# Thinking Effects of Cooperative Learning Onstudent's Higher Order

**Christina Andin, Azieyana Aziz**

***Abstract:This study examines the effect of cooperative learning on developing students' higher order thinking in the Economic subject. The pre-post of control and experimental group was used as the design of this study. The samples involved 62 form four students from three secondary schools.In each school, students were thenseparated intocontrol and experimental groups. The experimental group was taught using multiple cooperative learning activities for 3 weeks (24 hours). For the same periods, conventional learning strategies were performed with the control group. The pre-test was administered to both groups before the treatment. After the treatment, a post-test was given to both groups for measuring the difference in higher order thinking scores between the two groups. The scores of post-test show a significant difference between control and the experimental group. The scores of post-test between experimental group before and after the treatment also show a significant difference. This study also found that there was a significant difference between the scores of the experimental group before and after treatment (p=.05). The finding of this study proposed that the acquisition of the high order thinking can be enhanced through cooperative learning activities.***

***Index terms-Higher Order Thinking Skills, Conventional Learning, Cooperative Learning***

## I. INTRODUCTION

Higher order thinking (HOTS) is the ability of a person to interrelates and rearrange of new information and old information in memory to find a solution or decision in complex situations.Policy-makers around the world realise that thinking skills are crucial for current and future society. Therefore, by the late 1990s, many countries in the world included HOTS in their education policies . This is in line with Glevey (2006) who states that the rapid development of technological forced many educational reforms around the world to give a high priority on the enhancement of thinking as an important educational goal[1].

Despite the importance of teaching HOT, teaching and learning in schools are still focusing on low order thinking (LOT). In most situations, teachers only function as informants and students act as information recipients [2]. Students are not encouraged to improve themselves as thinkers. In fact, according to teaching and learning in schools were dominated by the traditional approach where teachers play their role as transmitters of knowledge and students play a passive role as knowledge receptors. HOTS practice in teaching and learning are still low . The one-way learning-based approach with teacher centred learning less enhance the student's thinking skill and also their learning performance.More emphasis on mastering facts and concepts than thinking skills will not support the implementation of HOTS in teaching and learning.Students' thinking is still low because teachers aremore inclined tothe conventional way of teaching with the focus on mastery the content knowledge rather than thinking. [6]-[13]

Teaching HOTS requires teachers to engage the students actively in teaching and learning activities. Based on the reviewer of more than 500 previous research results on learning, Barkley, Cross and found that cooperative learning strategy is the best approach for active learning. In a meta-analysis of 375 experimental studies by Johnson and Johnson found that through cooperation, students showed the skills to engage in high order reasoning, creative thinking, transfer learning, and spend more time on learning activities. The superiority of cooperative learning compare to the individualistic efforts is greater when the students engaging in more problem solving and creative decision -making activities (Johnson & Johnson, 1989). This is in line with the revision on forty-six studies related to the impact of cooperative learning on problem-solving by Zhining et alThey concluded that the ability to solve more problems correctly was higher among students who worked cooperatively compare to students who worked competitively. conducted a study on the effect of cooperative learning in enhancing students' critical thinking in Lithuania. In the study students were engaging in several thinking activities such as debating and critiquing ideas, questioning, synthesizing and summarising. They found that the students' performance in the activities correlates positively with cooperative learning. The study also showed that the group members played an important role in supporting the students' improvement in critiquing and making a better decision[14]-[19].

Studies in cooperative learning indicated that the learning strategy has a profound effect on students' thinking ability compare to individual learning. Thus, this study investigates the effectiveness of cooperative strategyin mastering the Economics subject through the integration ofHOTS in the learning activities. In this study, the acquisition of students' HOTSwasobtained by calculating the difference in mean

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**Christina Andin**,Universiti Malaysia Sabah, Malaysia
*christina@ums.edu.my

score usingpre-tests and post-tests.

*Research objectives*

The study aimed to examine the effectiveness of cooperative learning in improving students' higher order thinking skills.

*Hypothesis of the Study*

$H_{o1:}$ There is no significant difference in the mean scores of pre-test between control and treatment groups.

$H_{o2:}$ There is no significant difference in the mean scores of post-test between control and treatment groups.

$H_{o3:}$ There is no significant difference in the mean scores between pre-test and post-test of the treatment group.

## II. METHODOLOGY

### a) Research Design

The present study was experimental in nature. It was based on the quasi-experimental designmethod that based on pre-test and post-test.

### b) Samples

The sample of the study consisted of 62 form four students enrolled in Economics subject in three public secondary schools. In each school, students were divided into a control group and treatment group. An age range of sample was from 16 to 17 years old. Both the control and treatment group were studying in same the class. They were divided into two groups by using a systematic sampling technique where every odd number from the list was included in the control group.

### c) Instrument

A test was designed by the researcher because there is no standardised test available for measuring the HOT in Economics subject. The Content of the test was validated with the assistance of expert teachers in HOT. The test consisted of 30 multiple choice questions and three short essay questions. The pre and post-test were conducted using the same test question.

### d) Procedures

In the first step, the pre-test was administered to all62 students in control and experimental groups. The same content outline for both groups is similar as per given in the textbook. The control group was taught through traditional teaching method while the experimental group was taught through cooperative learning strategies (with modules prepared by the researcher of this study). The teaching and learning for both groups were implemented for a period of three weeks (24 hours). After the period, the post-test was administered to both groups.

### e) Results

$H_{o1:}$ There is no significant difference in the mean scores of pre-test between control and experimental groups.

| | ***Mean of Control Group*** | ***Mean of Treatment Group*** | ***Mean Difference (%)*** | ***t*** | ***Significance (2-tailed)*** |
|---|---|---|---|---|---|
| *Pre Test of Control-Treatment Group* | 49.94 | 49.68 | 0.26 | 0.137 | 0.89 |

The value of mean scores difference between control and experimental groupson pre-test are calculated using the independent sample t-test.Table 1 shows that there is no significant difference between the control and experimental group ($p=0.89$, $p > 0.05$). Thus, it can be concluded both groups were on the equal level of HOT before treatment.

Table 1. Independent Sample t-test for Pre-test of student's HOTS

$H_{o2:}$ There is no significant difference in the mean scores of post-test between control and experimental group.

The value of mean scores difference between control and experimental groups on post-test are calculatedusing the independent sample t-test.Table 2 shows that there is a significant difference between the two group ($p=0.00$, $p <0.05$).). The mean of treatment group (59.26) is higher than the mean of the control group (50.45). It means thatthe application of cooperative learning strategies has a greater impact on students' HOTS compare to conventional learning.

| | ***Mean of Control Group*** | ***Mean of Treatment Group*** | ***Mean Difference (%)*** | ***t*** | ***Significance (2-tailed)*** |
|---|---|---|---|---|---|
| *Post Test of Control-Treatment Group* | 50.45 | 59.26 | 8.81 | -4.827 | 0.00 |

Table 2. Independent Sample t-test for Post-test of student's HOTS

$H_{o3:}$ There is no significant difference in the mean scores between pre-test and post-test of the experimental group.

Table 3 shows that there is a significant difference between the mean scores of pre-test and post-test ($p=0.00$, $p <0.05$). The mean for post-test (59.26) is higher than the mean of pre-test (49.68). It means that the use of cooperative learning strategies in teaching increased the students' HOTS.

| | Mean of Pre Test | Mean of Post Test | Mean Difference (%) | t | Significance (2-tailed) |
|---|---|---|---|---|---|
| Treatment Group | 49.68 | 59.26 | 9.58 | -9.36 | 0.00 |

Table 3. Analysis of t-test Treatment Group

## III. DISCUSSION

The objective of the study was to explore the effect of cooperative learning on the students' HOTS through Economics subject. The results indicate that cooperative learning has a positive effect on students' HOTS. These results are similar tothe finding of previous research studies, for example, who found that learning through small groups allows students to analyse and develop issues better than before. If students solve problems individually, they will only have one way to solve the problem. In contrast to group-based learning, students will find there are various ways to solve a problem or project because of the ideas and discussion within their group. This situation can be seen when the students in the cooperative learning methods show enhancement in terms of giving their own opinions and arguments, formulating and expressing opinions, analysing, synthesizing and making decisions while the students in conventional learning strategies cannot do so[19].

states that cooperative learning can develop student thinking through the analysis of the way their friends thinking in the group. Students who have the opportunity to learn in groups and collaborate will be more efficient in carrying out their tasks and always being positive in their environment. Through cooperative learning, students can develop decision-making skills, take initiative, and solving problems. All these conditions had been practiced by students in the treatment group using cooperative learning[20].

In contrast to conventional learning strategies, students are seen to be weak in the skills of giving a reason and solving problems. This finding is supported who found that passive learning will make students weak in their skills of givinga reason and solving problems. The passive learning can be transferred into active learning through the application of cooperative learning. According to Topping et al. there is a positive relationship between cooperative learning and critical thinking skills. Cooperative learning provides students with the opportunity to learn independently, safely and respect each other among group members.). This situation encourages students to develop their thinking skills through group-based learning activities.Through cooperative learning, students can further develop their knowledge by correlating them with new knowledge. Indirectly, students' thinking skills can be improved through cooperative learning strategies . The results of previous studies have shown that cooperative learning can create interactive learning while encouraging interaction among students to solve problems more easily through the sharing of opinions. Therefore, the cooperative learning is one of the best approaches of teaching that intended for integrating HOTS.

## IV. CONCLUSION

An educational policy that related to students' HOTS has been given a high priority in most countries over the world. In order to improve the student'sHOTS, teachers should shift from passive traditional teaching to active learning strategies such as cooperative learning.Cooperative learning promotes group activities that provide ample opportunities for students to interact and actively involves in learning activities. The interaction and active involvement of students through group discussions will help to increase their ability to form their own opinions and arguments, formulate, express opinions, analyse, synthesize and make decisions. The findings of this study proved that cooperative learning has a high potential to develop students' HOT compared to inactive conventional learning.

## REFERENCES

1. Barkley, E.F., Cross, K.P., & Major, C.H. (2005). Collaborative Learning Techniques: A Handbook for College Faculty. San Francisco: Jossey-Bass.
2. Brown, D. (2007). *Principles of Language Learning and Teaching, Fifth Edition*. New York: Pearson Longman.
3. Chiew, F. P., & Shashipriya, N. ( 2014).Implementation of Creative Thinking and Critical Thinking in Teaching and Learning in Secondary Schools. *Malay Education Journal, Vol. 4, No 2,* 10-24.
4. Chua Yan Piaw. (2006). *Research Methods and Statistics Book 1: Research Methods, Malaysia:* McGraw-Hill.
5. Craft, A. (2007). Possibility thinking in the early years and primary classroom. In A. G. Tan (Ed.), *Creativity: A Handbook for Teachers***.** Singapore: World Scientific.
6. Costa, A. L. (1999). *Changing Your Curriculum Means Changing Your Mind*. Pacific Grove CA: Midwest Publications.
7. Glevey, K.E. (2006). Promoting thinking skills in education. *London Review of Education,*
8. Vol. 4, No. 3, November 2006, 291–302.
9. Harison, B. (2008). *Teachers Awareness About Mathematics Teaching Standards.* Master Thesis, Tanjung Malim, Malaysia: University Sultan Idris.
10. Ishak, B. (2009). *The Effectiveness of Teaching and Learning and Its Relationship to the Academic Performance of UTHM Students.* VOT 0486 Short Term Grant. Batu Pahat, Johor: University Tun Hussein Onn Malaysia.
11. Johnson, D. W., & Johnson, R. T. (2009). *An Overview of Cooperative Learning*. Baltimore: Brookes Press.
12. Klimoviene, G., Urboniene, J., & Barzdziukinie, R. (2006). Developing Critical Thinking through Cooperative Learning. *Studies about Languages, No.6*, 77-84.
13. Landell, K. (1997). *Management by Menu*. London: Wiley and Sons Inc.
14. Malaysia Education Transformation Bulletin (March 2015). *Malaysian Education Development Plan 2013-2025.* Putrajaya: Ministry of Education Malaysia.
15. Nik Azis, N. (2003). The Use of Theory and Theoretical Framework in Mathematics Education Research. *Issues in Education, Vol. 26,* No. 1, 29-61.
16. Norasyikin M. Z., & Nurulhidayah, A. (2008). *Application of Active Learning Approach In the Final Year of the Faculty of Education, University Teknologi Malaysia, Bachelor Degree Thesis.* Skudai: University Teknologi Malaysia.
17. Noriza. K., & Effandi, Z. (2015). Integration of Higher Order Thinking Skills in the Teaching and Learning of Mathematics. *Journal of Mathematical Education, Vol. 3,* No. 1, 1-12.
18. Phawani, V. (2009). Cooperative Learning as a Means to Developing Students' Critical and Creative Thinking Skills. *Proceedings of the 2nd International Conference of Teaching and Learning (ICTL 2009).* INTI University College Malaysia.
19. Rafiza A. R. (2013).Collaborative Active Learning Strategies through Online in Malay Novel Analysis. *Journal of the Asia-Pacific Curriculum and Teaching, No. 1,* Issue 3, July 2013, 34-46.
20. Rajendran, N. S. (2001). Practicing of Thinking in Teaching Malay Language in Classroom. *10th Education Convention, Malay Institute of Malay Language.*

*21.* Ramos, J. L., Dollipas, B., & Villamor, B. (2013). Higher Order Thinking Skills and Academic Performance in Physics of College Students: A Regression Analysis. *International Journal of Innovative Interdisciplinary Research,* Issue 4, 14-28.

*22.* Rian, V., & Kamisah, O. (2012).Effectiveness of Teaching Multiple Teaching Media in Improving Science Process Skills among Students. *Journal of Malaysia Education, No. 37,* Issue 2, 1-11.

23. Rosma, O., Ong, E. T., Shakinaz, D., & Wong, K. T. (2012). Thinking Skills Level Among Primary School Teachers. *Bitara Education Journal, UPSI,* Vol. 5, Series 5.

24. Ruggiero, V. R. (1988). *Teaching Thinking Across the Curriculum*. New York: Harper and Row.

25. Sarimah, K., & Shaharom, N. (2008). The Critical Thinking Skill Mastery Level of Form Four Student. *Education Journal of University Teknologi Malaysia,* Volume 13, 58-72.

26. Smith, G. F. (2002) Thinking skills: the question of generality. *Journal of Curriculum Studies*, 34, 659–678

*27.* Topping, K. J., Thurston, A., Tolmie, A., Christie, D., Murray, P., & Karagiannidou, E. (2011).Cooperative Learning in Science: Intervention in the Secondary School. *Research in Science and Technological Education, 29 (1),* 91-106.

28. Thurston, A., Topping, K. J., Tolmie, A., Christie, D., Karagiannidou, E. & Murray, P. (2009). Cooperative Learning in Science: Follow up from Primary to High School. *International Journal of Science Education, 32*(4),501-522.