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Is Group Work an Effective Method to Promote Learning Outcomes in Universities?

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Abstract
It has often been said that group work is one of the representative effective methods to promote learning outcomes not only in primary and secondary education, but also in higher education. In recent years in Japan, group work has been embraced as part of the term 'active learning' and has been blindly praised and encouraged. In my classes, many assignments employing group work have been performed not only in large size classes but also in small size classes. Almost all research has provided positive evidence from the view of theoretical and empirical aspects of group work. However, skepticism and negativity towards group work are also emerging. Even if group work is not rejected outright, at the very least, opportunities to discuss effective methods of group work are increasing. This study focuses on the two issues mentioned above, motivation and gender difference. Group work has the advantage of allowing learners to listen to the ideas of others, compare them with their own, and form their own opinions. It may also have the benefit of cultivating communication skills and the ability to collaborate with others. However, conducting it within a limited time frame carries risks. There is also the possibility that it may have a negative effect on learning outcomes, or at least not bring about the expected benefits. Furthermore, learners may be aware of the limitations of group work.

Keywords: Communication, Group Work, Male/Female, Motivation, University

1. Introduction

Group work seems to be thought of as one of the representative effective methods to promote learning outcomes not only in primary and secondary education, but also in higher education. In recent years, group work has been embraced as part of the term 'active learning' especially in Japan and has been blindly praised and its introduction has been encouraged. In my university classes, many assignments using group work have been performed not only in large size classes but also in small size classes. Almost all research has presented positive evidence from the view of theoretical and empirical aspects of group work.

However, skepticism and negativity towards group work have also been indicated. Even if group work is not rejected outright, skepticism is emerging, and at the very least, opportunities to discuss effective methods of group work are increasing gradually. Of course, there are pros and cons in group work. Also, before criticizing the group work itself, it may be that the class planning is poor. However, for the last several years, there have been a lot of situations that group seems not to promote good learning outcomes in my classes apparently. Surely, the sample size of my classes to examine the effects of learning outcomes using group work is insufficient, however, to examine the group work early would be necessary because this method seems to be trusted as an effective method without any doubts.

This study's goal is to examine the effectiveness of group work to obtain good performances at the final stage. It is structured as follows. Following this introduction, section 2 reviews existing studies. The amount of recent research on this topic is significant. In section 3, empirical analyses are conducted to examine the effectiveness of group work. This section demonstrates empirical analysis methods used in this study. The results of empirical analyses are shown and the analyses are performed in section 4. Finally, this study concludes with a brief summary.

2. Existing studies

A lot of discussion has been performed about group work in the past. Recently, there has been an increase in the volume of papers that have been presented. It seems that the COVID-19's pandemic and the spreading use of AI have changed learners' attitudes toward learning.

Most papers evaluate group work as an effective method to promote learning qualities. Telling (2024) showed that rather than viewing learners' resistance to group work as simply individualistic frustration at doing something they don't want to do, view their comments as critical reflections on what should be valued in universities. Berry and Siger-Frieman (2023) suggested that learners who perceive a course as highly useful will learn more than learners who takes a course they perceive as less useful.

Concrete methods to enhance the learning outcomes in group work have been presented. Mistugi et al. (2024) found that regardless of leadership style, having a group leader was beneficial to task performance. Trang and Hanh (2024) showed that grouping is important in group work due to issues of leadership and mutual evaluation. From the view of fairness, Ion et al. (2024) revealed that Including SA (self-assessment) and PA (peer assessment) strategies in learners assignments increases learners' sense of fairness in the assessment process. Graham and Fulya (2025) found that there is suggestive evidence that paired quizzing fosters positive attitudes toward group work and improves quiz performance. The impact of group quizzes on outcome is more pronounced positively when low-achieving learners are paired with high-achieving learners.

Regarding motivation to learn, Adesina et al. (2023) indicated when learners recognize their contribution to group work, they become more motivated to learn within the group and their learning outcomes improve. Also, regarding gender difference, Morsi and Assem (2024) found that there was a highly significant difference in academic performance between boys and girls in the online groups, with girls performing better. Furthermore, all girls-only groups achieved higher grades than both the mixed-gender and boys-only groups. Gicheva et al. (2025) showed that before the pandemic, female and male learners had similar academic performance trends, but since fall 2021 in particular, the number of female college learners passing classes has decreased and the pace of credit acquisition has slowed, while there has been no corresponding difference in the number of credits they are attempting to earn. This study focuses on the two issues mentioned above, motivation and gender difference for conducting group work.

3. Empirical methods

It is interesting that there are only a few papers that deny the efficacy of group work. However, there are some symptoms that suggest that group work lacks a fruitful process. Rather than blindly evaluating and introducing group work, it would be necessary to strive to improve the quality of classes by objectively evaluating their merits and demerits. The primary goal is to improve the learning outcomes of learners. At least, some learners are not so

active in achieving high performance. Also, there seems to be a difference between male and female students. However, these two points are my impressions. So, this study examines two impressions empirically.

Three variables are used to analyze the effectiveness of group work. GWSCORE This is an evaluation of the results when group work is undertaken. It is not an evaluation of the student's efforts in group work, but rather an evaluation of the results. It is evaluated by me and learners, and scored from 0 to 10. FINAL is the final score and is scored from 0 to 100. GWPROCESS is the one when the group work is conducted, my scores are evaluated. The score is from 0 to 10. The GWPROCESS is evaluated by the rubric listed in Table 1.

Table 1: Group work rubric

	4	3	2	1
Participating in team discussions	Actively making constructive comments that advance the discussion during team discussions	Speaking up and leading the discussion during team discussions	Making relevant comments during team discussions	Participating in team discussions
Encouraging team members to participate in discussions	Encouraging active participation by creating a flow for the discussion that allows other team members to relate what one team member says to what others say.	Encouraging active participation by organizing and relating what team members say before speaking.	Encouraging team members to participate in discussions by showing understanding through nodding and other responses.	Listening to team members without interrupting.
Individual Contributions to Group Work	Actively participates in group work and makes a significant contribution to the completion of the assignment with a high level of completion.	Participates in group work and contributes to the completion of the assignment.	Participates in group work and cooperates in the completion of the work.	Participates in group work and helps with the work upon request.
Creating a good team atmosphere	Taking the initiative to improve the team atmosphere in response to changes in the team situation, or making statements or taking actions to resolve negative situations when they arise	Taking the initiative to improve the team atmosphere, and supporting team members	Taking statements and actions tailored to the team members to improve the team atmosphere	Participating in the team without making statements, taking actions, or displaying behavior that negatively impacts the team atmosphere

Note: This rubric is based on the one which was made by Kansai University of International Studies, Shukutoku University, Hokuriku Gakuin University, and Kurashiki Sakuyo University.

Statistical descriptions of these three variables are listed in Table 2. The sample size is 65.

Table 2: Statistical descriptions of each variable

	GWSCORE	FINAL	GWPROCESS
Average	4.753	68.015	3.553
Standard error	0.452	2.811	0.314
Medium	5.000	72.000	3.000
Mode	10.000	95.000	0.000
Standard deviation	3.644	22.667	2.537
Dispersion	13.282	513.827	5.438
Kurtosis	-1.311	-1.085	-0.761
Skew	0.182	-0.401	0.237
Minimum	0.000	20.000	0.000
Maximum	10.000	100.000	10.000

First of all, the relationship between group work score and final score is examined empirically. Moreover, the relationship between group work score and group work process is examined. Then, male and female differences are assessed for bias. The difference between male and female is included in each analysis. The empirical methods are OLS (Ordinary Least Squares) and RLS (Robust Least Squares). The RLS method is used in the case of over outliers. When the data contains noise or abnormal data points, the hypothesis is significantly influenced. This method is also beneficial when the data is not a normal distribution.

4. Empirical results

As mentioned in the previous section, three issues are examined empirically. First, FINAL SCORE is regressed by GWSCORE. The estimated equation is the equation (1). The results are in Table 3.

$$\text{FINAL SCORE} = a1 + a2\text{GWSCORE} \quad (1)$$

Table 3: Effect of group work on the final score

	OLS	RLS
C	53.859***	53.170***
(t-statistic/z-statistic)	(13.106)	(12.296)
GWSCORE	2.977***	3.149***
(t-statistic/z-statistic)	(4.328)	(4.349)
Adj.R^2	0.216	0.327
F-statistic/Rw^2 statistic	18.733	18.921
Prob (F-statistic/Rn^2 statistic)	(0.000)	(0.000)
Schwartz criterion	8.932	47.075

The results are clear. The effect of group work on the final score is significantly positive. The results are natural in part as the group work score is included in the final score, however, performing group work appropriately is important to obtain good scores.

To examine the description between male and female, these two variables are included as dummy variables (1 or 0). The equation is (2). The results are in Table 4.

$$\text{FINAL SCORE} = a1 + a2\text{GWSCORE} + \text{male} + \text{female} \quad (2)$$

Table 4: Effect of group work and gender description on the final score

	OLS	RLS
C	63.254***	63.402***
(t-statistic/z-statistic)	(4.158)	(3.912)
GWSCORE	2.763***	3.029***
(t-statistic/z-statistic)	(3.842)	(3.953)

MALE	-10.891	-12.503
(t-statistic/z-statistic)	(-0.715)	(-0.770)
FEMALE	-0.002	-1.194
(t-statistic/z-statistic)	(-0.000)	(-0.075)
Adj.R^2	0.233	
F-statistic/Rw^2 statistic	7.506	23.182
Prob (F-statistic/Rn^2 statistic)	(0.000)	(0.000)
Schwartz criterion	9.006	56.212

Gender description did not impact the final score significantly. However, it is worth noting that the proportion of women in this analysis is low. In particular, in groups with more men and fewer women, there were occasional cases where women made fewer comments. So, this study takes a look at group work process during group work.

The effects of GWPROCESS on the GWSCORE are evaluated by equation (3). The regression equation is (3) and the results are in Table 5.

GWSCORE = a1 + a2GWPROCESS (3)

Table 5: Effect of group work process on the group work score

	OLS	RLS
C	3.021***	2.672***
(t-statistic/z-statistic)	(4.075)	(3.263)
GWPROCESS	0.487***	0.549***
(t-statistic/z-statistic)	(2.863)	(2.924)
Adj.R^2	0.101	0.109
F-statistic/Rn^2 statistic	8.201	8.550
Prob (F-statistic/Rn^2 statistic)	(0.005)	(0.003)
Schwartz criterion	5.414	69.377

Group work process affects group work score significantly. It suggests that the class plan including group work is important.
Also, discrimination of male and female is included in the equation. The estimated equation is (4). The results are in Table 6.

GWSCORE = a1 + a2GWPROCESS + male + female (4)

Table 6: Effect of group work process on the group work score

	OLS	RLS
C	-1.472	-1.777
(t-statistic/z-statistic)	(-0.550)	(-0.622)
GWPROCESS	0.417**	0.461**
(t-statistic/z-statistic)	(2.340)	(2.422)
MALE	4.397*	4.454
(t-statistic/z-statistic)	(1.724)	(1.637)
FEMALE	5.194**	5.245**
(t-statistic/z-statistic)	(2.114)	(2.001)
Adj.R^2	0.138	0.142
F-statistic/Rn^2 statistic	4.417	13.112
Prob (F-statistic/Rn^2 statistic)	(0.007)	
Schwartz criterion	5.469	62.347

The results are quite interesting. Some groups are composed of only males or only females. The results show that such group results are high.

The performance of group work is related with motivation in participating. FAIL is also a dummy variable that scores 1 (learners that did not get scores in final evaluation) or 0 (learners that got scores in final evaluation). The estimated equation is (5) and the results are in Table 7.

GWPROCESS = a1 + a2FAIL (5)

Table 7: Effect of failure learners on the group work process

	OLS	RLS
C	4.282***	4.266***
(t-statistic/z-statistic)	(12.720)	(12.119)
FAIL	-2.493***	-2.535***
(t-statistic/z-statistic)	(-4.003)	(-3.893)
Adj.R^2	0.190	0.180
F-statistic/Rn^2 statistic	16.029	15.160
Prob (F-statistic/Rn^2 statistic)		(0.000)
Schwartz criterion	4.586	43.519

As expected, learners that did not get scores in final evaluation did not have a positive influence on the final scores. Also, the case of including male and female are the equation (6) and the results are in Table 8.

GWPROCESS = a1 + a2FAIL + a3male + a4female (6)

Table 8: Effect of failure learners on the group work process

	OLS	RLS
C	3.654	3.536
(t-statistic/z-statistic)	(1.980)	(1.915)
FAIL	-2.028***	-2.258***
(t-statistic/z-statistic)	(-3.252)	(-3.623)
MALE	-0.633	-0.659
(t-statistic/z-statistic)	(-0.349)	(-0.363)
FEMALE	1.479	1.622
(t-statistic/z-statistic)	(0.851)	(0.933)
Adj.R^2	0.100	0.117
F-statistic/Rn^2 statistic	4.560	10.643
Prob (F-statistic/Rn^2 statistic)	(0.014)	(0.004)
Schwartz criterion	4.740	49.808

Gender does not have a significant effect on the group work process. However, male has a negative effect and female has a positive effect. In particular, groups composed only of female members generally achieve higher scores in the group work process. Also, all of the learners who have excessive absences or who abandon their credits by not submitting their work were men, and this influence appears to be reflected in the positive and negative coefficients. However, no significant results were obtained.

Finally, the results of the questionnaires are shown in Table 9. This one is excluded by failure learners,

Table 9: Questionnaires about group work

Do you think group work is interesting?	Strongly agree: 0.0% Somewhat agree: 78.6% Not so much: 21.4% Not at all agree: 0.0%
Do you think group work is more effective than studying alone?	Strongly agree: 40.0% Somewhat agree: 46.73% Not so much: 13.3% Not at all agree: 0.0%
What skills do you think you have developed through group work, not just in this class? <Multiple choices allowed>	Communication skills: 46.7% Being able to see things from other people's perspectives: 66.7% Teamwork: 53.3% Problem-solving and identification: 33.3% Expressiveness: 33.3% Leadership: 20.0% Others: 6.7%
Would you like to do more group work?	Strongly agree: 14.3% Somewhat agree: 57.1% Not so much: 28.6% Not at all agree: 0.0%
Have you ever had problems with group work? <Multiple choices allowed>	It becomes one-way: 33.3% People are unable to express their opinions: 13.3% Things go off track: 20.0% Others are not very motivated to participate: 26.7% There is no one to take on leadership roles or they are too strong: 40.0% Friends stick together: 33.3% Goals are not shared and everyone works separately: 40.0% Individual efforts are not visible: 46.7% Others: 0.0%

All of the above analyses clearly demonstrate the dangers of having excessive expectations for group work. First, there is a risk of learners with low motivation being mixed into a group. The presence of even one such learner significantly reduces the quality and outcomes of group work. Learners may feel unable or unwilling to resist peer pressure. While teachers may be able to accommodate differences in learners' academic ability, it is difficult to address differences in motivation. Other approaches include organizing groups based on learner motivation or separating low-motivated learners into separate groups. However, this is difficult in practice, including explaining it to learners. It may also have a negative impact on highly motivated learners. If it affects grades and evaluations, motivated learners will be reluctant to do it. It is difficult for learners to point out problems or express their dissatisfaction to each other. In particular, when there are fewer female learners, they are less likely to behave in this way than when there are more male learners. While there is no perfect solution, careful consideration is needed when dividing learners into groups.

Second, learners may make decisions emotionally without careful consideration. It cannot be denied that individual judgment and analytical ability may not be reflected in decision-making. While the benefits of group work are undeniable, their drawbacks must also be properly evaluated. While it's difficult to call this a blessing, it seems that learners are calmly assessing the limitations of group work. Conducting surveys at the beginning of classes or midway through the semester and asking learners to reflect on their own experiences may be a solution. This study's author has implemented this approach.

5. Conclusion

Group work has been widely touted as one of the most effective ways to promote learning outcomes in universities. In recent years, group work has been incorporated into the term "active learning" in Japan and blindly praised and encouraged. In my classes, group work assignments have been implemented in many classes, both large and small. Most research has provided positive evidence regarding group work from both theoretical and empirical perspectives. However, skepticism and negative opinions regarding group work are also appearing. While group

work has not been completely rejected, skepticism is emerging, and at least opportunities for discussion of effective group work techniques are increasing. However, this is still far from sufficient.

This study focused on the two forementioned issues: motivation and gender differences. Group work has the advantage of allowing learners to listen to the ideas of others, compare them with their own, and form their own opinions. It is also thought to be effective in developing communication skills and the ability to work collaboratively with others. However, implementing it within a limited time frame carries risks. It may have a negative impact on learning outcomes, or at the very least, may not produce the expected results. Furthermore, learners themselves may be aware of the limitations of group work. Group work should not be overconfident or become a form of self-indulgence. Looking forward, further discussion on group work is needed.

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