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PREFACE

This volume contains the Extended Summary (ES) Proceedings of the 24th International Conference on Computers in Education (ICCE 2016). Extended Summary is launched in ICCE2016 in response to raising concerns about overlapping conference and journal papers, a new paper category. The ES session will provide opportunities for authors to pitch main ideas and key results. Four kinds of contributions are accepted: empirical, technical design, conceptual and literature review papers.

All the selected paper went through a rigorous blind review by independent peer reviewers to ensure high quality work. We hope that the papers in the proceedings will stimulate more research ideas and discussions among the young researchers.

On behalf of editors
Jie-Chi YANG
Weiqin CHEN
Sahana MURTHY
Su Luan WONG
Sridhar IYER

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Research on Critical Thinking in Asynchronous Online Communication of Chinese and British K-12 students

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1. Introduction

In the era of fast developing information technology, online communication is offering unprecedented support to critical thinking training, especially the discussion between teachers and students, even students and students. Limited by time and space, teachers and students could not perform outside of the classroom in traditional classroom. The emergence of online communication broke the shackles, the teachers and students, students and students can share, exchange and discuss in the network environment that will make both of them improve and enhance.

Compared with synchronous online communication: asynchronous online communication (1) not require learners to make immediate response; (2) the two sides of asynchronous online do not have to go on the line at the same time; (3) give them more opportunities to exchange. All the above advantages are conducive to the cultivation of students' critical thinking.（Thomas, 2002; Lim, Cheung & Hew, 2013）
This research choose a learning network－Wikispaces, which asynchronous is the main feature. Wikispaces supports many people discuss one topic and integrate learning process with learning discussion closely. In the process of learning and discussion, learners can add, expand and update the existing information, even realize the cooperation and interaction with others. Wikspaces provides the possibility of forming a virtual learning community. More than anything, asynchronous communication space can be a good way to inspiring the learners to put forward critical questions, so that all the learners have best study effects.

2. Theoretical Framework

2.1 Virtual Learning Community under social constructivism

The concept of "learning community" is also under social construction, referring to a group of learners and educators together. They communicate frequently share a variety of learning resources together to accomplish certain learning tasks in the process of learning. It not only promotes communication between learners. In the learning platform of Wikispaces, students constitute a virtual learning community and continue to question and answer to achieve the identity transfer between learners and facilitators. The members of virtual learning community can determine the credibility of contents and the original editors more easily.

2.2 Critical thinking and critical questions

Ennis (1987) has defined critical thinking from a practical point of view: "critical thinking refers to a reasonable and mature thinking when determining what to believe or to undertake." Paul defines critical thinking from the perspective of function and process, "critical thinking, in short, is thought to evaluate thinking by some criteria, thereby improving thinking." Kelman (1999) thought that critical thinking is the rational point of view and information. Lin (2008) believes that critical means an intelligent quality of thinking activities, which can estimate rigorously intellectual thinking quality materials and check thinking. In the thinking activities of raising creative issue, critical thinking plays a unique role: individuals need to monitor the own cognitive activity process with the use of critical thinking; in order to select an appropriate strategy to obtain information; to evaluate and reflect constantly information you have gained to process the information based on this, to come up with creative issues. Considering the occurrence of question, Rosenshine (1996) believes that asking questions is a process of cognitive processing. External stimuli and individual input on the great conflict between the knowledge of the world is the nature of the problem arising.

3. Methodology

This research adopts comparative method to collect all communication questions raised by the students of Chinese and British on Wikispaces and then score the quality of each question by using the evaluation index of the characteristics that integrated already. Therefore, the research question as follows: *What are the main characteristics of raising questions in the asynchronous online communication among Chinese and British K-12 students?*

3.1 Participants' profile

A total of 29 Chinese students and 10 native students of British participated in the project. There are 10 teams and each includes about 3 Chinese students and 1 British student. Considering diversity of language proficiency, British students are in 5th Grade while Chinese students are in 6th Grade.

3.2 Task description

Chinese and British teachers jointly determine *My Campus* as the learning theme. Students build up their homepage respectively on Wikispaces, and are required to upload 3 photos regarding learning theme. British narratives are necessary below each photo. After that, each student has to observe, collect, review and communicate about the information which from others' homepage. Just as Figure 1 & 2 shows.

3.3 Evaluation dimension

Previous researchers（Brown & Walter,1993; Middleton & Streefland, 1995）pointed out that the behavior of questioning help us to observe how students understand and learn, even their perspectives to solve the problem. Most psychologists（Simonio，1991）contended that all questions have 3 parts: preset, a set of narratives about the question and its conditions; purpose, the answer or the target state of a question, a set of narratives about the conclusions; obstacle, asking for thinking activities to reach target state. Van (1994) stated that students' question behaviors would enhance their concentration, expression, literacy and critical thinking ability. There are lots of differences in term of classification and description of critical questions. The author adopts the criterions of American Philosophical Society, which is mentioned in *Delphi Report*: Question Tendency and Question Content. As Table 1 shows.

3.4 Results

The first four data in Figure 3 belongs to the tendency, the later six points belongs to the dimension of content. The higher index in each group leads the more obvious characteristics, and the smaller the opposite. Moreover, we can draw from the Figure 2 and Table 4, in asynchronous online communication, the critical thinking of Chinese and British K 12 students showed significant differences in dimension 3, dimension 6, dimension 9. Results of variance show that the Chinese students have a great

performance in the question tendency dimension. The concrete reflection is "*Ask the follow-up question in a developing view*", but plays a relatively weaker role in *pumping*, *emphasizing personal experience*. On the other hand, British students are relatively good in the question content dimension. The concrete reflection is "*Ask the follow-up question in a developing view*", but plays a relatively weaker role in *pumping*, *emphasizing personal experience*. Specifically reflected in the "*difficulty*", "*function of information*", "*information forecasting*" and "*key points and core contents of the target information*" and so on, while less than Chinese students regarding *advanced statement*.

4. Significance

On the whole, according to incomplete statistics, Chinese students had significant impact on critical tendency. They will make a lot of statements before they ask questions. While the British students pay more attention to critical content. There are obvious differences between the two countries, especially in index 3, 6, 9. This shows that the characteristics of Chinese students' critical thinking are in the development trend of the target information. For example, a Chinese student comments after observation, *"Can you share the other version picture of your playground in winter?"* On the other hand, British students are more focused on the various attributes of the target information, and good at using critical thinking to grasp the core information. Another example, a British student said, *"What is the appliance used to do? Why do you use this thing instead of a chair?"* Of course, it should be emphasized that the study of critical thinking will focus more on the process of thinking, rather than the answer. Moreover, asynchronous online communication is a learning environment, including diverse information. Learners complete the collection, observation, reflection, questioning, verification and other thinking activities by interacting. Therefore, researching on critical thinking in asynchronous online communication of Chinese and British K-12 will provide a good guide for their instructors.

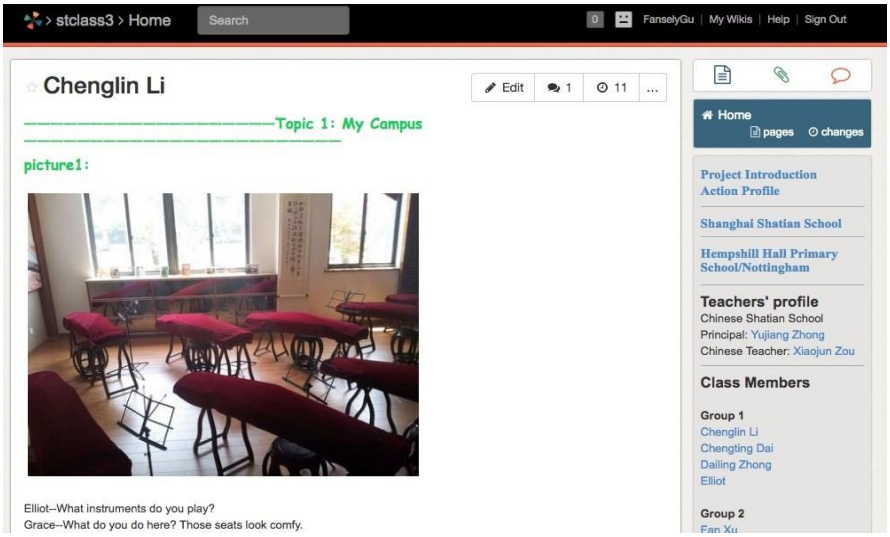

Figure 1

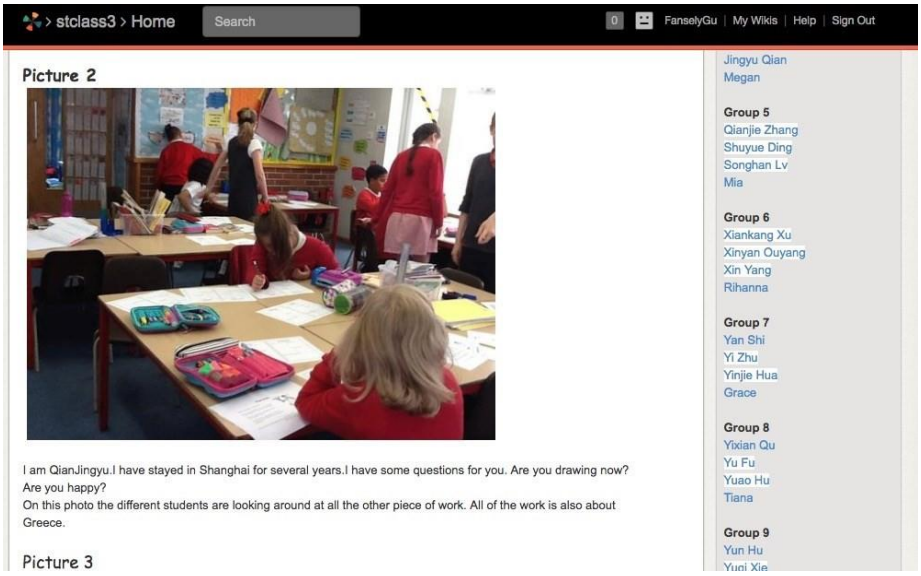

Figure 2

	Performer (Chinese student)	Information	Comment 1（English student）	Comment 2（English student）
2	Chenglin Li	picture1	What instruments do you play?	What do you do here? Those seats look comfy.
3		picture2	What sports do you like most?	What do you play here? It looks like a town. Do you have lots of tall buildings.
4		picture3	Is this a garden or a reading area?	That looks pretty. Did you grow them?
5	Chenting Dai	picture1	What is your favourite sport?	
6		picture2	Do you like to do running races?	
7	Dailing Zhong	picture1	Is this the entrance of your school?	
8		picture2	Is that your favourite flower?	
9		picture3	Is this where you relax?	
10	Haojiang Wang	picture1	Are they lanterns?	What does the symbols mean? Why do you have things hanging?
11		picture2	Is that a restaurant?	What does it say above the door? Why do you have lanterns every where?
12		picture3	Is that a flat?	Is this the school? The plants make it look tropical.
13	Heng Chi	picture1	Is that your music storage?	
14		picture2	Cool football pitch	
15		picture3	Is that a garden?	
16	Honghuan Xie	picture1	What races do you do? Do you play football?	
17		picture2	Why do you have a plant inside?	
18		picture3	Why is a fence there? what part of the school is this and where does the path lead to?	
19	Jiayi Xiao	picture1	What is that? I'm curious about what those balcony are for?	Is this your school? Are there your class? That is a big school, it is so organised.
20		picture2	Is this your classroom? Why do you have stools instead of chairs?	What is your name in English? How are you in china? How do you learn in China? What do you learn in China?
21	Jie Fang	picture2	My passion is definitely music, I have a serious talent for it. What do you have a talent for?	Why have you got a Chinese person on the wall. What songs do you learn.
22		picture3	It is so tropical and organised. Do you grow these by yourself?	
23	Xiankang Xu	picture1	Is that the school garden?	Can you climb on the rocks? Is this on your field. What flower is it?
24		picture2	What do you do here, is this your field?	
25	XinYang	picture1	It looks like a house. Is it?	
26	Yu Fu	picture1	Is that a classroom?	What do you play here? it is bright.
27		picture2	Is that a running court?	Is this inside your school or outside? Do you walk to school on this path?

Figure 3　British Student Comment

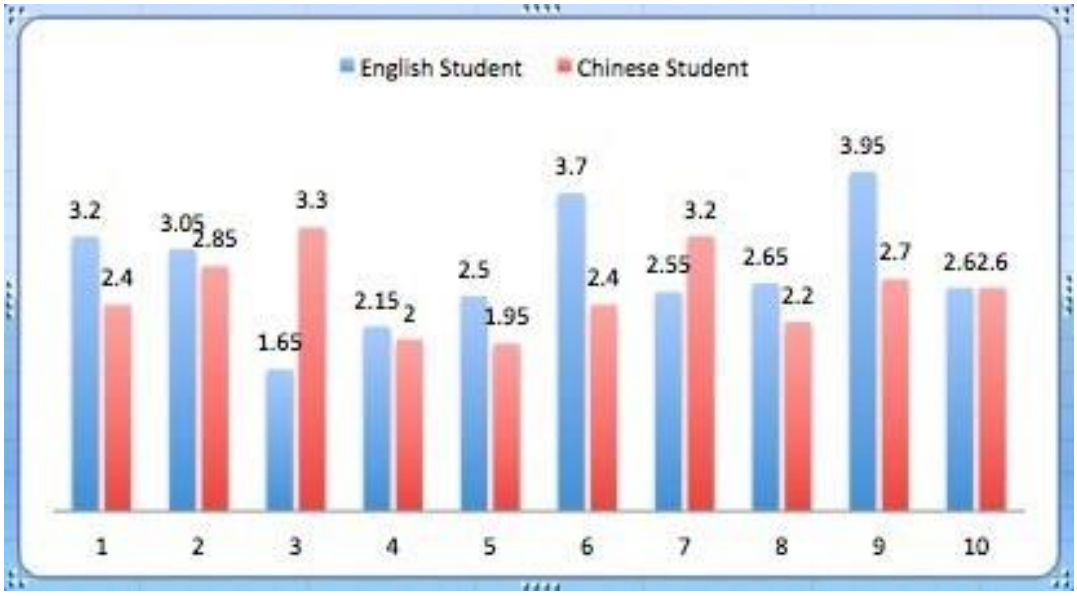

Figure 4

Critical Question Dimension	Evaluation Index	score
Question Tendency	1. When the other side does not respond, will add more questions	Strongly Agree 5
	2. Emphasis on individual experience.	Agree 4
	3. Ask the follow-up question in a developing view	Neither Disagree or Agree 3
	4. The question is the need for a certain effort to get the answer	Disagree 2
Question Content	5. There is a certain distance between the answer and the ability of questioner at the present stage.	Strongly Disagree 1
	6. Pay close attention to the content in question	
	7. Made a statement before the question is raised	
	8. Include some forecast information	
	9. Reflect key points and core content of the specific information	
	10. Express the cognitive conflict of the questioner.	

Table 1

Scorer 1 (English comment)											Scorer 2 (Chinese comment)										
Critical question Dimension	Problem Tendency				Problem Content						Critical question Dimension	Problem Tendency				Problem Content					
Number	1	2	3	4	5	6	7	8	9	10	Number	1	2	3	4	5	6	7	8	9	10
question1	1	2	1	1	3	5	1	1	5	2	question1	2	2	3	1	1	2	2	1	2	1
question2	1	4	1	1	3	3	5	1	4	2	question2	2	4	3	2	2	2	2	1	2	2
question3	1	4	2	1	2	4	4	4	5	1	question3	2	3	4	2	2	2	2	4	3	2
question4	1	1	1	1	1	4	1	4	3	5	question4	4	2	3	3	2	2	2	1	4	2
question5	5	2	1	4	4	4	1	1	3	4	question5	2	2	4	2	2	4	2	3	2	3
question6	5	2	1	4	1	4	1	2	4	2	question6	2	2	3	2	2	4	2	1	4	4
question7	1	1	1	1	2	4	5	2	4	1	question7	2	4	4	2	2	2	4	2	2	2
question8	5	1	1	1	2	2	1	4	4	1	question8	2	2	3	2	2	4	4	3	2	2
question9	1	1	4	3	3	4	1	1	5	4	question9	2	4	4	2	2	2	4	2	2	4
question10	5	4	3	4	3	4	1	3	5	4	question10	2	4	3	2	2	2	4	2	2	2
question11	5	5	1	3	4	4	1	1	3	4	question11	2	2	3	2	2	4	2	1	2	5
question12	5	4	1	1	2	4	5	3	4	3	question12	2	4	4	2	2	2	4	1	4	4
question13	5	4	1	4	4	4	1	4	4	3	question13	2	2	4	2	2	2	4	2	2	2
question14	5	4	1	3	3	2	4	1	4	1	question14	4	4	3	2	2	2	4	3	2	2
question15	1	3	1	2	3	4	4	2	3	1	question15	2	2	3	2	2	2	4	2	2	2
question16	5	2	3	1	2	4	1	4	3	5	question16	4	2	2	2	2	2	2	3	2	3
question17	5	4	3	1	2	4	2	5	4	3	question17	2	2	4	2	2	2	4	4	4	2
question18	1	5	1	4	3	2	5	1	4	4	question18	4	4	2	2	2	2	4	2	3	2
question19	1	4	2	2	1	5	2	5	4	1	question19	2	4	4	2	2	2	4	4	4	2
question20	5	4	3	1	2	3	5	4	4	1	question20	2	2	3	2	2	2	4	1	4	4
Average	3.2	3.05	1.65	2.15	2.5	3.7	2.55	2.65	3.95	2.6	Average	2.4	2.85	3.3	2	1.95	2.4	3.2	2.2	2.7	2.6

Table 2 Comment Score

Critical Question Dimension	Question Tendency				Question Content					
Number	1	2	3	4	5	6	7	8	9	10
Scorer	0.812	0.745	0.837	0.766	0.705	0.739	0.821	0.82	0.77	0.842

Table 3 Inter-scorers Reliability

	F	df	Sig
dimension 1	126.357	38 24.985	0.112 0.117
dimension 2	5.206	38 34.237	0.604 0.604
dimension 3	4.98	38 33.052	0 0
dimension 4	68.169	38 21.326	0.622 0.624
dimension 5	38.006	38 21.117	0.016 0.019
dimension 6	0.004	38 37.898	0 0
dimension 7	28.186	38 29.89	0.165 0.167
dimension 8	6.229	38 34.723	0.235 0.235
dimension 9	7.758	38 35.084	0 0
dimension 10	5.444	38 34.376	1 1

Table 4

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The Research of Teacher-Student Interaction of the Flip Classroom integrated with Video Annotation Learning Platform

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1. Introduction

It has been more than 20 years since the "Modern Educational Technology" Course (previously called "Audio-Visual Education" Course) was opened. As a compulsory course for normal university students and a core course of 21st-Century Teacher Education in China. At present, the traditional lecture model is widely used, which leads to the problem of cramming education, the relative lack of classroom communication and interaction and little enthusiasm and initiative of students during their knowledge internalization(Huang Yan, Jiang Ling and Huang Lei, 2014; Zhang Qi, Chen Lin, 2009). Therefore, the problem of how to increase teacher-student interaction, strengthen students' motivation and finish quality classroom teaching within short periods (usually 36 periods) needs to be solved.

Previous studies have revealed that in the flipped classroom model, student practice under the guidance of the teacher, while in the traditional classroom model, the teacher gives lectures and students receive them passively with simple practice. Flipped classroom model, consequently, can greatly improve students' motivation and efficiency of learning(Huang Yan, Jiang Ling and Huang Lei, 2014). Other studies established flipped classroom model of Modern Educational Technology based on micro video resources, which has proved to be effective teaching as it can stimulate students' interest and improve their comprehension ability and academic grades(Yang Jiumin, Shao Mingjie and Huang Lei, 2013; Fan Fulan, Zhang Yi and Bai Qingyu).

2. Research Purpose

The purpose of the research is to study and discuss whether flipped classroom model, with the support of video annotation learning platform, can improve teacher-student interaction and whether it can stimulate students' interest and motivation.

2.1 Flanders Interaction Analysis System (FIAS)

FIAS was put forward by Flanders Ned A. in 1960s. According to FIAS, classroom teaching activities are mainly organized by the way of verbal behaviors. Also, the classroom interaction between the teachers and students is classified. Analytic data can be obtained by analyzing the matrix, which provides important basis for evaluating and improving teachers' teaching quality. FIAS can also be employed to analyze the classroom interaction of information technology application. The analytic process is simple and easy to operate(Fang Haiguang, Gao Chenzhu, 2012).

2.2 Video Annotation Technology

More and more researchers describe pedagogic scenarios where the use of a video annotation tool could be of added value to the students' overall learning process due to its great expressiveness. These annotation tools allow learners to add their comments and pop questions in particular time.

3. Method

3.1 Participants and Design

The sample was two classes of junior undergraduate students majoring in history education with each class 37 students. In the experiment, two different models, namely traditional lecture model and flipped classroom model, were adopted by the same teacher with 12-year teaching experience to instruct the same content (The Humanism Learning Theory). The length of teaching time was one class time, 40 minutes. In the traditional lecture model, the teacher adopted the Instructional Strategy of Robert Gagné's nine events of instruction. In the flipped classroom model, before class, the teacher uploaded the micro video to the video annotation learning platform and set embedded exercises. Then students watched the video lectured and took down the notes. Also, students questioned and sent their messages to the teacher through the platform when coming across any difficult problems. During class, the teacher answered these questions together and provided targeted guidance in the classroom. Besides, the teacher raised the questions to generate the group discussion and communication. The whole process of the two classes were filmed respectively for later analysis.

3.2 Video Annotation Learning Platform

As shown in figure 1, the platform employed three kinds of annotation, namely "embedded exercises", "notes" and "questioning".

"Embedded Exercises": When the video comes to the marked point, it will pause and some objective questions will pop out for students to answer. The answers are graded according to the degree to which the answers given by students match those pre-uploaded by the teacher. "Notes": When students add notes, the video will pause, leading to the connection of the current video content with the notes. A single video can be noted many times.

"Questioning": Students can ask questions by sending messages to the teacher through the platform whenever they need.

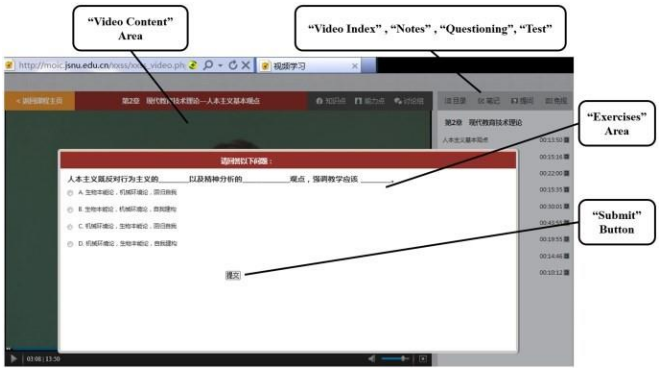

Figure 1. The video annotation learning platform (VALP)

As shown in figure 2, teachers can use the platform to check each student's video academic record, which calculated by view times, answers times and accuracy.

用户名	真实姓名	专业	视频名称	观看视频积分	回答问题积分	问题回答次数	免视积分	是否免视	本节总分
轻舞飞扬	周明智	机制师范	02-06.mp4	1	2.0	2	0.0	否	3
轻舞飞扬	周明智	机制师范	04-01.mp4	1	1.5	4	0.0	否	2.5
轻舞飞扬	周明智	机制师范	04-30.mp4	1	1.5	4	0.0	否	2.5
轻舞飞扬	周明智	机制师范	04-19.mp4	1	2.0	2	0.0	否	3
轻舞飞扬	周明智	机制师范	01-01.mp4	1	1.5	4	0.0	否	2.5
轻舞飞扬	周明智	机制师范	02-05.mp4	1	1.5	4	0.0	否	2.5

Figure 2. Students' video academic record

4. Data Analysis

The videos filmed in the classrooms were played with a pause of every 3 seconds and two researchers got the analysis data of every 3 seconds. The methods of data collecting and counting could be found in the references (Xiao Feng, 2000; Sun Jie, 2012).In the Flanders Interaction Analysis Matrix, the column and row represent ten categories of speech act, the number of each cell in the matrix respectively represented the frequency of each speech act in a class. The proportion of teacher talk, student talk, invalid language, teacher questioning and student speaking were calculated.

5. Results and Discussion

5.1 Proportion of Teacher Talk and Student Talk

The results revealed, in traditional lecture classroom, teacher talk accounted for 84.3% while student talk took up 8.1% and invalid language tool up 7.6%. In the flipped classroom, the proportion of Teacher talk was 66.3% while student talk accounted for 31.61% and invalid language accounted for 2%, showing that students in the flipped classroom were more willing to express their ideas.

5.2 The Proportion of Teacher Questioning and Student Speaking

The results revealed that in the flipped classroom, the proportion of teacher questioning was 55.5% and the proportion of student speaking was 51.2%. However, in the traditional lecture classroom, the proportion of teacher questioning was 5.8% and the proportion of student speaking was 3.2%.

5.3 The Function of Teacher Talk

The effects that the teacher exerted on students could be classified as two kinds: direct effects and indirect effects. If the ratio of indirect effects to direct effects is greater than one, it showed that the teacher tended to control students indirectly in the classroom, otherwise he/she tended to control students directly. The results we got from the experiment showed that in traditional lecture classroom, the ratio was 13.8% while the figure in the flipped classroom was 102.7%.

5.4 Teacher-Student Interaction Model

The closed loop structure formed by cell (4-4), (4-8), (8-4) and (8-8) in the Flanders Interaction Analysis Matrix embodied the "lecture-practice" teaching model. The closed loop formed by cell (3-3), (3-9), (9-3) and (9-9) embodied the "inquiry-innovation" teaching model. The results revealed that the lecture classroom was in accordance with the "lecture-practice" teaching model and the flipped classroom was in accordance with the "inquiry-innovation" teaching model.

6. Future Works

In further research we plan to replicate this experiment and to obtain a larger sample of participants, and to improve the existing coding system based on related study achievements of FIAS and information

technology-based interaction analysis system(ITIAS). We also plan to combine with and feature of the technologies enhanced classroom. This is to allow us to perform a more complete quantitative analysis of the results.

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