AN EFFECT OF INTEGRATING CONCEPT MAPPING AND GROUP WORK TOWARDS THE EFFECTIVENESS OF CONSTRUCTING THE CONCEPT MAPPING OF THAI UNIVERSITY STUDENTS

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Abstract - This study is a classroom-based research. The ultimate goal is promoting the meaningful learning occurred practically. The purposes of the research were 1) to investigate the efficiency of integrating concept mapping and group work towards the students' effectiveness of constructing the concept mapping; and 2) to examine the students' opinions towards the integrated learning activity. A one group pretest-posttest design was conducted. A convenience sample was 40 students who minor in Linguistics at Srinakharinwirot University(SWU) in Bangkok, Thailand. The research instruments were Pretest and Posttest and a questionnaire designed to garner the students' opinions towards the integrated activity. Qualitative data from open-ended questions were taken into account. It was discovered that the average score of students' Pretest was 17% and the students' average Posttest score was 88%. The Posttest score was 71% higher than the Pretest. There are 21, 4, 6, 8 and 1 student(s) got the score of 100, 90,80, 70, and 10 respectively. 39 students could improve constructing the concept mapping efficiently. Only 1 student could not improve his constructing concept mapping. The students were satisfied with the integrated activity of constructing concept mapping in group work of 35% in the most scale , 52.5% in the much scale and 12.5 % in the medium scale. They pointed out that constructing concept mapping stimulates them to categorize major concept, minor concept and related sub concepts with propositions effectively. It assisted them to understand the lesson and foster them in learning by doing and then discovering the knowledge by themselves. Working in small group provided them an opportunity to exchange knowledge and ideas with friends.

Keywords - Concept Mapping, Group Work, the Students' Effectiveness, the Students' Opinions

I. INTRODUCTION

The students, who minor in Linguistics at SWU, are from different majors; Thai, English, French, Chinese, Psychology, Philosophy, Children Literature, History as well as social science, Finance and International Business. Their difficulty in learning linguistic courses is that they are not familiar with linguistic content. Then they try hard to remember or understand the content by using the technique of rote memorization. [1] The problem with rote memorization is that unless constantly reinforced, the information learned is usually forgotten within 2 to 3 weeks. Rote memorization does not produce meaningful learning. The researcher needs to change the students' rote learning style to the meaningful learning through developing the students' cognitive skill of critical thinking by constructing the concept mapping. From the Informal interview, the students informed that concept mapping was introduced when they were in the secondary school, however, they rarely constructed it. Then an integrated activity of concept mapping and group work is conducted to see whether it can assist the students to construct the concept mapping efficiently or not.

II. LITERATURE REVIEW

A. Concept Mapping

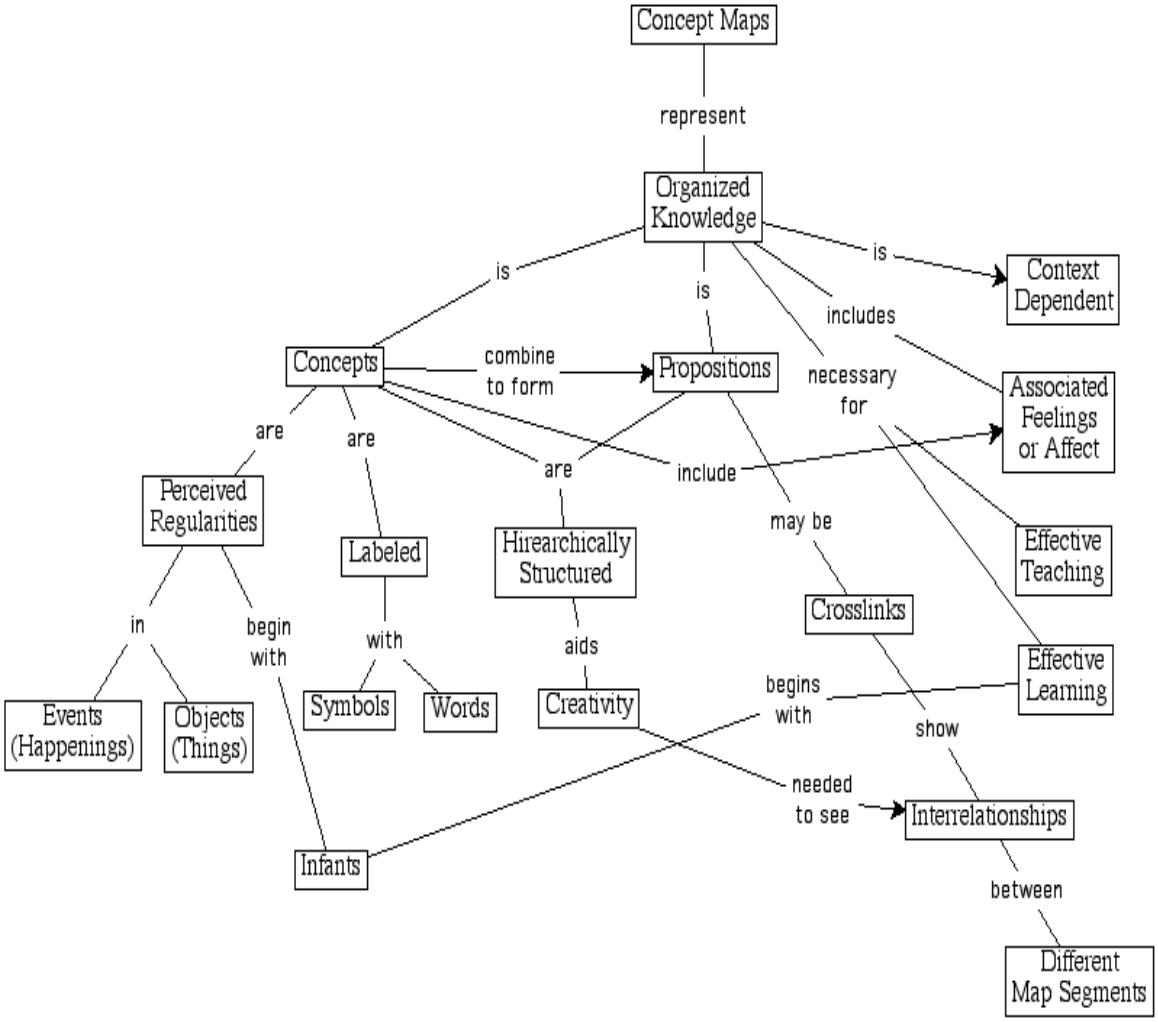
Reference [2] shows that concept mapping was started by Joseph D. Novak around 1960s. It was based on the theories of David Ausubel who stated that the meaningful learning comes from whenever students can relate new ideas or concepts to their existing knowledge. [3] Concept maps as the graphical tools for organizing and representing knowledge. Its structure should be presented in a hierarchical order. The most general concept is at the top and the more specific, less general concepts arranged hierarchically below. The main physical appearance contains concepts in boxes or circles and linking concept relationships by using words or phrases which are called propositions. The propositions consist of two or more concepts connected using linking words or phrases to construct a meaningful statement. The mentioned features are shown below.

The above diagram shows the most general concept is Concept Maps at the top and the more specific, less general concepts arranged hierarchically. Propositions are linked by using words or phrases which can create a meaningful statement, for instance, concept maps represent an organized knowledge or concepts are labeled with symbols and/or words.

Reference [4] stated that concept mapping is so powerful for meaningful learning. It assists learners to organize knowledge and to structure it. Active learning can occur practically whenever the learners learn meaningfully. Concept mapping can be used as a teaching and assessment tool. Students' concept mapping should be scored by using rubrics. Grading systems can be used to score a concept map. [3] The score for hierarchy-where the concepts are placed appropriately around up to 3 points. Validity of

propositions is 1/2 point(s). Cross links travel far across a map or return upwards is 1/2 point(s). Creativity or thoughtfulness or relevance of organization as well as words chosen is up to 2 points.

[5] Another detailed rubric suggested consists of 5 marking rubrics as shown:



Source: Novak, Concept Maps: What the heck is this?, 2008, p.3.

TABLE I Concept Mapping Rubrics

MARKING RUBRICS	Excellent	Proficient	Average	Poor
Organization	Well organized Provides a very clear big picture of the ideas Contains main concepts Contains an appropriate number of concepts Follows standard map	Thoughtfully organized Provides a big picture of the ideas Contains most of the main concepts Contains an adequate number of concepts	Somewhat organized Provides a picture of the ideas Somewhat incoherent Contains only a few of the main concepts	Choppy and confusing Provides a scattered picture of some ideas Contains a limited number of concepts

	conventions Concepts are short and clear	Follows the standard map conventions Concepts are clear		
Links	Links are precisely labeled Simple and complex relationships are mapped effectively	Links are labeled Relationships are mapped	Links are not labeled Some ideas, concepts are linked but not distinctive	No links Difficult to follow relationships
Thinking and Idea	Includes concepts that are extremely suitable for the topic and that show original or creative thinking All ideas, themes, theories and framework are well thought-full	Most or all concepts are suitable for the topic Some ideas, themes, theories and framework are thought-full	Most concepts satisfy the basic requirements for the topic, but some do not directly relate to the topic Adequate ideas, theories and framework are thought-full although not clearly shown	• Many concepts are inappropriate for the topic • Thinking process is not clear
Communi-cation	Clearly presented, high level of understanding	Clearly presented, good level of understanding	Information is presented but more understanding can be gained	Very difficult to understand
Teamwork	Worked extremely well with each Respected and complemented each others ideas	Worked very well with each other Worked to get everyone involved	Attempted to work well with others At times ”off task” and not everyone was actively involved	Little or no teamwork

Source: Chan, Assessment: Concept Map, Assessment ,2009.

The marking from TABLE I is adapted to be the criteria used for assessing the students' Pretest and Posttest in this investigation. The marking rubrics; organization, links , thinking and idea and communication are used. For the purpose of this study focuses on the potential of each student in constructing a concept mapping not teamwork.

B. Cognitive and Constructive Learning Theory

The are many reasons to confirm that cognitive and constructive Learning theory can serve the meaningful learning. [6] Cognitive approach focuses on the mental activities of the learner that lead up to a response and acknowledges the process of mental planning, goal-setting and organizational strategies. It emphasizes learners' comprehension through learning by discovering. This approach has been as the root for constructivism. There are 2 main approaches; cognitive constructivism and social constructivism. Cognitive constructivism identifies that learning occurs as an internalized system. A person learns or gains knowledge through one's perception and insight. [7] Social constructivism initiated by Vygotsky in 1978. He introduced the zone of proximal development (ZPD) which occurs when people need to scaffold the schema; a generalized description or a conceptual system for understanding knowledge through interaction with more able or more knowledge or more capable peers.

In this study concept mapping is integrated with group work due to the hypothesis that the more capable

students assist the less capable ones as well as the instructor's guidance helps the students to scaffold the knowledge.

III. METHODOLOGY

A. Sample of the Study

There were 40 undergraduate students in this study. These students minor in Linguistic Program. They are from various majors; 15 students major in social science, 9 students major in Philosophy, 7 students major in English, 3 students major in French, 3 students major in Psychology, 2 students major in International Business and 1 student majors in Children Literature. Their average age is 20 years old. At the time of doing this investigation they studied LI 311 Language and Linguistics. The researcher acted as their instructor.

B. Research Instruments

Research Instruments in this study are Pretest and Posttest, and a questionnaire.

C. The Procedures of the Study

1) Do the Pretest

Ask each student to construct his/her concept mapping on the topic of Aspects of Language. It was done to examine the students' existing knowledge of constructing concept mapping. The researcher scored the students' pretest to find out the more able students and the less able students.

2) Teaching Plan

Stage 1: Two students were asked to report the topic of concept mapping. They explained general knowledge of concept mapping, demonstrated how to construct a concept mapping and asked the other students to do an exercise and construct a simple concept mapping. The researcher as an instructor explained 2 main features; concepts in boxes or circles and linking concepts or propositions which are words or phrases to make meaningful sentences.

Stage 2: Ask the students to work in group of 3-4. In each group there was at least 1 more able student. Then the less able students could discuss with the more able student. Ask them to construct a concept mapping on the topic of Aspects of Linguistics. Representatives from some groups were asked to present their concept mapping. Then the students were asked to consider which concept mapping was the best and they had to give the reasons to support their decision. The researcher explained the point to make sure the students' understanding on how to categorize the content into the most general concept is at the top and the more specific, less general concepts arranged hierarchically. Linking concept relationships by using words or phrases; propositions to construct a meaningful statement was also discussed.

Stage 3: Ask the students to work in the previous group as 2). They practiced/constructed a concept mapping on the topic of Organs of Articulation. Representatives from some groups were asked to present their concept mapping. After that the researcher chose 2 concept mappings and asked the students to discuss which one was the well-constructed concept mapping. They were stimulated to express their reasons to support their argument.

3) Do the Posttest

Ask each student to construct his/her concept mapping on the topic of Consonants. The students' Posttest were scored to find out their progress of constructing concept mapping.

4) The students were asked to complete the questionnaire.

5) The data were analyzed.

IV. RESULTS OF THE STUDY

A. The students' Score of Pretest and Posttest

The Pretest concept mapping created by 40 students was scored in percentage. Their average score was 17%. It was found that most of the students could not construct properly. They could not categorize the concepts into the proper concepts. They included the more specific with less general concepts and no propositions. After 2 times of working in small groups under the instructor's guidance, the students did Posttest and their concept mapping was scored. It was found out most of the students could categorize the concepts properly. That is the most general concept is at the top and the more specific, less general concepts arranged hierarchically with appropriate propositions. Their average score was 88%. There are 21, 4, 6, 8 and 1 student(s) get the score of 100, 90, 80, 70 and 10 respectively. It can be stated that 39 students could improve constructing the concept mapping efficiently. Only 1 student cannot improve his constructing concept mapping.

B. The Rating Scale Score from Questionnaire

The students showed their opinions in the Most scale with the percentage of 60 %-62.5 % in the following topics:

- Construct concept mapping stimulates them to categorize major concept, minor concept and related sub concepts effectively.
- Constructing concept mapping helps them to understand the lesson by themselves.
- Constructing concept mapping encourages them to think critically.
- They can apply how to construct concept mapping in other courses.

- Working in small group provides them an opportunity to participate in constructing concept mapping with friends.
- The students show their opinions in the Most scale with the percentage of 50 %-57.5 % in the following topics: They like providing the knowledge of the definition, the stages of constructing and the advantages of concept mapping before asking them to construct concept mapping with friends or by oneself.
- Working in small group stimulates them to exchange knowledge and ideas with friends.
- Constructing concept mapping is suitable to the content of course LI311 Language and Linguistics.
- Constructing concept mapping fosters them in learning by doing.
- Constructing concept mapping vitalizes them in learning by discovering.
- Constructing concept mapping stimulates them to construct the cognitive schema in categorizing the major concept, minor concept and related sub concepts effectively.
- Constructing concept mapping encourages them to use the appropriate word(s) in order to link the concepts appropriately.
- The students showed their opinions in the Most scale with the percentage of 45 %-47.5 % in the following topics:- Constructing concept mapping in small group assists them to more comprehend the content of course LI311 Language and Linguistics.
- The learning atmosphere encourages them to be responsible for themselves and their group work.
- The students show their opinions in the Much scale with the percentage of 40 %-53 % in the following topics:They were satisfied with the integrated activity ofconstructing concept mapping in group work.
- Constructing concept mapping in small group assists them to more comprehend the content of course LI311 Language and Linguistics. (The same percentage as the Most scale)
- The learning atmosphere encourages them to be responsible for themselves and their group work.

DISCUSSION

Discussion 1: Can the integrated activity of concept mapping and group work assist the students to improve constructing Concept Mapping?

The students in this study stated that constructing concept mapping can stimulate them to categorize major concept, minor concept, related sub concepts and it encourages them to use the appropriate word(s) in order to link the concepts appropriately as well as it can encourage them to think critically. Thus it can help them to comprehend the content of the subject matter through the graphical tool meaningfully not in a text form as a rote learning. The cognitive process occurs when they were asked to construct concept mapping with peers and individually. Constructing concept mapping can assist them gain more clarity and understanding. [8] Every learner must construct her/his own cognitive structure through her/his own efforts by meaningful learning not rote learning. This study approves that each student can construct her/his own cognitive schema through her/his own understanding of the content and then she/he can create a concept mapping properly.

However, the researcher realizes that the sufficient time should be provided for the students to improve their potential more. Although 21 students in this study could get the full score of 100 after 2 times of practice with peers and under the instructor's guidance, the other 19 students still need more time to practice with peers and also to get more guidance from the instructor in order to improve their constructing concept mapping as efficiently as the 21 students. [9] One secondary school in Costa Rica where concept mapping was used in all subjects in all grades in 2003 found out that it was not easy for the students in the first year, but at the end in the following years 100% of the students could pass state exams. Furthermore, the students felt more confident in their abilities and less stressed in school learning.

Discussion 2: The reason why 1 student cannot improve his constructing his concept mapping

Changing rote learning to meaningful learning is not easy if students are not ready to do it. This fact happens with 1 student in this study due to his personal problems. He was always late and often absent. Then he did not work in group for more than one time. He always kept in silence whenever he worked with peers. Then he could not increase his ability in constructing concept mapping. The researcher considers that this student's big problems are from his absence and he did not pay attention in learning. [10] Not going to class seems like a blatantly obvious reason for doing poorly in college. Class absence is the cause that a student lacks an opportunity to cooperate with friends or instructors. Doing tasks with peer is better than doing alone.

Discussion 3: The reason why the integrated activity of concept mapping and group work should in conducted in the class room

The students reported that the learning atmosphere encourages them to be responsible for themselves and their group work. Group work could promote them working with friends and they are satisfied with constructing concept mapping in group work. The researcher considers that working in the same group during this study assists the students to gain the social skill i.e. they have to be as a listener and speaker as well as they have to make a decision with friends during their brain storming to construct a concept mapping. Thus group work can provide a chance to

practice the social skill. [13] Group work provides responsibility and accountability for each other's learning is shared and it also allows the students to learn from each other and also gives them practice in how to get along with people.

Furthermore, the researcher thinks that the students' opinions reflect the other advantages of the integrated activity of concept mapping and group work as follows:
For the cognitive domain, it assists the students to more comprehend the content of the subject matter. The students report that constructing concept mapping helps them to remember the content of the lesson more.

In an affective domain the activity of constructing concept mapping in group promotes working with friends. The learning atmosphere encourages them to be responsible for themselves and their group work. Moreover, the students informed that they can apply how to construct concept mapping in other courses. The researcher considers that the integrated activity in this study can be used as the students' learning strategy. They can apply it to the other courses or their everyday life. [14] Refer to Ehrenfeld (2004) who found out that concept maps encourage students to think independently, increase their orientation in knowledge, aid in finding connections between the different areas, and give them more confidence in implementing their knowledge.

Discussion 4: How could the Integrated Activity of Concept Mapping and Group Work be Managed in the Class Room?

90% of the students mention that they like providing the knowledge of the definition, the stages of constructing, types, and the advantages of concept mapping. It helps them to construct concept mapping appropriately. This implies that they need to know the concepts of concept mapping before constructing it. Their opinion reflects that the teaching plan in this investigation can help them to enhance creating a concept mapping efficiently as discussed later. First, the students got the overall picture of concept mapping when their two friends as the presenters reported the topic of Concept Mapping. They explained general knowledge of concept mapping , demonstrated how to construct a concept mapping and asked the other students to categorize the concepts and the appropriate proposition by filling concepts or words in a simple concept. Then it is the first step to practice on how to do a concept mapping . [15] At the beginning of the teaching concept mapping should be presented and explained and given a map with the concept missing and ask the students to complete or fill a map. It is also revealed that Complete -the -Map activities are useful for students to practice thinking. The researcher considers that in this stage the teacher or instructor role should be as someone who helps the presenters explain some points clearer or in this study the researcher as an instructor explained and concluded 2 main features; concepts in boxes or circles and linking concepts or propositions which are words or phrases to make meaningful sentences.

After that the students were asked to work in group of 3-4. They were selected due to the criteria of the zone of proximal development; in each group there was at least 1 more able student who worked with the less able students. It was expected that the less able ones learned how to think or categorize the concepts and propositions from the more able student. Another activity; the students' presentation is necessary. After some representatives presented their concept mapping. the students were first asked to consider which concept mapping was the best and they had to give the reasons to support their decision. [16] One of Implementation Basics is encouraging the students to discuss by asking them to explain and critique each other's concept map. Moreover, after the second group of representatives finished their presentation, the researcher chose 2 concept mappings and asked the students to discuss which one was a well-constructed concept mapping. They were stimulated to express their reasons to support their argument. [16] Encourage peers to compare/contrast each other's concept map should be done. If there are suggestions, students should have to explain and provide justification change; helping to clarify the concepts.

Last but not least teachers should study how to assess the students' concept mapping. Using an appropriate rubrics will be essential to determine the students' mental ability. Concept mapping can be used as a teaching tool and an assessment tool.

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