A Research into Blended College English Teaching Model Based on Flipped Classroom—A Case Study of BIPT

Yu Yuan[1,a,*], Zhang Weiran[1,b], Yan Jiaolan[1,c]

[1]Zhiyuan Department, Beijing Institute of Petrochemical Technology, Beijing, China
[a]yuyuan@bipt.edu.cn, [b]zhangweiran@bipt.edu.cn, [c]yanjiaolan@bipt.edu.cn

Abstract: *To deal with the prominent problems of a large amount of class hour and low teaching efficiency of college English course, the teaching team of Beijing Institute of Petrochemical Technology has implemented a blended college English teaching reform based on flipped classroom for some students of Grade 2021. In teaching practice, the key elements of teaching such as the content, teaching process and teacher-student interaction were optimized and reconstructed. While the reform achieved certain results, it was still in the exploratory stage. Therefore, the authors pondered over some problems and challenges such as the information technology, teacher's quality, students' quality and evaluation system, etc. This paper also puts forward the idea for the subsequent practice of the reform.*

Keywords: *college English course; flipped classroom; blended college English teaching model; school-based reform*

1. The Background of Educational Reform

1.1. The Background of Educational Reform at Beijing Institute of Petrochemical Technology

According to the "Curriculum Requirements for College English Teaching" issued by the Ministry of Education in 2007, the teaching goal of college English is to "cultivate students' comprehensive application abilities in English, especially in listening and speaking"[1]. The College English Teaching Guide (2020 Edition) also clearly points out that the teaching goal of college English is to "cultivate students' English application ability, enhance cross-cultural communication awareness and communication ability, develop independent learning ability, improve comprehensive cultural literacy, cultivate humanistic spirit and critical thinking ability, so that students can use English properly and effectively in study, life and future work to meet the needs of national, social, school and personal development"[2]. However, English classes in Chinese universities often adopt large class teaching methods (with an average of 45 students per class), which makes it difficult to meet the individual learning needs of students. Most students are passive participants in listening classes, resulting in "inefficient and time-consuming" English teaching and students' poor English application abilities, especially in listening and speaking. Moreover, the environment for cultivating students' self-study abilities has not been established. According to a student survey conducted by our school's Higher Education Research Office in 2014, the average learning time after English class is less than one hour per week, which indicates that students' internal motivation for learning needs to be improved and their self-study abilities urgently need to be cultivated.

In addition, starting from 2017, the Ministry of Education has actively promoted the construction of new engineering disciplines. Many universities are vigorously exploring the Chinese engineering education model in the intelligent era, aiming to cultivate a large number of internationally competent innovative talents in the field of engineering and technology in our country. New engineering disciplines have also put forward requirements for the reform of English teaching in universities, mainly reflected in teaching philosophy, teaching content, teaching methods, evaluation system, and teaching management.

In 2019, facing the sudden outbreak of the pandemic, under the unified deployment and arrangement of the Ministry of Education, schools nationwide took swift actions and actively conducted online classes through various means to ensure that "classes are suspended, but teaching and learning continue". The large-scale online classes conducted nationwide have greatly promoted online teaching supported by

information technology, which also provided development opportunities for the reform of blended education in English under the background of new engineering disciplines.

In the context of new engineering education, English teachers need to proactively enhance their skills and abilities in educational information technology. They should address the unique online teaching scenarios and improve their online teaching skills. Furthermore, they should find ways to bridge offline and online classrooms, leveraging their respective strengths to ultimately enhance the quality of talent cultivation in new engineering fields. The goal is to nurture multidisciplinary professionals with an international perspective and a strong sense of patriotism. The design of college English teaching curriculum should seamlessly integrate the transition from offline to online development. It should aim to maximize the efficiency and effectiveness of educational resources, while constructing a college English teaching system that meets the requirements of new engineering disciplines, promotes openness and flexibility, and aligns with the needs of both society and students.

1.2. The Rise of MOOCs and the Concept of Flipped Classroom in the World

The rise of MOOCs and the concept of flipped classroom teaching have become important practices in the reform and development of international higher education. MOOCs, as a representative of the new online education service model, have shown the power to break through traditional educational systems and models. Exploring new teaching models in the new technological environment has become a key proposition for higher education reform.

Flipped classroom, which refers to reversing the traditional learning process with the help of modern information technology, has gained acceptance and widespread application in schools in the United States since Jonathan Bergmann and Aaron Sams adopted the teaching model. In recent years, the flipped classroom has garnered global attention and was recognized as a major technological revolution in classroom teaching in 2011 by Canada's The Globe and Mail[3]. Scholars often describe the flipped classroom as "a transformative process"[4], enhancing both the early delivery of knowledge and its internalization. The flipped classroom has captured significant interest in the Chinese education community as a novel instructional approach grounded in information technology.

1.3. Approaches to Reforming School-based Education

College English teachers should be oriented towards adapting to social development, aiming to improve the efficiency of classroom teaching and individualized learning for students. Based on the new demands for talent in the new engineering field, teachers intend to adhere to the student-centered and outcome-based education (OBE) concept, using modern information technology as a tool and flexible curriculum design as a means. On account of extensive literature review and research, teachers have implemented a blended learning model based on flipped classrooms for some students in the 2021 academic year. Teachers have optimized and reconstructed the teaching content structure, teaching process structure, and teacher-student interaction structure, creating a blended English teaching model that combines online and offline components, meets the need of personalized and multi-dimensional English learning, and promotes comprehensive development of students, as shown in Figure 1.
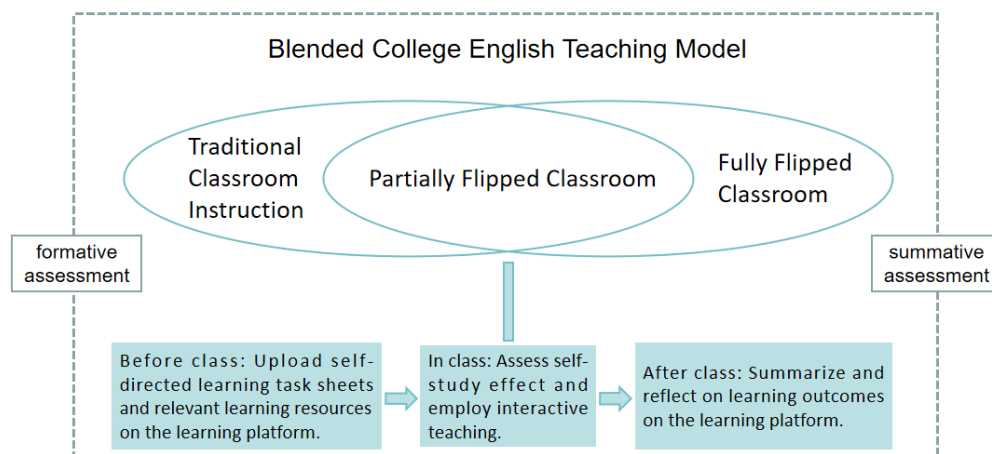

Figure 1: Blended College English Teaching Model.

2. The Theoretical Basis of the Reform

2.1. The Mastery Learning Theory

The Mastery Learning Theory, which emerged in the late 1960s in the United States, was developed by Benjamin Bloom, an American psychologist and educator. It is a form of optimistic teaching that combines group instruction with individualized learning. The fundamental idea of Mastery Learning is that by providing appropriate materials and ample learning time and assistance to students, almost all students can achieve the predetermined learning objectives. The core idea behind this teaching strategy is that many students' poor academic performance can't be attributed to intellectual limitations but to a lack of suitable teaching support and learning time tailored to their individual characteristics [5]. Currently, many students in our school have weak foundations in English, learning initiative, and intrinsic motivation. Guided by the Mastery Learning Theory, teaching reforms that cater to individual needs are implemented, striving to ensure that almost all students master nearly all instructional content.

2.2. The Scaffolding Instruction Theory

The term "scaffolding" was first coined by Wood, a psychologist, to describe the effective support provided by peers or accomplished individuals in someone's learning process. Developed and refined by Bruner later [6], the "Scaffolding Instruction" model was introduced. According to the relevant documents from the European Community's Distance Education and Training Program (DGXIII), scaffolding instruction is defined as "providing learners with a conceptual framework necessary for constructing knowledge and understanding. The concepts in this framework are needed to further the learner's understanding of the problem, and therefore complex learning tasks are broken down in order to gradually deepen the learner's understanding." The process of providing scaffolding is a social interaction between teachers and students, as well as among students, which is also a process of cultivating students' independent learning abilities. Therefore, teachers provide various forms of scaffolding to promote interaction between teachers and students, especially between peers [7]. According to Vygotsky's zone of proximal development theory [8] and the definition of scaffolding instruction, scholars generally agree that scaffolding instruction includes the following components:

① building scaffolds: establishing a conceptual framework around the current learning topic requirements;

② situating the problem: introducing students to a specific problem context;

③ independent exploration: allowing students to explore independently while providing timely prompts to help them progress along the conceptual framework;

④ collaborative learning: engaging in group negotiation and discussion based on sharing collective thinking achievements, achieving a comprehensive and correct understanding of the current concepts learned;

⑤ assessing effectiveness: assessing learning outcomes includes students' self-assessment and the learning group's evaluation of individual learning. By utilizing flipped classroom teaching and providing challenging learning tasks (problem contexts) in accordance with the requirements of the zone of proximal development, teachers facilitate students' development and provide appropriate scaffolding for problem-solving and task completion.

2.3. The Output Hypothesis

The Output Hypothesis by Swain proposes three main functions of language output: attention function, hypothesis-testing function, and metalinguistic function. This hypothesis argues that speaking and writing in the target language can facilitate fluency and automaticity in language use for learners. Language output compels learners to shift from semantic processing to syntactic processing. By producing more output, learners can also test their own hypotheses about the target language and receive corresponding feedback [9].

Building on Swain's theory, Professor Wen Qiufang has developed the "Output-driven Hypothesis" which emphasizes the importance of meeting students' needs, societal needs, and subject-specific needs in language output. According to the "Teacher Assistance Gradual Reduction Method", English teachers should understand the students' situation, tap into their potential, gradually let go, and progressively

enhance students' autonomy in learning [10][11].

Based on these three language education theories, our school has localized the flipped classroom teaching model, and creatively implemented the teaching reform of College English Course, adapting it to our specific context.

3. School-based Teaching Reform Practice on College English Course

3.1. School-based Teaching Reform Practice

3.1.1. Optimization of Teaching Content Structure for College English Course

In the selection of teaching content and design of teaching activities, the emphasis is put on the "student-centered and teacher-led" approach. Teachers guide students to explore unknown knowledge based on the students' existing knowledge, establishing the students' active role in English learning and helping them gain control over their learning and develop independent learning abilities. The content of college English flipped classroom teaching is not limited to the textbook, although it originates from the textbook. Based on the theme and core concepts of the textbook, teachers provide students with diverse reading and audio-visual materials for them to choose according to their knowledge needs. For example, when teaching Unit 9 entitled Jobs in Course of College English Book 3, the teacher provided students with various extracurricular learning resources before class: 60 English names for jobs (PPT), BBC audio about students taking part-time jobs to pay high tuition fees, the American movie *The Pursuit of Happiness* and Steve Jobs' *Legendary Speech at Stanford University in 2005*, etc. These materials come in various forms and come from a wide range of sources, which optimize the listening and speaking materials in the textbook, broaden students' horizons, and ignite their enthusiasm for learning.

3.1.2. Reconstruction of the Teaching Process and Teacher-student Interaction of College English Course

Blended college English teaching, based on the flipped classroom, aligns with the growing integration of curriculum teaching and information technology. It goes beyond a mere combination, instead involving a comprehensive and cohesive approach to multiple dimensions and aspects of "teaching and learning". Teachers transfer the process of knowledge transmission away from the classroom, providing comprehensive learning instructions and guidelines on the online learning platform, empowering students to choose the most suitable approach for acquiring new knowledge, while simultaneously monitoring and managing their online learning progress. The process of internalizing knowledge takes place within the classroom, encouraging increased communication and interaction among students and between students and teachers, fostering broader perspectives, cultivating critical thinking skills, and enhancing practical English proficiency. The traditional teaching→learning model is transformed into a technology-supported learning→teaching model, optimizing the two cognitive stages of "knowledge transmission" and "knowledge internalization". The learning activities, the teaching activities, and the learning performance in the school-based flipped classroom are illustrated in Figure 2, Figure 3, and Figure 4 respectively.
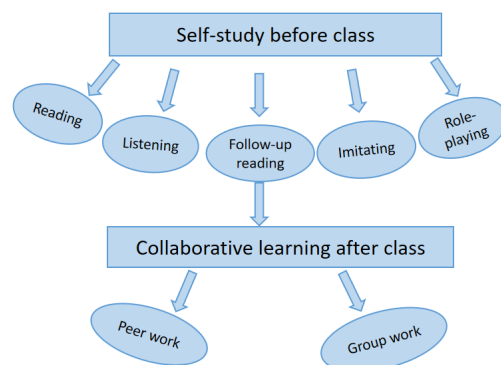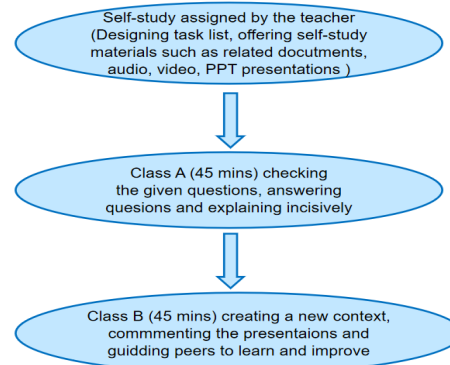

Figure 2: Students' Learning Activities.   *Figure 3: Teachers' Teaching Activities.*
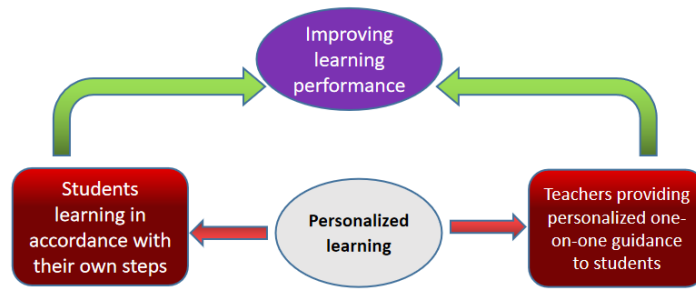
Figure 4: Students' Learning Performance.

Before class: Teachers provide students with independent learning tasks, as well as related documents, audio, video, PPT presentations, micro-courses, and other learning resources, to help them construct and internalize the knowledge needed for higher language cognitive activities and skills. Students complete the tasks independently following the learning guide and using modern tools such as WeChat, email, and QQ to communicate any doubts or questions with the teacher.

In class: Based on the teaching arrangement and students' needs, the college English listening and speaking class is divided into two types: Class A and Class B, with a total duration of 90 minutes. In Class A (45 minutes), the teacher focuses on explaining commonly encountered problems or videos that students have viewed frequently. Through designing in-class tests, the teacher deepens the students' understanding and consolidates key and common error points. In Class B (45 minutes), the teacher creates new contexts, guides students to engage in inquiry-based and collaborative learning, and provides personalized guidance. The teacher designs some extension exercises for students, such as picture description, retelling short stories, situational dialogues, role-playing, themed speeches, theme writing, and book reports to demonstrate their understanding. The teacher's comments and peer evaluation are combined to help students achieve internalization and practical application of the knowledge learned.

After class: Students can engage in independent study or group learning to further refine and consolidate the works presented in the classroom. As part of their oral proficiency development, they are encouraged to write scripts after class to consciously identify and rectify any language errors or inaccurate expressions. Collaborative efforts within the group facilitate mutual support and collective progress. Additionally, by recording videos or audios, students are able to visualize their learning achievements and incremental improvements, fostering a sense of accomplishment and enhancing their motivation towards English language acquisition. Upon completion of the task, students are expected to craft reflective summaries, demonstrating proficiency gains, elucidating challenges encountered, and specifying areas where assistance may be required to facilitate their personal growth and value realization.

It is important to note two key points in the initial stage of implementation. Firstly, it is crucial to meticulously design the "Self-learning Plan" and distribute it to students a week in earlier before class. In the initial stage, the design of the "Self-learning Plan" plays a crucial role. Teachers should begin by applying the "Zone of Proximal Development" theory to understand students' current developmental level, including their existing language knowledge, experiences, interests, and levels of thinking. Subsequently, teachers should create appropriate learning objectives and self-learning plans for students, incorporating various support structures and engaging students in problem-solving contexts. This facilitates a smooth transition from old knowledge to new knowledge and fosters the development of students' self-learning abilities and innovative thinking, enabling them to reach higher levels of development. The design of the "Self-learning Plan" adopts a task-driven and problem-oriented approach, with an emphasis on transforming teaching difficulties and priorities into questions. Additionally, teachers should effectively utilize modern information tools to promptly gather and address questions, and prepare well-structured lesson plans and content to support knowledge construction and the development of advanced thinking abilities. Secondly, when structuring the teaching plan, it is recommended to allocate a portion (approximately 40%) of the course content to the flipped classroom model. Based on teaching practice, teachers should regularly evaluate, reflect upon, and share their experiences, continuously improving the materials and corresponding exercises, gradually building a comprehensive flipped classroom resource library. Regarding pre-class exercises, teachers should carefully design them, ensuring a balanced level of difficulty, to facilitate the smooth transition from old knowledge to new knowledge. Furthermore, teachers should encourage students to consult teachers or other classmates through the learning platform when encountering difficulties.

3.2. The Effectiveness of School-based Teaching Reform

3.2.1. Beneficial to the Improvement of Students' Motivation for Learning

For the fall semester of 2020-2021, the project team conducted a survey on the general acceptance of blended college English teaching based on the flipped classroom. They randomly selected 270 students from 8 classes. The results are presented in Table 1.

Table 1: Questionnaire on Students' Acceptance of Flipped Classroom.

Survey questions	Options				
	Completely agree	Somewhat agree	Generally agree	Somewhat disagree	Completely disagree
It is conducive to knowledge accumulation	32%	40%	16%	6%	6%
It is conducive to increasing learning motivation	36%	44%	11%	5%	4%
It is conducive to the improvement of autonomous learning ability	27%	32%	17%	13%	11%
It is conducive to the improvement of information literacy	30%	43%	12%	8%	7%
It is conducive to the improvement of learning efficiency	29%	35%	15%	12%	9%
It is conducive to improving comprehensive application ability	33%	37%	14%	10%	6%

The survey data shows that 88% of students believe that the flipped classroom helps to strengthen knowledge accumulation, with only 12% holding a negative attitude. 91% of students agree with the enhancement of learning motivation, while only 9% do not agree. In terms of autonomous learning ability, 76% of students acknowledge its promotion, while 24% deny its effect. The level of agreement regarding the improvement of information literacy reaches 85%, with only 15% expressing disagreement. 79% of students agree with the improvement of learning efficiency, while 21% disagree. 84% of students acknowledge the role of the flipped classroom in improving comprehensive application abilities, while only 16% consider it to have little or no significance to their English learning. These results indicate that surveyed students generally affirm and recognize the positive impact of flipped classrooms on their various abilities and learning efficiency.

Teachers have also observed a significant enhancement in students' intrinsic motivation for autonomous learning after implementing flipped classrooms in teaching practice. Additionally, some students mentioned in interviews that their acceptance of the flipped classroom teaching model also depends on certain objective factors closely related to teachers, such as the difficulty level of autonomous learning materials, teachers' level of classroom control, and the novelty of teaching activities. Therefore, it can be seen that the implementation of blended college English teaching poses higher demands on college English teachers.

3.2.2. Beneficial to Improving the Assessment System

Over the years, the English examinations in universities have focused more on testing language knowledge and language skills, and less on language usage and proficiency. The blended model of flipped classroom in college English teaching practice has posed new challenges to the current assessment methods, requiring a shift in evaluation methods and the establishment of a new evaluation system. Teachers are required to rely on the technological advantages and power brought by big data, cloud computing, and artificial intelligence to achieve dynamic monitoring of teaching at all levels, and in all processes. They need to explore means and methods for collecting learning behaviors, gathering evaluation criteria and information, and constructing students' academic and physical growth trajectories based on the longitudinal tracking of big data. Accurate judgments of students' self-discipline and self-directed learning status in online learning should be made, and non-knowledge data such as emotions, attitudes, and psychology should be included in the evaluation criteria to promote students'

comprehensive growth and talent development. Currently, supplementing the formative assessment methods has been implemented by incorporating online self-directed learning, classroom presentations, classroom tests, and oral tests into the overall evaluation scores towards the end of the term. This shift in teaching evaluation moves from focusing on outcomes to emphasizing the process, and from ambiguity to precision.

4. Challenges Encountered in Reform Practice and Practical Ideas for Future

4.1. The Challenges

The practice of blended learning in college English teaching based on flipped classrooms faces challenges from the following six aspects.

Support in information technology and technical personnel is crucially needed. Teachers need hardware and software support, such as high-performance servers, increased network access, and comprehensive Wi-Fi coverage on campus, to create teaching videos and construct personalized and collaborative learning environments. Currently, the hardware and software for blended learning in college English teaching are still being developed, posing challenges to teaching.

English teachers need to possess high comprehensive literacy. They need to learn new teaching theories and language acquisition theories to design "individualized learning plans" and organize materials. Recording videos requires more time and effort, and teachers need to master various strategies for organizing learning activities, such as problem-based learning, project-based learning, and group learning, to guide student communication and classroom organization. Therefore, a learning community for teachers should be established to enhance their comprehensive literacy. Additionally, teachers need to reshape their educational philosophy, reorganize teaching content, redesign the process, and reconstruct evaluations by learning from the latest educational theories, high-quality MOOCs, learning platforms, and apps.

Students need to possess strong self-learning and information retrieval skills. Blended learning requires students to develop individualized learning plans according to their own proficiency level, allocate their learning time effectively, and adeptly conduct information retrieval. Through communication and interaction with teachers and classmates via online learning platforms, students can successfully accomplish their learning tasks. This poses a challenge for the majority of students who are accustomed to traditional teaching methods.

Personalized guidance for students needs to be strengthened. To develop students' ability to use English for future tasks, English learning programs related to different schools and majors should be created to integrate English learning with specific disciplines. At the same time, personalized and customized learning programs should be provided for learners with different learning styles and levels. In teaching practice, teachers should make corresponding adjustments by considering the current situation and needs of different types of learners, giving special attention to students with lower proficiency. A considerable number of students face challenges in effectively communicating with teachers and peers in English, and students with weaker foundations find it hard to adapt to online assignments. These issues need to be addressed as part of the ongoing reform and exploration process.

Multiple evaluation methods for students need to be established. Blended learning based on the flipped classroom not only assesses students' learning outcomes but also their collaborative abilities, organizing skills, time management, expression, and emotional attitudes. Additionally, it is important to involve multiple evaluators, such as students, parents, and society, to establish a diversified evaluation community. This will ensure evaluation results are objective and comprehensive, avoiding biases that may arise from relying solely on a single evaluator. Diversified evaluation can also enhance the educational function of evaluations, fostering the ability of students to self-evaluate and assess others, helping students develop self-awareness and confidence in their learning. Therefore, traditional educational evaluation mechanisms require coordination and reform from schools, departments, and various stakeholders.

A multimodal interactive resource library needs to be created. Resource libraries should be established according to schools and majors, providing integrated teaching spaces that combine virtual and physical elements. These spaces should offer ubiquitous and immersive interactive learning experiences, such as high-quality micro-courses, interactive reading materials and recitation and evaluation of famous quotes for writing. Furthermore, a comprehensive resource library for ideological

education needs to be established. Through contextualized selected readings, micro-courses, and other resources, the library should promote and preserve excellent traditional Chinese culture, revolutionary culture, and socialist advanced culture. Ultimately, this will cultivate students' core values, love for their country, morality and virtues, and inspire them to fulfill their sense of mission and responsibility.

4.2. Practical Ideas for the Future

Timely updates and expansion of hardware and software, coupled with a dedicated technical support team, are essential to cater to the requirements of teachers and students in conducting teaching activities and managing the teaching process.

"Maintaining consistent pace and presenting exactly the same content simultaneously — traditional education caters to the demands of teachers and systems, rather than the interests of students" [12]. Hence, in the backdrop of data-driven education, teachers should promptly collect, analyze, and provide feedback on students' online learning data, enabling them to adjust the teaching content, optimize it, and promote personalized learning.

Targeted training should be provided to teachers on teaching theories and modern information technology to enhance their comprehensive competencies. The expeditious development of a SPOC platform tailored to our school's students for English learning needs should be prioritized.

In the future, teachers can fully utilize the learning platforms such as Unipus, WELearn, and mosoteach and continue harnessing the potential of our school's English learning WeChat platform — Petrochemical English Channel (biptenglish). With teachers uploading and posting of materials more timely and targeted, the learning platforms will become a competent assistant for our university's blended English teaching.

5. Conclusions

Following the trend of integrating curriculum teaching and information technology, the blended college English teaching model, based on the flipped classroom model, showcased innovative teaching process structures, revamped teaching content, streamlined teaching design and evaluation, and established a multimodal interactive resource repository—all aimed at empowering students in self-constructing knowledge, boosting their overall English proficiency, and elevating the quality of talent development. Currently, our university is still in the exploratory phase of implementing the blended college English teaching practice based on flipped classroom. Further, extensive empirical research is pending to continuously refine and adjust the established teaching model; thus, scientific validation through teaching practice becomes imperative. Through this iterative process, an effective college English blended teaching mode, tailored to our students' unique characteristics, can be developed.

References

[1] Department of Higher Education, Ministry of Education. Teaching Requirements for College English Courses [Z]. Shanghai: Shanghai Foreign Language Education Press, 2007:1
[2] Higher Education Department of the Ministry of Education, Guide to College English Teaching, [Z]. Beijing: Higher Education Press, 2020:10.
[3] Zhang Jinlei, Wang Ying, Zhang Baohui. Research on Flipped classroom Teaching Mode [J]. Journal of Distance Education, 2012, (4): 46-51
[4] Guan Zhongke. What is the Inverted Classroom? [J]. China Information Technology Education, 2012, (5): 19-22
[5] Ju Yingmei, Liu Xudong. Contemporary Foreign Teaching Theory [M]. Beijing: Education Science Press, 2004:60
[6] Bruning R H, Schraw G J, Ronning R R. Cognitive psychology and instruction(2nd edition)[M]. Upper Saddle River,N J: Merrill, 1995:155-179.
[7] Berk L E, Winsler A. Scaffolding children's learning Vygotsky and EARLY childhood education[D]. Washington DC: National Association for the Education of Young Children, 1995:189-191.
[8] Vygotsky L S, Mindin. Society: The development of higher psychological processes[M]. Cambridge: Haward University Press, 1978:84-91.
[9] Swain M. Three functions of output in second language learning[A]. Cook G, Seidlhofer B. Principle and practice in applied linguistics: Studies in honour of H.G. Widdowson[C]. Oxford: Oxford University

Press, 1995:125-144.

[10] Wen Qiufang. Research on Key Issues in Second Language Acquisition [M]. Beijing: Foreign Language Teaching and Research Press, 2013:76

[11] Wen Qiufang. Application of Output Driven Hypothesis in College English Teaching: Reflections and Suggestions [J]. Foreign Language Journal, 2013, (6): 14-15

[12] Meier Schoenberg and Kukeyer. Translated by Zhao Zhongjian and Zhang Yannan. Working with Big data - the Future of Learning and Education [M]. Shanghai: East China Normal University Press, 2015:35