or acquaintance of the trainers.

7. Teachers propose that the process of teaching development be set officially as criteria for their academic position upgrading or renewal of their teaching license.

8. Requirement for teachers to prepare lesson plans in English discourages a certain number of teachers. Some may prepare them by copying from other sources.

9. Teachers and school administrators still have a misconception and wrong understanding

that EIS must be delivered in English for the whole hour or the whole teaching time which is not true.

10. Most school directors still have the perception that the academic affairs should be the responsibility of only the deputy director of academic affairs or persons being assigned for academic matter. In fact, development of academic affairs should be the most important task or in another word, should be one of the top priorities of the director in governing school.

11. Most school directors still rely on the value of "Client-Patron System". There must be teachers who would have to "take care of" and "receive" orders from the directors. Even information technology knowledge and skills that all directors are required to master as personalized abilities and perform works that need technology skills by themselves, they still need some teachers sitting beside them and assisting them all the time.

12. Most school directors lack academic leadership, and knowledge and understanding of skillful learning management. Only a few pay attention to and are fully determined to do them earnestly.

13. An open culture to listen to other opinions reflecting the images of their own teaching performance must be fostered. This should be cultivated since they were students in education.

14. School directors are the most important and influential factor in portraying that

they have faith in EIS module and encourage teachers to apply EIS in their teaching.

Discussion

The participants have learning management competencies through the e-CLIP lesson study process because they have thorough knowledge and understanding of the process. From participation in the meetings in Bangkok and Chiangmai, examples of best practice can be led to implementation. However, it is necessary to design project activities to be in accordance with the lesson study process so that the teachers can have practical guidelines.

Preparation of learning management plans is the main strategy of learning management. However, with teachers' various tasks and workload, and with commercial learning management plans prepared for teachers, most teachers ignore preparing their learning management plans by themselves in their own contexts. Requirement for the sample group to prepare learning management plan by themselves is to emphasize planning for integration of English together with technological media for efficient learning. Thus, the high level of both students' academic achievement and satisfaction are resulted from the teachers' preparation of their learning management plans, particularly those developed from learning exchange among teaching colleagues which became better in quality.

Learning management by means of ICT media always meets the needs of students in

the present age because it is a virtual world where students can open up their worldview with their own fingers. In addition, using English, a global language, as a medium for communication usually stimulates students to be active, interested, and curious for searching information. The present world communities are now closer and English is a must for students to learn and is relevant to students' learning process because it is a major foundation for increasing effectiveness.

General Recommendations

1. Full-time teachers have competency in receiving and adapting to new innovations. However, other workloads and administrators' attention as well school atmosphere are important factors affecting the actual and continuous implementation of the intentions.

2. Plans of leaning management are the key element to learning management and consider a very important tool for teaching profession. Teachers should pay attention on learning management design to suit their own contexts. Furthermore, learning management plan should comprise sufficient details that will provide practical guidelines with directions and educational principles covering curriculum and instruction, psychology, media usage, assessment and devaluation.

3. The visits to observe learning management implementation by the full-time teachers have positive effects on enhancement of creative behaviors of administrators, teachers, and students.

4. The scope of unfamiliar English words used in the classroom should be clearly defined, for instance, technical terms, greeting, reinforcing, and emotion expressions, and interjections. This will not only help students understand English easily but also create their good attitude towards English which is better than letting teachers speak the whole hour without the students understanding of what have been said and eventually the students got bored of classes and dislike English.

5. As for teacher-ness or value of being teachers, teachers should use both verbal and non-verbal communication as well as better their perspective and their skills on foreign language. The non- verbal communication should be used in the class to arouse and encourage students' interest and to ease their understanding, also to create their good attitude towards foreign languages.

6. In filming the lessons, shooting should consider numbers of important elements such as image resolutions, appropriate backdrops, and clear voice recording. This is to attract attention of viewers. Likewise, other media and equipment must be well prepared before using in order to avoid problems occurring during operating

7. Teachers should be aware that the use of ICT for learning management will greatly assist students to learn more efficiently. It will also help create virtual reality so that students can have good impression and attitude toward the lesson and English language. Hence, ICT is

not just a tool to help create joy in class but rather is a media to enhance learning capacity.

8. Educational innovation needs a certain period of time to reflect its outcomes. Continual and sustainable action is very important, including team work for reinforcement. Once everybody has collaborated and kept on doing, it is certain to yield good outcomes.

Research Recommendations

1. It is recommended that further study be conducted on the use of e-CLIP teaching model integrated with other teaching techniques, for example, cooperative learning, problem-based learning, or project-based learning in order to obtain variety of innovative teaching models.

2. A study on results of learning management through the e-CLIP teaching model with an emphasis on learning in actual class environment should be carried out to gain practical guidelines for application of students' learning outcomes in different subjects.

3. It is recommended that there is a comparison of students' learning outcomes through the implementation of e-CLIP teaching model applied in different subjects. This is to obtain an appropriate and efficient e-CLIP teaching model for other subjects in the future.

References

Allen, D.E. & Duch,B.J. (1998). *Thinking toward solution: Problem-based learning activities for general biology*. New York: Harcourt Brace and Company.

Baker Colin. (2001). *Foundation of bilingual education and bilingualism*. Clevedon, England: Multilingual Matters.

Barrows, H.S., & R. Tamblyn. 1980. *Problem-based Learning.* New York: Springer.

Boonlue, S. (2007). *The Development of Problem Based Learning Virtual Classroom model in Higher Education Level.* Dissertation, Ed.D. Bangkok: Graduated School, Srinakharinwirot University.

Catherine C. Lewis. (2002). *Lesson study: A handbook of teacher-led instructional change. Research for better schools,* Inc. Philadelphia, PA.

Charinee Triwaranyu. (2009). Lesson Study: A new way to improve teaching and learning. *Journal of Education, 37*(3), 131-149.

Fernandez, C. & Yoshida, M. 2004. *Lesson study: A Japanese approach to improving.*

Good, C. V. (1973). *Dictionary of education.* New York: McGraw-Hill.

Google. (2557). *Products of Google Apps for Education.* Retrieved from http://www.google.com/enterprise/apps/education/products.html

Google. (2557). *Benefit of Google Apps for Education.* Retrieved from http://www.google.com/enterprise/apps/education/benefits.html

Handbook. Oxford, England: Pergamon Press.

Keeves, P. J. (1988). *Educational research methodology and measurement: An international mathematic teaching and learning.* New Jersey: Lawrence Erlbaum Associate.

Ministry of Education. (2008). *The basic education core curriculum B.E. 2551 (A.D. 2008).* Office of the Basic Education Commission of Thailand. Bangkok: The Agricultural Co-operative Federation of Thailand., Limited.

Ngamsom, S. (2547). The Documentation in EIS curriculum design.Copier papers.

Ngamsom, S. (2552). The Model of EIS: Education strategies to enhance achievement. Course materials.

Schmidt, H. G. (1993). *Foundation of problem-based learning: Some exploratory notes.* Medical Education, 27, 422-432.

Smith, R. H., et al. (1980). *Measurement: Making organization perform.* New York: Macmillan.

SomkiatPornpisutthimas. (2013). Learning science in the 21st century. *Journal of Research Unit on Science, Technology and Environment for Learning.* Vol.7 No.1 (January-June)

The National Centre for Languages,n.d. Content and Language Integrated Learning: CLIL.