The Effect of Collaborative Distance Joint Class
Using BBS and Video-Conferencing on Information Study at High Schools between Japan and Thailand

Naomasa Sasaki

The Graduate School Student, Kyoto Institute of Technology
The United Graduate School of Professional Teacher Education, Kyoto University of Education
1 Fujinomori-cho Fukakusa Fushimi-ku, Kyoto-city 612-8522, Japan
E-mail: nsasaki@kyokyo-u.ac.jp

Abstract: To investigate the effect of collaborative learning using BBS (bulletin board system) and video-conferencing on Information Study, the three sorts of learning formation; simultaneous learning, autonomous learning, collaborative learning, were held for 422 students of 9th grade between Chulalongkorn University Demonstration school in Thailand and Senior high school attached to Kyoto university of Education in Japan, in FY2005. To grasp the consciousness on each learning formation of Thai students and Japanese students, the investigations using questionnaire after every class and pre-post of distance joint class were enforced, then statistical analysis and factor analysis were estimated. According to the result on estimation of analysis, relation between the three learning formations was investigated that the effect of collaborative learning using BBS and video-conferencing was more conspicuous than the other learning formation.

1. Introduction

It has been said empirically that usage on the sort of IT distance communication media is better way for collaborative learning. So, the effect of collaborative learning using BBS (bulletin board system) and video-conferencing sysytem was investigated comparatively on Information Study among the three sorts of learning formation; simultaneous learning, autonomous learning, collaborative learning. To grasp the consciousness of students is very important to investigate the effect of each learning formation, and the method of questionnaire is very useful to grasp the consciousness of students by statistical analysis and factor analysis.
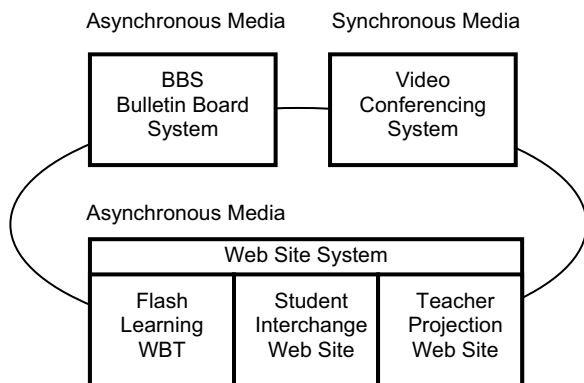

Asynchronous Media   Synchronous Media

Figure 1 Concept of Collaboration Learning System

2. Method

2. 1 Concept

IT distance communication media is separated to two types as Synchronous media and Asynchronous media. When the distance communication media is used practically and mixed, the usage on education shall be more effective.
The concept of collaboration learning system that used in this practical research is shown in Figure 1.

2. 2 Outline of Information Study Class

Development of Flash animation was practiced as learning contents of Information Study/Computer classes, held for 422 students of 9th grade between Chulalongkorn University Demonstration school in Thailand and Senior high school attached to Kyoto university of Education in Japan, in FY2005. The outline of classes are shown in Table 1.

Table 1 Outline of Classes, Japan side and Thai side

Items	Japan Side	Thai Side
1. Schools	Senior High School Attached to Kyoto Univ.of Education	Chulalongkorn University Demonstration School
2. Objective Students	9th grade, 201 students	9th grade, 221 students
3. Subject	Information Study B	COMPUTER
4. Duration	From October 2005 to March 2006	

Three sorts of the learning formation; simultaneous learning, autonomous learning, collaborative learning.were installed in the classes. And collaborative learning is consisted by two parts; using BBS (bulletin board system) and video-conferencing. The flow on the learning formation of classes is shown in Table 1. And the detail schedule of classes is shown in Table 2.
Classes started from Simultaneous learning formation. Teacher taught students about Flash animation development/programming by methods of handouts and speech. The next step was Autonomous learning formation. Teacher and Students had free interactive situation by methods of handouts, Web Based Training site and speech. The last step was Collaborative learning using Bulletin Board System BBS and Video-conferencing system by method of exchange presentations and opinions.
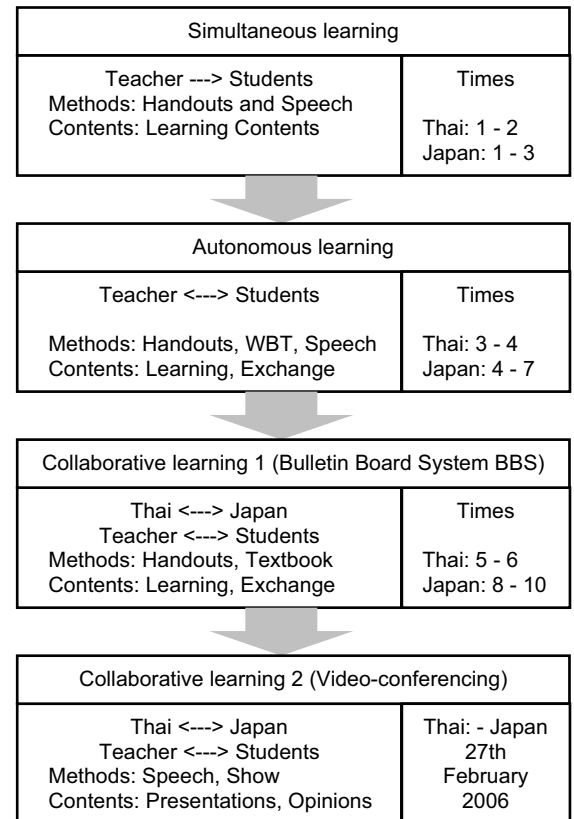
Figure 2 Class Structure on Three Types of Learning

2. 3 Condition and Method of Research

2.3.1 Transition on Consciousness of Students

To grasp the consciousness of Students, the procedure of learnig formation among simultaneous learning, autonomous learning and collaborative learning, Understanding, 5 items of counsciousness: Difficulty on Flash animation production learning, Difficulty on Classes, Will for learning (in class) and Will for searching Flash contents on Internet (self learning) were investigated by the questionnaire every after class; 14 times.

And to grasp the transition of the feelings of student for the activities of collaborative classes using video-conferencing were examined using the questionnaire of feelings by the method of Factor analysis. The investigation was examined on Prior and Post of the collaborative class. Questionnaires of 30 items of feelings on learning activities were prepared with 4 categories by Japanese and Thai language for the both students, who were requested to answer intuitively by

five steps of SD for Factor analysis processing.

3. Result and Consideration

3. 1 Transition on Consciousness of Students

3.1.1 Understanding

Understanding of students was better in Simultaneous learning classes (class 1-3). Learning contents were getting difficult, understanding of students decreased even the learning formations were revised. Transition of students' understanding is shown in Figure 3.

3.1.2 Transition of Difficulty on Flash Study

Difficulty of students on Flash amination production learning decreased time by time of classes from Simultaneous learning classes to Collaborative classes. Transition of difficulty of students on Flash amination production learning is shown in Figure 4.

Figure 3 Transition of Understanding

Figure 4 Transition of Difficulty on Flash Study

3.1.3 Transition of Difficulty on Classes

Difficulty of students on class activities decreased time by time of classes from Simultaneous learning classes to Collaborative classes. It increased temporaly at the middle of autonomous learning. Transition of difficulty of students on class activities is shown in Figure 5.

Figure 5 Transition of Difficulty on Classes

3.1.4 Transition of Will for Learning

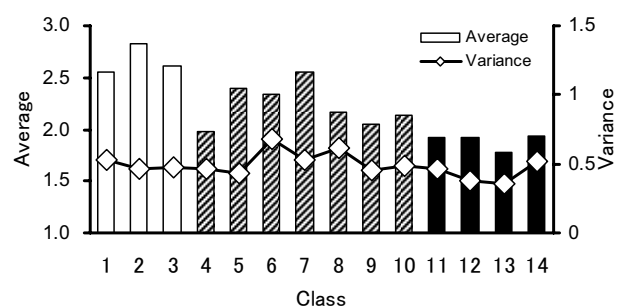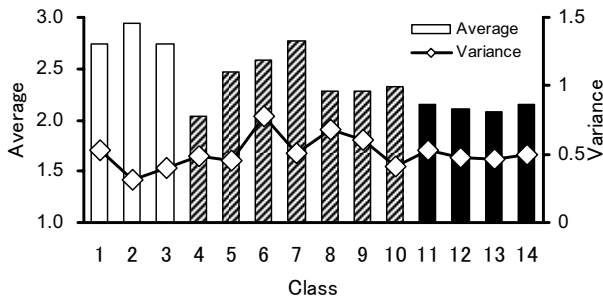Will for learning of students on class actvities was sustained continuously from Simultaneous learning classes to Collaborative classes. Transition of will for learning is shown in Figure 6.
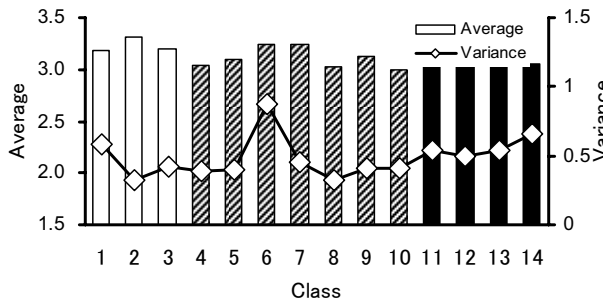

Figure 6 Transition of Will for Learning - In Class -

3.1.5 Transition of Will for Searching Flash Contents on Internet - Self Learning -

Will for searching Flash contents on Internet by self learning (as home work) increased from Simultaneous learning classes to the last part of Autonomous learning and Collaborative classes. Transition of will for searching Flash contents on Internet is shown in Figure 7.

3. 2 Comparison Study on Feelings of Students in Collaborative Study Using Video-Conferencing

The coefficients of the correlation among the items were calculated and the Factor analysis was examined by Iterative Pincipal Axis Method with Direct Varimax Rotation. For the extraction of factors, the first factor was extracted from the value of Factor loading more than 0.6, and the following factors were extracted from the value of
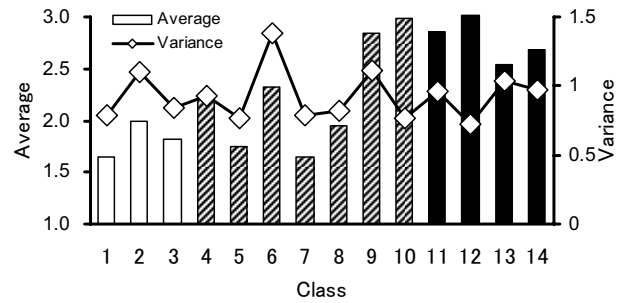

Figure 7 Transition of Will for Searching Flash Contents on Internet - Self Learning -

After the rotation, four factors were extracted on the feelings of students. Rotated and extracted factor loadings at the prior and the post of the class of Japan side are shown representatively in Table 3 and Table 4.

In the Post of the Collaborative learning at Japan side, the items "17 I want to know more about Thailand. L=.892 ", "18 I want to exchange opinions about Flash and Internet. L=.865", "08 I want to attend to Joint class with Thai school L=.795", "01 I want to go to Thailand. L=.641" and "02 I can feel Thai student's feeling. L=619", etc. were extracted as the first factor at the post of the Collaborative learning class. And they were named as the factor of "Will for interchange" once.

The next items, "11 I want to learn more about Flash and computer. L=.886", "24 Self learning time is increasing except my school class. L=.807", "09 I want to show presentation to Thai students. L=.722", "04 I want to watch Flash study class of Thai side.L=.713" and "03 I become to like Thai students.L=.600", etc. were extracted as the second factor. And they were named as the factor of "Interest in learning contents".

The third items, "13 I want to watch the compositions of Thai students. L=.858", "14 I change my mind to attend my

Table 3 Factor Loadings
- Before Collaborative Learning Using Video-Conferencing

Item	Factor 1	Factor 2	Factor 3	Factor 4
17 I want to know more about Thailand.	.917	-.099	-.024	.122
18 I want to exchange opinions about Flash and Internet.	.822	.011	-.416	.130
20 Education is different between Thailand and Japan.	.811	.143	.248	-.075
22 I try and learn by my self recently.	.776	-.216	.186	-.321
15 I have many good ideas except my teacher's advices.	.740	.146	.042	.339
16 I want to exchange opinions about Thai topics on BBS.	.710	.425	-.025	.040
14 I change my mind to attend my class through this activity.	.685	.415	.458	-.124
01 I want to go to Thailand.	.629	.162	-.292	-.068
08 I want to attend to Joint class with Thai school.	.605	-.496	-.056	-.104
12 I become to understand well.	.602	-.315	.131	-.378
06 I want to talk with Thai student through video-conf..	.555	.226	-.003	.205
02 I can feel Thai student's feeling.	.548	-.593	-.215	.166
04 I want to watch Flash study class of Thai side.	.115	-.915	.018	.036
03 I become to like Thai students.	.134	-.853	.078	-.076
24 Self learning time is increasing except my school class.	-.312	-.639	.328	.038
09 I want to show presentation to Thai students.	-.243	-.285	.804	.214
23 It is nice for my learning to know about Thai learning.	.191	.130	.782	.028
19 I want to search items to know using Internet.	.089	.086	.737	-.092
10 I know about Thai school and their learning.	-.228	.183	.619	.419
11 I want to learn more about Flash and computer.	-.143	-.429	.596	-.151
13 I want to watch the compositions of Thai students.	.481	.490	.542	-.103
05 We have many same things between Japan & Thailand.	-.040	.207	-.243	.880
26 It is better way to exchange opinions and feelings.	-.187	-.104	.163	.760
29 I know about Thai students' lives.	.265	.182	-.068	.549
28 It is better to access to Thai website to know Thai items.	.174	.173	.291	.486
Percent of Variance Explained by Rotated Factor (%)	23.8	18.2	13.0	10.0

n=18, Iterative Principal Axis Method, Varimax Rotation (7 Rotations), Total Variance Explained (%): 65.0

Table 4 Rotated Factor Loadings
- After Collaborative Learning Using Video-Conferencing -

Item	Factor 1	Factor 2	Factor 3	Factor 4
17 I want to know more about Thailand.	.892	.182	.250	.127
18 I want to exchange opinions about Flash and Internet.	.865	-.087	.031	.176
08 I want to attend to Joint class with Thai school.	.795	.322	.165	-.325
15 I have many good ideas except my teacher's advices.	.688	-.067	.322	-.135
16 I want to exchange opinions about Thai topics on BBS.	.662	-.289	.535	.057
29 I know about Thai students' lives.	.653	.036	.120	.503
01 I want to go to Thailand.	.641	-.035	.012	.162
02 I can feel Thai student's feeling.	.619	.204	-.275	-.066
20 Education is different between Thailand and Japan.	.602	.177	.462	.142
11 I want to learn more about Flash and computer.	.050	.886	.172	.125
24 Self learning time is increasing except my school class.	-.128	.807	.021	-.048
09 I want to show presentation to Thai students.	.028	.722	.149	.371
04 I want to watch Flash study class of Thai side.	.341	.713	.022	.064
03 I become to like Thai students.	.302	.600	.014	-.191
13 I want to watch the compositions of Thai students.	.252	-.003	.858	-.059
14 I change my mind to attend my class through this activity.	.553	.092	.743	-.102
19 I want to search items to know using Internet.	-.077	.535	.706	.042
27 My problem and solution is different from Thai students'.	.178	-.109	.668	.290
23 It is nice for my learning to know about Thai learning.	-.142	.372	.481	-.045
25 I am interested in Flash homepage and e-Learning.	.206	.121	.459	.245
05 We have many same thing between Japan and Thailand.	.134	-.184	-.057	.758
07 It is pleasure to know with Thai students.	.221	-.340	.446	.751
26 It is better way to exchange opinions and feelings.	.079	.234	.211	.698
10 I know about Thai school and their learning.	-.026	.467	.244	.549
28 It is better to access to Thai website to know Thai items.	.210	.279	-.043	.481
21 My Flash composition is my boast.	.217	-.624	.062	.422
Percent of Variance Explained by Rotated Factor (%)	15.8	13.8	12.7	12.3

n=18, Iterative Principal Axis Method, Varimax Rotation (12 Rotations), Total Variance Explained (%): 54.6

class through this activity. L=.743", "27 My problem and solution is different from Thai students'..L=.668" and "25 I am interested in Flash homepage and e-Learning. L=.459", etc. were extracted as the third factor. And they were named as the factor of "Learning method and contents".

Table 5 Summary of Comparison on Factor Analysis

Factor Scores	Before	After	Fluctuation
Factor 1			
Alfa Reliability Coefficients	0.839	0.862	
01 I want to go to Thailand.	4.946	4.583	
02 I can feel Thai student's feeling.	1.914	2.592	
08 I want to attend to Joint class with Thai school.	1.981	1.887	
17 I want to know more about Thailand.	0.639	0.752	
18 I want to exchange opinions about Flash and Internet.	0.751	0.940	
Summary	10.231	10.754	0.523
Factor 2			
Alfa Reliability Coefficients	0.717	0.859	
03 I become to like Thai students.	3.535	3.141	
04 I want to watch Flash study class of Thai side.	2.767	2.467	
09 I want to show presentation to Thai students.	0.013	2.744	
11 I want to learn more about Flash and computer.	1.001	2.242	
24 Self learning time is increasing except my school class.	1.116	1.358	
Summary	8.432	11.952	3.520
Factor 3			
Alfa Reliability Coefficients	0.808	0.836	
13 I want to watch the compositions of Thai students.	1.289	1.964	
14 I change my mind to attend my class through this activity.	0.536	0.850	
25 I am interested in Flash homepage and e-Learning.	0.690	0.987	
27 My problem and solution is different from Thai students'.	0.028	0.509	
Summary	2.543	4.310	1.767
Factor 4			
Alfa Reliability Coefficients	0.713	0.756	
05 We have many same things between Japan and Thailand.	2.499	3.086	
26 It is better way to exchange opinions and feelings.	0.916	1.114	
28 It is better to access to Thai website to know Thai items.	0.428	0.552	
Summary	3.843	4.752	0.909

The fourth items, "05 We have many same thing between Japan and Thailand. L=.758" and "07 It is pleasure to know with Thai students. L=.751", etc. were extracted as the fourth factor. And they were named as the factor of "Exchange between the both countries".

Alfa reliability coefficients was a=.862 as the items of the first factor, a=.859 as the items of the second factor, and a=.836 as the items of the third factor, and a=.756 as the items of the fourth factor. These meant the validity of factor extraction was confirmed to be enough high.

For the comparison study on the height of feeling level between the prior and the post, the summary total of each Factor scores of the items that extracted commonly at the prior and the post were compared.

The summary of comparison on factor analysis at the prior and the post is shown in Table 5, and the transition of each factor scores is drawn in Figure 8.
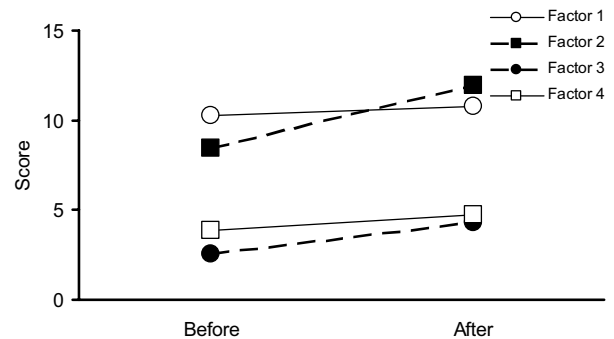

Figure 8 Transition of Factor Score on Collaborative Learning Using Video-Conferencing

The total factor score increased from the prior to the post in every factors; from s=10.231 to s=10.754 (+.523) on the first factor, +3.520 on the second factor, +1.767 on the third factor, +.909 on the fourth factor.

4. Conclusion

The effect of collaborative learning is emerged through two kinds of research; transition on consciousness and comparison on feelings of students. Especially it is more effective for the side of enforcing and stregthening students' will for learning and interest for learning contents comparing with understanding.

References

[1] Klaus-D.Graf & Seiji Moriya, "Distance Learning between Japanese and German Classrooms, Mathematics Education in Different Cultural Traditions / A Comparative Study of East Asia and the West", *Springer*, pp.415-425, 2006

[2] Naomasa Sasaki, Kazunari Morimoto, Takao Kurokawa Takao Kurokawa, "Design of Distance Class Using Video-Conferencing in Elementary School", *International Design Congress 2005, Taiwan,* p.83+CD-ROM, 6 pages, 2005