Increasing Teamwork Capacity of High School Students through Collaborative Teamwork Learning

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Abstract Recently, leaders of business and industry world generally require workers who are capable of working collaboratively to make their business a success. Unfortunately, various studies show that most high school students do not have the capacity to work collaboratively in solid teamwork. For this reason, high schools must develop the teamwork capacity of their students during the learning process. The present study was designed to examine the effectiveness of a collaborative teamwork learning model to improve the teamwork capacity of high school students. It was an experimental study with one group pretest-posttest design. The experiment was carried out in three high schools. They were SMA Negeri 1 Pontianak, SMA Negeri 1 Mempawah, and SMA Negeri 5 Singkawang. There were four aspects of the students’ teamwork capacity to develop. These aspects were sharing, collaboration, paying attention to the rights and welfare of others, and caring for others. The results of the study showed that the collaborative teamwork learning model was effective to improve the teamwork capacity of the students in three high schools. All of the investigated aspects got improved. They were categorized “high”, except the aspect of ‘paying attention to the rights and welfare of others’. It was classified “medium”.

Keywords: collaboration, team, teamwork

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1. Introduction

The rate of technological development, the escalation of global competition, and the various forms of change that do so fast have resulted in dramatic changes in the economic and industrial fields in various developed and developing countries. Today, business and industry leaders mainly require workers who can work collaboratively to achieve success in their business fields [1]. Unfortunately, various studies show that in general high school students do not have the capacity to work collaboratively in solid teamwork [2]. Furthermore, claims that the entry-level capacity of workers today generally is of low critical thinking competency and poor collaborative working ability in teamwork [3]. About this reason, collaborative work capacity must be developed during the learning process in high schools.

It is difficult to answer such questions as ‘What learning strategy is conducive to facilitate high school students to develop their capacity to work collaboratively in teamwork?’ and ‘What steps of the learning process should be taken to have high school students accustomed to developing their capacity to work collaboratively in teamwork?’ This difficulty may be due to the learning process in high schools. The students are still introduced to the concept of the success referring to more to competition than cooperation. Success is still defined more as a result of independence rather than of interdependence.

This concept has been abandoned in developed countries. In his book which won the bestseller entitled "The 7 Habits of Highly Effective People" has earlier introduced that it is interdependence that is considered the highest in the paradigm of modern management and modern life [4]. If they are put in order, dependence is the lowest, independence is in the middle, and interdependence is the highest.

Such concept shifting is very understandable because fields of science increasingly shift to be so specialized that to produce a product, production management must be able to collaborate harmoniously among the existing specialized fields of science. Thus, it is a need that people work collaboratively.

The learning process that puts more emphasis on the importance of cooperation than on competition or more on interdependence than on independence is also shown by Flynn [5] and Graham and Graham [6]. If competition is developed during the learning process, there will be a tendency that high school students are directed to the thoughts and the feelings to get used to not being reluctant to attack others. In fact, on the other hand, the development of cooperation and interdependence can
develop the ability to come at challenges, leadership, and management that are highly required when entering the world of work [5,6].

The efficacy of this collaborative teamwork model has been proven by Federal Express and Boeing Airlines when restructuring their company organizations - which had never been touched in the company's restructuring [3,7]. After applying the collaborative concept, Federal Express could increase 40% of its company's productivity. Likewise, when the production of 777 jet aircraft decreased, applying this collaborative model, Boeing could boost the production up to 50% [1].

Through the collaborative teamwork learning model, teachers can at least help high school students (a) learn to work successfully in team, and (b) develop the skills and improve the teamwork quality required for collaborative skills when they later enter the world of work [8,9].

Therefore, the present study was conducted to examine more deeply the teamwork capacity profile of high school students and the effectiveness of collaborative teamwork learning to improve the teamwork capacity of high school students. The result could be used by the teachers in running the learning process that becomes their responsibility. So, the students would have good teamwork capacity that is very much needed when they enter the world of work and university.

2. Method

The variables of the present research were (1) collaborative teamwork learning as an independent variable, and (2) teamwork capacity of the students as the dependent variable, which consisted of four aspects, namely sharing, collaborating, paying attention to the rights and welfare of others, and caring for others. The study was a quasi-experimental design with one group pretest-posttest design. The experimental procedures covered (1) developing the students’ understanding about the importance of teamwork; (2) forming a team; (3) helping the team focus on its main task; (4) distributing the assignments to the students wisely; (5) developing the students’ responsibility; (6) improving the students’ writing skills; and (7) providing the students with an initial assistance and giving a feedback; (8) using a recording form to organize and to plan by using the communication roster, task sheets, meeting schedule form, meeting agenda sheets, meeting evaluation sheets, and final evaluation sheets for all activities.

Each experimental group in each school comprised 35 students. Because the experiment was carried out in three schools, the total research subjects were 105 students. The data were collected using Collaborative Teamwork Inventory developed by Asrori [10]. This inventory was tried out and tested for its validity and reliability using Cronbach Alpha Technique and it obtained 0.853, meaning that it was eligible for use in research.

The students’ teamwork capacity profile data were analyzed using a comparison analysis between the actual score and the ideal maximum score based on the normal curve [11]. To determine the effectiveness of collaborative teamwork learning for increasing students’ teamwork capacity, the data were analyzed using t-tests for paired samples [11]; while to determine the effectiveness difference of collaborative teamwork learning to increase inter-school student teamwork capacity, the data were analyzed using analysis of variance [11].

3. Result and Discussion

3.1. Initial Teamwork Capacity Profile of Senior High School Students

Based on the percentage analysis, namely, by dividing the actual score obtained by all students with the ideal maximum score, the results are shown in Table 1.

Table 1. Initial Teamwork Capacity Profile of Senior High School Students

| Variable/ Sub-variable | Maximal Ideal Score | Actual Score | Percentage (Category) |
|------------------------|---------------------|--------------|-----------------------|
| Initial Teamwork Capacity of Senior High School Students | 28920 | 9254 | 31,99% (L) |
| 1. Sharing | 7230 | 2169 | 30,00% (L) |
| 2. Collaborating | 7230 | 2750 | 38,04% (L) |
| 3. Paying attention to the rights and welfare of others | 7230 | 2277 | 31,49% (L) |
| 4. Caring for others | 7230 | 2313 | 31,99% (L) |

L = Low; M = Moderate; H = High.

As can be seen in the Table 1, overall, the initial teamwork capacity of high school students is still classified ‘low’. If examined in more detailed, it can be seen that most aspects, that is, the aspects of sharing, paying attention to the rights and welfare of others, and caring for others are classified ‘low’. The only aspect that is categorized as 'moderate' is collaboration.

The results of this study indicate that high school students require serious intervention to enable them to develop their teamwork capacity. It is very important because the teamwork capacity is highly demanded by the world of work and industry when the students are already working. If not handled seriously, one of which is through the intervention of collaborative learning model learning, it will incline to produce graduates who will face various difficulties in the future.

3.2. Mean Difference of Students’ Initial Teamwork Capacity among Senior High Schools

The mean difference of students’ initial teamwork capacity among senior high school was analyzed using analysis of variance as shown in Table 2.

Table 2. Mean Difference of Students’ Initial Teamwork Capacity among Senior High Schools

| Variable/ Sub-variable | Sum of Squares | Df | Mean Square | F | Sig. |
|------------------------|----------------|----|-------------|---|------|
| Intergroup | 427,004 | 6 | 71,17 | 1,29 | 0,26 |
| Intrigroup | 12936,66 | 234 | 55,29 | | |
| Total | 13363,67 | 240 | | | |
As shown in the Table 2, the result of the variance analysis, if viewed from the difference of schools, shows that the initial teamwork capacity of senior high school students does not differ significantly. It means that the students' initial teamwork capacity of all schools is categorized "low". In more detail, analysis of variance was also carried out on each aspect that was covered in the initial teamwork capacity of senior high school students. The result of the analysis is shown in Table 3.

Table 3. Difference in Each Aspect of Students' Initial Teamwork Capacity from Senior High Schools

| Aspect | Sum of Squares | df | Mean Square | F | Sig. |
|--------|----------------|----|-------------|---|------|
| Aspect 1 | | | | | |
| Inter-group | 49.71 | 6 | 8.29 | 1.79 | 0.10 |
| Intra-group | 1083.46 | 234 | 4.63 | | |
| Total | 1133.17 | 240 | | | |
| Aspect 2 | | | | | |
| Inter-group | 25.37 | 6 | 4.23 | 0.59 | 0.74 |
| Intra-group | 1671.73 | 234 | 7.14 | | |
| Total | 1697.10 | 240 | | | |
| Aspect 3 | | | | | |
| Inter-group | 71.08 | 6 | 11.85 | 2.39 | 0.03 |
| Intra-group | 1162.32 | 234 | 4.97 | | |
| Total | 1233.40 | 240 | | | |
| Aspect 4 | | | | | |
| Inter-group | 51.34 | 6 | 8.56 | 1.73 | 0.12 |
| Intra-group | 1160.27 | 234 | 4.96 | | |
| Total | 1211.61 | 240 | | | |

Table 3 shows that if viewed in more detail into its aspects, the initial teamwork capacity of the students from different schools does not differ significantly, either. Of the four aspects, there is only one aspect (namely, paying attention to the rights and welfare of others) that shows a significant difference.

If seen from the aspects of sharing, cooperating, and caring for others, these three aspects do not show any significant difference.

3.3. The Effectiveness of Collaborative Teamwork Learning Model to Develop Teamwork Capacity of Students from SMA Negeri 1 Pontianak

The effectiveness of the collaborative teamwork learning model to develop teamwork capacity of students from SMA Negeri 1 Pontianak was analyzed by comparing the actual pretest and posttest scores with the ideal maximum score. The result is shown in Table 4.

Table 4. Teamwork Capacity of Students from SMA Negeri 1 Pontianak Before and After They Participated in the Learning Process with Collaborative Teamwork Learning Model

| Variable Aspect | Xideal | Pretest | Posttest |
|-----------------|--------|---------|---------|
| Sharing         | 7230   | 2169    | 5980    |
| Collabo-rating  | 7230   | 2750    | 5350    |
| Paying attention| 7230   | 2277    | 4338    |
| Caring for others| 7230  | 2313    | 5160    |

Table 4 shows that before the students were given a treatment (the result of the pretest) the teamwork capacity of students from SMA Negeri 1 Pontianak was categorized 'low'. It can be seen in all aspects. After they were given the treatment and the posttest was administered, all of the aspects developed up to the category of 'high'.

To examine the effectiveness significance of learning using 'collaborative teamwork learning' model, t-test was used for paired samples (t-test for paired samples), namely pretest and posttest data. The result of the t-test analysis shows that the value of $t = -28.77$ and $p = 0.001$. Thus, the statistical hypothesis is rejected and the working hypothesis is accepted. It means that learning using 'collaborative teamwork learning' model is very effective to develop the teamwork capacity of the students from SMA Negeri 1 Pontianak.

3.4. The Effectiveness of Collaborative Teamwork Learning Model to Develop Teamwork Capacity of Students from SMA Negeri 1 Mempawah

The effectiveness of the collaborative teamwork learning model to improve the teamwork capacity of the students from SMA Negeri 1 Mempawah was analyzed by comparing the actual pretest and posttest scores with the ideal maximum score. The result is shown in Table 5.

Table 5. Teamwork Capacity of Students from SMA Negeri 1 Mempawah Before and After They Participated in the Learning Process with Collaborative Teamwork Learning Model

| Variable Aspect | Xideal | Pretest | Posttest |
|-----------------|--------|---------|---------|
| Sharing         | 7230   | 2169    | 5980    |
| Collabo-rating  | 7230   | 2750    | 5350    |
| Paying attention| 7230   | 2277    | 4338    |
| Caring for others| 7230  | 2313    | 5160    |

Table 5 shows that before the students from SMA Negeri 1 Mempawah were given the treatment (the results of the pretest) their teamwork capacity was classified ‘low’. It was shown in all aspects. After the students were given the treatment and the posttest was administered, all aspects developed up to the "medium" category. This aspect dealt with the rights and welfare of others.

To test this hypothesis, the pre-test and post-test data were analyzed using the t-test for paired samples. The result of the t-test analysis shows that the value of $t = -22.75$ and $p = 0.001$. Thus, the statistical hypothesis is rejected and the working hypothesis is accepted. It means that learning using 'collaborative teamwork learning’ model is also effective to develop the teamwork capacity of the students from SMA Negeri 1 Mempawah. Unfortunately, it was not as effective as that was carried out in SMA Negeri 1 Pontianak because there was still one aspect of development which only reached the
"medium" category. It dealt with the rights and welfare of others.

3.5. The Effectiveness of Collaborative Teamwork Learning Model to Develop Teamwork Capacity of Students from SMA Negeri 5 Singkawang

To find out the effectiveness of the collaborative teamwork learning model to improve the teamwork capacity of the students from SMA Negeri 5 Singkawang, the analysis was performed by comparing the actual pretest and posttest scores with the ideal maximum score. The result is shown in Table 6.

Table 6. Teamwork Capacity of Students from SMA Negeri 5 Singkawang Before and After They Participated in the Learning Process with Collaborative Teamwork Learning Model

| Variable Aspect          | Pretest | Posttest |
|--------------------------|---------|----------|
|                          | X_{ideal} |                       |
|                          | X_{actual} Level | X_{actual} Level |
| 1. Sharing               | 7230     | 2169      |
| 2. Collaborating         | 7230     | 2750      |
| 3. Paying attention to   | 7230     | 2277      |
| the rights and welfare   | 7230     | 2313      |
| of others                | 7230     | 2313      |
| 4. Caring for Others     | 7230     | 2313      |

L = Low; M = Moderate; H = High.

As can be seen in the above table, before the students of SMAN 5 Singkawang were given the treatment (the results of the pretest), their teamwork capacity was classified ‘low’. It is shown in all aspects. After the treatment and the administration of the post-test, all aspects developed up to the "high" category. There was one aspect whose development reached the "medium" category. It is the sharing aspect.

To test this hypothesis, the pre-test and post-test data were computed using the t-test for paired samples. The t-test result shows that the value of $t = -17.28$ and $p = 0.001$. Therefore, the statistic hypothesis is rejected and the working hypothesis is accepted. It means that learning using ‘collaborative teamwork learning’ model is effective to develop the teamwork capacity of students in SMA Negeri 5 Singkawang. However, it is not as effective as that done in SMA Negeri 1 Pontianak because there is still one aspect whose development only reached the "medium" category. This aspect is ‘sharing’.

3.6. Differences in the Effectiveness of Collaborative Teamwork Learning Model to Develop Teamwork Capacity of Students from SMA Negeri 1 Pontianak, SMA Negeri 1 Mempawah, and SMA Negeri 5 Singkawang

Test of mean difference in students’ teamwork capacity from SMA Negeri 1 Pontianak, SMA Negeri 1 Mempawah, and SMA Negeri 5 Singkawang was computed using analysis of variance. The result is shown in Table 7.

Table 7. Differences in the Effectiveness of Collaborative Teamwork Learning Model to Improve Teamwork Capacity for Students from SMA Negeri 1 Pontianak, SMA Negeri 1 Mempawah, and SMA Negeri 5 Singkawang

| Aspect          | Sum of Squares | df | Mean Square | F     | Sig.   |
|-----------------|----------------|----|-------------|-------|--------|
| Aspect 1        | 49,710         | 6  | 8,285       | 1,789 | 0,102  |
| Total           | 113,170        | 240|              |       |        |
| Aspect 2        | 25,369         | 6  | 4,228       | 0,92  | 0,737  |
| Total           | 169,704        | 240|              |       |        |
| Aspect 3        | 71,080         | 6  | 11,847      | 2,385 | 0,030  |
| Total           | 123,340        | 240|              |       |        |
| Aspect 4        | 51,344         | 6  | 8,557       | 1,726 | 0,116  |
| Total           | 121,160        | 240|              |       |        |

4. Conclusion

Based on the research results and discussion, it can be concluded that (1) as a whole the collaborative teamwork learning model is effective to improve the teamwork capacity of the students from three senior high schools. There is only one aspect improving up to the category of ‘moderate’, namely, the aspect of paying attention to the rights and welfare of others, the other aspects improved up to the category of "high". (2) Seen from the difference of
schools, there is not any significant difference in the effectiveness of collaborative teamwork learning model to improve the teamwork capacity of senior high school students. It means that in the schools selected as the location of this study, the collaborative teamwork learning model is equally effective to improve the teamwork capacity of high school students. (3) If viewed in detail, the teamwork capacity of the students from the schools selected as the location of the present research does not differ significantly. Of the four aspects, there is only one aspect (namely, the aspect of paying attention to the rights and welfare of others) that differs significantly. There is not any other significant difference in the aspects of sharing, cooperating, and caring for others.

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