Design and Implementation of EFL Blended Smart Teaching Based on Rain Classroom

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Abstract: Since the outbreak of Covid-19, the Rain Classroom teaching platform has been used for online and offline teaching and learning in some universities of China, providing learners with virtual learning environment through the establishment of a connected classroom and learning community. However, there is very few empirical EFL research using this new pedagogy so far. In this study, a hybrid research method of qualitative and quantitative was applied to conduct an empirical study to verify the teaching effect. The questionnaire indicated that students were highly satisfied with this blended smart teaching mode (88.78%), and their motivation for learning English was improved significantly (85.17%). A pre-test and a post-test of English proficiency were conducted before and after the 16-week teaching experiment respectively. The results of post-test revealed that students' scores are much higher than those of pre-test (p<.05), which confirmed the effectiveness of this hybrid pedagogy. Therefore, this study has some enlightenments to the practice of EFL blended smart teaching in other universities.

Keywords: Rain Classroom; Blended Teaching; EFL Smart Education; Educational Technology

1. Introduction

With the rapid development and application of new information technologies such as Artificial Intelligence, Big Data and cloud computing, the integration of the Internet and education is deepening, and the education technology is constantly evolving. Entering the digital age, the pace of digitalization in the education domain is accelerating at an unprecedented rate. Various practical applications based on intelligent technologies are constantly appearing, which has brought about great changes in teaching methods. The arrival of "Internet + Education" has a profound impact on the research of EFL online and offline teaching mode in China's universities.

Since the outbreak of Covid-19, the world situation has undergone transformation. This great transformation is intertwined with profound changes and invariance. What has changed is the global political pattern, the mode of economic growth, the evolution of civilization and the development of science and education. What remains unchanged is the law of innovation-driven development and the competitive situation of innovative talents. The development of higher education is changing in the 21st century. The collaborative model of human intelligence and machine intelligence is rapidly extending to the field of education and learning, promoting the transformation from education 1.0 to learning 2.0, and creating a new space for the interaction between teaching and learning. This reconstructs the relationship between teachers and students, embodies collaborative openness, multi-dimensional symbiosis and intelligence enhancement, and forms a new digital learning ecosystem. Information technology and intelligent technology provide new teaching methods, learning methods and unprecedented rich resources for EFL teaching. Colleges and universities teachers should make full use of information technology to implement blended teaching mode and actively create a diversified teaching and learning environment

2. Literature review

Smart education is a kind of education using 5G, artificial intelligence, big data, cloud computing, block chain and other new technologies and new means to form a smart learning environment, through the deep integration of information technology and education mainstream business. In recent years, many scholars at home and abroad have put forward many unique opinions on the characteristics and specific methods of smart education from different perspectives. J. Palmisano (2008) [1], the former CEO of IBM,

first proposed the concept of "Smarter Planet" in his report, describing IBM's vision of how advanced information technology can be used to build a model of new world. Marc Prensky (2009) [2] argued that "digital intelligence" is an important dimension of the differences in human capabilities in the twenty-first century, and that the digital intelligence can only be achieved through the constant interaction between human's thinking and digital technology. Zhu & He (2012) [3] pointed out that the essence of smart education is to build a smart environment by using smart technology, so that teachers and students can apply dexterous teaching and learning methods, which can make impossible possible and turn small capability to great capability. Therefore, we can equip talents with good value orientation and strong thinking ability. According to Yang & Yu (2015) [4], smart learning is a completely learner-centered activity carried out in an intelligent environment. Learners not only have instant access to the resources, information and services they need in real time, but also enjoy personalized resources and services. They constantly explore their interests and potentials, making the learning process easier and more efficient.

In view of this, EFL teachers should apply various teaching methods more effectively, so that learners can have ubiquitous learning and personalized learning, having access to a better personal development experience of the application scenarios. Efforts have been made in improving the quality of education in an all-round way, promoting educational equity at a higher level and accelerating the process of educational modernization. *The Action Plan of Education Informationization 2.0* (Ministry of Education in China, 2018)[5] proposed to implement the Innovation and Development Initiative of Smart Education, based on emerging technologies, such as artificial intelligence, big data and the Internet of Things, relying on various types of smart devices and networks. As a compulsory course for all non-English major students in China's universities, "College English" course covers a wide range of population. It plays an important role in popularizing and deepening the application of English language and cultivating cross-cultural communication skills, and it is a very vital subject among many compulsory courses. The outbreak of Covid-19 is a world-wide crisis, which undoubtedly presses the fast-forward key of digital education reform. Teachers tend to adopt the online and offline blended teaching mode to maintain the order of teaching, which has greatly promoted the reform of EFL education teaching in universities. So far, there are few empirical studies based on rain classroom teaching platform to explore the blended smart teaching of foreign languages in colleges and universities, so this study has some enlightening significance to explore the specific operation methods of the integration of information technology and EFL education in universities.

3. Design and implementation of EFL blended smart teaching mode

3.1 Teaching Platform

The Rain Classroom Smart Teaching Platform is jointly developed by Xuetangzaixian (The Online School in China) and Tsinghua University, which can effectively enhance the classroom teaching experience and make the interaction between teachers and students more convenient. It is an intelligent terminal connecting teachers and students and it creates a new experience with the integration of PowerPoint into WeChat. Before class, teacher pushes preview courseware embedded with MOOC video to each student's mobile phones. During class, students can real time sigh in, answer questions, submit contribution and bullet screen interaction. After class, students complete assignment to consolidate knowledge. The platform covers all aspects of teaching comprehensively, from pre-class to in-class to after-class, enlivening the classroom atmosphere. Besides, the class report is generated as soon as the class ends, convenient and efficient.

3.2 Courseware pushing

Online learning is the initial stage of learning. Previewing can enable students to familiarize themselves with the course contents in advance. With their basic understanding and thinking of the new knowledge before entering the classroom, it is conducive for students to optimize learning results. Thus, two days before class, teacher push courseware to students' mobile phone to preview contents online through the Rain Classroom Platform. The courseware can be inserted some videos or MOOC training resources. Watch the video can familiarize the students with topics as an elicitation to arouse their learning interest. Teacher may also ask some questions to urge students to preview carefully and complete the low-scale knowledge learning themselves, getting ready for the classroom discussion later. The completion of the preview tasks of each student can be monitored by teacher from the background system. The entire teaching design process is shown in Figure 1.
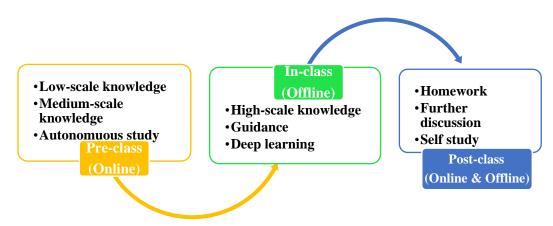
Figure 1: Process of blended EFL Smart Teaching based on Rain Classroom.

3.3 Face-to-face lecturing

The second stage of teaching is face-to-face lecturing in a classroom offline. When class begins, teacher initiates attendance check, students need to scan the QR code projected on the big screen. This code is randomly generated by the Rain Classroom Platform and only valid for today's class. Thus, a tight connection between teacher and students is established. Students' mobile phones are connected with the PPT simultaneously, where they can see the PPT more clearly, answer the questions teacher ask in class and send bullet screen comments conveniently. At the same time, teacher immediately knows who is absent without bothering reading aloud each student's name so as to save time. Teacher elaborately plans a wealth of classroom activities for the purpose of testing students' online previewing results, which help students to complete the internalization and migration of knowledge and guide them to achieve a higher-level learning phase. Teacher may insert a random name call or quiz in the courseware to maintain students' attention. Students may answer questions or freely express their views by submitting contributions or sending bullet screen comments on their mobile phones with the help of Rain classroom platform. So that the whole class can share and exchange viewpoints actively and efficiently. This interesting interactive activity can maintain students' attention and participation for a long time. Teacher can adjust the teaching progress according to the real-time feedback from students, hence teachers and students cooperate with each other very well. Multiple high-scale classroom tasks such as discussions, reports and presentations can also be conducted in this face-to-face teaching stage. In short, the offline classroom face-to-face teaching is the key link to optimize learning effect and the most important scenario to realize the innovation and challenge of learning.

3.4 Post-class expansion

After class, teacher may use the Rain Classroom Platform to assign homework or quizzes to students in order to consolidate or test knowledge. Teacher can monitor each student's completion of tasks and track their learning results in the background system. Apart from that, students are required to arrange online / offline group discussion tasks to further expand their understanding of the text theme. They could opt to organize their online discussions via Tencent Meeting / Zoom, which is convenient and efficient and easy to operate. Meanwhile, students need to report their group discussion results to the class next time. They summarize team members' viewpoints and make a PPT within 10 pages. Then a video should be recorded to report the summary of the group members' viewpoints. Finally, all teams' videos will be played to the whole class next week. By watching these wonderful and interesting videos made by classmates, students not only deepened their understanding of the theme of the unit, but also renewed ideas and expanded their thoughts, where they can get more enlightenments. Students' in-depth analysis and exploration not only train their critical thinking ability, but also activate the classroom atmosphere. In the meantime, cooperative learning effectively help boost the cohesion of the team.

3.5 Assessment

A combination of formative and final evaluation system was adopted in this smart teaching mode. Teachers should attach much importance to students' usual learning performance throughout the whole semester. 60% from students' usual score and 40% from final examination. The 60 points include attendance 5%, homework 10%, class involvement 10%, group presentation 10%, viewing-listening-

speaking task 10%, oral training 10% and teacher's extra rewards 5%. Students were informed of the proportion of those indicators at the beginning of semester. Among those indicators, the "class involvement" 10 points are used to reward the active answerers in the classroom. In order to encourage students to actively participate in classroom activities. Whoever answered actively or participate in class activities voluntarily will be rewarded 10 class coins. The total coins are 100, whoever gets 100 coins means that s/he can get 10 points of "class involvement". Meanwhile, the U campus and FIF Oral Training APP were also utilized. Students consciously completed the exercises of each unit on the U Campus platform, consolidating and strengthening the key vocabulary and sentence patterns after class. Besides, Students should finish oral training tasks on the FIF oral training APP every week. With the help of artificial intelligence scoring, the system can automatically recognize the speaker's mispronunciation and missing words, greatly improving students' pronunciation and thus enhancing their oral English proficiency. This kind of intelligent education skill mentioned above is based on the intelligent situational perception of the application scene. Students' voice information is transmitted to the control center, where it is analyzed and evaluated by the big data, cloud computing and other scientific ways. Therefore, the learners are able to enjoy the personalized intelligent services anytime, anywhere.

In a nutshell, the EFL smart teaching mode is interconnected to form a complete teaching cycle, a learning closed loop that runs through the "pre-class, in-class and after-class". This model is built on such a multi-directional interaction between teachers and students, students and students. The core goal of smart learning is to promote the personalized development of learners and provide an adaptive intelligent learning environment for learners. Through the establishment of a network learning space that connects classroom with community, family and campus as the important carrier to support the construction of learning community of mutual help and cooperation. A seamless connection between different learning scenarios are established naturally. Using intelligent and dynamic learning evaluation and feedback, we can supervise students' learning status in real time and remind them to speed up when necessary. A network communication community is built to kindle frequent communications and interactions among learners, giving full play to the overall function of classroom ecology.

4. Methodology

4.1 Population and Sample

In this research, the population comprised 265 sophomores, involving humanities, management, science and engineering and other majors of Lingnan Normal University in Zhanjiang City, Guangdong Province of China. This experiment included 16 hours of online self-study and 32 hours of offline classroom face-to-face instruction, lasting for 16 weeks (a complete semester).

4.2 Research instruments

The researcher used both qualitative and quantitative methodologies to evaluate the effectiveness of this new pedagogy.

Part one. A questionnaire was conducted to study the students' perception and satisfaction with this blended teaching mode at the end of semester. 265 questionnaires were distributed to students in the experimental class, of which 261 were valid. The questionnaire includes teaching design, teaching content, teaching effect, students' motivation of English learning etc., using five-level Likert scale (i.e. very satisfied=5, satisfied=4, general=3, unsatisfied=2, very unsatisfied=1) to collect students' evaluations.

Part two. Two English proficiency tests were carried out before and after the experiment respectively to validate whether testees' English competence had been enhanced by the online and offline pedagogy. In order to ensure the reliability and validity of English proficiency test, the researcher used the previous College English Test Band-4 test paper for testing. The total score of the test is 100 points, of which 70 are objective questions, including 20 points for listening, 40 points for reading comprehension, 10 points for completion; and 30 points for subjective questions, including 15 points for translation and 15 points for writing. Objective questions were graded by computer, while the subjective questions were reviewed by an experienced teacher. Before the experiment started, the students took a pre-test. After the 16-week teaching experiment ended, students took a post-test. The data of two tests were collected and processed by SPSS software.

4.3 Findings

4.3.1 Questionnaire

The first step is the processing and analysis of the questionnaire data. 265 questionnaires were sorted out, among which 261 were valid. The effective data were imported into SPSS for processing. As seen in Table 1, in the 261 valid data, up to 88.78 % of students were satisfied with the blended foreign language smart teaching mode. 90.82% of students thought that online and offline integration of teaching design was reasonable, learning content was ample and diverse, providing large amount of useful information. 89.73% of the students thought that the class activities were full of interactions, the exchanges between teacher and students in and out of class were sufficient. The class atmosphere was relaxing, joyous and friendly. 87.60% of students said they were more motivated to learn English ever since the blended smart teaching mode was applied. The overall results show that students were very satisfied with the blended teaching mode.

Table 1: Student's satisfaction survey of EFL blended smart teaching mode.

Evaluation Indicators	Satisfied	General	Unsatisfied
Attitude to the blended smart teaching mode	88.78%	8.21%	3.01%
Teacher is devoted, well-prepared, clear-minded, inspiring	92.48%	5.13%	2.39%
Reasonable design, abundant content, informative	90.82%	7.62%	1.56%
Skillful application of technology, well-designed PPT	93.84%	3.65%	2.51%
Sufficient interactions between teacher and students, amicable class atmosphere	89.73%	7.98%	2.29%
Enhanced motivation of English learning	87.60%	8.43%	3.97%

After having four months of blended teaching and learning, students had a better perception of online and offline learning methods, and gradually formed a good habit of previewing. The results of the single sample t-test analysis of questionnaire data show that students' self-study ability was significantly improved after the teaching experiment (P=0.001<0.05).

Table 2: Survey of Students' Self-Study Competence.

Stage	Self- Evaluation	Mean	SD	t	P
Pre-class	Study planning	3.43	0.74	10.357	0.001
	Previewing	4.46	0.82	11.792	0.001
In-class	Class involvement	4.64	0.76	17.428	0.000
	Study strategies	4.59	0.71	16.062	0.001
Post-class	Reflection of study	3.44	0.80	10.348	0.000
	Homework	4.50	0.73	12.694	0.001

4.3.2 Comparison between pre-test and post-test

The sample number is 265, the pre- and post-test scores are normally distributed. The data was processed by SPSS software. The difference of experimental data is studied by pairing t-test. Table 3 indicates that the pairing data show differences (t=3.359, p=0.002). The specific difference can be seen, the average of the post-test scores (72.83), is significantly higher than that of pre-test (65.85).

Table 3: Paring T-test of student's English proficiency scores.

	Pair (Mean ±SD)		Mean (Post-Pre)	t	p
	Post-test	Pre-test			
Post-test paired pre-test	72.83±6.83	65.85±7.71	6.98	3.359	0.002**

Table 4 data show that score of reading comprehension in post-test is obviously different from that of the pre-test (t=2.257, p=0.030), with the average score of post-test reading 29.49, much higher than the 22.34 of pre-test.

Table 4: Pairing t-test of Reading Comprehension Scores.

	Item	Mean	S.D.	M. D.	*t*	*p*
Pairing	Post-test	29.76	2.82	2.15	2.257	0.030*
	Pre-test	22.34	5.12			

* *p*<0.05 ** *p*<0.01

As can be seen from Table 5, the composition scores of the two tests also showed significant significance (t=3.322, p=0.002). The average score of the post-test was 11.98, slightly higher than that of pre-test (10.98). The data explain that by guiding students to discuss more high-scale issues in class and frequent communication with team members after class, the learner's thinking ability is apparently enhanced. The in-depth and thorough reflections are helpful to shape learner's critical thinking ability, and so reading comprehension and writing competence have been improved accordingly.

Table 5: Pairing t-test of Composition Scores.

	Item	Mean	S.D.	M.D.	*t*	*p*
Pairing	Post-test	11.98	1.18	1.00	3.322	0.002**
	Pre-test	10.98	1.70			

* *p*<0.05 ** *p*<0.01

5. Discussion

During the outbreak of Covid-19, the powerful advantages of Internet and information technology is to shorten the distance between time and space to ensure the health and safety of teachers and students under the premise of maintaining normal teaching progress and teaching order. Information technology greatly optimizes the efficiency of teaching management and greatly reduce the burden of teachers. In the post-pandemic era, educators should continue to use the Rain Classroom or other similar online teaching platforms to assist teaching. Each student's learning report in each teaching stage can be tracked real-time. For teachers, it is fairly effort-saving for students' scanning the QR code to confirm their attendance in class. The teaching management electronic reports are packed automatically as soon as teacher dismisses. It is convenient for students who fail to attend the class on time to view the playback video and complete self-study to keep up with teaching schedule. As Zhu (2016) [6] proposed, smart learning spaces need to build a seamless learning environment with the idea of O2O (Online to Offline) concept. In this way, learners can enjoy superior learning services in the virtual space online, complete the transfer and internalization of knowledge, and realize the migration of knowledge in the offline physical classrooms.

What is more, smart education based on intelligent scenarios can provide personalized and adaptive learning according to user's needs and on-demand push. On the ground of process data, teachers can also accurately analyze and evaluate each learner's weaknesses, then precisely push customized materials to meet their personal learning needs. These intelligent analysis and early warning of students are beneficial to help them create a new shortcut to efficient learning. Rewarding and game-like learning methods are particularly effective to arouse learner's interest and improve motivation, rewarding class coins is a good case in point.

During the lockdown period of Covid-19, the Internet became a new space for education. Foreign language teachers in the new era need to arrange students to do pre-class preview online, then organize students to develop and discuss advanced thinking in the physical classrooms, and finally, teachers assign homework or tests for students in the Internet community built on big data to consolidate their knowledge. In response to the *Action Plan of Education Informationization 2.0*, university faculty should rely on the advanced intelligent equipment and 5G network to carry out innovative teaching reforms and researches, reconstructing the education ecology.

6. Conclusion

In the era of Internet + Education, EFL educators in universities need to actively utilize information technology flexibly, update their educational concepts in a timely manner, and change educational models in order to keep up with the pace of the times. The Rain classroom smart teaching platform is very widely used in China's universities nowadays. As a large demographic course, College English should be taught by using online and offline hybrid smart teaching pattern, which is particularly meaningful in the context of the post-pandemic for EFL education career.

At present, mixed foreign language teaching in Colleges and universities has attracted more and more attention. Foreign language teaching will not completely return to the previous model. It is bound to integrate information technology means to increase the interaction between teachers and students and enhance the teaching effect. Being triggered by the pandemic, EFL educators should make every effort to promote the blended smart teaching mode and establish an intelligent platform for students to accomplish cooperative-learning, inquiry-learning and independent-learning. Thus, the teaching content, methods and teaching management system all should be adjusted accordingly, which is of far-reaching significance for optimizing the quality of EFL education in universities.

Acknowledgements

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