A Creative Design and Implementation of Student-led Flipped Classroom Model in English Learning

Chengcheng Liu
Dalian Yuming Senior High School, Dalian, 116023, China

Zhongwen Liu
Liaoning Police Academy, Dalian, 116023, China

Abstract—The paper begins with the introduction of the origin and wide application of flipped classroom model (hereafter refers to as FCM) in American schools, and then analyzes the basic connotations and framework of FCM with creative thinking. Five famous American FCMs are illustrated in detail and compared in different areas, which are used for reference in the design of our own future class. The highlight and creation of the paper is presented in Part III expounding the creative design and practice of Student-led FCM in English learning in Chinese high schools. It includes the elaborate design of pre-class independent learning with two indispensable components of Chinese FCM: micro-course and in-class activity learning with group discussion. The paper finally demonstrates a case study of Student-led FCM in English class designed and implemented by the students in Dalian Yuming Senior High School tentatively, providing inspiration and references for the creative application of Student-led FCM in Chinese high schools.

Index Terms—FCM, design and implementation, pre-class independent learning, micro-course, in-class activity learning, English learning

I. INTRODUCTION

Flipped Classroom, as a hybrid and integrated invention of educational concept and information technology, pioneers the new path to an individual, interactive and creative mode of instruction, which leads to the prominent improvement in teaching process and teaching effects. Although flipped classroom was born in American Woodland Park High School and widely promoted by Salman Khan and other universities or schools, it contributes to the worldwide educational reform in arrangement of teaching procedures and methods. Up till now, flipped classroom has accumulated abundant teaching experience and obtained enormous teaching accomplishments. According to the recent survey, more than 80 percent of students in American high schools acknowledged that this brand-new mode of teaching increased their abilities in self-study, cooperative learning and, most of important of all, their performance in exams.

Dalian Yuming High School is the provincially key and model senior high school with high-quality student resources and admirable graduates, and for sure, the first-class teaching resources. In 2015, six teaching cases were awarded Excellent Class by the Department of Education, and so classroom teaching in Yuming School entered the New Class stage, realizing the deep integration of information tools into classroom teaching in which teachers could teach the class easily and freely with flexible teaching means effectively and efficiently. In addition, this teaching practice has become normalized teaching which guarantees the students' development and improvement. These new teaching experiments promote the overall teaching practice supported by new technology and educational concept. The advocating of extracurricular reading and the exploration of reading habits development in our high school contributes to the successful construction of the Experimental Basis of Classical Reading and High School Chinese Education Project. In our Chinese classes, nearly 70 percent of Chinese teachers adopt the combination of self-study and classroom discussion, and 40 percent adopt advanced FCM with different characteristics. This FCM in liberal arts curriculum has produced abundant fruits in quality and exam-oriented education. Two top-scored students in liberal arts in the college entrance exam come from Class Ten Grade Three together in Yuming in 2016. Dozens of students obtained the national and provincial awards in Chinese Composition Competition of "Chinese Newspaper Cup" also in 2016, which is the rare phenomenon and great teaching achievement in composition contest.

In view of the great experiences and achievements that FCM brings forth home and abroad, this paper attempts to design and implement the creative student-led FCM to realize the integration of Student-led Class into FCM in Chinese high school classroom.

II. THEORETICAL ANALYSIS OF FLIPPED CLASSROOM CONNOTATION AND CREATIVE THINKING ON FCMS

A. The Analysis of the Basic Connotation and Theoretical Framework of Flipped Classroom

According to Wikipedia, Flipped classroom is an instructional strategy and a type of blended learning that reverses the traditional learning environment by delivering instructional content, often online, outside of the classroom. It moves activities, including those that may have traditionally been considered homework, into the classroom. In a flipped classroom, students watch online lectures, collaborate in online discussions, or carry out research at home and engage in concepts in the classroom with the guidance of a mentor. In short, the flipped classroom inverted traditional teaching methods, delivering instruction online outside of class and moving "homework" into the classroom. In the traditional classroom, teacher is regarded as the sage on the stage carrying out theoretical explanation, knowledge introduction and capability development in lecture class, while in the flipped classroom, teacher changes to be guide on the side observing and mentoring their students doing homework, taking part in the project relevant to the learning tasks and improving their comprehensive capabilities in thinking and practice in activity class. In view of the definition and illustration of flipped classroom, we can outline its theoretical framework as in Fig.1: educational technology is the driving force to introduce flipped classroom into the traditional classroom, and activity learning is the major teaching procedure and element to realize self-internalization and comprehensive digestion of the new knowledge and promote higher-leveled learning with critical and creative thinking in the classroom rather than after class. This inverted and reformed teaching procedure influences learning environment and improves learning effects accordingly.
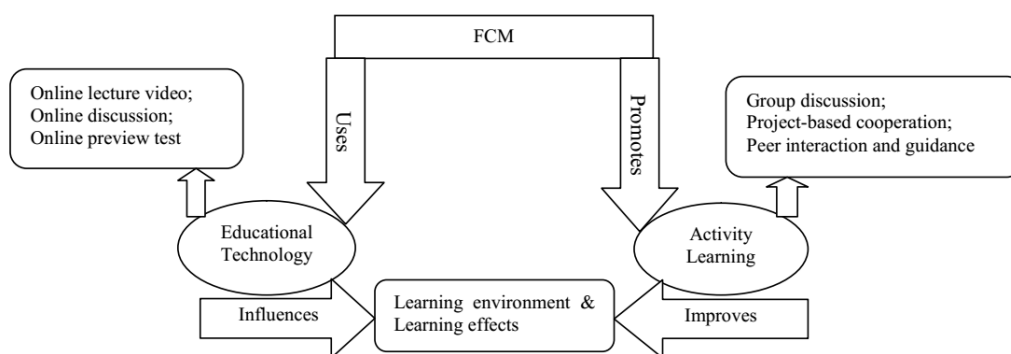

Fig.1: The theoretical framework of flipped classroom and interactive relationships of its elements.

B. The Normal Forms of Flipped Classroom in American Educational Circles and Impacts

Educators are increasingly pressured to find ways to reach all of their students—each with very different needs. The personalization of education, or differentiation, has been proposed as one solution. (Jonathan & Aaron, 2012) With more and more experiments of flipped classroom being implemented throughout the United States, there are five normal forms emerging from the water and attracting the current academic attention. (Zhang, 2016)

Woodland Park High School Model: this high school took the lead in constructing classical FCM in K12 schools, which took watching online lecture videos as homework and fulfilled previous exercise homework in the classroom. Those students were provided with DVD disks to watch on TV at home without computers or accesses to Internet. In the classroom, some meaningful explorative activities and lab tasks were added to the routine exercises.

Khan Academy Model: Khan Academy practiced flipped classroom by means of its popular teaching videos and its developed class exercise system whose highlights lied in the fact that the system could capture the problems stumping the students and teacher and offer help instantly, and meanwhile, it introduced gamification learning system which rewarded students for their excellent performance.

Riverside Unified School District Model: The prominent feature of this model is the adoption of digital interactive teaching materials in flipped classroom which include texts, pictures, three-dimensional animation and videos, and also combine the function of notebook, communication and sharing.

Harvard University Model: Dr. Eric Mazur (Eric, 2013) advanced and practiced the combined learning model of flipped classroom and peer learning. Its key points are as follows: before the class, students make preparations for in-class activity learning through watching lecture video, listening to podcasting, reading relevant passages to activate the previous knowledge to think about the problems; after online preview, students are required to report what they learn, collect problems and put forward difficult points; according to the difficult points students on the social websites, teachers organize various questions to develop teaching design and in-class learning materials pertinent to the questions. In class, teachers adopt Socrates' teaching method in which students advance questions and difficult points, cooperate with each other to answer questions and solve problems. The teachers listen to the dialogue, and participate in the group discussion and individual learning in need of help.

Stanford University Model: The flipped classroom experiment made in Stanford University suggested that the mere shift of online lecture video was as boring as traditional class, so in every fifteen-minute online lecture there would be a quiz to test the students' mastery of the knowledge. Besides, the experiment added the element of social media to allow the students to ask each other questions in order to enhance the validity of cooperative learning. The findings reveal that students answer each other questions very promptly, and this model of *Learning Together* is very effective.

Impacts: The above FCMs equipped with adequate teaching forms and various methods can help us to design our unique integrated FCM with Chinese peculiarity. We can apply their successful experiences and experiments for reference in our teaching practice, absorbing the essence and specialty from these five models to design and create our own FCM in Chinese high school.

Table 1 depicts these five models from the perspectives of pre-class online learning and in-class activity learning. After observing Table 1 carefully, we can find that all these five typical FCMs derive from the same origin of Woodland Park High School Model, following the same teaching procedures but with distinctive specialties and recreations. Those words in red are meaningful and creative application and sublimation of flipped classroom serving as our references in our future class.

TABLE 1:
COMPARISON AND SPECIALTY OF FIVE POPULAR FCMs IN AMERICA

FCM models	Pre-class online learning	In-class activity learning	
1.Woodland Park High School	Watching online lecture videos at home	Fulfilling previous exercise homework	Adding meaningful and explorative activities and lab tasks into routine activity
2.Khan Academy	Use of Popular teaching videos and its developed class exercise system	The exercise system could capture the problems and teacher could offer help instantly	Gamification learning system rewarding students for their excellent performance
3.Riverside Unified School District	Adoption of digital interactive teaching materials	Integration of various media materials: text, picture, three-dimensional animation and providing combined function of notebook, communication and sharing	
4.Harvard University	Students: preparations for in-class activity learning through online learning & discussing	Teachers: organize questions and design teaching materials	Socrates' teaching method: students advance problems and solve them with other students through cooperation; teachers listen to dialogue and offer help
5.Stanford University Model	Addition of a quiz in every 15 minutes lecture video to test the students	*Learning Together* strategy: add social media to encourage students to ask each other questions and interact with each other effectively	

After all, flipped classroom is an effective means to increase teacher-to-student contact time fulfilling interaction and individual learning. Students are provided with such a learning environment in which they should be responsible for their own study. Flipped classroom is a hybrid teaching method combining direct lecture and constructive learning, providing a permanent classroom available any time for those absent students to review or research. All in all, it is an active online and offline learning environments in which all students are offered individual education and encouraged to explore their potentials for deep-leveled thinking and learning.

III. Creative Design and Implementation of Student-led FCM in English Learning in High School Classroom

A. The Educational Background and Condition for Developing Flipped Classroom in Chinese High School

President Xi Jinping (Dong, 2015) recently stressed that there won't have modernization without information, which put the information construction into a higher strategic level pertinent to the country's prosperity and enhancement of the national quality. At present, under the impact of a series of new technology, new concept and new models, such as cloud technology, big data, and MOOCs, the education information has achieved great development. It is widely believed that the educational pattern of "Internet plus education" will be the mega trend in Chinese educational circle, and this educational reform will undoubtedly bring forth the consistent update of teaching materials, continuous change of teaching patterns, and the increasingly pluralistic evaluation in education.

Students of today are the generation growing up with new technology, being surrounded by computer, recreational machine, digital camera, and smart phone. IT changes their cognition, attitudes and behaviour habits greatly. These "digital aboriginals" immersed in digital environment possess the higher abilities to absorb multi-source information, preferring pictures, sounds and videos. As a result, the students' learning requirements and expectations are quite different from that of the previous generations. More chances of individual learning, more flexible learning pace, frequent use of digital resources and mobile terminal are what the students want urgently. Based on the rapid development of IT and pluralistic demands of the students, flipped classroom teaching model is the priority to meet the students' requirements for digital learning environment.

B. Creative Design of Pre-class Online Video Learning and In-class Activity Learning for Student-led FCM

According to the survey and study of FCMs, we can design and make our own lecture video (also named as micro-course) as the lead-in to introduce the new knowledge. Fig.2 shows 5 elements to compose micro-course from the macro perspective, revealing that content is the foundation or the soul of the course, objective is the goal or orientation to attain, multi-media is the tool to convey the content, teaching activity and interaction is the focus of the course. Without any one element there won't be the qualified and complete micro-course.
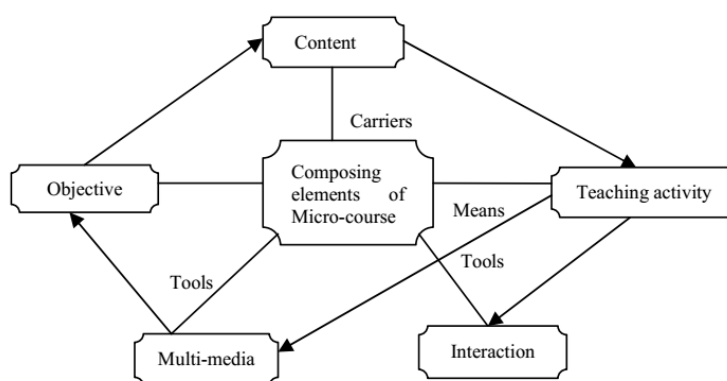
Fig.2: The composing elements of Micro-course (Su, Guan, Qian, Zhu, 2014)

Chinese cultural roots and educational concepts are quite different from those of Americans, so we'd better design Chinese culture-based micro-class with the characteristics displayed in Table 3.

TABLE 3:
DESIGN PRINCIPLES AND BASIS OF PRE-CLASS MICRO-COURSE (WEI & LIU, 2016)

Pre-class online independent learning	Design principles of micro-course	Design basis of micro-course
Preview learning model based on micro-course	1. Video time: between 15 and 20 min.	Optimized attention time span and survey results
	2. Video contents: Global analysis of the whole text; Explanation by different levels; Emphasis of connection and natural transition of language points; Broadened explanation of relevant materials	Collectivism culture, holistic way of thinking, to explore the question beginning from the global analysis; field-dependence cognitive style suitable for memorizing the environment and relevant information in view
	3. Video display model: to provide the similar teaching environment to classroom which is familiar to the students; to provide PPT and record teacher's image	Oriental (Chinese) culture belongs to relation orientation stressing individual feelings and psychology. The individuals are more sensitive to the social clues, so the Chinese students tend to prefer video display in the background similar to the traditional classroom with PPT and teacher's image which can motivate their learning enthusiasm.
	4.Video learning model: independent learning, cooperative learning and collective learning	Independent learning can help students set their own learning pace according to learning requirements, watching micro-course once or again and then finishing preview test. They can discuss with other students or teachers as to those difficult learning tasks by means of cooperative and collective learning

On making micro-course video, English lecturers should, first of all, follow the design principles including time limit, video content, and video display and learning model, and then, they should design the concrete teaching process and contents. In the process of pre-class online independent learning, students need to read teaching materials in the form of Doc. or PPT at first, and then watch online lecture videos according to their own levels of learning and learning needs, discussing those difficult points with peer students online and uploading unresolved problems to the communicative learning platform for teachers to collect and organize. The second teaching step is to design in-class activity learning procedure emphasizing the solution of preview problems (10 min.), the revision of the main points explained in micro-course (10 min.), practical language activity of performing situational plays or carry on debate contest to train new knowledge (20 min.), and at last, oral and written exercise or test for knowledge consolidation (10min.). Table 4 is the detailed description of the design of in-class activity learning.

TABLE 4:
DESIGN OF IN-CLASS ACTIVITY LEARNING OF FLIPPED CLASSROOM (LIU, WEI & GAO, 2016)

	Time	Teaching activity (Teachers' tasks and students' tasks)		Teaching forms
In-class Activity Learning Design Of Flipped Class-room	10 min.	Teachers give the concluding review of learning material, answering the questions and difficult points put forward on learning platform or communicative platform. (Solve the preview problems)		Internal cooperative learning among teachers and students
	10 min.	Teachers ask the main points of the text, checking preview effects. (Review the main points)	Group discussion; teachers require the students to answer questions of different level on the basis of the students' levels	group cooperative and learning; individual guidance
	20 min.	(1)To assign situational dialogue, to participate in students' training, and to evaluate the training process in formative form. (2) To assign debate contest as to the topic of text with cons and pros, and to evaluate the debating process for debaters (Language skill training through situational dialogue & debate)	Teachers select students of different level to play different roles in the situational play. Students take part in different debate groups to serve as the debaters. The students improve their performance according to teachers' guidance; fulfill play and debate topic of different level with newly-learnt knowledge.	multimodality interaction; exploratory activities; practical activity; formative evaluation
	10 min.	To consolidate oral or written exercises and give assignments in the form of discussion and writing.	To review and consolidate the main points of the text as requested.	Teacher-to-student online interaction

Although pre-class micro-course has been the symbol of the combination of information technology and education, and the prominent feature of FCM, in-class activity learning, as another indispensable component of FCM, is still regarded as the focus and the core element of FCM, for this face-to-face activity learning can solve many unresolved problems with many participants' working together, can arouse students' English learning enthusiasm and potentials under multi-interaction environment, and can train students' various language skills through performing situational plays and holding debate contests. The teaching practices prove that if students finish pre-class learning of micro-course effectively, they can get the utmost of in-class activity learning process.

C. Case Study of English Class with Creative Teaching Method of Student-led FCM in Dalian Yuming Senior High School

In English class, our English teacher carries out the reform of Student-led English Class which means students teach on the stage to serve as the role of teacher and fulfil the responsibilities of the English teacher including preparation, teaching and answering questions. On the basis of this teaching practice, the author creatively integrates FCM into Student-led English Class. The huge difference between this creative FCM with popular one is that the students are the major and positive forces of FCM, who organize and make micro-course, make preparation for in-class activity learning and develop in-class English teaching activities.

The whole students separated into eight study groups are assigned to teach one module. Group members have to cooperate with each other finishing their own teaching tasks and solving the common difficult points. The first step is to design teaching materials, and to make PPT and micro-course. Before making micro-course video, it's better to write a regular and general teaching material served as the guideline and foundation to make micro-videos. All the group members should collect qualified materials via Baidu or Google engine to find most suitable teaching materials and PPT of the module. Take Module 6 of Book 1 of senior high school published by Foreign Language Teaching and Research Press (Chen & Greenall, 2006) as an example. Owing to the massive educational resources in Internet, we needn't look into the explanation and example of every word or phrase one by one, the task for us is to collect, to select, and to organize our teaching material and PPT for us to make our micro-course. After the common efforts from group members, we design teaching materials covering every element to compose micro-course displayed in Table 5 and selected the appropriate PPT of Fig. 3 used for micro-course. With the abundant written and electronic documents, we'll take advantage of foreign teachers or college English teachers, the consultant or assistant in our study group, to give us 15 min. micro-course. All the teaching materials are collected and designed by the student members. In this micro-course, the pronunciation must be correct and native English as the good oral English example; the language points must be clear, correct and complete as the foundation of grammatical and literal learning; the explanation must be conceive, interesting and instructive. In addition, the well-made micro-course of Module 6 can be regarded as the classical lecture of this text watched over and over again. The micro-course is uploaded one or two days before the class teaching to the communicative learning platform, such as QQ or We Chat, and in the meantime, students can have discussions or take part in forum to carry out heated discussions about teaching contents of micro-course. They can put forward questions, difficult points, puzzles, and interesting points in the public communication platform. Students in charge of making micro-course will collect, collate and select these questions and points in order to better prepare for the design of in-class activity learning process.

TABLE 4:
TEACHING MATERIALS OF THE INTERNET AND TELECOMMUNICATIONS FOR MICRO-COURSE

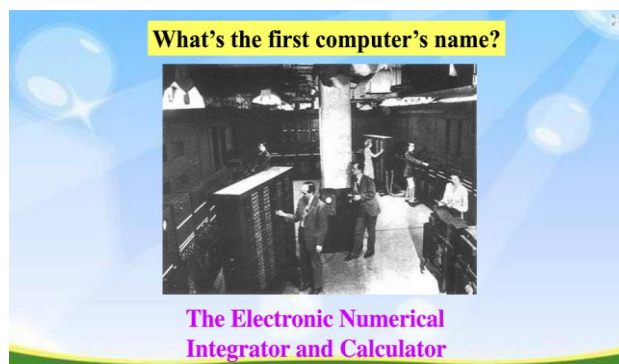| Topic	The Internet and Telecommunications		
Teaching procedure	Part one: Global Reading and Core Vocabulary Leaning		
Teaching objective	To master the main vocabulary and to grasp the general structure and meaning of the text through answering the structural questions and making sentences with core words		
Teaching content	Vocabulary learning task	Words: contain (vs. include); via; create (vs. invent)	
		Phrases: consist of (vs. consist in); compare with (vs. compare to); as well (vs. also, too)	
	Global reading task	Global understanding of the text and main ideas of each paragraph: Para. 1: An introduction of Internet. Para. 2: The inventor of World Wide Web Para. 3: The introduction of World Wide Web Para. 4: The origin of Internet Para.5: Berners-Lee's another contribution—Web browser	
Teaching activity	Lead-in question	1. Do you know any information about the first computer in the world?	
		2. What's the first computer's name?	
		3. Who invented the first computer?	
		4. How many parts are there in a computer? And label each part.	
	Task-driven teaching method to comprehend the text deeply	1. Who developed a way for computers to talk to each other through the telephone?	
		2. Who made it possible for everyone to use the Internet?	
		3. Has the internet created thousands of millionaires?	
		4. What can we do on the Internet? (Search for information, do online shopping, chat on the internet, play games, send emails, download music and film)	
Interaction types and forms	concept	Questioning dictions	Students-to-multi-media interaction
	information	Narrative pictures and dictions	
	operation	Tools for man-to-machine interaction	Students-to-interface interaction

Fig.3: The downloaded PPT of Module 6 from wenku.baidu.com used for micro-course

In-class activity learning generally includes four teaching processes: solution of the problems from pre-class independent study; test of preview; English show of new knowledge through situational play and debate contest; consolidation of oral or written exercises. The role of designer, organizer and tester of in-class activity learning is taken by the group leader taking the responsibility of the teacher. The first two sections mainly solve the students' problems, and every student can offer his solutions or answers to these problems. If they are too difficult to answer, our real teacher observing our class continuously will give us a paramount hand. Teacher behind the scene can guarantee our student-led FCM move forward with high efficiency and high correctness. As to the situational play, eight groups perform the play with their own scenario following the play rules and grammatical rules. As to the debate contest, different groups hold positive or negative side. According to the debate topic and the side taken, they collect open and massive data and proof to safeguard their opinions. After these enthusiastic performance or debate, the so-called teacher (group leader to act as the teacher) will make the preliminary comment on their performance and give the scores to each group. And the real teacher will add to some complementary comments or some corrections. In each student-led FCM, five minutes is left for teacher to carry out his or her comprehensible evaluation on the level and performance of the whole design and implementation.

D. Reflections on the Student-led FCM in English Learning in Dalian Yuming Senior High School

This creative student-led FCM in English class has been implemented for a period of time, offering hard-won opportunity for the students to train all-round capabilities and for the teacher to improve their general mastery of the knowledge.

It contributes to the students' improvement of comprehensive abilities in English. In the process of preparing for the class and giving the lecture, the students' initiatives are increasingly improved, and their independent, explorative, and cooperative abilities are trained and enhanced in some degrees.

It activates English learning environment, making the students refreshed and interested in English class. Student's teaching on the stage enables other students to concentrate on the class attentively, listening to the lecture and taking part in the play and contest actively and vigorously, which turns the tedious and uninteresting classroom to the harmonious and vibrant one.

It contributes to the formation of the good student-to-teacher relationship. By means of practicing the whole teaching process, the students can experience the nature of teaching profession: hardship and circumspection, wide learning and specialization. For those students who dream to be teachers, they can learn a lot from these teaching experiences. On the other hand, teachers can learn about the students' basic knowledge, levels of capability, and individual differences. Consequently, the teaching approach, testing contents and complexity will be adjusted to fit the students' learning level.

IV. CONCLUSIONS

FCM has gone into a relatively mature stage in American educational world after nearly two decades of development and perfection. Although it is also confronted with some criticisms and blames, nothing can prevent it from moving forward. Five famous American FCMs provide us adequate teaching experiences and uses for reference, and hence we Chinese educators, teachers and students can learn from their valuable attempts, and avoid some defects as well. Secondly, since education and teaching is characteristic of culture and concept, our Chinese FCM should be Chinese culture-based exclusively owned by Chinese classroom. Pre-class online independent learning and in-class activity cooperative learning can arouse the students' learning desires and improve their independent thinking abilities. Consequently, their literal art quality and academic levels are enhanced in parallel. The outstanding example can be found in the reform of English learning in my school: Dalian Yuming Senior High School, which can undoubtedly bring powerful inspiration for the creative application of the student-led FCM in Chinese high schools.

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Chengcheng Liu was born in Dalian, China in 1999. He is currently studying in Dalian Yuming Senior High School, receiving many English awards in a series of national English competitions including the First Prize of Dalian Division at the Thirteenth China Daily "21st Century Cup" National High School and Primary School English Speaking Competition in 2014, the Outstanding Winner Special Award of Dalian City in the SEAS Competence Contest in 2015, the Regional First Prize in the Northeast Division in National Creative English Contest in 2016, the Second Prize of Liaoning Division at the 8th "FLEP Cup" National High School English Competence Contest in 2016. He also wrote an English academic article titled An Optimized Study on Chinese and American Flipped Classroom Mode: from the Cultural Perspective with WEI Li published by IOSR Journal of Research & Method in Education in 2016.

Zhongwen Liu was born in Dalian, China in 1969. He received his BA of English from Liaoning Normal University, China in 1993, and received his Master of Engineering from Dalian Maritime University, China in 2005.

He is currently a professor in Liaoning Police Academy. His research interests include College English Teaching and Technology Application. He is the author of *English for Elite Police,* Press of Chinese People's Public Security University, 2009 and 6 EI

indexed papers. He coined VPIE and Virtual Service Learning pedagogies with research interest in web-mediated instructional technology.

Professor Liu is a member of IEEE, Program Committee member for several IEEE international conferences, and a candidate for the Police Liaison Officers of the Public Security Ministry of China.