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The effect of cooperative learning on social networking with creative problem solving process on creative problem solving ability and teamwork skills of pre-service teachers

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Abstract

The purpose of this article is to compare the cooperative learning outcomes on social networking with the creative problem solving process which affected creative problem solving ability and teamwork skills. With the purposive sampling method, 25 pre-service teachers were divided into 5 groups according to three levels of their learning ability - clever, medium, and weak. Each group learned by means of cooperative learning on social networking in order to brainstorm and give some suggestions for solving problems to the researcher. Teamwork skills used as research instruments were as follows; solving problem activities and treatment skilled evaluation test. Samples were asked to evaluation themselves and their team after their learning through social networking. The questionnaires, pre-test and post-test were used in this research with the analysis of Arithmetic means, standard deviation and t-test. The result of this research indicated that learners engaged in cooperative learning with creative problem solving method could succeed after having some problems solving. This group of learners all got the higher scores in post-test compared with pre-test showing statistically significant at the .05 level. Students who engaged in teamwork skills over social networking with creative problem solving ability have statistically significantly higher score than the previous test at 0.5 level.

Keywords: Cooperative learning, social networking, creative problem solving process, creative problem solving ability, teamwork skills.

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1. Objectives of the study

Specifically, this study aimed to:

1.1 design cooperative learning on social networking with creative problem solving process;

1.2 compare creative problem solving ability of learners before and after they had joined cooperative learning on social networking with creative problem solving process; and

1.3 compare teamwork skills of learners joining cooperative learning on social networking with creative problem solving process before and after the experiment.

2. Literature Review

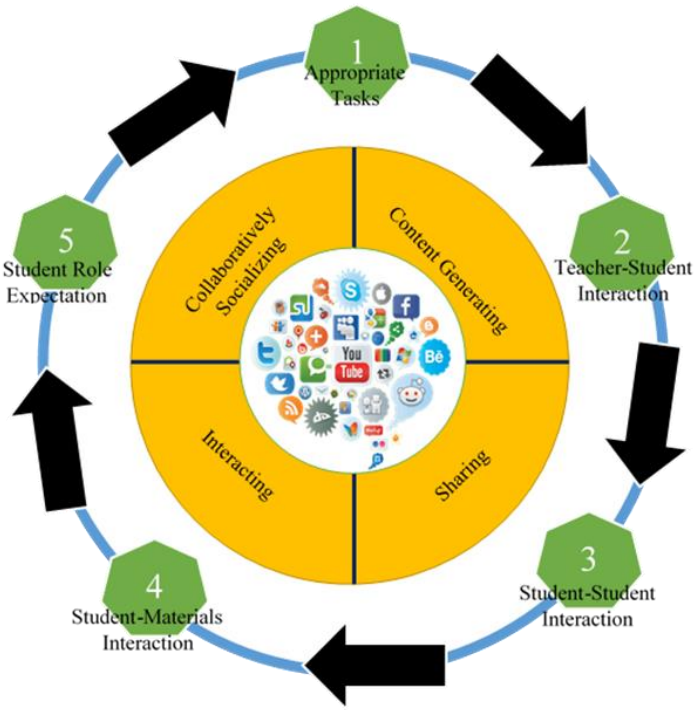

Figure 1. Steps of Cooperative Learning on Social Networking (Saekhow, 2015)

The concept of cooperative learning is an attempt of western educators to develop a group learning method for increased learning efficiency. Slavin (1995) and Strommen (1995) stated that cooperative learning can be employed effectively to all levels of teaching and learning facilitation. This included mathematics subject, reading, writing, and Science subject as well as subjects which need computer to help solve complex problems and facilitate convenience in cooperative learning. Uslik and Walker (1994) and Serra (1997) claimed that cooperative learning can be managed in various forms in which it comprises 2-6 learners depending on types of learning activities. However, one research finds that a group of 4-5 learners is the most appropriate.

Johnson and Johnson (1994), Johnson and Johnson (1987), and Slavin (1995) have proposed the method of cooperative learning facilitation as follows:

1. Appropriate Tasks Coordination is an appropriate method for teaching and learning facilitation which needs skills for problem solving, creative thinking, high quality achievement and knowledge, and complex tasks. In addition, cooperative learning method is employed when social development of learner is needed.

2. Teach – Student Interaction In cooperative learning, there is a tight relationship of roles of a teacher and students. The teacher introduces students about learning content, explains learning objectives, construct learning conditions, and provides a guideline for creative thinking and making conclusion. Besides, the teacher is an observer and assists students when needed. Meanwhile, the teacher also assesses learning achievement of students. Students must take part in suggested learning process and use their knowledge to seek for answers leading to the goals of learning.

3. Students – Students Interaction each students must perceive that their group members are the ones who can assist, support, and enhance in learning. Students are required to form small groups and everyone must sit near to one another to share opinions and crate the feeling of unity.

4. Students – Materials Interaction There is difference in the preparation of learning materials based on forms and objectives of learning content. Normally, students will receive a set of learning materials to be studied. The preparation of learning materials is based on the discretion of the teacher. The learning materials may be used for group tasks or an individual. Ideas obtained from learning will be shared among group members. Thus, students must be responsible for the management of their learning materials.

5. Student Role Expectation Cooperative learning expects students to have interaction among group members. That is, there is opinion and learning material sharing as well as learning support. They must set clear learning goals and all group members are expected to achieve the goals of learning.

Learning on Social Networking Saekhow, 2015; Sandars & Schroter, 2007; Murray, 2008; Hargadon, 2008; Churchill, 2009; Kane & Fichman, 2009; Ras & Rech, 2009; Rhoader, Friedel & Morgan, 2009; Mason & Rennie, 2008; Virkus, 2008; Oradini & Saunders,2008; Minocha, 2009 found that online social networks comprise members of online social networks and construction of networks for doing a particular activity. Its process includes the following:

1. Content generating. Users can generate content from technology in social networks by themselves e.g. message writing, picture posing, songs, and video. This can be done by using tools in online social networks i.e. Blogs, Wikis, Photo sharing, Video sharing, Instant message, and social networking sites.

2. Sharing. This includes sharing of various message in files e.g. opinions, conservations, experience, knowledge, etc. This can be done by using online social network tools: Wikis and Social networking sites.
3. Interacting. Users have interaction among social networks. This can be in the forms of verbal language, messages, opinions, etc. It can be done through online social network tools i.e. Blogs, Video sharing, and Social networking sites.
4. Collaboratively. Socializing Members collaborate one another in a particular activity within online social networks e.g. mutual using, interaction, and sharing common goals. This can be done through Wikis, Instant message, and Social networking sites.

2.1. Teamwork Skills

Mackall (2004) and Sorbero (2008) claimed that teamwork skills is a personal skill assisting an individual to be successful in his work performance. This includes common shared goal setting, arisen conflict fighting, and adaptation to environment. Besides, the teamwork culture focuses on successful teamwork which all group members participate in group activities, have a chance to discover and create something, and learn by themselves. Important skills and teamwork behavior include initiative planning, informing, discussion, presentation, implementation, general etiquette, conflict problem solving, and group relationships.

Teamwork skill measurement and evaluation can be done by determining situations of teamwork for learners to work together. Learner behavior observation and record must be in accordance with the truth. This includes the determination or indication of behavior items of teamwork to be measured and score weight of each behavior. In addition, an analysis of a particular behavior must be consistent with behavior to be measured (the total score of each behavior). A total score of the group is obtained from all score adding together. Importantly, inquiry helps the teacher perceive behavior of work performance of learners. Learners are given a chance to evaluate themselves in terms of work performance related to the tasks assigned by the teacher.

3. Methodology

The purposive sampling method, 25 pre-service teachers were divided into 5 groups following their 3 level of their learning ability - clever, medium, and weak. Each group learned by means of cooperative learning way on social networking in order to brainstorm and give some suggestions for solving problems as the researcher. Teamwork skills research instruments were as follows; solving problem activities and treatment skilled evaluation test. Samples were asked to evaluation themselves and their team after their learning through social networking. The Data were analyzed by Means Arithmetic mean, Standard Deviation, and t-test.

4. Results of the study

4.*1 Cooperative learning design on social networking with creative problem solving process*

Table 1. Appropriateness evaluation of the cooperative learning style on social networking with creative problem solving process by specialists

Items	$\bar{X}$	SD	Description
Learning Tools			
1. Content generating by using Facebook and YouTube	4.33	0.47	High
2. Facebook sharing	4.00	0.00	High
3. Facebook interacting	3.66	0.47	High
4. Facebook collaboratively socializing	3.66	0.47	High
Procedures and Cooperative Learning Method			
1. Appropriate tasks	4.33	0.47	High
2. Teacher – student interaction	4.00	0.00	High
3. Student – student interaction)	4.33	0.47	High
4. Student – materials interaction	4.33	0.47	High
5. Student role expectation	3.66	0.47	High

According to Table 1, the specialists perceived that the cooperative learning style on social networking with creative problem solving process is appropriate at a high level in terms of the learning tools, procedures, and learning method ($\bar{X}$ = 3.66-4.33).

4.2 A comparison of creative problem solving ability of learners before and after they had joined cooperative learning on social networking with creative problem solving process

Results of the study showed that, after the experiment, the learners had a higher level of creative problem solving ability than before with a statistically significant level at 0.05.

Table 2. A comparison of creative problem solving ability of learners joining cooperative learning on social networking before and after the experiment

Scores	$\overline{X}$	SD	t-test	Sig	N
Before	18.57	2.91	-14.70	0.00	25
After	27.20	0.18			25

According to Table 2, findings showed that the score of creative problem solving ability of learners after joining cooperative learning on social networking with creative problem solving process was clearly higher than before. This conformed to the hypothesis as set with the significant level at 0.05. Based on t-test, the statistical value of was equivalent to -14.70 (Sig = 0.00) which was less than the statistically significant level as set. This implied that the score of creative problem solving ability of learners after joining the creative learning on social networking was statistically different at .05.

According to learner interview, it was found that cooperative learning encouraged the learners to discuss what they had learned and help one another. Besides, social networking encouraged them to be confident in writing and expressing opinions more than ever. In addition, they perceived various media, ideas of friends, and new concepts with friend's support.

4.3 A comparison of teamwork skills of learners who joined cooperative learning on social networking with creative problem solving process before and after the experiment

Table 3. A comparison of teamwork skills of learners before and after the experiment

Score	$\overline{X}$	SD	t-test	Sig	N
Before	107.76	1.64	-165.83	0.00	25
After	114.31	1.39			25

According to Table 3, findings showed that the score of teamwork skills of the learners after the experiment was equivalent to 114.31 which was higher than before. This conformed to the hypothesis as set. Based on the hypothesis testing at the significant level of .05, it was found that the statistical value of t-test was equivalent to -165.83 while the significant level of was at 0.00 which was less than the statistically significant level as set. This implied that the score of teamwork skills of the learners before and after the experiment was statistically different.

Regarding learner interview in terms of cooperative learning on social networking with creative problem solving process, it was found that teamwork skills development had diverse learning methods and it helped them do assigned tasks conveniently. Besides successful teamwork needed cooperation among group members.

5. Discussions

Regarding the activities on creative problem solving process having an effect on the creative problem solving ability of learners, it was found that they had a higher level of the ability in creative problem solving than before with the statistically significant level at .05. This was because the activities on creative problem solving process are factors promoting the ability of learners. That was, the facilitation of learning atmosphere could contribute to cooperation among learners in their group. Besides, the teacher was an important person enhancing the ability of learners. As a matter of fact, teaching style has an effect on the enrichment of the ability in creative problem solving. This focuses on what and how which leads to analytical thinking and brain storming (Hamza and Griffith, 2006).

The following had an effect on the learner ability in creative problem solving: selection of a person responsible for problem solving; selection of a person determining a guideline for problem solving; determining a person responsible for support on counselling about problem solving; and identification of a person who has expertise in a specific matter. Besides, the activities on creative problem solving process promoted divergent thinking which included different thinking, diverse thinking, creative

thinking, and improvement of existing things for better efficiency. This may be a guideline for promoting learners to be competent in creative problem solving (Makoto, 2008). This included the following activities: (1) card brain storming, (2) brain writing, and (3) web of abstraction. Results of activities on creative problem solving process conformed to a study of Saengchai (2008) on an analysis of outcomes of the interaction between a teaching style of problem solving referring to the triarchic theory of intelligence and a problem solving style towards the ability in creative problem solving and mathematics learning achievement of third year secondary school students. It was found that the students learning through the teaching of problem solving referring to the triarchic theory of intelligence had a higher ability in creative problem solving than those learning through normal teaching with a statistically significant level at .05. Barbier (2009) had conducted a study on learning of nature and environment in the form of action research with the creative problem solving research of grade 3 students, Blanche Bourgeois School. It was found that the creative problem solving process was challenging to the ability of the students in using diverse methods of problem solving. This made them be successful in problem solving and the problem solving methods were recognized by the community.

Regarding the activities on creative problem solving process having an effect on teamwork skills, it was found that there was statistically significant difference at .05 after holding the activities. That was, the sample group had a higher teamwork skills than before. This might be because the activity holding on creative problem solving process could enhance teamwork skills (Treffinger, Isaksen and Dorval, 2003). That was, each student joined group activities and they must answer questions on the chat page of online social networks. Besides, they mutually presented their achievement, analyzed problem solving methods, and did assigned tasks. Thus, group members discussed or exchanged opinions freely and this practiced them to listen to opinions of others. In fact, the activities on creative problem solving process had the explore acceptance step which promoted teamwork skills. In this step, students mutually expressed opinions about problem solving such as why they chose or did not choose a method of problem solving; and this could reduce resistance of those who disagreed. This conformed to a study of Jansukwong (2008) on research and development of a project activities planned by the application of creative problem solving process for the development of creative thinking, teamwork skills, and achievement quality of elementary school students. It was found that the students doing activities of the project had higher skills in creative problem solving process than those doing normal project implementation at the statically significant level of .01. This was because they participated in opinion expression or data provision to the group. Besides, they listened to opinions of other group members, apparently supported or acted against opinions of others leading to the decision-making of the group. Wongamat (2008) had conducted a study on the teaching and learning of facilitation of mathematics in the form of group process entitled “Probability for Sixth Year Secondary School Students, Non Charoen Phitthayakhom School.” It was found that the facilitation of learning activities in the form of group process could make learning achievement of the students be higher than before.

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