RESEARCH ON THE INFLUENCE MECHANISM OF GROUP WORK ON CURRICULUM ENGAGEMENT

- Take Course Papers and Reports as Examples

Yi Zhong，Wen-Tsao Pan，Qionghui Huang , Danhui Chen，Zhaohui Luo，Zhihai Hu

Guangdong University of Foreign Studies, Guangzhou Higher Education Mega Center, Guangzhou, 510006, China
Corresponding email: teacherp0162@126.com

Abstract

Group work is an important channel to inspect the teaching results of Guangdong University of Foreign Studies. Group work engagement refers to students' engagement in behavior, emotion and cognition in the process of group work based on their own needs, values and interests. This paper takes the students of Guangdong University of Foreign Studies(GDUFS) as the main research objects and takes the course papers and reports as examples to discuss seven different factors that may affect the level of group work input based on these three dimensions. It collects data through questionnaires and analyzes the data by using the method of equal linear regression, concluding that there is a positive correlation between learning motivation, teacher-student interaction and group interaction and group work input, and puts forward suggestions for the problems existing in the group work input of college students.

Keywords: Group work, Course Input, Equal Linear Regression, Learning Motivation, Group Interaction, Teacher-student Interaction.

1. INTRODUCTION

Group cooperative learning is a supplement and improvement to the form of class teaching.[1]The task of cooperating with others can enhance the cooperative spirit of students. This group learning form allows students to explore and win with their peers while exploring knowledge independently, so as to further explore the unknown. In the current research at home and abroad, the research results of cooperative learning and learning of college students have been fully researched, but no further and detailed research has been done on the special content of college students' group work. As a university which attach great importance to presentation, GDUFS pays special attention to the quantity and quality of group work. However, we have also observed that students' commitment to the form of collaborative learning, group work, is different. This study will take the students of GDUFS as the research object, and study the group work engagement of students and its influencing factors.

2. LITERATURE REVIEW

2.1 Research on Learning Input

2.1.1 Concepts on learning investment
Kong Qiping[2] believes that student input is a combination of emotional input, cognitive input and behavioral input, in which emotional input refers to student teaching. The emotional experience in the activity, cognitive input mainly refers to the learning strategy, or the problem of active input and superficial input, and the behavioral input mainly refers to whether the student's learning behavior is positive or not..

2.1.2 Research on learning input
Yang Shuo[3] takes the undergraduate freshmen, sophomores, and juniors of H University as the research object, carried out the research on learning input from academic investment, active cooperative learning, teacher-student interaction, richness of educational experience, and support for campus environment. Zhao Lei[4] analyzed and summarized the research methods such as in-depth interviews and field observations, constructed a theoretical analysis model of the factors influencing the input of college students' curriculum learning. And the factors are not one or the other, but the relationship of mutual influence and interaction.

2.2 Concepts and Research on Group Cooperative Learning

2.2.1 Peer relationship factors in learning input
Zhang Na[5] mentioned that relationships affect learning engagement. She believes that the status of learning investment is one indicator for students to choose their peers, and studies that show that peers

have a great impact on students' behavioral input.

2.2.2 Reference to group work research

Based on the data of the "H University Undergraduate Study and Development Survey", Zhang Junchao and Li Mengyun[6] built the regression model which was established by studying the frequency and feedback timeliness of different assessment methods, and the results showed that the frequency and feedback timeliness of "the group completed the coursework" have the greatest impact on the improvement of innovation ability; in the degree of influence on "course learning input", the frequency of "group cooperation to complete homework" is second only to "classroom display".

3. THEORETICAL MODEL

Forms of work affect students' learning commitment significantly. Kong Qiping believes that students' input is composed of emotional input, cognitive input and behavioral input. Based on the definitions of emotional input by Kozolanck K. (1995) and others, we define emotional input as the emotional experience of students during learning. While there are many related explanations for cognitive input, we adopt Kong's definition, which is the learning strategy students use in learning. Scholars generally consider behavioral input as whether students' learning behavior is positive. Based on these, we study the influence of group work on learning commitment from these dimensions, and the theoretical framework is shown in Fig. 1.

3.1 The Influence of Job Challenge, Academic Enthusiasm, Teacher-Student Interaction on Learning Commitment

Zhang Jingjing[7] measures learning commitment with five indicators including job challenge, active cooperative learning and student-teacher interaction.According to National Survey of Student Engagement[8], challenge and creativity of academic tasks have a very important influence on college students' learning commitment and academic achievement. Job challenges include indicators of learning effort, students' perceived curriculum goals, and school environment.Learning enthusiasm refers to students actively interacting with teachers and classmates to learn problems and so on. It's very important for teachers to understand the students' comprehension and remove their doubts in time.

3.2 The Influence of Academic Responsibility on The Degree of Learning Commitment

Gao Changfeng[9] believed academic responsibility covers responsibility cognition, responsibility emotion and responsibility behavior, and these students often better perform, prepare for, understand and participate in course learning.

3.3 The Effect of Intra-Group Interaction on Learning Commitment

Wan Faping[10] mentioned that the group mutual-assisted teaching mode can strengthen the interaction and information exchanges between students, helping them more comprehensively understand knowledge, and pointed out that effective intra-group interaction can enhance their participation.

3.4 The Influence of Gender on the Degree of Learning Commitment

E.Maccoby and C.N.Jacklin published the Psychology of Gender Difference. Luo Jie 's[11] research also showed that men and women differentiate in teaching mode and learning ability. Meanwhile, gender has a regulatory effect on learning adaptation and burnout. Wang Jin, Chen Xiaosi[12] found that boys are more likely to form anti-school cognition, emotion and behavior, resulting in differences in academic achievement.

3.5 The Influence of Grade on the Degree of Learning Commitment

University education is less intense than high school, which makes most students with insufficient autonomy to become less academically invested. Tang Yuhua's[13] study has proved that there are differences in the investment in the second, third and fourth year.

In conclusion, we propose the following assumptions:

H_1: The level of learning commitment increases as challenge of the job increases.

H_2: A positive correlation between learning enthusiasm and the learning commitment.

H_3: Learning commitment strengthens as teacher-student interaction strengthens

H_4: Learning commitment strengthens as academic responsibility do.

H_5: Intra-group interaction has a positive effect on the degree of learning commitment.

H_6: Women have a higher degree of learning commitment.

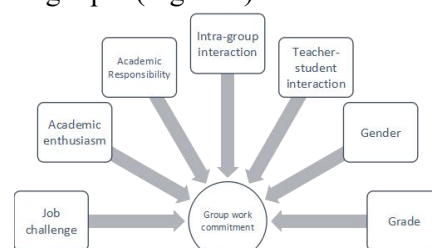H_7: The higher the student's grade level, the lower the learning input.(Figure 1)

Fig 1 Regression model chart

4. RESEARCH METHODS

4.1 Research Samples and Procedures

The data comes from GDUFS. GDUFS values group cooperation so students have to finish more than one group work every semester. Through giving out questionnaires, we conducted a survey of 200 students at the second half of the semester, the concentrated period of the deadline of assignments. Most students are completing or have just finished their homework, which reinforces the representativeness of the results. 194 valid questionnaires were obtained so the recovery rate was 97%.

4.2 Measurement Scale

(1) Course input: We adopts the curriculum investment scale proposed in the "Huazhong University of Science and Technology University Students' Learning Input Study", and is measured by two questions.(2)Job Challenge:used the scale in "Study on the Quality Improvement of Higher Education Based on the Perspective of Learning Input", consisting of rigor of cognitive objectives and curriculum requirements of the group work assignments, and is measured by three questions.(3)Learning enthusiasm:divided into enthusiasm and sense of accomplishment, including two questions.(4)Academic Responsibility: This study will use the academic responsibility scale compiled by Gao Changfeng[9]. Three measurement questions are used.(5)Teacher-student interaction and group interaction: This study uses the scale in the "Analysis of the Factors Affecting the Input of College Students' Curriculum Learning", and is measured by one question.

4.3 Analytical methods

We adopted the method published by Wen-Tsao PAN (2017) professor in volume 13th of the International SSCI Journal "EURASIA Journal of Mathematics Science and Tech", entitled "A Newer R Equal Part Linear Regression Model:a case Study of the Influence of Educational Input on Gross National Income ", proposed new regression Methods-Equal linear regression model, the data is modeled linearly regression in several equal ways, and the model trend of each equal grade is observed independently, and finally compared with the general linear regression.(Table 1)

5. DATA STATISTICS AND ANALYSIS

5.1 Descriptive Statistics

5.1.1 Overall description of learning commitment
194 valid questionnaires were collected, including 80 males and 114 females, distributing in freshmen, sophomores, juniors, seniors and graduate students.

Table 1 Survey sample distribution table

	Sample distribution	Number of samples	Proportion of samples
Gender	Male	80	41.2%
	Female	114	58.8%
Grade	Freshman	10	5.2%
	Sophomore	43	22.2%
	Junior	130	67.0%
	Senior	9	4.6%
	Graduate	2	1.0%
Total	194	194	100.0%

This research used the 5-point Likert scale (except gender and grade). Table 2 shows that there are certain differences between the scores of different variables. The highest score is academic responsibility (4.25); the lowest score is academic enthusiasm (3.27). The students' studying investment in the group is not so active, due to their academic responsibility and intra-group division of labor. Besides, due to the limitations of the sample source, most of them are female and sophomore and senior students.(Table 2)

Table 2 Scores of different influencing factors

	N	minimum	maximum	mean average	standard deviation
Job challenge	194	1	5	3.55	0.800
Academic enthusiasm	194	1	5	3.27	0.952
Academic Responsibility	194	2	5	4.25	0.568
Teacher-student interaction	194	1	5	3.74	0.673
Inter-group interaction	194	3	5	4.17	0.523

	N	minimum	maximum	mean average	standard deviation
Gender	194	1	2	1.59	0.494
Grade	194	1	5	2.74	0.672

Table 3 shows the average group work input of students (2.74 points), indicating that group work input from the samples is low, and the standard deviation (0.672) indicates that the gap between the group work inputs is slightly different(Table 3).

Table 3 Group work input scores

	N	minimum	maximum	mean average	Standard deviation
Group work commitment	194	1	5	2.74	0.672

5.1.2 Comparative analysis of individual questions
Table 4 shows that the frequency of these seven questions is mainly based on 4. In general, most students think group work is challenging. They have strong academic responsibility, and recognize the importance of teacher-student interaction and group interaction, but they don't have a large enthusiasm in group work(Table 4).

Table 4 The frequency of different scores for each question

		1	2	3	4	5
Operational Challenges	Group Activity Education Cognitive Objectives	7	14	56	96	21
	Strictness of course requirements	4	27	48	91	24
Learning initiative	Academic enthusiasm	13	38	64	66	13
	A sense of accomplishment	10	30	46	91	17
Academic Responsibility	Cognition	1	3	9	105	76
	Emotion	0	1	19	103	71
	Behavior	2	2	21	98	71
Teacher-student interaction	Cognition	2	3	47	104	38
	Emotion	2	5	19	112	56
	Behavior	8	28	89	52	17
Inter-group interaction	Cognition	1	2	11	116	64
	Emotion	0	0	9	132	53
	Behavior	0	4	32	111	47

5.2 Parameter Estimation
The confidence interval is used to estimate the overall situation of group work input of college students of GDUFS. If the same sample size is used to repeat the survey several times, the degree of input of the group of students from GDUFS will be found. 90% of the sample will fall within the range of 3.085-3.277, 95% of the sample will fall within the range of 3.067-3.296, 99% of the sample will fall within the range of 3.030-3.333(Table 5-6).

Table 5 Group work input of college students from different levels of confidence

	Sample mean	lower limit	Upper limit
90%	3.181	3.085	3.277
95%	3.181	3.067	3.296
99%	3.181	3.030	3.333

5.3 Equivalent Linear Regression Analysis

Table 6 Aliquot linear regression analysis reslt

	LRM $R^2=0.553$			EPLRM $\tau=1$ $R^2=0.723$			EPLRM $\tau=2$ $R^2=0.674$			EPLRM $\tau=3$ $R^2=0.328$		
Stat.	Conf.	T	Sig.	Conf.	T	Sig.	Conf.	T	Sig.	Conf.	T	Sig.
X1	0.002	0.033	-	-0.095	-1.005	-	0.057	0.604	-	-0.011	-0.083	-
X2	0.574	11.561	***	0.623	9.749	***	0.677	7.638	***	0.502	4.013	***
X3	-0.214	-2.495	**	-0.075	-0.589	-	-0.272	-1.822	***	-0.243	-1.245	-
X4	0.062	0.809	-	-0.097	-0.854		0.219	1.521	-	0.141	0.9	-
X5	0.235	2.45	**	0.105	0.766		0.186	1.13	-	0.247	1.117	-
X6	0.008	-0.135	-	-0.136	-1.735	**	0.009	-0.095	-	0.126	0.796	-
X7	0.007	-0.082	-	0	0	***	-0.044	-0.266	-	0	0	***
	LRM $R^2=0.553$			EPLRM $\tau=1$ $R^2=0.723$			EPLRM $\tau=2$ $R^2=0.674$			EPLRM $\tau=3$ $R^2=0.328$		
Stat.	Conf.	T	Sig.	Conf.	T	Sig.	Conf.	T	Sig.	Conf.	T	Sig.
X1	0.002	0.033	-	-0.095	-1.005	-	0.057	0.604	-	-0.011	-0.083	-
X2	0.574	11.561	***	0.623	9.749	***	0.677	7.638	***	0.502	4.013	***
X3	-0.214	-2.495	**	-0.075	-0.589	-	-0.272	-1.822	***	-0.243	-1.245	-
X4	0.062	0.809	-	-0.097	-0.854		0.219	1.521	-	0.141	0.9	-
X5	0.235	2.45	**	0.105	0.766		0.186	1.13	-	0.247	1.117	-
X6	0.008	-0.135	-	-0.136	-1.735	**	0.009	-0.095	-	0.126	0.796	-

Note: ** means Sig.<0.05, *** means Sig.<0.01

The X_2, X_3 and X_5 variables of LRM are all less than 95% significant, indicating that they all have significant effects on Y in standard linear regression analysis.

5.1.3 Use aliquot linear regression

In the first aliquot, X_2 and X_7 are less than 99% significant, X_6 is less than 95% significant; representing the first aliquot have significant explanatory power for Y. Enthusiasm (X_2), students' grades (X_6) and gender (X_7) can significantly affect a student's commitment to the course (Y).In the second aliquot, X_2 and X_3 are less than 99% significant, and representing the second aliquot, have significant explanatory power for Y, indicating that students have academic enthusiasm(X_2) and study responsibility for group work. Academic responsibility (X_3) will significantly affect students' commitment to the course(Y).In the third aliquot, X_2 and X_7 are less than 99% significant, and, representing the third aliquot, have significant explanatory power for Y, indicating students' "academic enthusiasm" (X_2) and students' Gender (X_7) will significantly affect the student's commitment to the course (Y).Now, compare the standard linear regression estimates with results of the equal-part regression estimates:
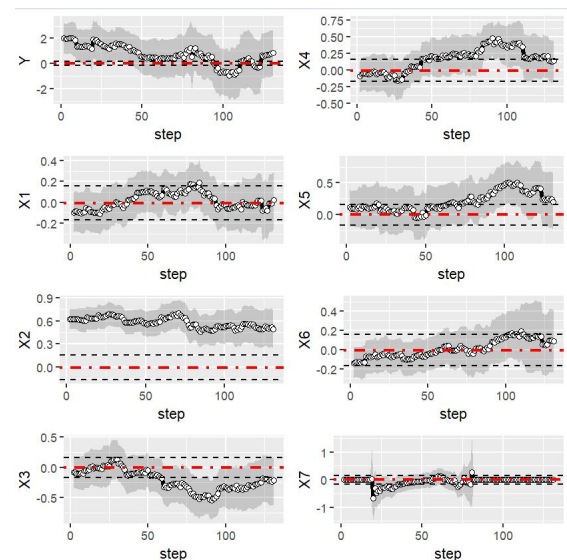
Fig. 5 R analysis chart

The red dotted line shows the standard linear regression, the upper and lower horizontal dashed lines are the confidence intervals of the standard linear regression, the irregular thick lines consisting of dense points are the aliquot linear regression lines, and the upper and lower gray areas are the confidence of the aliquot linear regression.The figure shows that the operational challenge (X_1) and

the grade (X_6) are all within the confidence interval of the standard linear regression, that is, the estimation using the standard linear regression does not cause variation.

Whether academic enthusiasm (X_2) is low, equal or high, if the standard linear regression is used for estimation, there is an underestimation, so this factor will significantly affect students' commitment to the curriculum.Regarding academic responsibility (X_3), if the standard linear regression is used for estimation, only the underestimation occurs in the middle of the low aliquot, and the overestimation is found in other regions with low, equal, and high scores, indicating that the factor is not The main reason that affects the degree of participation (Y).Regarding teacher-student interaction (X_4), if the standard linear regression is used for estimation, there will be an underestimation in the 1/4, middle and high scores after the low score, indicating that the

teacher-student interaction (X_4) will significantly affect the students' course. Input (Y),Regarding the intra-group interaction (X_5), except for the 1/5 region after the low score, in the other regions with low scores, medium scores and high scores, if the standard linear regression is used for estimation, there is an underestimation, so the intra-group interaction (X_5) can significantly affect students' commitment to the course (Y).As for gender (X_7), it can be seen from the figure that in the middle score, if the standard linear regression is used for estimation, there will be an overestimation, so this factor is not the main factor affecting the degree of participation (Y).

In summary, academic enthusiasm (X_2), teacher-student interaction (X_4), and intra-group interaction (X_5) are the main factors affecting the degree of participation (Y)(Table 7).

5.1.4 Difference test after translation

Table 7. Difference test after translation

Variable item	$\tau1 - \tau2$		$\tau2 - \tau3$		$\tau1 - \tau3$	
	F_value	Sign.	F_value	Sign	F_value	Sign
X1	0.355	**	0.210	***	0.075	***
X2	0.200	***	1.229		0.246	***
X3	0.298	**	0.842	***	0.251	***
X4	0.723		0.264	**	0.190	***
X5	0.059	***	0.714		0.042	***
X6	1.014		0.469		0.476	
X7	0	***	Inf	***	NaN	

Note: ** expresses Sig. <0.05, *** expresses Sig. <0.01

In the 3 coefficients of equal linear regression, between the first and the second equal part, there are significant differences in X_1, X_2, X_3, X_5, X_7. Between the 2nd and the 3rd equal part, there are significant differences in X_1 , X_3 , X_4 , X_7, and significant differences in X_1 , X_2 , X_3 , X_4 , X_5 , X_6 between the 1st and the 3rd equal part.

Combining the linear regression lines of each equivalent, we concluded that:

(1) Setting the course assignment as the form of the group completion will be the most effective for improving the course input of students with low and moderate learning enthusiasm. Among them, there were significant differences in the degree of influence between the low and moderate level of learning enthusiasm, the low and high level of learning enthusiasm. The coefficients of low, medium and high score are 0.623, 0.677, 0.502, indicating that assigning group homework to the low and medium level of learning enthusiasm is the most effective to improve the course input degree.

(2) Setting the course assignment as the form of the

group completion will be the most effective for improving the curriculum input of students with moderate and high student-teacher interaction. There were significant differences between the low and high, the medium and high student-teacher interaction. And the coefficients of low, medium and higher score are -0.097,0.219,0.141, indicating that assigning group homework to the medium and high level of student-teacher interaction is the most effective to improve the course input, that is, to improve the level of interaction between teachers and students can effectively improve the degree of students ' curriculum input.

(3) Setting the course assignment will be most effective in improving the course input of students with moderate and high level of interaction within the group. The level of interaction in low and middle group, and the low and high group were significantly different. The coefficients of low, medium and high score are respectively 0.105, 0.186, 0.247, indicating that assigning group work to the medium and high level of group interaction is

most effective in improving course input, that is, improving the level of group interaction can have a positive impact on students' curriculum input.

6. DISCUSSION & CONCLUSION

6.1 Results Discussion
Through the online questionnaire survey among 194 university students, we found that: there is a positive correlation between students ' learning enthusiasm and course input degree, the level of student-teacher interaction and the degree of curriculum input, the level of interaction within the group and the degree of curriculum input.
(1) Improving students' enthusiasm for learning can effectively improve students' commitment to the curriculum. The effect of improving the low and moderate students' enthusiasm are more obvious to improve the degree of curriculum input, while the coefficient of high sequal part decreases slightly. Combining with some phenomena in group's work, we think that students with low and medium enthusiasm will be bound by group strength. In this way they will improve the input to the curriculum. Students with high motivation always have to take on more responsibilities, which may be a situation of hitchhiking by others, so they may get tired of group's homework. Therefore, It's not so obvious for students with high learning enthusiasm to set up group works to improving the degree of course input.(2) Improving the level of student-teacher interaction can effectively improve students' commitment to the curriculum. It's of great effect to improve the input degree of students in the middle and high level of student-teacher interaction. Therefore, when considering to assign group work, teachers can create a better environment, encourage students to interact more with them while completing group works, and give effective feedback in time.(3) Improving the level of group interaction can effectively improve students' commitment to the curriculum. It is most effective to arrange group works for students in the medium and high level of group interaction to improve the input degree of the course. Therefore, teachers can take some measures when arranging group work, such as setting rules of group combination to ensure a better internal interactive environment. The team leader also has the responsibility to create a better atmosphere, such as organizing offline discussion activities, encouraging group members to communicate. Team members also have the obligation to follow the team leader, and actively express personal opinions.
6.2 Conclusion
This research found that the students' enthusiasm for learning, the student-teacher interaction and the

group interaction will have a positive impact on students' curriculum input degree. In college study life, group works has become an important way for teachers to improve students' curriculum input. As college students' attitude to group work is mixed, teachers can start from students' learning enthusiasm, teacher-student interaction and group interaction when setting up group works, to make group operations really become an effective way to improve the input of students' courses.

ACKNOWLEDGMENTS

REFERENCES

[1] Guo Hua. Theoretical Hypothesis and Practical Operation Mode of Group Cooperative Learning [J]. Chinese Education Journal, 1998 (5): 48-50.

[2] Kong Qiping. Concept Connotation and Structure of "Student Input" [J]. Foreign Education Materials, 2000 (02): 72-76.

[3] Yang Shuo. Research on Undergraduate Learning Input of H University [D]. Hebei University, 2013.

[4] Zhao Lei. Analysis of Factors Affecting College Students' Participation in Curriculum Learning [D]. Huazhong University of Science and Technology, 2013.

[5] Zhang Na. Summary of Research on Learning Inputs at Home and Abroad and Its Influencing Factors in Schools [J]. Psychological Research, 2012, 5 (02): 83-92.

[6] Zhang Junchao, Li Mengyun. How the Process Learning Evaluation Affects University Students' Learning Input and Learning Effect—Based on the Data Analysis of "H University Undergraduate Study and Development Survey" [J]. Higher Education Research, 2015 (06): 119-124.

[7] Zhang Jingjing. Research on the Quality Improvement of Higher Education Based on the Perspective of Learning Input [D]. Guizhou University, 2015.

[8] Reference website: http://nsse.indiana.edu/

[9] Gao Changfeng. Compilation and measurement of the academic responsibility scale for primary and middle school students [D]. Nanjing Normal University, 2007.

[10] Wan Faping, Song Liang, Liu Hongmei, Wang Yulan, Wang Deguang, Liu Zhian. Construction and practice of interactive teaching mode for local anatomy group of

international students [J/OL]. Basic Medical Education, 2018(12): 1109-1111[2018-12-23]

[11] Luo Jie, Zhou Wei, Pan Yun, Zhao Shouying. Regulatory Role of Gender in College Students' Learning Adaptation and Learning Burnout [J]. China Special Education, 2013(06): 69-73.

[12] Wang Jin, Chen Xiaosi. Gender Differences between School Environment and Student Achievements An Empirical Study Based on Seven Junior Middle Schools in Guangzhou [J]. Society, 2013, 33 (05): 159-180.

[13] Tang Yuhua. Study on the investment commitment of college students in Huazhong University of Science and Technology [D]. Huazhong University of Science and Technology, 2011.